Energy Trust Board of Directors
Strategic Planning Workshop

May 19 and 20, 2016

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Packet Contents
Annual Board Strategic Planning Workshop

May 19 and 20, 2016

1. **Meeting Agenda**

2. **Mercy Corps Visitor and Parking Information**

3. **Energy Trust Board Retreat Roadmap:** This paper summarizes major conclusions and questions posed for the board in the other papers in the packet, following the order of the meeting agenda.

4. ***2015-2019 Strategic Plan* Summary and Implementation Dashboard**: This document is a new tool developed in coordination with the Strategic Planning Committee to monitor progress toward Strategic Plan goals.

5. **Comparison of the Northwest Power & Conservation Council 7th Power Plan to Energy Trust Goals**: This paper reports our findings regarding how Energy Trust Oregon goals compare to the Power Council's latest regional power plan, especially (1) forecasted energy savings potential, (2) differences in the projected pace of acquisition of efficiency, (3) different assumptions in our analysis and theirs, and (4) insight into measures we may want to develop.

6. **Renewable Energy Sector Strategic Issues and Opportunities**: This paper addresses three areas: (1) Renewable energy project development other than solar; (2) Solar project development; and (3) the potential role of renewable energy in helping communities manage extreme events – weather, earthquakes, etc.

7. **Energy Trust & Demand Response**: This paper outlines what Energy Trust is doing in light of growing interest in demand response (i.e., changing the timing of energy use to reduce peak loads, redistribute energy use more evenly and lower costs).

8. **Residential Sector Strategic Issues and Opportunities:** This paper reports on our analysis of a potential reorganization of residential sector efficiency programs, responding to predicted constraints on residential energy efficiency measures, including cost, tighter codes and standards and other factors.

9. **Energy Trust as Educator**: This paper outlines a potential expansion in Energy Trust engagement in educating customers about the benefits of energy efficiency and renewable energy.

10. **Mercy Corps Global Headquarters**: Background on the Mercy Corps building.

11. **Glossary of Terms Related to Energy Trust of Oregon's Work**

Agenda
Annual Board Strategic Planning Workshop

Mercy Corps Global Headquarters
Portland, Oregon
May 19 & 20, 2016

Thursday, May 19, Mercy Corps, Aceh Lecture Room

7:30am **Arrival & Breakfast**

8:00am **Welcome & Introductions** (Debbie Kitchin, Board Chair/Mark Kendall, Strategic Planning Committee Chair)

8:15am **Context Setting & Agenda Review** (Nick Viele)

8:30am **Opening Remarks** (Margie Harris)

9:00am **Break**

9:15am **Strategic Plan Progress Update** ……..…… ***packet***

- 2015-2019 Strategic Plan Implementation Dashboard (Debbie Menashe)
- Energy Goals
  - Renewable Energy (Fred Gordon, Betsy Kauffman)
  - Electric Efficiency (Fred Gordon)
  - Gas Efficiency (Fred Gordon)
- Comparison of the Northwest Power & Conservation Council 7th Power Plan to Energy Trust Goals (Ted Light) ……..…..…… ***packet***

10:30am **Break**

10:45am **Strategic Plan Progress Update, continued**

- Emerging Energy Efficiency Resources Development (Mike Bailey)
- Expanding Participation (Debbie Menashe)

11:45am **Board Photo**

12:00pm **Lunch**

1:00pm **Morning Recap**

1:15pm **Strategic Plan Progress Update, continued**

- Key process improvements (Amber Cole, Mariet Steenkamp, Scott Clark)
- Staff engagement (Sarah Castor)
- New opportunities for collaboration (Debbie Menashe)

2:30pm **Break**

2:45pm **Strategic Issues in Energy Trust Programs**

- Introduction (Margie Harris)
- Renewable Energy Sector Strategic Issues and Opportunities (Betsy Kauffman, Dave McClelland) ……..…..…… ***packet***

Energy Trust & Demand Response (Ted Light) ……..…….…….…… ***packet***

4:15pm **Public Comment**

4:30pm **Day-One Closing Comments** (Nick Viele)

5:00pm **Break & Travel**

Friday, May 20, Mercy Corps, The Gallery

7:30am **Arrival & Breakfast**

8:00am **Board Executive Session**

9:30am **Break**

Friday, May 20, Mercy Corps, Aceh Lecture Room

9:45am **Welcome and Day-One Recap**

10:00am **Strategic Issues in Energy Trust Programs, continued**

- Residential Sector Strategic Issues and Opportunities (Thad Roth) ……..……... ***packet***
  - Nest Seasonal Savings pilot example (Marshall Johnson)

11:00am **Energy Trust as Educator** ….……... ***packet***

11:45am **Public Comment**

12:00pm **Lunch**
Summary of to-dos and next steps (Nick Viele and John Volkman)
Closing comments (Board members)

1:00pm **Mercy Corps Building Tour** …… ***packet***

Names and Title of Presenters at the Board Strategic Planning Workshop

- Mike Bailey, Engineering Manager-Planning
- Sarah Castor, Evaluation Senior Project Manager
- Scott Clark, IT Director
- Amber Cole, Director of Communications and Customer Service
- Fred Gordon, Director of Planning and Evaluation
- Margie Harris, Executive Director
- Marshall Johnson, Senior Homes Program Manager
- Betsy Kauffman, Sector Lead-Renewable Energy
- Ted Light, Senior Planning Project Manager
- Dave McClelland, Program Manager-Solar
- Debbie Menashe, General Counsel
- Thad Roth, Sector Lead-Residential
- Mariet Steenkamp, Chief Financial Officer
- Nick Viele, Facilitator, c3 strategy
- John Volkman, Senior Counsel

VISITING THE MERCY CORPS HQ

Mercy Corps Headquarters
45 SW Ankeny Street
Portland, OR 97204
United States

Located on the corner of Ankeny and Naito Parkway.

Google map with area parking lots

Parking around the Mercy Corps Action Center

Mercy Corps has a small parking lot located on the Northside of the building that is free after 5:00pm, if spots are available.

There are several uncovered parking lots (and a few covered parking garages) around the MC HQ. Most of these have a flat 'per-day' rate ranging from $8-10 USD, although some offer hourly rates as well. These lots often fill up in the morning. Please call to get up to date rates.

Uncovered Parking Lots:

SW 1st & Ankeny (Directly across from MC Action Center)

- 503 221-1666

SW Ash & 1st (West of 1st, behind Kell's)

- Central Parking Systems
- 877 717-0004

Covered Parking Lots:

NW Davis & Naito Pkwy (North of Burnside Bridge two blocks)

- Smart Park
- 503 823-2898

Board Retreat Roadmap

Briefing Paper
Energy Trust Board Retreat Roadmap

May 19 and 20, 2016

Summary

This paper summarizes major conclusions and questions posed for the board in the other papers in the packet, following the order of the meeting agenda.

Background

It has been almost two years since the Board adopted the *Energy Trust 2015-2019 Strategic Plan*. The *Plan* called for a variety of strategies and directed staff to think harder about several issues. This retreat affords an opportunity to begin to assess how we are doing, emerging issues, and potential shifts in Energy Trust programs.

Discussion

- **Progress toward goals**: The retreat will begin with a review of progress toward the *2015-2019 Strategic Plan* goals, in three steps:
    - To help the board monitor overall progress, the Strategic Planning Committee worked with staff to create a Strategic Plan Implementation Dashboard. At the retreat, we will orient you to this new tool.
    - We will provide two briefings on progress toward the *Strategic Plan's* energy efficiency and renewable energy goals. (pp. 3-4 graphics in the dashboard) provide context for these briefings.
    - Finally, we will brief you on how the *Strategic Plan* goals compare to the regional goals of the Northwest Power & Conservation Council's 7th Power Plan. See Comparison of Northwest Power & Conservation Council Power Plan to Energy Trust Goals

  Questions for the Board: This discussion does not pose any particular questions for the board, and is meant to provide background, a progress report, and an opportunity for the board to ask questions.

- **Progress implementing key strategies:** The *Strategic Plan* called for Energy Trust to implement certain key strategies to further the plan's vision, purpose and goals. The Implementation Dashboard provides highlights and progress indicators regarding these strategies. In addition, at the retreat, staff will brief you on:
    - Emerging efficiency resources
    - Expanding participation
    - Key processes for improvement
    - Staff engagement
    - New opportunities for collaboration

Questions for the Board: This discussion poses no questions for the board, and is meant to provide background, a progress report, and an opportunity for the board to ask questions.

- **Strategic issues in Energy Trust programs:** The retreat will then review strategic issues that Energy Trust programs are grappling with:

  a. **Renewable Energy Sector.** On the afternoon of day one, we will review renewable energy programs, where several issue areas have emerged:

  (1) "Other Renewables": Renewable energy project development apart from solar continues to be slow, hampered by low energy costs against which renewable energy must compete. This may change with passage of Oregon's new Clean Electricity Act, expected to accelerate renewable projects. However, it is too early to say how the Act will affect demand for Energy Trust incentives. We propose to (a) work with the OPUC on Clean Electricity Act implementation; and (b) continue to work on net-metered projects able to offset higher retail rates, projects with non-energy benefits that can be monetized, and projects that leverage early investments or additional funding sources.

  (2) Solar: A host of unresolved issues and activities may affect the solar program and the solar markets that we are working to build and serve. The paper examines each and its potential impacts. We expect the number of solar projects to increase with the extension of the federal investment tax credit, and it is unclear whether this will mean more or less demand for Energy Trust incentives given the tax credit reduces above-market costs. As long as there is a significant above-market cost for solar electric projects for homes, we propose to retain our program. If above-market costs erode temporarily, we would retain marketing and quality-control aspects of the program and position ourselves to re-enter the market if warranted. If above-market costs seem to disappear permanently, we will revisit whether Energy Trust has any role in the solar market.

  (3) Resilience: There is increasing interest in helping communities manage extreme events such as weather and earthquakes. Solar and other technologies might be deployed with batteries to enable buildings to stay operational during an outage. However, figuring out how Energy Trust could deploy solar and storage for emergency purposes is in its beginning stages, and answers depend on community decision-making and potential collaboration with utilities. We recommend that we continue to talk to community partners, brief the board at intervals, and report at the 2017 board retreat.

  Question for the Board: The question for all of these concerns and opportunities is whether the direction outlined above seems appropriate? If so, we will begin to translate these ideas into the next budget and action plan.

  b. **Energy Trust and Demand Response**. We will end day one with a review of demand response and Energy Trust's role with regard to it.

  Background: Demand response programs change the timing of energy use in order to reduce peaks, redistribute energy use more evenly, and lower costs.

Utilities manage demand by contracting with customers to reduce energy use at certain times, and using new technologies to push energy use to times when there is less demand. Energy Trust programs also help manage energy demand: efficiency measures reduce energy consumption overall, and distributed wind and solar generation reduce demand for grid energy, transmission and distribution.

In the past, there has not been enough economic value for Oregon utilities to invest much in demand management except for large customers. However, the NW Power and Conservation Council's 7th Power Plan now identifies a potential need for 600 MW of new resources to meet the Northwest's winter peak by 2021, and indicates that targeted energy efficiency investments are the cheapest and least risky way to do it. The question is what implications this has for Energy Trust programs.

Energy Trust is just beginning to work with utilities to find ways to integrate utility demand management programs with Energy Trust efficiency and renewable energy programs.

Question for the Board: The basic question for the board is whether this direction and level of effort seem about right.

c. **Residential Sector**. We will start day two by describing an exploration of residential sector efficiency programs issues and opportunities.

Background: For several years, we have projected that starting in 2015 or 2016, each year's new, incremental energy savings would level off and then decline. We have begun to see this trend clearly in the residential sector, due to several factors:

- Fewer savings measures satisfy our cost-effectiveness criterion as the cost of alternatives declines with natural gas prices.
- As energy codes and standards tighten, there are fewer remaining savings for Energy Trust programs to promote.
- The residential sector has acquired many of the cheapest energy savings over a long period of investment and the remaining measures are more costly.
- Consumers are using efficient lighting measures more readily than anticipated, which will lead to significant declines in program savings in the longer term.

The challenge to the residential sector is to offset this projected decline and redesign programs to accommodate what is likely to be significantly lower savings volumes in the near future.

To manage these factors, we are exploring ways to lower program costs, attract new participants and identify new methods, strategies and technologies to save yet more energy. We will also need to reevaluate residential sector savings goals to reflect achievable savings.

Our thinking about program realignment is still preliminary, and is likely to involve shifting to a model in which savings come from measures offered through retailers and distributors. In this model, Energy Trust would be less visible to residential energy users.

Questions for the Board: This is primarily a progress report on the analytical and planning work underway for this reevaluation. The board and others will see the results of our efforts more concretely in the next annual budget and two-year action plan cycle. For purposes of the retreat, we want to give you a sense of the significance of the challenges in this area and ask whether you are comfortable with the steps we are taking to address them.

d. **Energy Trust as Educator**. The retreat will close with a discussion of a step staff would like to take: broadening Energy Trust's investment in educational activities that increase understanding, skills and knowledge among customers as a long-term pathway to savings and generation. This would be additive to our current approach in which educational activities are utilized to deliver savings and generation within a short, measurable time-frame. Increasing investment in general customer education would increase Energy Trust costs, whether in program or general budgets. Staff will brief you on Energy Trust's current approach to educational programming, how the proposal relates to the organization's focus on expanding participation and issues discussed in the residential sector paper, and policy and evaluation considerations for developing future education programming.

   Questions for the Board: Is the board is generally comfortable with this direction? If so, staff will flesh the idea out in the budget process this fall.

SP Summary and Implementation Dashboard

Summary: Energy Trust 2015-2019 Strategic Plan Annual Board Strategic Planning Workshop

May 19 and 20, 2016

A. GOALS

1. Energy Efficiency

Long-term: Acquire all achievable, cost-effective energy efficiency for customers

Five-year:

- Save 240 average megawatts of electricity
- Save 24 million annual therms of natural gas.

2. Renewable Energy

Long-term:

Accelerate the pace at which new, small and mid-scale renewable energy projects are completed, to help Oregon achieve 2025 goal of meeting at least eight percent of retail electric load from small-scale renewable energy projects.

Five-year:

- Sustain a vibrant renewable generation market that continually grows small and mid-scale project installations for all eligible technologies
- Achieve 10 average megawatts of renewable energy.

3. Operations

- Align internal operations and management to efficiently support strategic goals and objectives, optimize resources and systems and maintain an effective, open, transparent and accountable business
- Sustain a culture of highly engaged staff.

B. STRATEGIES

1. Energy Efficiency Strategies

Saving energy on this scale will require improved programs and outside help -- from new technology, large efficiency opportunities, evolving cost-effectiveness criteria and other developments. The board adopted the following strategies to facilitate this:

Continuous improvement, along lines demonstrated over the past five years

Broader participation by people and businesses we have not reached in the past

Managing costs: We can nurture conservation potential by lowering *our* costs, especially transaction and delivery costs, recognizing that other costs are rising.

New technology: We can increase efficiency potential by identifying, testing, culling and refining new technologies and other innovations.

State energy and climate goals: We should monitor and, where appropriate, report our contributions to state energy and climate goals.

To balance and adjust these strategies for different sectors and changing markets and policies, Energy Trust will use a number of tools:

- Ongoing planning, budgeting and management processes
- Sector plans to adapt strategies for industrial, commercial and residential sectors
- Utility Integrated Resource Planning to test strategies with then-current information
- Energy Trust annual budgeting
- Metrics with which to track implementation

2. Renewable Energy Strategies

- Support a range of renewable energy technologies, and maintain flexibility to shift resources to capitalize on market opportunities
- Emphasize early-stage support for custom projects:
    - Improving project performance by, e.g., reducing solar soft costs and operations and maintenance costs of biopower projects, and learning from experience with completed projects.
    - Collaborate with others, such as potential funders and financiers
    - Work with key market actors, utilities and others to find additional opportunities for market assistance and building project pipeline
- Use competitive processes to fund new projects and find market solutions for projects receiving non-standard incentives

3. Cross-Cutting Strategies for All Energy Programs

- Continuously improve program delivery efficiencies
- Continue to employ open, transparent budgeting and action planning
- Maintain flexibility to pursue complementary government, utility and other relationships and initiatives
- Establish strategic partnerships and relationships with community leaders and organizations to support energy efficiency and renewable energy
- Explore projects that align with other government priorities, e.g., energy and water, management of waste streams, and projects that save transportation fuel

4. Operations Strategies

- Continuously improve internal operations to increase efficiency and manage risk
- Optimize planning, evaluation processes, internal services and communications to support programs
- Address key recommendations of the Management Review
- Capitalize on opportunities to strengthen management of administrative costs, staffing and organization structure, and refine budgeting and reporting
- Establish and implement a succession plan for executive and senior managers
- Maintain flexibility to help programs leverage policy initiatives that spur energy efficiency and renewable energy.

2015-2019 Strategic Plan Implementation Dashboard

May 19 and 20, 2016

This dashboard provides highlights and progress indicators on achievement to the 2015-2019 Strategic Plan goals and strategies. This is not a complete reporting of all activities. Refer to board briefing papers, quarterly reports and annual reports for more information.

I. AT A GLANCE

Status indicates if the goal or strategy is on track (green) or off track (red)

ENERGY GOALS	**Status**
Electric efficiency savings of 240 aMW	
Natural gas efficiency savings of 22 million annual therms	
Renewable energy generation of 10 aMW	

EMERGING EFFICIENCY RESOURCES	**Status**
NEEA identification of electric market transformation savings of 35 aMW	
Energy Trust identification of electric market transformation savings beyond NEEA's	
NEEA gas market transformation progress indicators	

EXPAND CUSTOMER PARTICIPATION	**Status**
Market research progress indicators	
Program design and execution progress indicators	

KEY PROCESSES	**Status**
Energy project tracking	
Internal procurement and payment	
Customer services and customer information	
Incentive processing	

NEW OPPORTUNITIES	**Status**
Complementary initiatives with government, utilities, others	
Response to policy initiatives	
Load and demand management with utilities (includes demand response)	

STAFF ENGAGEMENT	**Status**
Sustain a culture of highly engaged staff	

II. ENERGY GOALS (through 2015)

- Saved 23% of the electric efficiency five-year goal of 240 aMW
- Saved 27% of the gas efficiency five-year goal of 24 million annual therms (MMTh)
- Generated 39% of the renewable energy five-year goal of 10 aMW

Chart A: Electric Efficiency—Strategic Plan Goal to Aggregate Actuals and Projected Savings

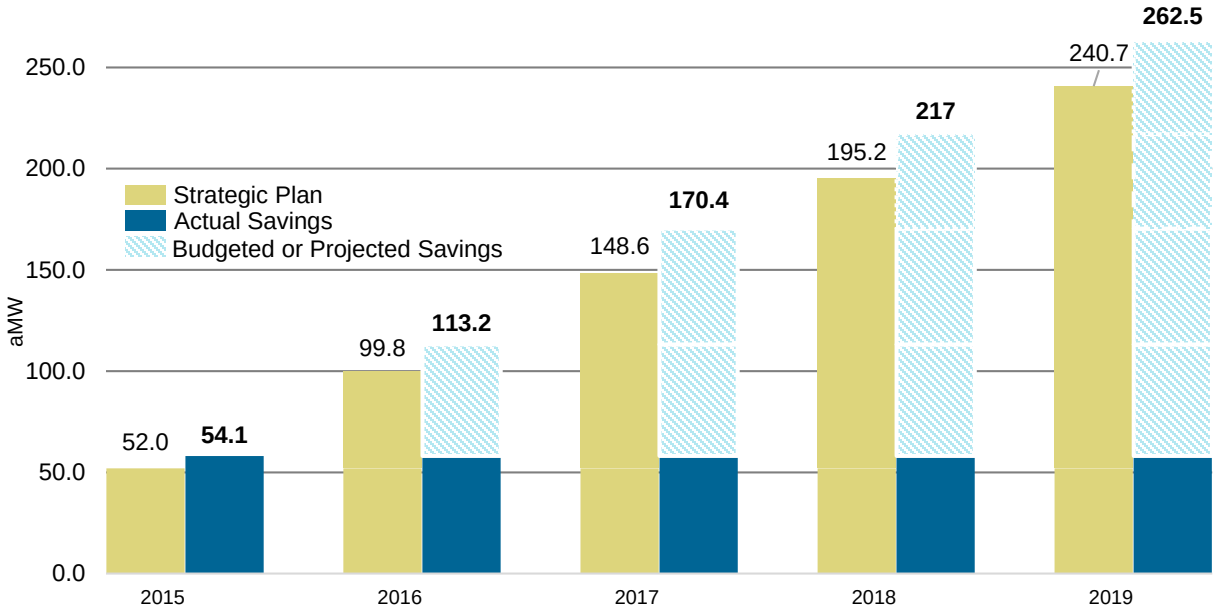


Chart B: Gas Efficiency—Strategic Plan Goal to Aggregate Actuals and Projected Savings

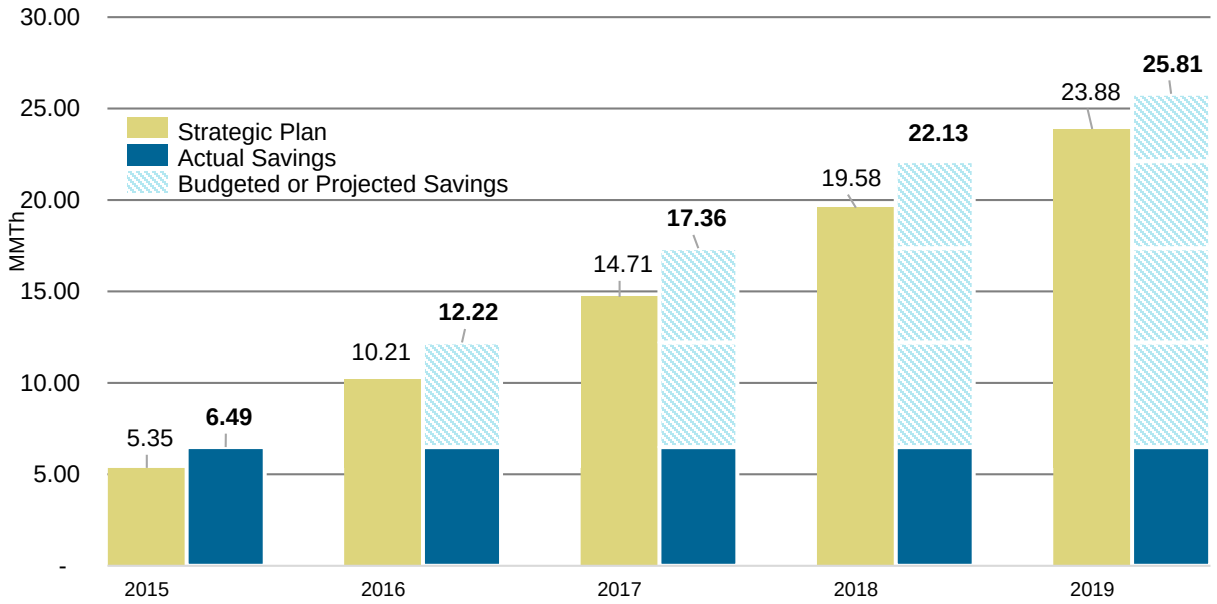
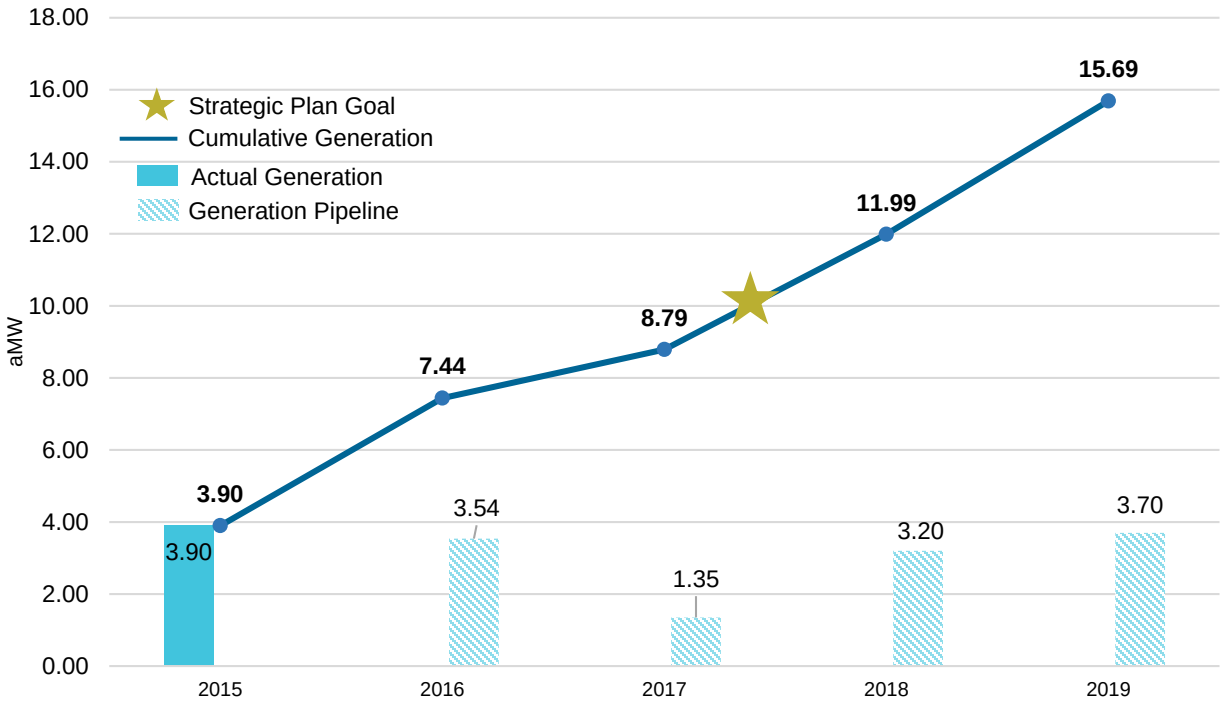


Chart C: Renewable Energy—Strategic Plan Goal to Aggregate Actuals and Pipeline of Generation



2015 Generation Sources: 49% Solar, 51% Other Renewables (biopower and hydropower)

Energy Goals Background

- The electric savings goal reflects the savings projections from the 2014-2015 budget planning process, individual utility IRP savings targets for 2016-2019, and adjustments to annual savings totals based on the projected contributions from emerging efficiency resources, new sources of savings and >1 aMW customers.
- The natural gas savings goal reflects the savings projections from the 2014-2015 budget planning process, individual utility IRP savings targets for 2016-2019, and adjustments to the annual savings totals from emerging efficiency resources and new sources of savings.
- Energy Trust is re-examining potential electric and natural gas savings deployment curves for the residential sector. This may lead to a reduction in electric and gas savings. See the Residential Sector Briefing Paper.
- The renewable energy generation goal reflects the generation projections and pipeline from the 2015-2016 budget planning process, and adjustments for incentive demand due to changes in federal level support, state level support and market forces.

III. EMERGING EFFICIENCY RESOURCES

Replenishing efficiency resources through electric and gas market transformation occur with NEEA and separately at Energy Trust. Technologies that successfully move through the development pipeline are new savings resource opportunities for programs. See the 2015-2019 Emerging Efficiency Resources Dashboard.

IV. EXPAND CUSTOMER PARTICIPATION

A. Market Research Progress Indicators

Metrics for 2016	Status
Study and determine if there are gaps and opportunities: • Participation data analysis • Customer Insights Survey • Focus groups with Hispanic and Asian consumers	
If gaps or opportunities are identified, develop an action plan which includes engagement and goals • *Expected in time to inform 2017 plans*	
Report on research results, action plan and engagement results • *Expected in time to inform 2017 plans*	
Advance engagement with two target ethnic markets: • Target portions of marketing to Hispanic and Asian consumer groups through methods identified in focus group findings • Deliver translated materials to Hispanic and Asian customers through the Small Business Direct-Install initiative	
Report in 2017 on action plan and engagement results	

B. Program Design and Execution Progress Indicators

Achievement to the first three progress indicators was determined by collecting program and operations activities and strategies planned for 2016. See the Expand Customer Participation Reference Paper.

Metrics for 2016	Status
Itemize new initiatives in 2016 to reach new and difficult-to-reach markets	
Itemize expanded initiatives in 2016 to reach new and difficult-to-reach markets	
Itemize continued initiatives from 2015 that are meeting savings goals	
Evaluate initiatives and report back to the committee in 2017	

V. KEY PROCESSES

Energy Trust is a continuously improving organization, exemplified by the embedded functions of Planning and Evaluation to support program design. Process improvement activities occur regularly at both Energy Trust and with PMCs. Results are documented in customer Fast Feedback surveys, process and impact evaluations, and quarterly and annual reports to the OPUC and board.

Four key processes were selected for process improvement in response to the 2014 Management Review and direction from the OPUC and Board of Directors. The four key process improvements to be tracked by the Strategic Planning Committee are set forth below.

Through training with Coraggio Group, staff is gaining additional skills and techniques in how to map and measure baseline process times, identify pain points and make

improvements. At this stage, staff have completed baseline measurement exercises in three of the four key process areas.

Staff have discovered that the most valuable outcome of the baseline measurement work is the identification of opportunities for improvement that occurs during the process mapping and measurement. Due to the time intensive nature of baseline and follow-up measurement work, going forward staff will collect measurements only when significant value is anticipated (i.e., significantly shortened processing times, efficiencies or improved quality are expected to result from an improvement project). Staff will continue to identify opportunities and make improvements to key processes as resources are available in the coming year(s).

Energy Project Tracking

- Progress
  - Developed and implemented a new project tracking system (PT) with a simplified user interface that increased usability and access to information
  - Completed several updates to PT to further improve search functionality and allow for more default values to reduce data entry time
  - Staff and PMC staff worked with Coraggio Group to develop baseline process times for the Existing Multifamily program
  - Through the work with Coraggio Group, staff identified several potential areas for process improvement
- Next Steps
  - Continue with planned process and system improvements
  - Determine if ongoing measurement against metrics is reasonable from a cost/benefit perspective
  - Investigate developing an automated method to capture cycle time within data systems
  - Investigate potential process improvements in the Existing Multifamily program
  - Determine what other programs will benefit from deep process analysis based on the techniques learned in analysis of Existing Multifamily

Internal Procurement and Payment

- Progress
  - Staff worked with Coraggio Group to complete a value stream map and baseline measurements, and applied principles to a straightforward purchase-to-pay process
- Next Steps
  - Complete collection of data to select and refine potential metrics, including capturing information on invoices that fall outside the straightforward process and are not captured in baseline measurements
  - Apply lean principles to the exceptions to identify cycle and process times where follow up are required
  - Determine if ongoing measurement against metrics is reasonable from a cost/benefit perspective
  - Finalize a Request for Information on information systems to automate requisitioning, procurement, invoice approval and document management

Customer Services and Customer Information

- Progress
  - Staff worked with Coraggio Group to complete a draft value stream map, baseline measurements and potential metrics for customer services by phone in the Existing Homes program. Baselines were measured for total call time, total wait time (customer on hold), call volume, call abandon rate and call quality. These data points are already captured by the program for internal management purposes and may serve as ongoing metrics.
  - Staff worked with Coraggio Group to collect Existing Homes call data from January to March 2016, assess the data and identify opportunity areas for future improvement to customer services by phone
  - Staff established a quarterly timeline for pulling easily accessible call center data to assess progress
  - Staff completed a major improvement to the main Interactive Voice Response (IVR) call system, simplifying the choices and reducing navigation time for customers
  - Staff commenced a redesign of the Energy Trust website to simplify navigation and improve customer access to information on mobile devices. Website analytics and a customer usability study identified opportunities for improvement.
- Next Steps
  - Review Existing Homes call center data in Quarter 2, 2016
  - Determine why there is a gap in response time identified for the Spanish phone line
  - Determine whether Existing Homes measurements are applicable to other programs or program groupings
  - Determine if ongoing measurement against metrics is reasonable from a cost/benefit perspective
  - Measure impact of IVR improvements completed in March 2016
  - Continue with scheduled service-by-phone process improvements and identify potential future improvements
  - Complete website redesign by year-end

Incentive Processing

- Progress
  - Programs and PMCs have completed incremental improvements to processing incentive payments
- Next Steps
  - Create baseline metrics for core incentive processing tasks
  - Identify and prioritize activities to improve within incentive processing
  - Identify quantifiable key performance and process improvement indicators

VI. NEW OPPORTUNITIES

A. Complementary Initiatives with Government, Utilities and Others

Staff engage with organizations that have complementary initiatives and goals. Activities can range from significant and game changing to smaller-scale. Staff continue to explore opportunities beyond this list.

- Irrigation modernization
    - Through 2015, enrolled 12 districts in project development assistance. Districts are now working with Farmers Conservation Alliance and undergoing initial assessments to identify comprehensive system improvements, to generate hydropower, reduce energy and water use and improve drought resilience.
- Water savings
    - Working with the City of Portland water bureau to provide incentive support to property owners for the installation of tenant water sub-meters to encourage water savings and corresponding energy savings. Effort to launch in 2016 and results are anticipated in 2017.
- Wood heat conversions
    - Washington County continues to work toward developing a program to help homes replace or convert wood stoves to electric ductless heat pumps or efficient gas hearths to improve air quality. Energy Trust is coordinating with the county.
- Federal loan repayment
    - Federal manufactured home replacement program is considering using on-bill repayment to service energy efficiency and conservation loans. Energy Trust is working with Pacific Northwest Generating Cooperative to explore this opportunity.
- Carbon reduction
    - NW Natural is developing projects to reduce carbon emissions under a state program authorized by SB 844, some of which may include energy efficiency projects.
- Nest thermostats and demand response
    - Energy Trust is conducting a third pilot with Nest smart thermostats to test a strategy to increase savings beyond our current approach. In addition, PGE is testing them as a demand management solution in coordination with our pilot.
- Solar + Storage
    - After attending the Rocky Mountain Institute Elab Accelerator workshop with PGE and the OPUC, Energy Trust is working with them to install a customer-sited solar + storage system to learn about the utility and customer benefits of customer-sited energy storage and to gain a greater understanding of the link between grid reliability and resilience. This effort is underway and will continue through 2017.

B. Response to Policy Initiatives

- Environmental Protection Agency Clean Power Plan
    - Participating in the National Energy Efficiency Registry multi-stakeholder working group, coordinated by the Climate Registry
    - After the Supreme Court's stay of the Clean Power Plan in February 2016, confirmed Oregon will continue to evaluate the best compliance approach for the state, and will use the extra time to further explore what goal to select, the role of biomass and whether to trade with other states
    - Submitted comments to the EPA in December 2015 and January 2016 on components of the plan open for comment, including the Clean Energy Incentive Program, and evaluation, measurement and verification rules

    - Participated in state-led stakeholder meetings in late 2015, including review of the state's criteria and compliance scenarios with which to evaluate compliance options
- Northwest Power and Conservation Council 7th Power Plan
    - Examining the final plan (published in February 2016) for any significant differences from Energy Trust's planning assumptions
    - Submitted comments on the draft plan in December 2015
- Oregon Legislation
    - Monitored proposed 2016 legislation, including Moneys collected by electric utilities (SB 1509, did not pass), the Clean Electricity and Coal Transition Plan (SB 1547, signed by Governor Brown) and a large-scale solar bill (HB 4037, signed by Governor Brown)

C. Load and Demand Management with Utilities (includes demand response)

Staff has started planning on ways to lower energy use in a way that improves local distribution system constraints and operation costs. Updates will be provided to the OPUC mid-year 2016 and in the 2016 Annual Report. See the Demand Response Briefing Paper.

- Definitions
    - Load Management: The process of structuring and/or scheduling the use of energy among a group of customers to best match demand to available supplies. It includes a variety of strategies that either reduce the demand for energy at peak times or shift the energy use to periods of lower demand.
    - Demand Response: A load management strategy, it is the reduction in electricity consumption by end-use customers from their normal pattern of consumption during times of peak energy use, when wholesale electricity prices are high and/or when system reliability is jeopardized. Customers are often compensated for participating in demand response programs.

- Planned Energy Trust activities (in addition to completing ongoing activities)
    - Compare the Power Council's valuation of energy efficiency's peak capacity benefits to Energy Trust's current methodology to identify any potential improvements
    - Continue utility discussions to quantify the value for "demand response-ready" equipment when efficiency measures are being installed; additional incentives or services enabled by the additional value considered in cost-effectiveness tests may prevent lost opportunities and build the demand response resource utilities can call upon
    - Consider a referral structure for customers completing Strategic Energy Management, for whom demand response may be a logical next step
    - Continue work with utilities to consider projects combining energy efficiency with local generation and demand response to defer or avoid capital projects planned for areas with specific grid constraints

- Demand response and load management activities by other organizations
    - Demand response programs are relatively new to the Northwest, and are widely and routinely used in the rest of the country. A recent presentation by Bonneville Power Administration noted that 55,000 megawatts of demand response are enrolled in the U.S., representing about 6 percent of peak loads

- PGE has approximately 28 MW of demand response capability through a variety of commercial, industrial and residential programs
- BPA has historically had demand response contracts with large aluminum smelters; with the decline of this industry in the region, BPA's capability has diminished though it has maintained agreements with customers to provide 30 to 100 MW of demand response capability
- BPA and PGE are running pilots to expand demand response capability. For example, BPA and other utilities completed a pilot project in the Olympic Peninsula that demonstrated, among other things, the ability of homeowners to reduce demand at peak times when given financial incentives (time of use or real time electricity rates), equipment and control tools
- Idaho Power has approximately 390 MW of demand response capability through control of irrigation pumping loads, commercial and industrial buildings, and residential air conditioning
- Rocky Mountain Power in Idaho has about 170 MW of irrigation load control

VII. STAFF ENGAGEMENT

One outcome of the annual Staff Engagement Survey is an assessment of employee engagement. Staff responses to survey statements were categorized as "engaged" when staff indicated "agreement" or "strong agreement" with the statement.

Energy Trust's ranking in the Oregon Business magazine 100 Best survey is another indicator of employee engagement as the rankings are determined by employee surveys.

Source	2015	2016	2017	2018	2019
Staff Engagement Survey	3/4s of statements with 75% or more engaged	*Results expected in June*			
Oregon Business Survey	7th of 100				
Indicator	**Engaged**				

2015-2019 Emerging Efficiency Resources Dashboard

As of Budget Year 2016; updated with information from the 2015 Pilots Report submitted to the OPUC

OVERVIEW

Energy Trust and NEEA each manage a pipeline for establishing new, energy-saving resources. NEEA focuses on upstream activities stimulating the ***Development & Production*** of new energy-saving resources. Energy Trust focuses on ***Testing & Implementing*** technologies ready for deployment.

PIPELINE STAGES

Each pipeline is designed to move technologies through a defined set of stages. Either the technology moves forward to the next stage or it drops out and will not become a savings resource for programs.

END RESULT

If a technology successfully passes through a pipeline it becomes an additional savings resource. It is then available to the programs to design a program offering and capture the savings.

Energy Trust Emerging Efficiency Resources Pipeline

Scoping (5)

- New Building Var. Refr. Flow
- Com. Luminaire Lighting Controls
- Ind. Continuous SEM ●
- Res. Online Appliance Purchase ●
- T-Stat Demand and Energy Controls

Planning (1)

- Variable Refrigerant Flow

In Implementation (8)

- Heat Pumps (manufactured homes)
- Ductless Heat Pumps (mobile homes)
- Adv. Power Strips (Tier 1)
- Cadet Heaters
- Adv. Power Strips (Tier 2) ●
- Pay for Performance ●
- Air Sealing (new homes)
- Water Sub-metering ●

Install Complete (4)

- Building Perform. Tracking & Controls
- Com. SEM ●
- Ind. CORE SEM ●
- T-Stat (gas furnaces in homes) ●

Evaluation (2)

- Ductless Heat Pumps (multifamily)
- T-Stat (heat pumps in homes)

Path to Net Zero program offer ●

Goal by 2019

Achieve additional savings resources separate from NEEA

New Resource for Savings in Programs

REMOVED FROM PIPELINE

- Memory Care Lighting Pilot
- Prescriptive air sealing
- mPower
- Opower

● = Gas Savings Potential

NEEA Electric Market Transformation Pipeline

Scanning

- Combined Space and Water Heating
- Residential Secondary Window Glazing
- Advanced Water Heating Systems
- Business IT
- Automated Measurement & Verification
- Extended Pump Products
- Pump Certifications
- Pivot Commissioning

Concept Assessment

- Com. Secondary Window Glazing
- Com. New Construction
- Manufactured Homes

Early Stage
5-yr goal: 1,400 aMW | Through 2015: 1,427 aMW

Market, Product Assess.

- Super-Efficient Dryers
- Retail Product Portfolio
- Luminaire-level Lighting Controls

Strategy & Testing

- Next Step Homes
- Refrigeration Energy Specialist Certification

Mid Stage
5-yr goal: 1,000 aMW | Through 2015: 520 aMW

Market Development

- Reduced Wattage Lamp Replacement
- Heat Pump Water Heaters
- Ductless Heat Pumps Homes
- Building Operator Certification Expansion
- Other Codes & Standards
- Industrial Technical Training
- Integrated Design Labs
- Com. & Ind. SEM

Market Deployment
5-yr goal: 175 aMW | Through 2015: 175 aMW forecast

Long-Term Monitoring

- Monitoring & tracking energy savings from 13 previously funded initiatives

Goal by 2019

35 aMW of additional savings resources for Energy Trust

New Resource for Savings in Programs

NEEA Gas Efficiency Resource Annual Progress Indicators

Metric	Status
2015: Complete scanning research and concept opportunity assessment for 2 technologies	Achieved, with 3 technologies receiving high-level assessment: Combi systems, low-capacity modulating furnaces and smart thermostats for control of multiple heat sources
2016: Complete concept opportunity assessment for 3 technologies	NA
2017: Complete market and product assessment for 1 technology; 5 additional technologies in “Scanning”	NA
2018: Complete strategy testing and finalization for 1 technology	NA
2019: At least 2 technologies ready for scale-up	NA

Current Initiatives
Absorption heat pump water heaters
Absorption continuation space and water heating systems
Efficient clothes dryers
Rooftop commercial condensing heaters
Efficient hearths

Expand Customer Participation Reference Paper
2015-2019 Strategic Plan Implementation Dashboard

May 19 and 20, 2016

This reference paper provides information for the Expand Customer Participation: Program Design and Execution Progress Indicators. Energy Trust staff inventoried initiatives programs have identified in annual actions plans to directly reach new customer segments or new markets in support of the Strategic Plan goal to expand customer participation.

Additional activities occur or are being explored by programs and support groups beyond the direct customer or market engagement activities listed here (e.g., contracting and procurement changes). The Diversity Initiative is organizing these longer-term strategies, and will help identify new initiatives for programs to pursue in the coming years.

Progress Indicator 1: New initiatives in 2016 to reach new and difficult-to-reach markets

- Join at least one U.S. Department of Energy proposal to increase solar deployment among low- to moderate-income groups
- Create materials in Spanish for commercial lighting and in Korean for steam traps/dry cleaners, and provide to utilities
- Support the two-year Commercial Property Assessed Clean Energy financing pilot through Multnomah County and the City of Portland, and all projects to adhere to equity policy
- Hold an Allies for Efficiency training series in Portland, Salem, Bend, Medford, Eugene, Pendleton and Boise to provide information on the largest newly constructed multifamily Passive House Building in North America
- Explore community outreach activities, particularly in rural markets, to reach small multifamily owners, a typically low-participating customer group
- Hire a lighting specialist to work with single multifamily properties, which often include income- and age-restricted properties
- Assess the Existing Multifamily Trade Ally Network to identify and recruit additional trade allies in rural communities
- Provide dedicated efforts to support Central Oregon multifamily customers in 2016
- Expand availability of residential gas and electric water heater incentives to units sold at retail locations

Progress Indicator 2: Expanded initiatives in 2016 to reach new and difficult-to-reach markets

- Continue the Small Business Energy Savings (Direct Install) program offer to serve small customers outside larger cities, and translate materials into Spanish in 2016
- Expand the LED buy-down promotion with 11 distributors and 47 statewide locations, to better serve small commercial customers
- Expand retail residential product incentives to select online purchase transactions

Progress Indicator 3: Continued initiatives from 2015 that are meeting savings goals

- Promote the New Buildings Market Solutions and Hey Buildings marketing campaign, which targets small and mid-sized commercial business owners
- Participate in commercial construction industry events focused on the minority business community
- Include in PMC contracts the requirement for PMCs to reach out and serve diverse customers and contractors, including
    - Customers served in all sizes of existing commercial buildings
    - Participation in the Small Commercial Efficiency and LED buy-down initiatives
    - Outreach and engagement with rural, small businesses
    - Outreach and marketing collateral featuring rural business customers, small businesses and minority- and woman-owned businesses
    - New Buildings participation across small businesses
    - New Buildings direct outreach efforts to communities
    - Deliver training and education regionally and improve access to trainings
    - Reach a wide range of technical, business and non-technical commercial construction audiences with educational content in-person and online
    - Deliver on the New Buildings Strategic Regional Outreach Plan
    - Diversify the make-up of the Trade Ally Network
- Email Existing Buildings customers when bilingual representatives are available to help
- Support Spanish-speakers in filling out Existing Buildings forms
- Have Existing Multifamily bilingual staff
- Staff residential events where Spanish speakers are expected to attend with a Spanish-speaking staff member
- Support food banks and agency deployment of the Products program's Carry Home the Savings with a Spanish client intake form
- Provide trainings in Spanish for residential builders and sub-contractors, particularly insulation contractors
- Translate Existing Multifamily customer handouts in Spanish
- Translate select residential web pages in Spanish, including Savings Within Reach and Appliances
- Maintain an Existing Buildings call center real-time translation services contract
- Hold trade ally workshops in smaller markets to engage small businesses
- Continue having outreach staff in southern, central, northeast, Corvallis, Eugene and Lincoln City
- Continue having PMC outreach staff across the state supporting multiple residential programs, through engagement with consumers as well as contractors, builders and verifiers
- Develop industrial Strategic Energy Management curriculum and materials for people of all backgrounds, utilizing icons and relatable vocabulary
- Include geographic, gender, ethnicity and racial diversity, and various sizes of businesses, in outreach, marketing and website materials
- Deploy targeted residential marketing focused on savings potential, geography, energy use, home size and income parameters
- Focus program design, delivery and outreach on statewide participation (urban and rural) and participation by all sizes of Production Efficiency businesses
- Implement an initiative to lower the soft costs of solar to make it more accessible to all groups
- Work with housing authorities and community housing groups to reach rural and low-income multifamily properties

- Participate with affordable member organizations to promote affordable living for low-income renters through energy-efficiency improvements and free services
- Work with Habitat for Humanity and CASA (Community and Shelter Assistance Corp) as residential trade ally builders
- Support student homebuilders in Hermiston, reaching an underserved part of the state
- Collaborate with utilities to include an email distribution offering a limited-time online purchase of products (lighting and showerheads)

7th Power Plan Comparison

Briefing Paper

Comparison of the Northwest Power & Conservation Council 7th Power Plan to Energy Trust Goals

May 19 and 20, 2016

Summary

The Northwest Power and Conservation Council's 7th Power Plan provides an influential and well-considered analysis of expected Northwest energy demand and resources, especially energy conservation resources, for the coming 20 years. Energy Trust pays close attention to how our plans compare with the Council's expectations of the region and recently compared the results of the 7th Plan to Energy Trust's own analyses.

Background

While the analysis considered a range of issues, we wanted to highlight some of the significant findings:

- Energy Trust predicts slightly less energy-saving potential, as a percentage of load, than the Council. When viewed at the sector level, Energy Trust has higher potential predicted in the industrial sector, but this difference is offset by lower potential in the commercial and residential sectors.
- There are more significant differences in the projected pace of acquisition of efficiency. Energy Trust plans to capture more efficiency in the early years and less in later years than what is envisioned in the 7th Plan.
- Energy Trust's IRP goals over the next five years are generally in line with and more ambitious than its estimated share of the Plan's regional goals. At the same time, Energy Trust and the Council make different assumptions in setting goals, based in part on legislatively-defined missions. For example, the Council counts savings from many codes and standards while we count only savings for which we can claim a determining influence. The Council also counts "gross" savings, which are uncorrected for free-riders and other factors, while we report "net" savings.
- While differences from the Council's work do not indicate error, the comparison provides good insight on specific measures where we may want to develop.

In the remainder of this paper, we elaborate and expand on these points and their implications for Energy Trust.

Discussion

A. The 7th Plan

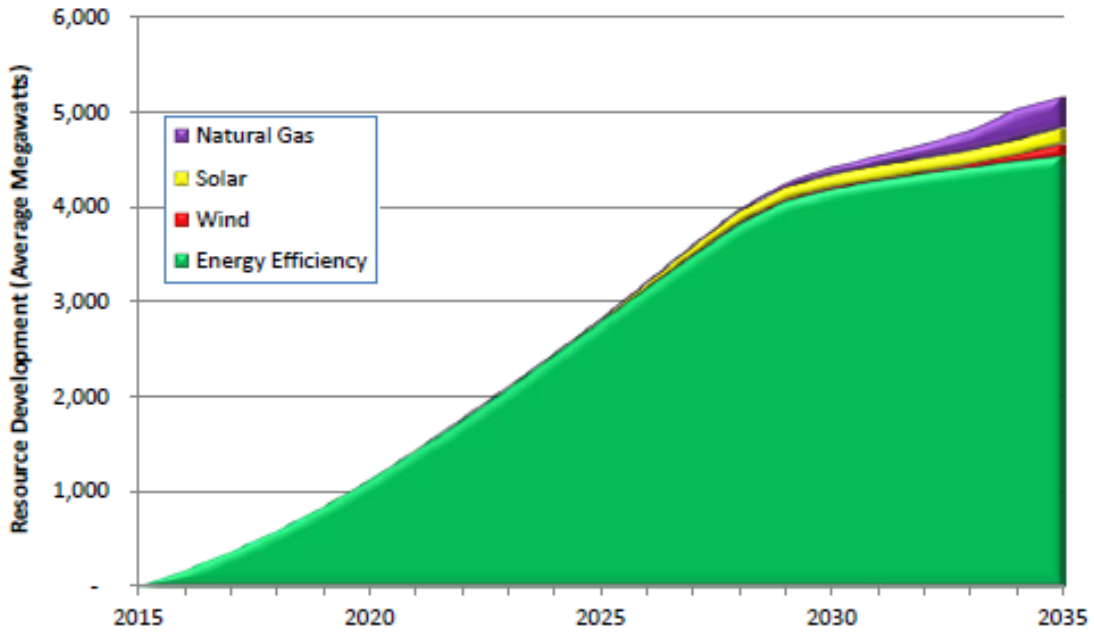
The Northwest Power Planning and Conservation Act of 1980 authorized the Northwest Power and Conservation Council (Council) to prepare a regional power plan and energy market forecast every five years, including a fish and wildlife program for the Columbia River dams. The Plan covers Idaho, Western Montana, Oregon and Washington. The plan accounts for all the economic and environmental costs and benefits of energy alternatives, with a priority on energy conservation. The plan has legal consequences for federal agencies, especially the Bonneville Power Administration (BPA). The plan influences state public utility commissions and utilities, primarily through the quality of its analysis. The Council estimates that the region's ratepayers

have saved about $3.75 billion in electricity costs due to efficiency investments since 1980. On February 10th of this year, the Council's seventh power plan was approved.

The Council uses highly sophisticated modeling and scenario planning to develop all of its plans. This modeling tests how well different energy resources would perform over a range of 800 different future conditions. There two key *regional*[1] findings from the analysis:

1. The Northwest can rely almost entirely on efficiency and demand response to meet nearly all regionally forecasted load growth and capacity needs (Fig. 1).

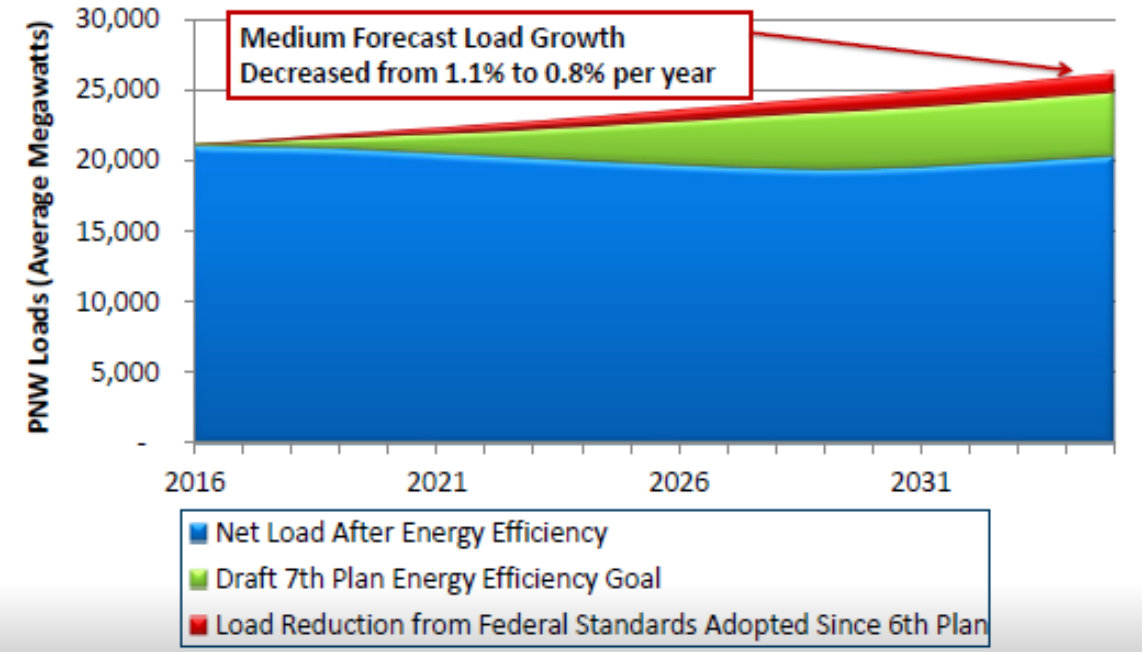
Figure 1 - 7th Plan Proposed Resource Portfolio (2015 – 2035)



2. The region's net electricity load after efficiency will remain below current levels until 2035 (Fig. 2, below). Federal efficiency standards, greater efficiency in lighting, and slower growth in home electronics and new commercial floor space will moderate growth in the residential and commercial sectors, despite growth in high-tech industries and data centers.

[1]The Council's Plan impacts over 100 utilities served by the Bonneville Power Administration region-wide. As the Council points out in the 7th Plan, a single utility's conditions may vary from the region's.

Figure 2 – 7th Plan Forecasted Regional Electricity Load



Other notable findings in the 7th Plan:

- To meet regional resource adequacy standards for winter peaking capacity, the region must develop demand response resources. PGE is our only electric utility with a winter electric peak, and it is quickly being exceeded by their growing summer peak. Because the winter high load period is much longer it is more costly, and so presents a larger cost savings opportunity from efficiency.
- Taken as a whole, the region is expected to be able to comply with the EPA's proposed carbon emission limits under the Clean Power Plan and with current energy and carbon policies. Note that this finding was made prior to passage of Oregon's Clean Electricity Act.
- Efficiency and demand response are more economic than renewables in meeting regional power needs and under some circumstances high penetrations of renewables could negatively impact the adoption of efficiency as a least-cost resource.[2]

B. The 7th Plan and Energy Trust

The 7th Plan provides Energy Trust with important, independent insights and analysis that can shape our near-term operations and long-term direction. Energy Trust hired the Cadmus Group to compare the results of the 7th Plan to Energy Trust's own analyses. The following section

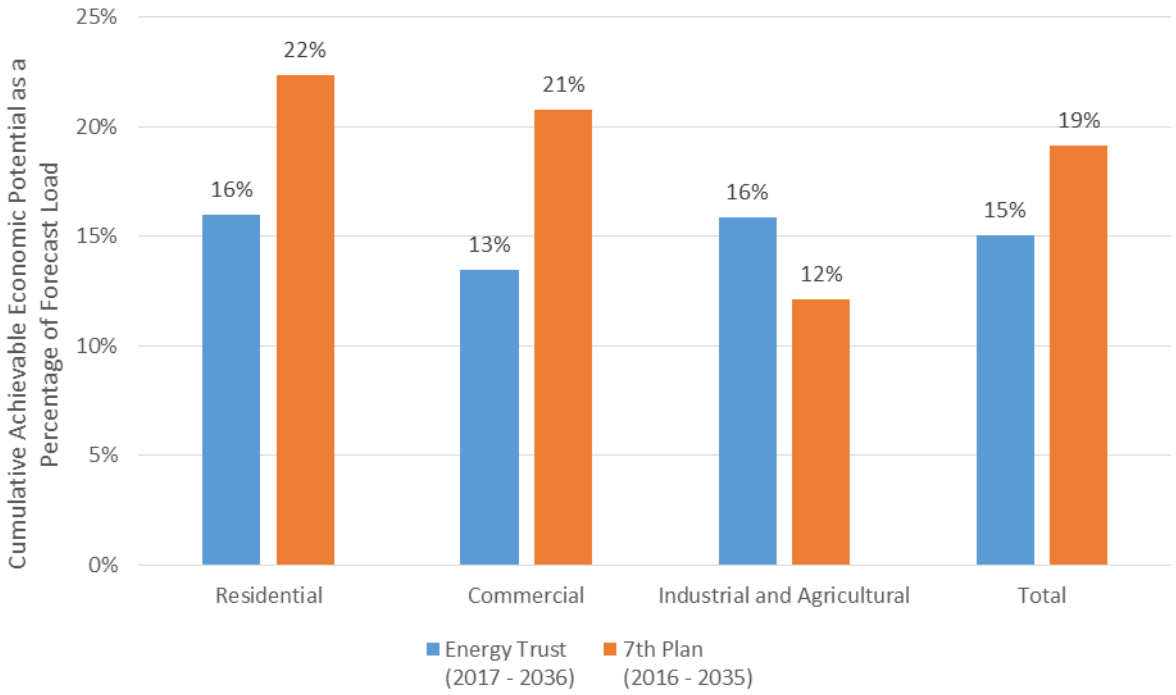
[2] This led to some controversy about the role of renewable energy in the future of the Northwest; renewables advocates have suggested that some of the detailed assumptions and modeling processes undersold the value of renewables. The Power Council did not explicitly analyze a 50% RPS requirement similar to the requirement that just became law in Oregon under HB1547B. That law exists only in one of the four Northwest states, and the "efficiency first, demand management second" language in the new Oregon law may provide similar support for efficiency as was the case before the new law. The OPUC will establish rules to implement the new law later this year.

discusses the results of that comparison work, starting at the high level and then drilling down to measure-level detail in each sector.

1. Amount of Potential Identified

As stated above, the 7th Plan foresees more modest annual savings in the near term, trending up over 20 years. Energy Trust sees more near-term savings, and a gradual decline. Figure 3 breaks it down by sector:

Figure 3 – Comparison of Energy Trust and 7th Plan Cost-Effective Potential



Note*: The Energy Trust residential sector savings shown above are based on current modeling. In the residential sector paper (Tab 8), we describe how we are refining these projections, which we will integrate into future forecasts, and may produce a different picture*.

The differences in assumptions that drive these differences will be explored in more detail below, but overall:

- Energy Trust may have higher saturations of efficiency measures today compared to the region as a whole, due to more aggressive program funding and savings, on average, over the past 14 years. This leaves Energy Trust with less savings to acquire over the twenty-year period.
- The two analyses have a different mix of energy use, efficiency conditions, and measures. In particular, Oregon may have higher industrial loads than the rest of the region, while the region may have higher saturations of electric space and water heat than is the case in Oregon.

- The Council counts savings from codes and standards regardless of attribution or influence. Energy Trust counts the savings from codes and standards only where there is a strong case that our programs or NEEA have influenced the savings.
- Our respective cost-effectiveness screens use different methodologies and data sources, leading to different determinations.

2. Pace of Acquisition in Efficiency Resource Potential

Beyond the total 20-year potential identified, there are differences in the planned pace of acquisition. The 7th Plan's energy efficiency development targets for the region are ambitious. They are:

- 1,400 aMW by 2021
- 3,100 aMW by 2026
- 4,500 aMW by 2035

Figure 4, below, breaks down the 7th Plan goals for the first six years. Energy Trust's resource potential amounts to 17% of the Council's region-wide potential. We believe our utility Integrated Resource Plan (IRP) targets are aligned with the Council's goals for the region and compare favorably, acknowledging differences in the pace of acquisition:

Figure 4 - Comparison of 7th Plan Goals to Energy Trust IRP Goals

Reporting Year	Council's 7th Plan Regional Goal (Gross aMW)	Energy Trust's Estimated 17% of 7th Plan Regional Goal (Gross aMW)	Energy Trust IRP Targets[3] (Gross aMW)
2016	185	31.5	58.9
2017	185	31.5	60.3
2018	230	39.1	57.6
2019	230	39.1	55.8
2020	285	48.5	47.9
2021	285	48.5	44.0
Total	**1,400**	**238.0**	**324.5**

Looking beyond the first six years, the 7th Plan savings goals increase annually for ten years before decreasing. Energy Trust's savings goals, while initially higher, soon begin to decrease slightly each year until reaching a steady state level.

This is because the Council's analysis identifies more resource potential and makes different assumptions about "ramp rates," i.e., rate of acquisition. In determining ramp

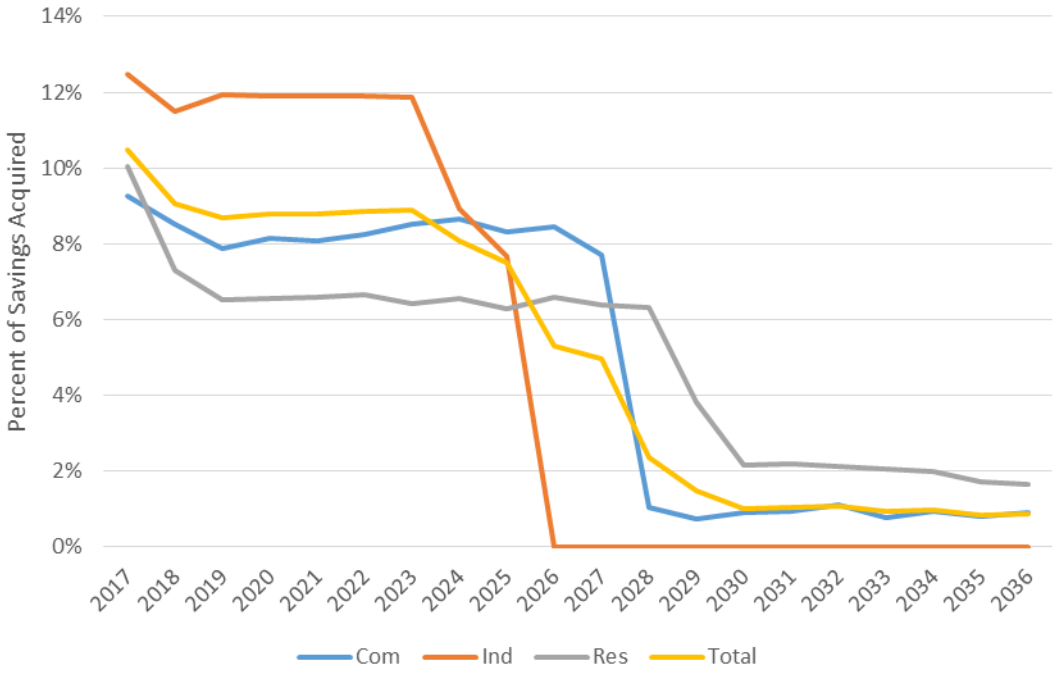
[3] We used the most up to date information from the 2015 PGE IRP and the 2013 PAC IRP because the savings targets were already calculated in Gross aMW at the measure level, and so would be more accurate than a converted 2015-2019 Strategic Plan savings goal. They also cover the entire timeframe in question. When these IRP values are converted from GROSS to NET they were greater than the goals 2016-2019 goals from the 2015-2019 Strategic Plan. Gross savings means all savings from efficiency measures regardless of whether Energy Trust influenced the customer decision to implement the measure. Net savings means only those savings which Energy Trust influenced.

rates, Energy Trust aligns near-term resource acquisition to current levels of program performance, while the Council's ramp rates do not. Council rates are not as aggressive in the first few years.

Cadmus looked at the planned acquisition of cost-effective resources for both Energy Trust and the 7th Plan. Energy Trust develops ramp rates for each utility as part of each IRP process. For this exercise, Cadmus used the ramp rates developed for Energy Trust's electric service territory as a whole, which differ from those developed for utility IRPs. Notably, the industrial sector is not projected to diminish as starkly in utility IRP projections.

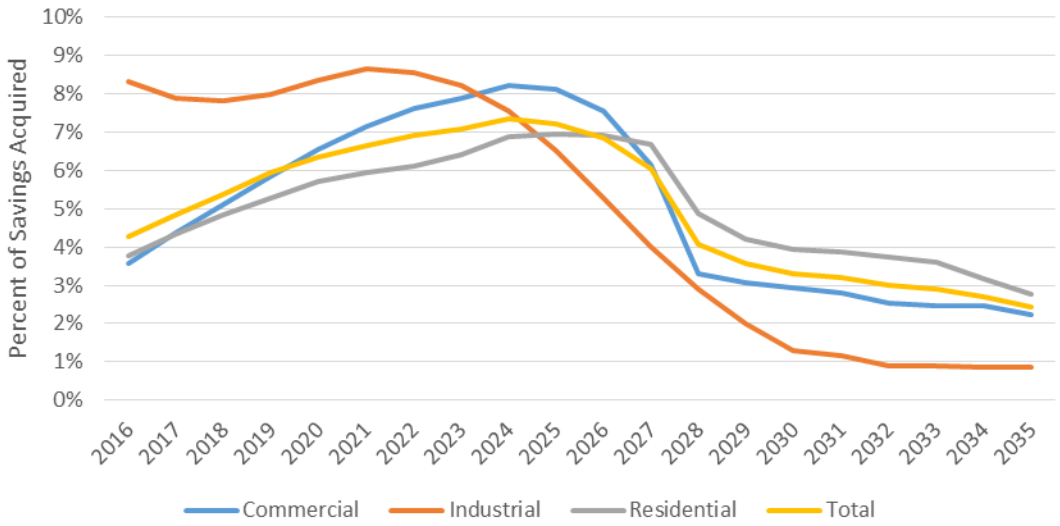
The following figure shows Energy Trust resource acquisition by sector (as noted above, this is based on current modeling; the revisions in projected resources discussed in the residential sector paper, **Tab 8**, may change this picture):

Figure 5 - Energy Trust Incremental Acquisition of Total Cost-Effective Potential, by Sector



The next figure, Figure 6, shows acquisition projected by the 7th Plan. Because the rates of acquisition start lower, they have room to grow for the first 10 years. At that point, market saturation limits the remaining potential and acquisition rates exhibit a similar decline.

Figure 6 – 7th Plan Incremental Acquisition of Total Cost-Effective Potential, by Sector



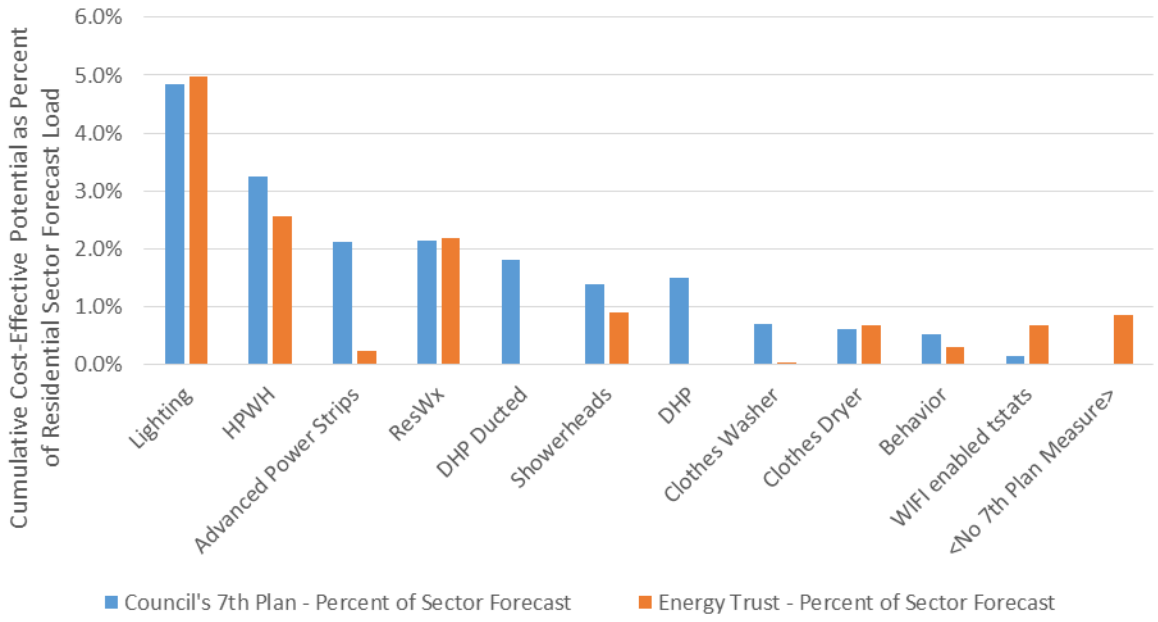
The two sets of lines exhibit a similar trajectory. While Energy Trust's ramp rates start higher, both sets of lines decline when market saturation begins to be reached.

3. Differences by Sector

The following section compares the main sources of cost-effective savings potential between the 7th Plan and Energy Trust. Cadmus grouped measures into higher-level measure categories and compared the relative contributions of each group. The graphs are by sector. Each section also contains a list of some things we've identified as the underlying causes behind some measure differences, as well as a list of implications for each sector. The differences will continue to be explored as we continuously update and refine our resource assessment modeling and, as we have noted above, the residential sector analysis in **Tab 8** may change our forecast of residential energy savings.

Differences between Energy Trust and 7th Plan estimates do not necessarily indicate error, but may indicate differences in homes and businesses in Energy Trust's service territory compared to the Northwest as a whole. Differences in underlying economic factors may also drive differences in cost-effectiveness.

Figure 7 – Comparison of 20-Year Cost-Effective Potential in the Residential Sector



Some differences can be expected due to the above mentioned differences in demographics. In addition, Energy Trust has learned following about some of the most prominent individual residential measure differences:

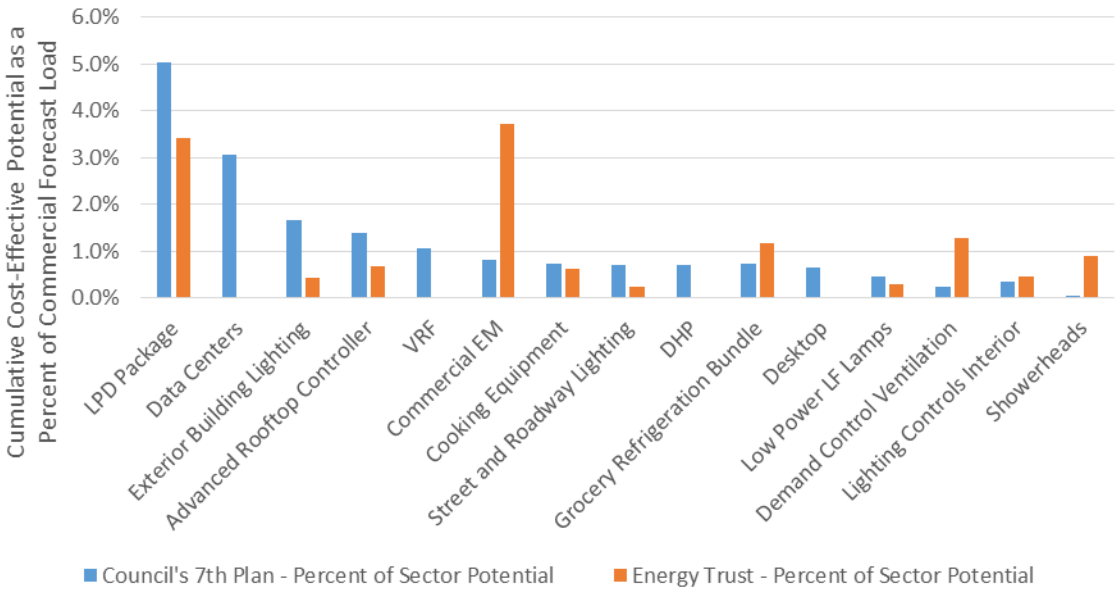
- We have different assumptions about whether power strips are proven measures and how many can be installed to save energy in homes. Energy Trust currently has several pilots underway.
- The 7th Plan assumes that ductless heat pumps will be installed in homes with ducts. Energy Trust currently assumes that homes like this will have an efficient, ducted heat pump, but is monitoring further research in this area.
- Ductless heat pumps do not show up for Energy Trust due to being marginally not cost-effective in our modeling. Updates done subsequently to this work have changed that such that it is now cost effective.

Implications for Energy Trust in the residential sector:

- Energy Trust's residential program should explore program design changes that encourage the adoption of advanced power strips and monitor the further expansion of markets for ductless heat pumps. See the Residential Sector Paper, **Tab 8,** for further discussion.
- The Council sees similar potential in savings to what we predict from heat pump water heaters and residential behavior measures over the twenty-year study period.

Differences in measure results in the commercial sector are detailed in Figure 8, below.

Figure 8 - Comparison of 20-Year Cost-Effective Potential in the Commercial Sector



Why are we seeing these differences in top commercial cost-effective measures?

- Measure mixes reflect different utility programs and levels of experience. For example, Energy Trust has been a leader in implementing Strategic Energy Management in the commercial sector. As a result, Energy Trust has identified savings for commercial Strategic Energy Management (SEM), whereas the Council did not.

- Energy Trust's analysis of lighting is fundamentally different for technical reasons:

    - The Council compared lighting to typical market purchases whereas Energy Trust compared lighting to existing equipment.
    - Energy Trust does not claim savings from code changes other than those Energy Trust directly influences. The Council counts savings regardless of who caused them.
    - Lighting equipment is changing quickly. Energy Trust uses slightly different approaches to incipient technology improvements.

- We have different opinions on the potential for reaching small data centers. A recent NEEA initiative was discontinued. The Council may be correct that these savings are technically available, but we have not yet seen a practical way to acquire these savings.

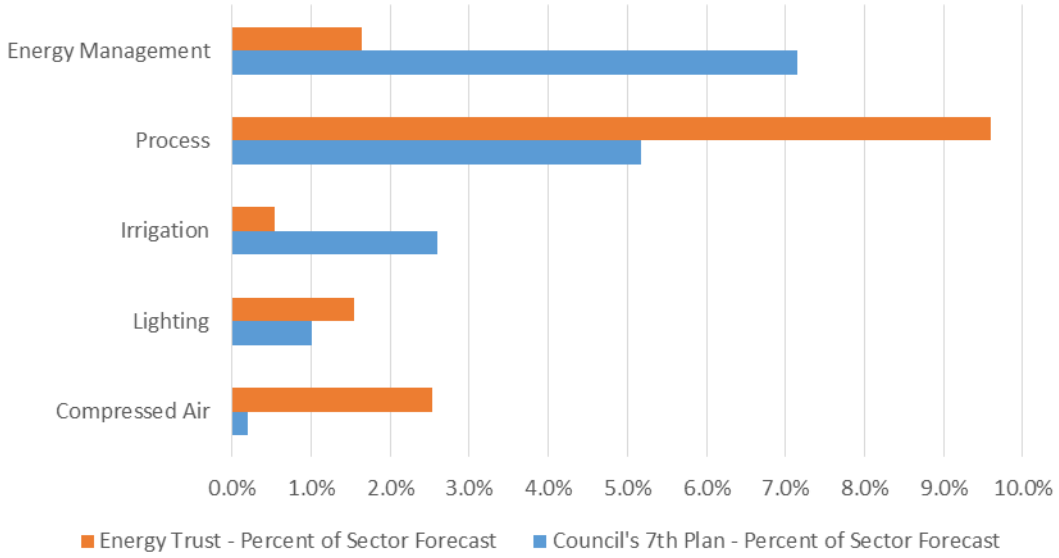
Implications for Energy Trust in the commercial sector:

- Energy Trust's commercial program should explore program design changes that encourage the adoption of variable refrigerant flow, ductless heat pumps, and embedded data centers. We have pilots underway for the first two. Based upon previous experiences, we may have limited ability with embedded data centers (we will keep looking for a practical approach).

- Impressive savings from Energy Trust's commercial sector Strategic Energy Management program could put Energy Trust in a regional leadership position. Energy Trust has had some success and is still firming up this approach and potential savings from this measure.

Figure 9 shows the measure level detail for the industrial sector. Estimating potential in the industrial sector is the most difficult, and Energy Trust's analysis has taken an approach that differs from the Council's approach. While the 7th Plan includes a mix of measures specific to certain industries and applicable across all industries, Energy Trust models measures that are more generic and applicable across a range of industry types. This approach was informed by the history of our industrial program and the measures we typically find. To make worthwhile measure comparisons, Cadmus needed to aggregate the industrial measures at a higher level than the other sectors.

Figure 9 - Comparison of 20-Year Cost-Effective Potential in the Industrial Sector



Energy Trust believes that the factors underlying the differences above can be at least partially explained:

- While differences in the individual categories exist, the energy management and process categories are nearly equivalent in total. This may simply be a result of different decisions on which measures to include in the model, and how to characterize them.
- Energy Trust has a long, successful history with Strategic Energy Management in the industrial sector.
- Energy Trust's irrigation loads are markedly less than the rest of the region.
- Energy Trust has also developed a successful approach to reaching compressed air systems of all sizes. That program success may be reflected in the modeling.

Implications for Energy Trust in the Industrial Sector:

- The Council sees large, long-term savings potential from energy management in general. The Industrial sector should continue its development of Continuous Strategic Energy Management to continue acquiring these savings.

4. Importance of New Measures

Over forty percent of the 7th Plan's 20-year resource potential comes from new measures not found in the 6th Plan. The 2015-2019 Emerging Efficiency Resources Dashboard (**Tab 5**) provides a snapshot of emerging efficiency resources. Key technologies and potential are listed below by sector:

Figure 10 – New Energy Efficiency Measures in the 7th Power Plan

Technology	Sector	Regional Potential aMW *(2035)*
Solid State Lighting & Controls	All	1,150
Advanced Power Strips	Residential	260
Embedded Data Centers (not standalone)	Commercial	260
Variable Refrigerant Flow (VRF)	Commercial	90
Ductless Heat Pumps	Commercial	60

Clearly, the advances in technology are behind this growth will continue into the future. As discussed at previous meetings, Energy Trust has incorporated emerging technology into its resource potential estimates.

Going forward, Energy Trust should increase the nimbleness of its pilot process to introduce new technology more quickly into programs and explore where the measures listed in the table above can increase their prominence in Energy Trust's current measure mix.

5. Demand Response

The region's future electricity needs can no longer be met by evaluating annual energy requirements alone. Modeling for the 7th Plan identified the need to add capacity resources to maintain an adequate and reliable system.[4] The need for capacity is the result of regional growth, changes in the region's generation mix since the 6th Plan, more renewables, and decreased flexibility of the hydropower system to balance system needs.

Demand response is a relatively low-cost means to maintain reserves for system adequacy[5]. The Council states the region may need the equivalent of 600 MW of winter peak resource capacity by 2021. Oregon's recently passed Clean Electricity and Coal Transition Plan also stipulates that utilities acquire cost-effective demand response. In the Demand Response paper, **Tab 7,** we describe the work Energy Trust is doing to develop capability in this area.

[4] Capacity is the amount of generation the system can generate; it represents power plants' potential generation, measured in megawatts, not what the plants actually generate. Capacity is directly relevant to peak demand, which occurs at limited times. Energy is the amount of electricity (produced from capacity) customers actually consume over time, measured in megawatt-hours (MWh).

[5] Efficiency is in many cases more costly per kW of peak reduction, but has the additional benefits of energy savings make it an attractive overall value.

With this, Energy Trust has acknowledged the role it can play by encouraging "demand-ready" technology—technology that can provide both energy savings and demand response capability—into select energy efficiency offerings to increase levels of adoption and help utilities build the demand-response resource. We plan to participate in regional and utility-specific collaborations that develop demand response resources.

Conclusions

- Although there are differences in individual sectors and measures, we did not find that we are much different from the Council's 7th Plan in our assumptions or analyses. The review does not reveal large opportunities to augment our resource supply estimates, or arguments that they should be greatly diminished. It does provide helpful information on where efforts to update and improve our modeling should focus.
- We will focus our work over the next year on making sure that our program savings are reflected in the resource assessment. That is the best path to resolve any ambiguities about our analyses.
- There are more significant differences in the planned pace of acquisition of energy efficiency resources. Energy Trust has historically and expects to continue to acquire resources at a faster pace than the rest of the region. Because of this, Energy Trust does not have the same opportunity to increase the pace of annual acquisitions that the Council foresees for the rest of the region. Over the first six years, Energy Trust's goals set in utility IRP processes have established goals that exceed its estimated share of 7th Plan goals.
- Demand response will grow in importance and adoption in the coming years, and Energy Trust will continue to discuss how our work can assist that transition.

Renewable Energy Sector

Briefing Paper
Renewable Energy Sector Strategic Issues and Opportunities

May 19 and 20, 2016

Summary

This paper provides a window on the strategic issues, challenges and opportunities facing the renewable energy program over the next few years, and how Energy Trust could respond, beginning with challenges to "Other Renewable" technologies, then solar, and last in how renewable energy might help communities manage extreme events – weather, earthquakes, etc.

Briefly:

- The strategy for technologies other than solar has been to build a pipeline of projects that can manage in this market characterized by low wholesale energy prices, primarily biogas from wastewater plants and irrigation hydro. This strategy has proven successful. It is too early to say if market conditions will be affected by the new Clean Electricity Act. Going forward, we plan to (a) work with the OPUC on Clean Electricity Act implementation; and (b) continue to work on projects that are net-metered and thus able to offset higher retail rates and projects with non-energy benefits that can be monetized.
- A host of activities may have impacts on the solar program and the broader solar markets that we are working to build and serve. These include PUC dockets, upcoming decisions, and requested program reviews; community solar implementation; and uncertainty regarding solar above-market cost. As long as there is a significant above-market cost for solar electric projects for homes, we will retain our program. If above-market costs appear to be significantly reducing for one or more market segments, we will revisit Energy Trust's role in the market.
- There is increasing interest in helping communities manage extreme events – weather, earthquakes, etc. There are ways that solar or other technologies plus storage might be deployed to enable buildings to use batteries to stay operational during an outage and for other purposes such as demand response. However, figuring out how Energy Trust might deploy solar and storage for emergency purposes is in its beginning stages, and answers depend on community decision-making that is only just beginning. We recommend that we continue to talk to community partners, brief the board at intervals, and report to the 2017 board retreat.

Questions for the Board: The paper poses no particular questions for the board except to ask if the direction outlined in the paper seems about right.

Discussion

1. "Other Renewables:" hydropower, biopower, geothermal and wind

Energy Trust's "Other Renewables" program addresses hydropower, biopower, geothermal, wind power non-solar technologies. The primary market challenge for these resources has been

low wholesale energy prices which have led many developers to postpone projects or shift attention to other states. Our strategy, which is proving to be successful, has been to build a pipeline of projects that can manage in this market: primarily biogas from wastewater plants and irrigation hydro. Typically, these projects are net-metered, enabling them to offset higher retail rates, or they have non-energy benefits that can be monetized. As a result of these factors, the number of projects enrolled in our Project Development Assistance track has doubled. We expect to see increasing demand for project installation incentives in the coming two to three years. The board has been briefed in the past year on our hydro modernization initiative, which is driving most of the pipeline growth and has so far exceeded our expectations.

The passage of the Clean Electricity Act with its requirement that 8% of aggregate capacity be composed of small-scale renewable may increase demand for our incentives, but that will depend on how requirements are implemented and how close the state already is to meeting the requirement. Early thinking by the renewable community is that the requirement has already been met. The Clean Electricity Act may also result in some changes to the rates utilities pay to buy power from qualified renewable energy projects from independent developers. It's difficult to predict those changes, which will occur through utility proposals to the Oregon PUC. At this point, it appears that the primary impact will be to increase the number of large utility-scale projects, which are out of our purview. We will continue to make sure the RECs from the projects we fund count toward the RPS requirements. We plan to engage with the OPUC on Clean Electricity Act implementation.

Two other activities may affect the Other Renewables program: The OPUC's examination of Blue Sky/Clean Wind project funding, and a requested review of Energy Trust's renewable programs. Both are discussed in detail in the next section.

2. Solar program

A host of unresolved issues and activities may affect the solar program and the solar markets that we are working to build and serve. It is important to examine each and its potential impacts:

- Open PUC dockets and reviews
- Community solar and its impact on the market
- Solar above-market cost

A. Open OPUC dockets and reviews

Solar Incentive Program Review (UM 1758): Legislation passed in 2015 directed the PUC to evaluate the efficiency and effectiveness of programs that incentivize solar. The legislature expressed concerns about confusion in the marketplace because of the variety of solar programs. The programs being evaluated include: Energy Trust's solar program, net-metering, Oregon's Renewable Portfolio Standard, Oregon's Volumetric Incentive Program (also called the Feed-in Tariff), Oregon tax credits such as the RETC, ODOE's Renewable Energy Development (RED) grants, and voluntary solar programs such as Pacific Power's Blue Sky program. The OPUC will evaluate and recommend whether each program should be discontinued, modified, extended or remain unchanged. While we believe the OPUC will conclude that our program is effective, the range of potential outcomes includes termination or modification for our program and for others that affect the projects we fund.

Energy Trust has responded to OPUC requests for information about our solar program. The criteria that will be used to evaluate programs have not yet been made public. A draft report for public comment is due this summer with a final report scheduled for September.

Resource Value of Solar (UM 1716): This docket examines the value of solar generation to utilities and to the grid. It is also looking at how solar may affect the reliability of the utility electricity transmission and distribution system and at the concept of cost-shifting: do solar customers by generating their own power and lowering the amount of revenue they provide to the utility shift costs to non-solar ratepayers?

The biggest potential impact of the docket could be on net-metering, i.e., how much owners of solar systems will be paid when their systems are producing more than can be used on-site, and sending power to the grid. Currently, customers are credited at the retail rate. Some states have lowered this rate. If the OPUC does something similar, the payback on a PV system would be longer. This would increase the above-market cost for solar, making our presence in the market more important.

Additionally, if solar net-metering is altered, there is a question about whether it would be altered for non-solar technologies, such as biogas projects at wastewater plants.

OPUC examination of Blue Sky/Clean Wind project funding: Energy Trust has always encouraged renewable projects to access other funding sources in order to stretch our dollars further. This includes the utilities' community renewable energy grant programs: Blue Sky and Clean Wind. Over the past 13 years, Energy Trust and Blue Sky have jointly funded at least 50 projects across all technologies. We have also co-funded a small number of projects with Clean Wind. These are chiefly government and non-profit projects that cannot utilize tax credits and need to assemble a package of funding to succeed.

The OPUC recently decided to examine the practice of having both voluntary and other ratepayer dollars fund projects, whether multiple incentives are adding undue complexity to the solar market, and whether these programs are driving additional projects as expected. While this examination is taking place, the OPUC requested that there be a suspension of co-funding, with exceptions for several non-solar projects. The OPUC process is expected to take two months.

The primary risk for Energy Trust solar and non-solar projects is the possibility of a permanent suspension of co-funding, requiring projects to choose between Energy Trust and other funding. Those that choose Energy Trust would have larger above-market cost.. For those that choose funding from utility programs, Energy Trust would lose some opportunities for project participation and community connection. There is also risk that projects could not assemble sufficient funding to move forward. Percentage-wise, the number of affected projects would be small relative to the full solar program, however this small number comprise the majority of government and non-profit projects we work with.

OPUC's request to Energy Trust to review renewable programs. At the PUC's request, the renewable team will review all renewable programs this year, with the RAC and board. The review will encompass both solar and non-solar technologies. The request was prompted partly by the passage of the Oregon Clean Electricity Act, which expanded the state's renewable portfolio requirement and led the OPUC to ask how all of the renewable energy programs receiving ratepayer funds fit together. Concerns about solar's above-market cost also drove the request, along with significant changes in the market such as the ITC extension. The sector's

strategic planning work is now two-years-old, and an update, particularly for solar after the ITC extension, will be an opportunity to examine new areas where Energy Trust could provide value, such as community resilience (discussed below), and using projects to provide grid and other system support. This examination will likely run for the rest of 2016.

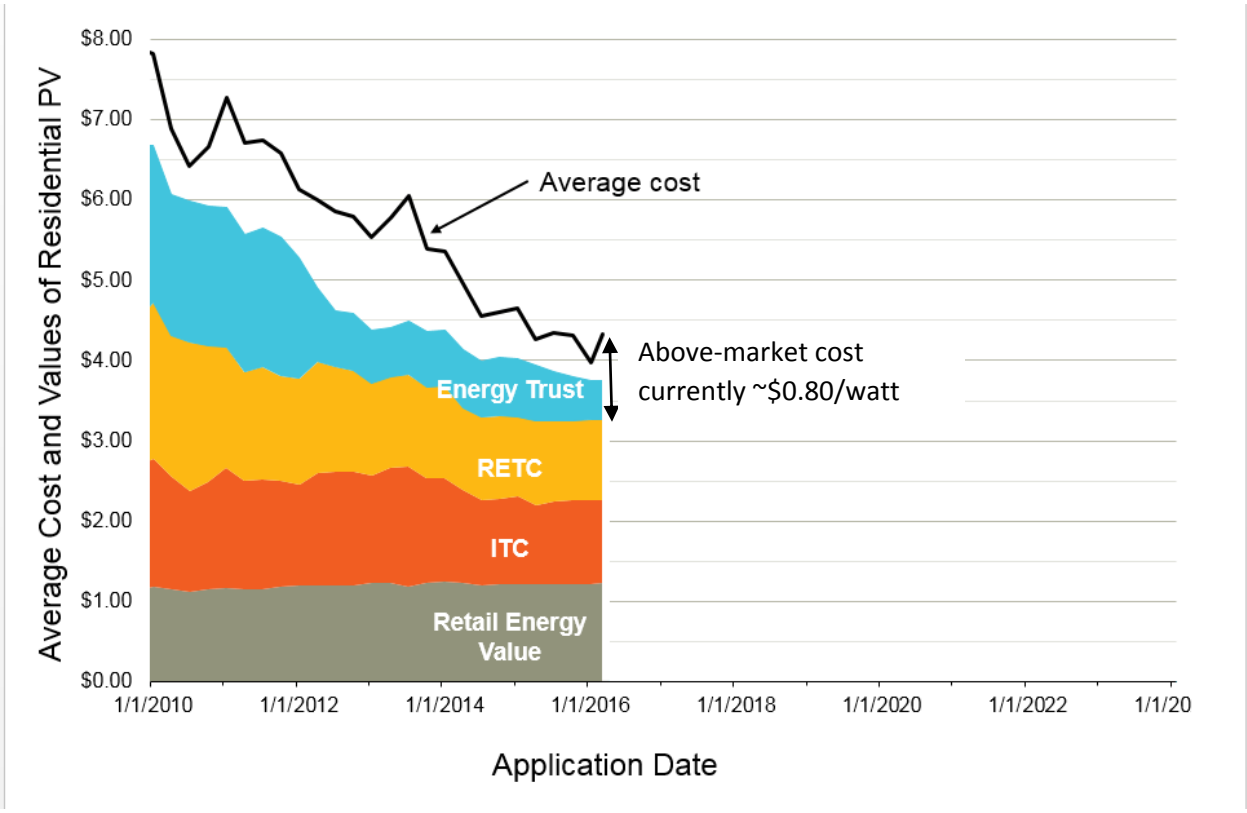
B. Community solar and its impact on the market:

Energy Trust is keeping an eye on "community solar" because it is a hot topic in renewable energy policy. Essentially, community solar provides a vehicle for multiple people to get power and/or financial benefit from solar projects. It is seen as a way for people without suitable roofs to participate in solar. How it will impact demand for our incentives, the marketplace, and trade allies' business models is unclear. The new Oregon Clean Electricity Act requires the OPUC to implement a community solar program that ensures 10% low-income participation. Much remains to be determined regarding community solar programs: ownership models, the bill credit rate, who will participate, marketing guidelines, interconnection issues, and more. While community solar holds promise, there is still much to be worked out before we start to see a rapid expansion in the market. In addition, the law requires that RECs stay with the project participants. This may preclude our involvement and will need to be examined. We do not see community solar as a risk. We will monitor its development to see when and/or how it will impact our budget planning and how much demand there is for community solar.

C. Unknowns regarding above-market cost

Energy Trust can use renewable funds only to pay the "above-market cost" of projects, i.e., the increment of a project's cost that exceeds the cost of energy from the grid. In the next few years, solar above-market cost could decline to zero or climb back to a level as high as it was five years ago. Solar prices have been steadily falling, yet we do not know if they will continue to fall, level out, or how tax credits and other incentives will affect project costs. Each of these is discussed below.

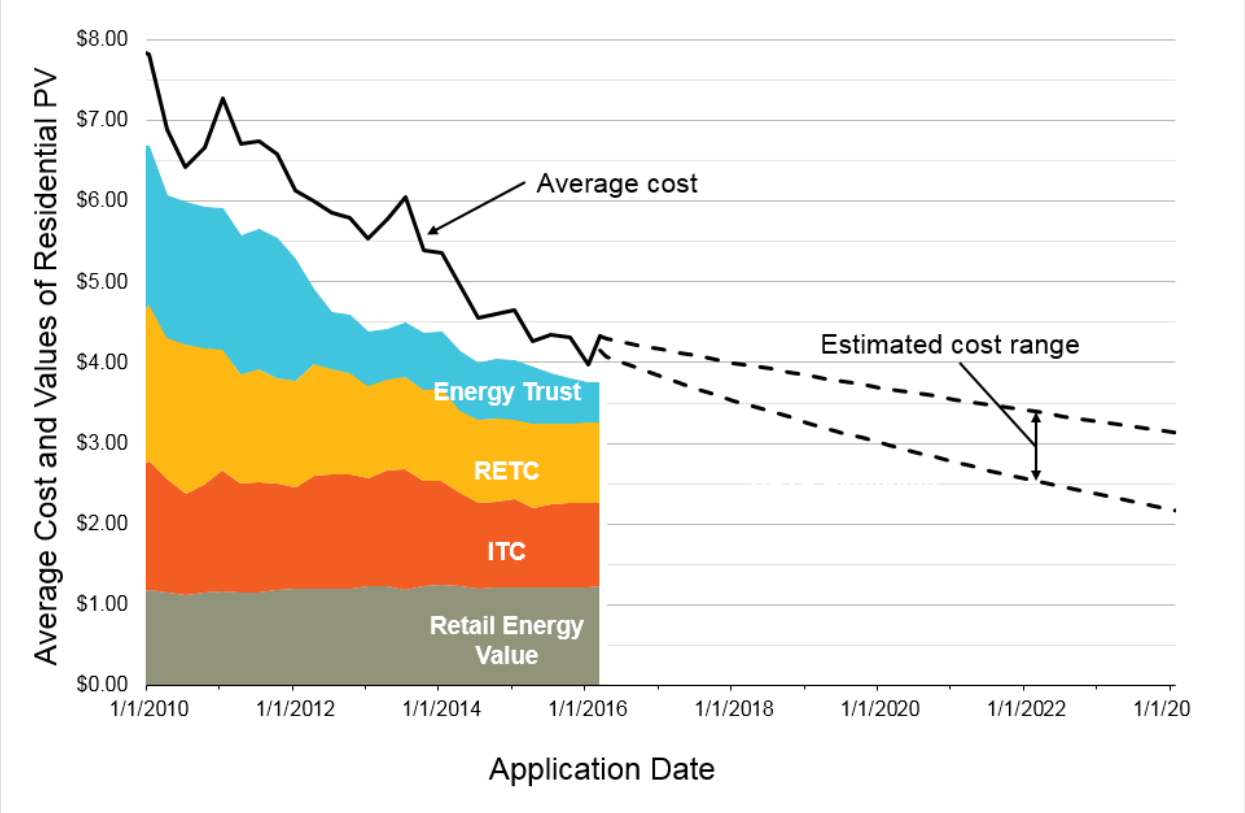
By way of background, Energy Trust's standard solar program has traditionally set incentive levels to cover 75% of the above-market cost of an average project. The 75% figure is based on our read of the market and customers' willingness and ability to cover upfront costs, it is not set in stone. The following chart shows how the above-market cost for residential solar has decreased over the past several years and where it stands today.



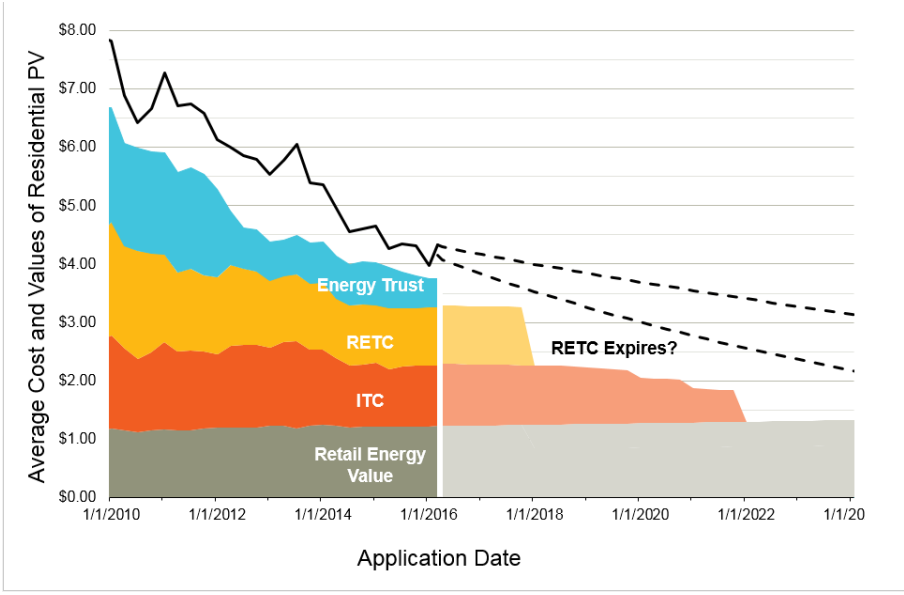
A year ago, we were anticipating the expiration of the investment tax credit (ITC) at the end of 2016, which would have increased the above-market cost of solar projects. In December 2015, however, the ITC was extended. It is now scheduled to stay at 30% through 2019 and then gradually ratchet down to 22% in 2021, expiring for residential solar at the end of 2021. The result is that above-market cost is smaller than we expected to it be at this time.

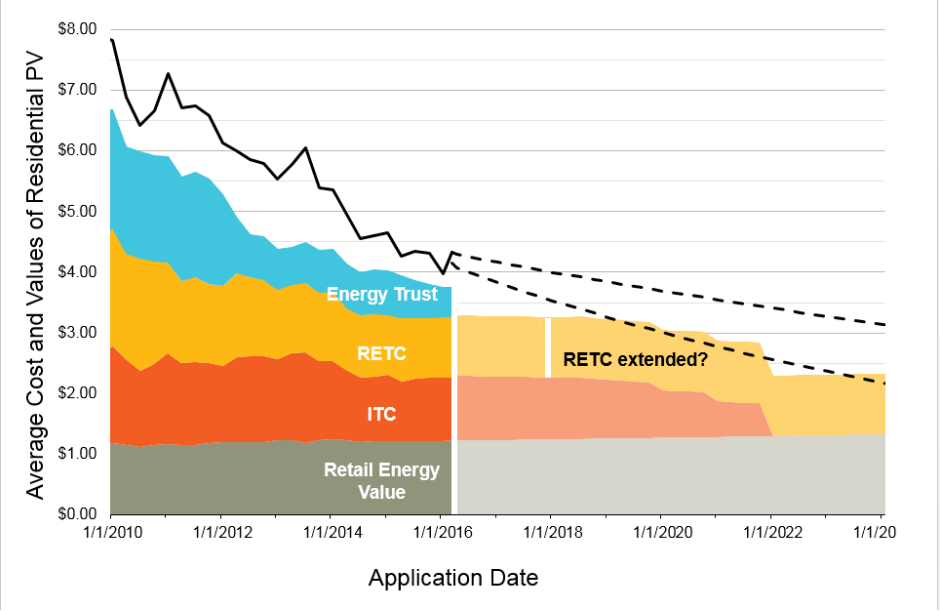
Several factors will influence the above-market cost in the coming two to three years:

- The rate at which solar prices decrease. Solar prices have fallen at about 8% per year for the past five years, producing a steady decrease in above-market cost. The solar program has responded by regularly lowering incentives. It is unclear if the market will continue to sustain that rapid rate of change. The following chart shows a range of reductions from the current 8% rate to a slower rate of 4% per year.

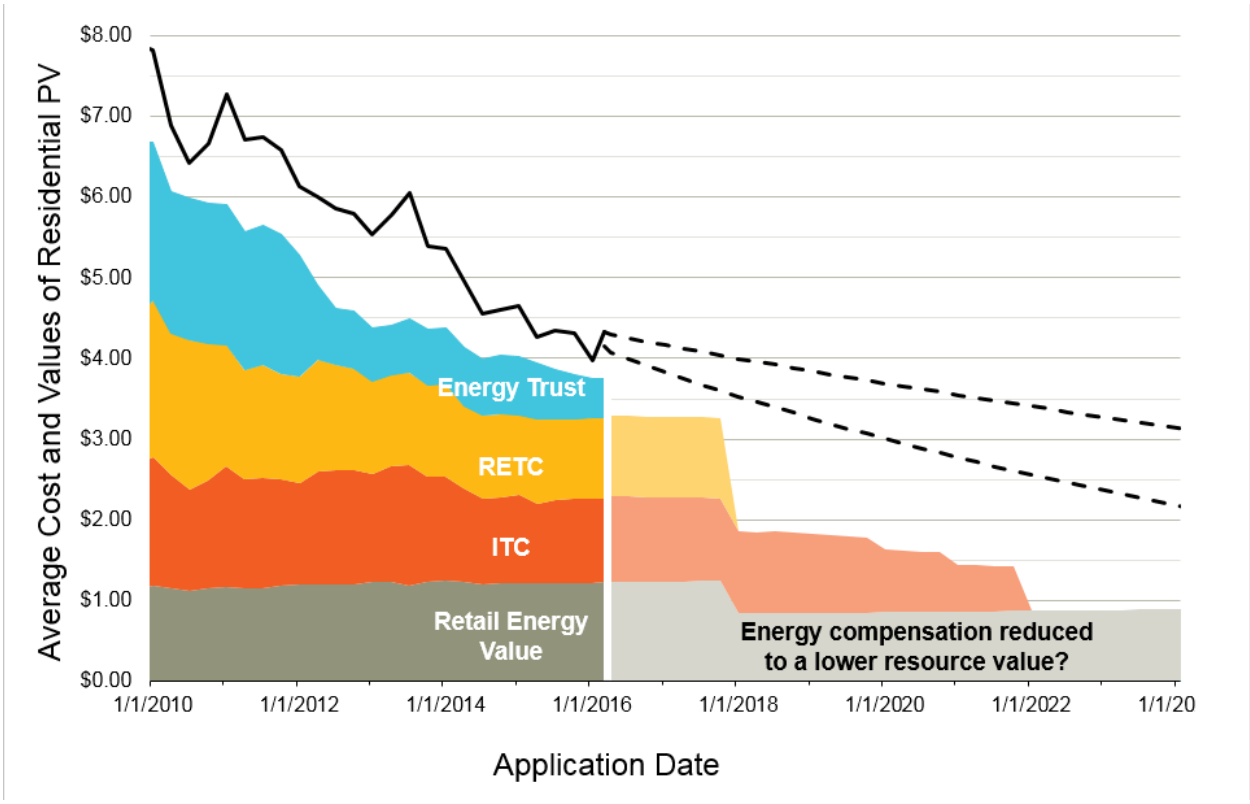


- Whether the Residential Energy Tax Credit (RETC) expires as scheduled, at the end of 2017, or is extended. The end of the RETC would increase above-market cost beginning in 2018. The following charts show the impact of a RETC extension on above-market cost.





- Potential change to net-metering. Currently, when customers upload power to grid when their solar energy systems are producing more than can be used on-site, they are credited at the retail rate. These credits are banked and can be used later in the year. Some states have lowered this credit. If Oregon does something similar perhaps in the Resource Value of Solar docket (UM 1716) discussed above, above-market cost could decrease as shown in the following chart (this models a 30% decrease in retail energy value as an example):



During 2016, staff will revisit the five-year strategic plan written two years ago to examine these scenarios and potential responses for different parts of the market. Strategies may include:

- Retaining the solar electric program for market segments where there is a significant above-market cost.
- Examining how above-market cost is defined for different customer groups and expanding our reach into low-income groups.
- Examining how incentive structures can help the grid and play a role in demand response – e.g. higher incentives for west-facing systems that match peak or working with projects to use solar and storage to shave peak and reduce demand charges.
- Increasing involvement with such things as demand management, smart inverters, solar+storage, and using solar to provide critical grid services such as peak-shaving and frequency regulation. (As noted in the demand response paper, Energy Trust is working with utilities on integrating utility demand management programs with Energy Trust's energy efficiency programs. Should we identify a significant role for on-site storage with renewables could play in grid management, it would most likely arise through discussion with and coordination with the electric utilities.)
- If and when it appears that the above market cost has permanently become too low for Energy Trust to offer incentives in one more markets, we will assess whether and how we play a role in assuring the ongoing health of the market.

3. Community resilience

Because of the many and varied influences on the solar market, it is important for us to be ready to serve the market in new ways. For that reason, we are thinking about where we move next in the market – where are the opportunities and how can we best serve communities and the renewable energy industry? Two factors may create an opportunity for Energy Trust to help communities meet important needs that can be well-served by renewable technology:

- Community interest in and planning for resilience
- Decreasing costs for energy storage and solar technology

In recent years, interest in resilience has increased sharply on the east coast, and it is building in Oregon. In this paper, "resilience" means the ability of individuals and institutions to function in the event of major disruptive events such as a large earthquake. Governments, homeowners, and businesses are currently planning for how they will respond to, survive, and move forward after a disaster that has the potential to disrupt electricity, water supplies, and transportation along with other important functions. East coast states are further along in their resilience planning, having ramped up these efforts after Hurricane Sandy. Interest in Oregon increased after a *New Yorker* article last summer talked about the devastation that would be caused by a Northwest earthquake – considered to be more of a "when" than an "if".

During an extended outage, homes and other buildings that choose to have back-up power have generally used diesel generators. However, attention started turning toward solar and storage instead because more than 50% of diesel generators failed after Sandy and access to liquid fuels after a disaster may be limited. Amplifying that interest is the fact that the cost of solar and storage has been falling dramatically. Unlike diesel generators which are only useful during an outage, solar and storage can potentially be used for a variety of purposes throughout the year for non-emergency functions such as peak-shaving, frequency-regulation, reducing demand charges, demand response, and grid services. This can help offset the cost of purchasing the solar and storage.

Energy Trust has been following the discussions about community resilience as interest in using solar and storage as preparedness tools has grown, along with interest in our playing a role. The question has come up at RAC meetings and has been posed by community planners. We have begun engaging with the city of Portland in order to learn about what is being planned and what role we might play. We plan to expand these conversations to other communities.

From our conversations and research, we have learned that there are a variety of ways that solar and storage or other technologies plus storage might be deployed in the context of resilience. These may include:

- Critical facilities – 911 centers, police and fire stations, wastewater plants, and hospitals
- Community gathering places – community centers, schools, faith-based buildings
- Homes – particularly those playing a key role in neighborhood preparedness efforts
- Housing for disabled populations and others who would have a particularly difficult time reaching gathering places or meeting their own needs.

While the concept is fairly simple – enable a building to use batteries to stay operational during an outage – there is still a distance to travel before we can begin developing and offering programs to meet community needs. Chief among these is that communities are still in their planning stages and the level of planning varies widely between communities. Some are much further along than others and electricity is just one of many issues they are planning for. Thus far there is far more interest in assuring that buildings, major transportation corridors and other infrastructure elements do not collapse or cause fire or other hazardous events. Energy resilience is definitely of interest to emergency planners but is overshadowed by these other issues at this point.

There are other challenges and questions that we will need to address in building resilience:

- Additional cost of islanding and wiring – Simply adding batteries to a building is not enough. It is unnecessary and too costly to power an entire building during an outage. The building owner must determine what subset of electrical needs are critical and wire those functions to a subpanel that can be islanded during an outage. In a new building, this wiring can be part of the construction process, but in an existing structure, rewiring involves a retrofit. This is more affordable for large needs and large solar or other renewable installations, and more problematic, for example, for homes or small facilities.

- Financing – Storage combined with renewables has become financially viable on the east coast in large part through public funding that augments the conventional sources of renewable funding. East coast projects also gain benefits by being used for other purposes in addition to resilience, such as selling grid services. These services have a much higher value on the East Coast, where there is a market for them. Because no such market exists in Oregon, storage would be less viable financially. Storage can be used to shift peak and reduce demand charges for commercial customers, which is helpful, but the full range of storage uses and benefits may be left untapped.

- Lack of experience with solar+storage – Although the technology is available, it has not yet been widely-used. Communities, trade allies, and utilities are still in the learning stage regarding control systems, best practices, and installation, although off-grid customers and solar trade allies who serve them have useful experience and knowledge. Energy Trust is pursuing demonstration projects to begin to develop institutional knowledge.

Because we are at the beginning of a learning curve in this area, we recommend that we continue to work with potential community partners, brief the board at intervals in 2016 and early 2017, and bring back a recommendation to the 2017 board retreat.

Energy Trust & Demand Response

Briefing Paper
Energy Trust & Demand Response

May 19 and 20, 2016

Summary

Demand for energy changes over the course of the day and the year. There is little demand in the middle of the night when people are sleeping and buildings are largely shut down, and demand surges in the morning and evenings when homes and businesses are using energy. Demand for energy also peaks in the summer and winter when cooling or heating needs are greatest.

Utilities must provide resources to meet the demand for energy at all times, instantaneously, even though some generating resources sit idle when demand is low. Building a system to meet peak demand is much more expensive than meeting average demand.

Demand response (DR) programs change the timing of energy use in order to reduce peak demands, redistribute energy use more evenly, and lower utility system costs. Utilities play a dominant role in many demand response measures – those that change the timing of energy use through contractual arrangements between utilities and customers. Utilities can also reduce demand with new technologies which allow consumers to adjust energy use based on the price of electricity, which varies with demand.

Energy Trust programs also help manage energy demand. Efficiency measures reduce demand by reducing energy consumption overall, including times of peak demand. Distributed wind and solar generation reduce demand for grid energy and can defer the need for new transmission or distribution lines.

In the past, there has not been enough economic value for utilities to invest much in demand response programs in Oregon or the rest of the Northwest. The economics are changing, however, as a consequence of increasing peak loads, increased saturation of renewable energy, and a hydropower system that is more constrained in its ability to balance system demands. The NW Power and Conservation Council's 7th Power Plan (the 7th Power Plan) identified a potential regional need to add 600 MW of demand response resources to meet winter peak by 2021 (see separate paper on the 7th Power Plan in this packet). In addition, Oregon's new Clean Electricity Plan explicitly requires electric utilities to plan for and pursue demand response resources.

Questions for the Board: This paper outlines what Energy Trust is doing now to explore our role in demand response programs, and planned next steps. The basic question we would ask the board is whether this level of effort seems about right. In addition, this briefing provides an opportunity to answer board questions.

Discussion

A. What is demand?

- Demand is the rate at which energy is delivered by a system or used by a customer at any given instant. Demand is measured in units of power, like kilowatts (kW) or megawatts (MW), whereas energy is measured in units that include a dimension of time, like kilowatt-hours (kWh) or megawatt-hours (MWh). If likened to travelling, energy is analogous to how far you have travelled while demand is the speed at which you are travelling at a given moment. Utilities are obligated to meet the demand for power at all times.

- Utilities can reduce demand through (i) the installation of energy efficient equipment, (ii) encouraging customers to reduce usage during times of peak demand through utility rate designs that make usage at those times more expensive, or (iii) demand response programs in which customers or utilities turn down or shut off equipment.[1]

B. Why is demand important?

- *When* energy is used is becoming increasingly important. In our interactions with PGE and Pacific Power, we have seen more focus and value placed on saving energy during peak times, like those in the early evening in the warmest and coldest months of the year. As a result, utilities have expressed interest in Energy Trust efficiency programs better quantifying reductions in power demand at times of peak usage.

- The Northwest Power and Conservation Council also looked at the value of energy savings during peak more closely in their 7th Power Plan, and as a result has targeted over 600 MW of demand response by 2021 to meet the Northwest's winter peak during critical water years (i.e., years of low streamflow when hydropower generation is most constrained). While utilities have had fairly simple programs to help large customers reduce peak loads for many years, there is new interest in more ways to reduce peak demand. This is a fairly new situation for the Northwest. Hydropower previously provided the ability to meet changing system needs; it is now less able to do so in light of load growth, increasing saturation of renewables,[2] and constraints imposed on hydropower to protect fish. The 7th Plan is reviewed in detail in a separate paper in the board retreat packet.

- There is also increasing discussion about how energy efficiency and/or demand response can help defer or avoid expensive new utility transmission and distribution projects.

C. Why this matters to Energy Trust

[1] Some of the programs in this third class are voluntary; others involve incentives for reducing loads.

[2] In addition to peak load reduction, there are opportunities to use end use equipment to help smooth out power system fluctuations that result from the intermittent nature of wind and solar resource.

Energy efficiency programs have the potential to help utilities address demand-related challenges by:

- **Providing more information on the value of peak energy savings:** Many energy efficiency measures save energy during times of peak demand. This value is already captured in the avoided cost used in calculating measure and program benefit-cost ratios. Energy Trust is taking several steps to improve the calculation of system demand reductions caused by energy efficiency measures. Energy Trust also intends to compare how we and the 7th Plan value the capacity benefits of energy efficiency measures.

- **Coordinating energy efficiency and demand response program delivery:** Energy efficiency and demand response programs often operate in separate silos even when both programs are being run by the same utility. New products, however, challenge this reality by providing both energy efficiency and demand benefits. Examples include products like the Nest thermostat, heat pump water heaters with built-in Wi-Fi and demand response capability, and control systems for commercial buildings. Coordinating energy efficiency and demand response programs for these products offers an opportunity to collaborate and strengthen our working relationship with utilities.

- **Sharing Customer Delivery Channels:** Energy Trust may be able to benefit to the utility system by increasing the saturation of efficient, demand response-capable equipment that can help reduce peak demand.

D. New opportunities

Energy Trust has tracked demand response activities in the Northwest, particularly since the board's review of this subject in 2008-2009.[3] Though it is widely used elsewhere, demand response has played a relatively modest role in Oregon, and the opportunity for Energy Trust efficiency programs to add value has been limited. As discussed above, Energy Trust now sees new opportunities to provide demand-response benefits to the utility system. This could take the form of incentives or services for demand response-capable equipment, or incentives for equipment that was not cost-effective on the basis of energy savings alone.

Energy Trust is also refining its ability to estimate the impacts of energy-saving measures on reducing peak demand. This will help Energy Trust better engage in discussions with utilities on options for deferring or eliminating future capital expenses to meet localized grid demands.

[3] The board held a workshop on January 22, 2009 after identifying demand response as an area of interest in its strategic plan review in 2008. At the time, demand response appeared to be limited by low power rates and the fact that the Northwest was not capacity-constrained. Higher rates and changes in capacity needs led the NW Power and Conservation Council to reevaluate the role of demand response in the 7th Plan, as noted above. For board members interested in the tenor of the 2008-2009 discussion, we have notes of the 2009 workshop.

In their comments on our 2016 budget, the OPUC asked Energy Trust to do the following:

- *Report the value of current program impacts more broadly, connecting to large grid efficiency contributions made.*
  - *Add expected winter and summer coincident peak capacity contribution estimates expected from energy goals for energy efficiency and renewable generation.*
  - *Work with utilities to identify where and how Energy Trust programs reduce demand on critical elements of the power delivery system.*
- *Assess data and tools needed to link utility grid objectives to specific Energy Trust actions. These might include:*
  - *Actionable information about opportunities to avoid specific grid investments.*
  - *Tools for linking the areas where investments are needed to demographic and load data for program targeting.*
  - *Possible enhancements to cost-effectiveness analyses considering capacity and other values to the grid.*
- *Identify 1-2 possible complementary pilots to achieve energy efficiency and equipment control to meet grid optimization objects, to be developed in coordination with utilities.*

E. Actions to date

The following actions have already been completed:

1. In modeling, Energy Trust has adopted the load shapes developed for the 7th Power Plan. These shapes are more granular and help identify how energy use and savings are distributed across the hours of a year. Energy Trust is also updating its data systems to report on peak-demand impacts of completed energy efficiency measures. We have also worked with each utility to define summer and winter peak periods of interest.

2. Energy Trust is discussing other demand-related topics with utilities:
   a. Initial discussions with PGE on how to assess the cost-effectiveness of equipment with energy efficiency and demand response value; and cross-program referrals for large commercial and industrial customers who may be good demand response candidates.
   b. PGE - NEEA discussions of heat pump water heater load management.
   c. Pacific Power plans for a demand response pilot for agricultural pumping loads in Oregon.
   d. Recent work with NW Natural quantifying benefits of gas savings delivered on days of peak usage. This work may reveal heating-system savings whose value was previously unquantified and mitigate cost-effectiveness challenges resulting from the declining price of natural gas. Work is also underway to determine whether energy efficiency

may help defer capital projects in NW Natural's distribution system in and around Salem.

e. Discussions with BPA on how "non-wires" alternatives like targeted energy efficiency could defer or eliminate transmission capacity capital projects.

Next Steps

Energy Trust has plans to complete or is considering the following steps:

1. Comparing the NW Power Council's valuation of energy efficiency's peak capacity benefits to Energy Trust's methodology to identify potential improvements.

2. Continue utility discussions outlined above to quantify the value for "DR-ready" and efficient equipment. Additional incentives or services enabled by the additional value considered in cost-effectiveness tests may avoid lost opportunities and build demand response resources. Coordinated programs using demand-capable thermostats or water heaters may help improve marketing and reduce costs.

3. Consider a referral structure for customers completing Strategic Energy Management programs for whom demand response may be a logical next step. These customers are aware of their energy usage, motivation, and management structure to make the most of their energy opportunities.

4. Continue to work with utilities on projects combining energy efficiency with local generation and demand response to defer or avoid capital projects in areas with grid constraints. Such areas would need to be identified several years in advance so program(s) to defer the investment could be planned and implemented in time.

Residential Sector

Briefing Paper
Residential Sector Strategic Issues and Opportunities

May 19 and 20, 2016

SUMMARY

For several years, we have projected that annual energy savings would level off and then decline starting in 2015 or 2016. In adapting the Energy Trust 2015-2019 strategic plan to the residential sector, we have begun to see this trend clearly, due to several factors:

- Fewer measures are cost-effective as the cost of natural gas continues to decline;
- Tighter energy codes and standards;
- Measure saturation, i.e., the residential sector has delivered low-cost energy savings for decades, and remaining savings are more costly;
- Customers are installing efficient lighting measures faster than anticipated, suggesting significant declines in program savings in the longer term.

The challenge to the residential sector is to offset the accelerated speed at which residential savings are likely to decline, by lowering program costs, attracting new participants and identifying new methods and technologies.

Although our thinking is still preliminary, program realignment is likely to involve shifting to a model where savings come from more "upstream" measures than is the case now, i.e., from equipment and services provided by retailers and distributors rather than Energy Trust. In this model, Energy Trust would have considerably less direct interaction with residential energy users and be much less visible to consumers. We have already moved in this direction via online home-energy evaluations and other online tools that lower delivery costs, speed decision-making and make transactions more efficient. These efficiencies may come at the expense of customers who need or prefer more direct and interactive customer service.

We also plan to reevaluate residential sector savings goals to reflect achievable savings.

Questions for the Board: This is primarily a progress report on the analytical and planning work that is underway. You will see the results of our efforts more concretely in the next annual budget and two-year action plan. For purposes of the retreat, we want to give you a sense of the significance of the challenges in this area and ask whether you are comfortable with the steps we are taking to address them.

ANALYSIS

1. Residential sector strategic plan

In July 2015, a sector plan was developed outlining how the residential sector could implement the 2015-2019 Energy Trust strategic plan. The sector plan included program history, structure, challenges/barriers, and key strategies to address the challenges/barriers identified, as follows:

A. Challenges and Barriers:

- Cost-effectiveness: Low avoided costs, higher implementation costs and declining savings from existing measures could eliminate key program measures, based on cost-effectiveness criteria.
- Market changes: Measure saturation, new codes and standards and market transformation are expected to reduce savings from key measures such as lighting and showerheads. Market acceptance of LEDs appears to be transforming the residential lighting market ahead of new federal lighting standards, which are expected to be fully implemented in 2020. For showerheads, market saturation is beginning to limit program options.
- Aligning program structure with the resource: The current structure of programs, which uses individual PMCs to deliver savings in new homes, existing homes, and products makes it challenging to develop a comprehensive strategy across technologies. This structure also results in duplicate elements of program delivery.
- Expanded participation: Expanding geographic reach and offerings for a wider range of customer groups while lowering costs will be a challenge. These goals may be at odds, depending on how programs are designed.

B. Key strategies:

- Meeting sector savings goals through 2019: The residential programs expect to meet Energy Trust's five-year savings goals. In the near term, we expect savings goals to be dominated by lighting and showerheads/aerators, and in the longer term success will come from high-savings measures including water heating, space heating, and new construction.
- Aligning program structure to resource potential: Residential programs should orient programs around technologies and market channels that evolve with resource availability and reduce program delivery costs.
- New measure development: Energy Trust should expand our internal capacity to identify, pilot, and introduce new measures to the residential portfolio and work with NEEA to fill the pipeline for gas and electric technologies and use pilots to test new measures or delivery strategies with cost-effective potential.
- Expanded participation: Energy Trust will reach new and non-participating customers with compelling opportunities, targeted electronic offers, online shopping tools, and a broad retail presence.

C. Progress report: We began to implement these strategies two years ago.

- The sector responded to cost-effectiveness challenges (most notably in the Existing Homes program) by reducing delivery costs, capping incentives, and streamlining processing and reporting requirements.
- To improve energy savings and coordination between programs, we launched an effort to develop new measures and expand measures across all programs instead of maintaining a narrow focus within each program. In 2015, the sector created a new thermostat measure in Existing Homes and Products in which each PMC shared development steps and the sector focused on how to maximize savings from the new technology across programs.

- We have expanded participation in programs by, for example, adding retail partners to support lighting and water-savings devices in rural areas, and coordinating outreach between the Existing and New Homes programs in rural areas.

2. A More Comprehensive Approach to Implementation

In the fall of 2015, the residential sector began to reevaluate the above strategies. While our thinking is still evolving, these are our preliminary observations:

A. Sector savings goals

In the residential strategic plan, we indicated that we expected to meet our five-year savings goals. We expected to achieve electric goals by relying on lighting and appliance recycling, heating systems, and growing savings in tank water heaters. Gas savings would rely on showerheads, aerators, new construction, and growing savings in tank water heaters.

More recent analysis calls this strategy into question. Five-year savings for lighting and showerheads in particular are at risk. The impacts of measure saturation, changes to codes and standards, and penetration of LEDs in the residential market appear to be sooner, faster and larger than previously thought.

To better understand these impact on longer-term goals, residential sector and planning department staff agreed to develop a five-year forecast for key measures. This analysis addresses three measure categories:

- Measures expected to decline over the next five-year period;
- Measures that will increase or continue to perform at predictable savings levels;
- New and emerging measures that are expected to add to savings during the five-year period.

We expect this analysis to advance our understanding of savings through 2020. We will review the analysis with external parties including Energy Trust PMCs, BPA, the Power Council, the RTF, and other program implementers. We expect the analysis to be completed in late May, 2016.

The residential sector is focused on completing this review before reviewing other structural changes to the program. Understanding the magnitude of these changes will be key to crafting strategies that will best fit the savings opportunities for the sector.

B. Program structure

Program design is determined by resource potential, savings value, delivery costs, market characterization and participation goals. In the sector plan, we indicated that all of these criteria were driving consideration of new program design options. Once our review of five-year savings goals is complete, we will evaluate whether and how best to restructure the sector.
This review is expected to take place in the second quarter of 2016, and an initial review of proposed actions completed by the end of the third quarter.

At this stage, we anticipate changes that move us away from our current “siloed” program structure and toward programs organized around technology. As noted above, our current approach may result in duplication of services and challenges our ability to focus strategies on

key technologies. We anticipate that focusing on technologies will leverage wider expertise and help us to reach more savings with a given technology or market channel. We think this will lower costs, decrease duplication and better adapt to changes in resource potential.

We also expect to move toward mid- and up-stream engagement and away from customer-facing incentives. This strategy is expected to reduce program costs, improve cost-effectiveness and nudge consumers to buy efficient equipment. This approach will change the way we engage with consumers and residential customers. As part of this restructuring, we expect to address our role in advising and educating residential customers on energy use in homes.

This structural review is expected to take place this summer, and bring any policy implications to the board as they arise.

C. Transition planning

Once the sector structure review is complete and decisions are made on new or amended program designs, a transition team will begin implementation in 2017. The details of this transition will be developed when the proposed changes are determined. Depending on the scope of the proposed changes, the transition is expected to extend into 2018.

This process will address internal and external impacts. Internal transition plans will likely focus on impacts to support department (CCS, Finance, IT, Planning, etc.) and changes in the sector itself. Externally, we expect to engage utilities, PUC, PMCs, trade allies, program participants and other stakeholders. The transition could affect services provided by PMCs and likely would be phased as existing contracts expire.

D. Communications Plan

This process will require extensive communication across the organization and externally. A communications plan will support the three steps outlined above, provide a mechanism for feedback, and report on changes in program design and delivery as we transition to new program operations.

Briefing Paper
Energy Trust as Educator

May 19 and 20, 2016

Summary
This paper provides an overview of Energy Trust's current approach to investing in educational programs, activities, and resources, and proposes we broaden our investment going forward.

Currently, the vast majority of Energy Trust's investment in educational activities is intended to deliver savings and generation within a short, measureable time-frame. Most education investment decisions are made under program requirements for delivering cost-effective savings. By broadening our investment consideration to include more educational activities and resources designed to deliver savings and generation over the long-term, Energy Trust will:

- Provide stable and consistent access to information and resources to help customers understand energy efficiency and renewable energy benefits and opportunities. This is particularly important as Energy Trust evolves program offers as a result of cost-effectiveness limitations in the residential sector, and potentially in other sectors in the future.
- Support the strategic plan objective of expanding participation among customers who have yet to participate in Energy Trust offers because they may require more knowledge of energy efficiency or renewable energy to take action.
- Develop customer readiness in a complex energy landscape where they have more choices for where to invest time and money when making energy-related decisions. This may become more important as customers are considering energy efficiency, renewable energy, community-solar, electric vehicle, and even demand response or storage options.

Questions for the Board: Staff is seeking the board's feedback on the proposal to broaden our approach to investment in educational programming, giving more consideration in the future to supporting activities that inform and engage customers as a long-term pathway to the delivery of savings and generation. The paper identifies four possible ways we could expand general education investment. Staff would like the board's thoughts on these and any others that would increase customer knowledge about energy efficiency and renewable energy and help Energy Trust achieve its goals over time.

Background
Over fourteen years, Energy Trust has designed various efforts to engage customers through activities that support investment in energy efficiency and renewable energy improvements. For the purposes of this paper we consider education to be a set of activities specifically designed to increase understanding, skills or knowledge among those we serve. By contrast, marketing and outreach are activities primarily designed to drive awareness of and participation in program offers.

In the industrial and commercial sectors, Energy Trust currently employs educational offerings as a fundamental program path to behavioral and measure-based savings. The residential and renewable sectors have also pursued education as a method to drive program activity, although

cost constraints in recent years have resulted in elimination of some educational approaches in the residential sector.

Below are some examples of past or current efforts to demonstrate the range of purposes and benefits of the activities. Expected outcomes range from immediate to near-term measureable savings. All are included in program cost-effectiveness calculations and evaluations.

Program education efforts designed for direct savings results in the short-term:

- Strategic Energy Management, SEM – provides training, technical support and tools to customer staff. Working with Energy Trust, employees learn how to systematically reduce the energy intensity of the facility and maximize energy savings. SEM is delivered through a cohort of participants, which is a core element of industrial sector savings and a growing element of commercial sector savings.
- Builder Operator Certification trainings – these technical training webinars for commercial building operators deliver savings in the commercial sector.
- LivingWise kits for school classrooms – kits come with a sixth grade math and science curriculum, as well as energy-saving products to install in the home as part of the learning activities.

Program education efforts designed for near-term savings/generation results:

- Contractor and program ally trainings – trainings to build a network of contractors and professionals able to successfully engage customers in offers.
- Employer energy fairs – on-site employer engagement by Energy Trust with employees, typically to promote residential offers, and used to further reinforce energy-saving behavior at work.
- Home Energy Review – a full review of energy-efficiency opportunities in a home, previously provided in-home, online, and over the phone. Now available on-line and in special cases over the phone.
- Solarize—efforts that join neighbors together to learn about going solar through free group workshops and bulk purchasing to accelerate decision-making and minimize barriers to adoption.

In addition, Energy Trust provides modest funding to support activities that are educational in nature and designed to engage customers and deliver savings and generation over time. These efforts leverage Energy Trust's role as an expert resource for energy efficiency and renewable energy development, which has benefit for future customer engagement.

Below are some examples of past or current efforts to demonstrate the range of purposes and benefits of the activities. In those instances where savings and generation are an eventual outcome, the specific educational activity may not be traceable back to a specific program or be documented in a future evaluation.

General education efforts designed to increase understanding, skills or knowledge and potentially results over the long-term:

- Educational presentations on energy efficiency and renewable energy – leveraging program knowledge to engage with customers and the general public, most often in response to a request.

- Kill-a-watt energy monitors and learning materials available for check-out in libraries around the state.
- Support for community energy planning efforts that include education objective and may lead to identifying and advancing specific energy efficiency or renewable energy projects for multiple customers.
- Onsite energy kiosks or monitors that show project savings or generation; these tend to be popular with schools and we have partnered with other entities to support their installation.
- Educational web content – information on Energy Trust's website that provides context and background beyond direct services or offers; builds knowledge or understanding but may not necessarily drive to an action step.

While the lion's share of education investment decisions are currently made under program requirements for delivering cost-effective savings and renewable generation, Energy Trust's grant agreement with the Oregon Public Utility Commission references educational programs as activities that need not be restricted by cost-effectiveness limitations:

> *"Conservation programs will be designed to be cost effective and will be independently evaluated on a regular basis. This guideline should not, however, restrict investment in pilot projects, educational programs, demonstrations, or similar endeavors. After consideration of the sources of public purpose funding, all classes of electricity users and their related geographic areas should benefit from conservation and renewable program expenditures."*

Proposal
Below are several options for potential expansion. We are interested in the board's thoughts on these and any others that would increase understanding, skills or knowledge of energy efficiency and renewable energy and help Energy Trust achieve its goals over time.

- Expand support for community- or partner-driven initiatives delivering educational content through events, materials, online resources and other methods.
- Resume or expand activities previously offered for savings as educational offerings to increase understanding, skills or knowledge.
- Expand partnerships with educational institutions such as K-12 schools, community colleges and universities. This could include presentations, scholarships for specific areas of study, and additional student internships at Energy Trust.
- Implement a broad campaign that increases customer knowledge of energy efficiency and renewable energy.

Considerations:
If Energy Trust expands investment in general education, there will be considerations for how to budget and account for costs and how to determine effectiveness.

a. Accounting for the costs

Increasing investment in customer education—with the purpose of informing and engaging customers as future, potential contributors to savings and generation—would increase Energy Trust costs, whether in program or general budgets. If the education activities are targeted to specific customer types they would be considered program costs. How they are considered for the purposes of measuring program cost/benefit and

levelized cost of savings or generation would need to be considered. If the costs are targeted to multiple customer types or all customers generally, they would be considered general costs and would be factored into administrative costs allowed by the OPUC.

b. Evaluation considerations

Some educational efforts yield immediate, measurable results, and others yield results that span years and are more difficult to quantify.

There is a long history of broad educational campaigns for efficiency and renewable energy in the US, and very limited documentation on their impact on actual efficiency and renewable energy actions. Education which leads to direct, measurable savings and generation is almost by definition a different activity, one which we engage in already in some of our programs (see above). It is well understood that knowledge and action are not always correlated. Last year's evaluation of solar energy workshops provided one extreme example. Some participants felt that they had engaged in the green energy movement by going to a workshop, and had no need to take further action.

This leads to an important choice. If we were to expand our investment in educational programming, outside the current short term savings-based, cost-effectiveness program design boundaries, we could also endeavor to:

- Determine the effectiveness of any education program on awareness, engagement, participant satisfaction, and other secondary indicators, but not on direct energy savings and generation.
- Seek education opportunities where, though the educational purposes are broad, we can trace ensuing participation in or other direct benefit to Energy Trust programs over multiple years.

The latter course would considerably narrow options, and might also increase the cost of the initiative.

Next steps:
If the Board has interest in this expanded education approach, Energy Trust would assess methods of offering additional general education. Methods would be considered based on potential to expand customer participation over the long term, provide stability over time as program offers evolve, and develop customer readiness for future energy opportunities. Approach to budgeting and evaluating efforts would be also be considered. Proposals for new or expanded general educational programming would be developed and highlighted for the board in 2017 and 2018 budget and action plans.

Mercy Corps Building

MERCY CORPS GLOBAL HEADQUARTERS

PROJECT-AT-A-GLANCE

Overview

- 40,000 square foot expansion 42,000 square foot renovation/ restoration
- Completed in 2009
- Certified LEED® Platinum

Estimated Savings

- 92,100 annual kilowatt hours
- 24,500 annual therms
- $36,400 Energy Trust cash incentive

Awards

2012

- American Institute of Architects Committee on the Environment COTE Top Ten Green Project

2011

- Architectural Record's Good Design is Good Business Award
- Best Historic Rehabilitation Involving New Construction: "Timmy" Award

Project Contributors

- Hacker Architects (Formerly THA)
- Glumac

The new Mercy Corps Global Headquarters in Portland is a place of action. It is designed to invite, teach and encourage visitors—especially students—to get involved in answering the great world challenges of our day: poverty, hunger and conflict.

The organization's new headquarters exemplifies its sustainable, community-focused approach. The project restored and doubled the size of the Packer-Scott Building, a historic Portland landmark, and features a green roof, glass sunscreen shades that provide alternative power, low-flow fixtures and resource-friendly landscaping.

The headquarters also includes the Action Center with interactive exhibits that educate visitors about the constantly changing nature of relief and development work and provide suggestions for concrete ways people can act now to help.

Sustainable Design Highlights:

- Restoration and/or reuse of 75 percent of the existing Packer-Scott building
- 35 percent of the building's energy supplied with green power
- Reduced use of potable water by 50 percent for irrigation and 75 percent for flush and flow fixtures
- Onsite filtration of stormwater runoff through bioswales
- Solar electric integrated glass sunscreens that shade southern-exposed glass and provide alternative power
- Energy-efficient features reduce energy use by 30 percent
  - Variable Refrigerant Flow HVAC system
  - 100 percent outside air makeup air system
  - Daylighting
  - Improved envelope insulation
  - Improved windows
  - 79-kilowatt solar electric system
- Full building commissioning and monitoring & verification

Source: Hacker Architects www.hackerarchitects.com/mercy-corps-global-headquarters#

Glossary

Glossary of Terms Related to Energy Trust of Oregon's Work

Glossary provided to the Energy Trust Board of Directors for general use. Definitions and acronyms are compiled from a variety of resources. Energy Trust policies on topics related to any definitions listed below should be referenced for the most current and comprehensive information. Last updated July 2015.

Above-Market Costs of New Renewable Energy Resources
The portion of the net present value cost of producing power (including fixed and operating costs, delivery, overhead and profit) from a new renewable energy resource that exceeds the market value of an equivalent quantity and distribution (across peak and off-peak periods and seasonally) of power from a nondifferentiated source, with the same term of contract. Energy Trust board policy specifies the methodology for calculating above-market costs. *Reference the Board Cost-Effectiveness Policy and General Methodology*

Aggregate
Combining retail electricity consumers into a buying group for the purchase of electricity and related services. "Aggregator" is an entity that aggregates.

Air Sealing (Infiltration Control)
Conservation measures, such as caulking, efficient windows and weatherstripping, which reduce the amount of cold air entering or warm air escaping a building.

Ampere (Amp)
The unit of measure that tells how much electricity flows through a conductor. It is like using cubic feet per second to measure the flow of water. For example, a 1,200 watt, 120-volt hair dryer pulls 10 amperes of electric current (watts divided by volts).

Anaerobic Digestion
A biochemical process by which organic matter is decomposed by bacteria in the absence of oxygen, producing methane and other byproducts.

Average Megawatt (aMW)
One megawatt of capacity produced continuously over a period of one year. 1 aMW equals 1 megawatt multiplied by the 8,760 hours in a year. 1 aMW equals 8,760 MWh or 8,760,000 kWh.

Avoided Cost
(Regulatory) The amount of money that an electric utility would need to spend for the next increment of electric generation they would need to either produce or purchase if not for the reduction in demand due to energy-efficiency savings or the energy that a co-generator or small-power producer provides. Federal law establishes broad guidelines for determining how much a qualifying facility (QF) gets paid for power sold to the utility.

Base Load
The minimum amount of electric power delivered or required over a given period of time at a steady rate.

Benefit/Cost Ratios
By law, Oregon public purpose funds may be invested only in cost-effective energy-efficiency measures—that is, efficiency measures must cost less than acquiring the energy from conventional sources, unless exempted by the OPUC.

Energy Trust calculates benefit/cost ratios (BCR) on a prospective and retrospective basis. Looking forward, all prescriptive measures and custom projects must have a total resource cost test BCR > 1.0 unless the OPUC has approved an exception. As required in the OPUC grant agreement, Energy Trust reports annually how cost-effective programs were by comparing total costs to benefits, which also need to exceed 1.0.

Biomass
Solid organic wastes from wood, forest or field residues which can be heated to produce energy to power an electric generator.

Biomass Gas
A medium Btu gas containing methane and carbon dioxide, resulting from the action of microorganisms on organic materials such as a landfill.

Blower Door
Home Performance test conducted by a contractor (or energy auditor) to evaluate a home's air tightness. During this test a powerful fan mounts into the frame of an exterior door and pulls air out of the house to lower the inside air pressure. While the fan operates, the contractor can determine the house's air infiltration rate and better identify specific leaks around the house.

British Thermal Unit (Btu)
The standard measure of heat energy. The quantity of heat required to raise the temperature of 1 pound of liquid water by 1 degree Fahrenheit at the temperature at which water has its greatest density (approximately 39 degrees Fahrenheit).

Cogeneration (Combined Heat and Power, CHP)
The sequential production of electricity and useful thermal energy, often by the recovery of reject heat from an electric generating plant for use in industrial processes, space or water heating applications. Conversely, may occur by using reject heat from industrial processes to power an electricity generator. *Reference the Board Combined Heat and Power Policy*

Compact Fluorescent Light Bulbs (CFL)
CFLs combine the efficiency of fluorescent lighting with the convenience of a standard incandescent bulb. There are many styles of compact fluorescent, including exit light fixtures and floodlights (lamps containing reflectors). CFLs are designed for residential uses; they are also used in table lamps, wall sconces, and hall and ceiling fixtures of hotels, motels, hospitals and other types of commercial buildings with residential-type applications.

Conservation
While not specifically defined in the law or OPUC rules on direct access regulation, "conservation" is defined in the OPUC rule 860-027-0310(1)(a) as follows: Conservation means any reduction in electric power or natural gas consumption as the result of increases in efficiency of energy use, production or distribution. Conservation also includes cost-effective fuel switching.

Although fuel switching is part of the definition, this aspect of the rule has not been operationalized as of March 2013.

Cost Effective
Not specifically defined in SB 1149. The OPUC has a definition which refers to a definition from ORS 469.631 (4) stating that an energy resource, facility or conservation measure during its life cycle results in delivered power costs to the ultimate consumer no greater than the comparable incremental cost of the least-cost alternative new energy resource, facility or conservation measure. Cost comparison under this definition shall include but not be limited to: (a) cost escalations and future availability of fuels; (b) waste disposal and decommissioning cost; (c) transmission and distribution costs; (d) geographic, climatic and other differences in the state; and (e) environmental impact. ORS 757.612 (4) (SB 1149) exempts utilities from the requirements of ORS 469.631 to 469.645 when the public purpose charge is implemented.

By law, Oregon public purpose funds may be invested only in cost-effective energy-efficiency measures—that is, efficiency measures must cost less than acquiring the energy from conventional sources, unless exempted by the OPUC. *Reference the Board Cost-Effectiveness Policy and General Methodology*

Cumulative Savings
Sum of the total annual energy savings over a certain time frame while accounting for measure savings "lives." (For example, if a measure is installed for each of two years, the cumulative savings would be the sum of the measure installed in the first year, plus the incremental savings from the savings installed in the second year plus the savings in the second year from the measure installed in the first year.)

Decoupling
A rate provision which reduces or eliminates the degree to which utility profits are driven by the volume of electricity or gas sold. Decoupling is thought by its proponents to reduce utility disincentives to support efficiency. There are many specific variants employed in different states and with different utilities.

Direct Access
The ability of a retail electricity consumer to purchase electricity and certain ancillary services from an entity other than the distribution utility.

Economizer Air
A ducting arrangement and automatic control system that allows a heating, ventilation and air conditioning (HVAC) system to supply up to 100 percent outside air to satisfy cooling demands, even if additional mechanical cooling is required.

Energy Management System (EMS)
A system designed to monitor and control building equipment. An EMS can often be used to monitor energy use in a facility, track the performance of various building systems and control the operations of equipment.

ENERGY STAR®
ENERGY STAR is a joint Environmental Protection Agency and Department of Energy program that encourages energy conservation by improving the energy efficiency of a wide range of consumer and commercial products, enhancing energy efficiency in buildings and promoting energy management planning for businesses and other organizations.

Energy Use Intensity (EUI)
A metric that describes a building's energy use relative to its size. It is the total annual energy consumption (kBtu) divided by the total floor space of the building. EUI varies significantly by building type and by the efficiency of the building.

Enthalpy
Enthalpy is the useful energy or total heat content of a fluid. Ideally, the total enthalpy of a substance is the amount of useful work that substance can do. Enthalpy is used in fluid dynamics and thermodynamics when calculating properties of fluids as they change temperature, pressure and phase (e.g. liquid to liquid-vapor mixture). In HVAC, refrigeration and power cycle processes, enthalpy is used extensively in calculating properties of the refrigerant or working fluid. Additionally, in HVAC applications, enthalpy is used in calculations relating to humidity. An enthalpy economizer is a piece of HVAC equipment that modulates the amount of outdoor air entering into a ventilation system based on outdoor temperature and humidity.

Environmental Protection Agency (EPA)
Founded in 1970, this independent agency was designed to "protect human health and safeguard the natural environment." It regulates a variety of different types of emissions, including greenhouse gases emitted in energy use. It runs several national end-use programs, like ENERGY STAR, SmartWay, Smart Growth programs and green communities programs.

Evaluation
After-the-fact analysis of the effectiveness and results of programs. *Process and Market Evaluations* study the markets to be addressed and the effectiveness of the program strategy, design and implementation. They are used primarily to improve programs. *Impact evaluations* use post-installation data to improve estimates of energy savings and renewable energy generated.

Feed-in Tariff
A renewable energy policy that typically offers a guarantee of payments to project owners for the total amount of renewable electricity they produce, access to the grid and stable, long-term contracts. In Oregon, the pilot program was called the Volumetric Incentive Rate program and each investor-owned utility in the state ran separate programs. Solar systems receiving a feed-in tariff rate were not eligible for Energy Trust incentives or a state tax credit.

Footcandle
A unit of illuminance on a surface that is one foot from a uniform point source of light of one candle and is equal to one lumen per square foot

Free Rider
This evaluation term describes energy efficiency program participants who would have taken the recommended actions on their own, even if the program did not exist. Process evaluations include participant survey questions, which lead to the quantification of the level of free rider impacts on programs that is applied as a discounting factor to Energy Trust reported results.

Geothermal
Useful energy derived from the natural heat of the earth as manifested by hot rocks, hot water, hot brines or steam.

Green Tags (Renewable Energy Certificates or RECs)
See the Renewable Energy Certificates entry.

Gross Savings
Savings that are unadjusted for evaluation factors of free riders, spillover and savings realization rates. Energy Trust reports all savings in net terms, not gross terms, unless otherwise stated in the publication.

Heat Pump
An HVAC system that works as a two-way air conditioner, moving heat outside in the summer and reusing heat from the cold outdoors with an electrical system in the winter. Most systems use forced warm-air delivery systems to move heated air throughout the house.

Heating, Ventilation and Air Conditioning (HVAC)
Mechanical systems that provide thermal comfort and air quality in an indoor space. They are often grouped together because they are generally interconnected. HVAC systems include central air conditioners, heat pumps, furnaces, boilers, rooftop units, chillers and packaged systems.

Hydroelectric Power (Hydropower)
The generation of electricity using falling water to turn turbo-electric generators.

Incremental Annual Savings
Energy savings in one year corresponding to the energy-efficiency measures implemented in that same year.

Incremental Cost
The difference in cost relative to a base case, including equipment and labor cost.

Instant-savings Measure (ISM)
Inexpensive energy-efficiency products installed at no charge, such as CFLs, low-flow showerheads and high-performance faucet aerators. Predominately used by the Existing Homes program and multifamily track to provide homeowners and renters with easy-to-install, energy-saving products.

Integrated Resources Planning (Least-Cost Planning)
A power-planning strategy that takes into account all available and reliable resources to meet current and future loads. This strategy is employed by each of the utilities served by Energy Trust, and for the region's electric system by the Northwest Power and Conservation Council. The term "least-cost" refers to all costs, including capital, labor, fuel, maintenance, decommissioning, known environmental impacts and difficult to quantify ramifications of selecting one resource over another.

Interconnection
For all distributed generation—solar, wind, CHP, fuel cells, etc.—interconnection with the local electric grid provides back-up power and an opportunity to participate in net-metering and sell-back schemes when they are available. It's important to most distributed generation projects to be interconnected with the grid, but adding small generators at spots along an electric grid can produce a number of safety concerns and other operational issues for a utility. Utilities, then, generally work with their state-level regulatory bodies to develop interconnection standards that clearly delineate the manner in which distributed generation systems may be interconnected.

Joule
A unit of work or energy equal to the amount of work done when the point of application of force of 1 newton is displaced 1 meter in the direction of the force. It takes 1,055 joules to equal a Btu. It takes about 1 million joules to make a pot of coffee.

Kilowatt
One thousand (1,000) watts. A unit of measure of the amount of electricity needed to operate given equipment.

Large Customers (with reference to SB 838)
Customers using more than 1 aMW of electricity a year are not required to pay electric conservation charges under SB 838. Additionally, Energy Trust may not provide them with services funded under SB 838 provisions.

Least Cost
The term “least-cost” refers to all costs, including capital, labor, fuel, maintenance, decommissioning, known environmental impacts and difficult to quantify ramifications of selecting one resource over another.

Levelized Cost
The level of payment necessary each year to recover the total investment and interest payments (at a specified interest rate) over the life of the measure.

Local Energy Conservation
Conservation measures, projects or programs that are installed or implemented within the service territory of an electric company.

Low-income Weatherization
Repairs, weatherization and installation of energy-efficient appliances and fixtures for low-income residences for the purpose of enhancing energy efficiency. In Oregon, SB 1149 directs a portion of public purpose funds to Oregon Housing and Community Services to serve low-income customers. Energy Trust coordinates with low-income agencies and refers eligible customers.

Lumen
A measure of the amount of light available from a light source equivalent to the light emitted by one candle.

Lumens/Watt
A measure of the efficacy of a light fixture; the number of lumens output per watt of power consumed.

Market Transformation
Lasting structural or behavioral change in the marketplace and/or changes to energy codes and equipment standards that increases the adoption of energy-efficient technologies and practices. Market transformation is defined in the Oregon Administrative Rules.

Megawatt
The electrical unit of power that equals one million watts (1,000 kW).

Megawatt Hour
One thousand kilowatt hours, or an amount of electrical energy that would power approximately one typical PGE or Pacific Power household for one month. (Based on an average of 11,300 kWh consumed per household per year.)

Methane
A light hydrocarbon that is the main component of natural gas and marsh gas. It is the product of the anaerobic decomposition of organic matter, enteric fermentation in animals and a greenhouse gas.

Monitoring, Targeting and Reporting (MT&R)
A systematic approach to measure and track energy consumption data by establishing a baseline in order to establish reduction targets, identify opportunities for energy savings and report results.

Municipal Solid Waste
Refuse offering the potential for energy recovery. Technically, residential, institutional and commercial discards. Does not include combustible wood by-products included in the term “mill residue.”

Net Metering
An electricity policy for consumers who own (generally small) renewable energy facilities (such as wind, solar power or home fuel cells). "Net," in this context, is used in the sense of meaning "what remains after deductions.” In this case, the deduction of any energy outflows from metered energy inflows. Under net metering, a system owner receives retail credit for at least a portion of the electricity they generate.

Net-to-Gross
Net-to-gross ratios are important in determining the actual energy savings attributable to a particular program, as distinct from energy efficiency occurring naturally (in the absence of a program). The net-to-gross ratio equals the net program load impact divided by the gross program load impact. This factor is applied to gross program savings to determine the program's net impact.

Net Savings
Savings that are adjusted for evaluation factors of free riders, spillover and savings realization rates. Energy Trust reports all savings in net terms, not gross terms, unless otherwise stated in the publication.

Nondifferentiated Source (Undifferentiated Source)
Power available from the wholesale market or delivered to retail customers.

Non-energy Benefit (NEB)
The additional benefits created by an energy-efficiency or renewable energy project beyond the energy savings or production of the project. Non-energy benefits often include water and sewer savings (e.g. clothes washers, dishwashers), improved comfort (e.g. air sealing, windows), sound deadening (e.g. insulation, windows), property value increase (e.g. windows, solar electric), improved health and productivity and enhanced brand.

Oregon Public Utility Commission (OPUC)
Energy Trust operates under a grant agreement with the OPUC and reports quarterly and annually to the state agency. Reports include quarterly presentations to the commission and an annual update on progress to OPUC minimum annual performance measures.

Path to Net Zero (PTNZ)
The Path to Net Zero pilot was launched in 2009 by the New Buildings program to provide increased design, technical assistance, construction, and measurement and reporting incentives to commercial building projects that aimed to achieve exceptional energy performance. The offer demonstrates that a wide range of buildings can achieve aggressive energy goals using currently available construction methods and technology, as well as by testing innovative design strategies.

Photovoltaic
Direct conversion of sunlight to electric energy through the effects of solar radiation on semi-conductor materials. Photovoltaic systems are one type of solar system eligible for Energy Trust incentives.

Program Management Contractor (PMC)
Company Energy Trust contracts with to deliver and implement a program or major program track. PMCs keeps costs low for utility customers, draw from existing expertise and skills in the market, and allow Energy Trust to remain flexible and nimble as the market changes. PMC contracts are competitively selected, reviewed by a committee with internal staff and external representatives, and approved by the board.

Program Delivery Contractor (PDC)
Company Energy Trust contracts with to implement a specific program track. PDCs keeps costs low for utility customers, draw from existing expertise and skills in the market, and allow Energy Trust to remain flexible and nimble as the market changes. PDC contracts are competitively selected, reviewed by a committee with internal staff and external representatives, and approved by the board.

Public Purpose Charge
Established in SB 1149, the public purpose charge is a 3 percent charge from PGE and Pacific Power Oregon customers. Three fund administrators distribute the ratepayer dollars: Energy Trust of Oregon for energy efficiency, market transformation and renewable energy programs; the Oregon Department of Energy for energy efficiency in schools; and Oregon Housing and Community Services for low-income weatherization and housing assistance. Energy Trust is funded through the public purpose charge (SB 1149), supplemental funding (SB 838) and contracts with two gas utilities.

Public Utility Commissions
State agencies that regulate, among others, investor-owned utilities operating in the state with a protected monopoly to supply power in assigned service territories.

Public Utility Regulatory Act of 1978 (PURPA)
Federal legislation that requires utilities to purchase electricity from qualified independent power producers at a price that reflects what the utilities would have to pay for the construction of new generating resources. The Act was designed to encourage the development of small-scale cogeneration and renewable resources.

Qualifying Facility (QF)
A power production facility that generates its own power using cogeneration, biomass waste, geothermal energy, or renewable resources, such as solar and wind. Under PURPA, a utility is required to purchase power from a QF at a price equal to that which the utility would otherwise pay to another source, or equivalent to the cost if it were to build its own power plant.

Renewable Energy Certificates (RECs or Green Tags)
A Renewable Energy Certificate is a tradable commodity that represents the contractual rights to claim the environmental attributes of a certain quantity of renewable electricity. The environmental attributes include the reductions in emissions of pollutants and greenhouse gases that result from the delivery of the renewably-generated electricity to the grid.

Here's how emission reductions occur: When a renewable energy system generate electricity, the grid operators allow that electricity to flow into the grid because it is less expensive to operate, once it has been built, than generators that burn fossil fuels. But the electricity grid cannot have more electricity flowing into it than is flowing out to electricity users, so the grid operators have to turn down other generators to compensate. They generally turn down those that burn fossil fuels. By forcing the fossil fuel generators to generate less electricity, the renewable energy system causes them to generate fewer emissions of pollutants and greenhouse gases. These reductions in emissions are the primary component of RECs.

RECs were developed as a separate commodity by the energy industry to boost construction of new wind, solar, landfill gas and other renewable energy power plants. RECs allow owners of these power plants to receive the full value of the environmental benefits their plants generate. They also allow consumers to create the same environmental benefits as buying green electricity, or to neutralize the pollution from their consumption of fossil fuels.

RECs are bought and sold every day in the electricity market. They are measured in units, like electricity. Each kilowatt hour of electricity that a renewable energy system produces also creates a one-kilowatt hour REC. *Reference the Board Renewable Energy Certificate Policy*

Renewable Energy Resources
a) Electricity-generation facilities fueled by wind, waste, solar or geothermal power or by low-emission nontoxic biomass based on solid organic fuels from wood, forest and field residues
b) Dedicated energy crops available on a renewable basis
c) Landfill gas and digester gas
d) Hydroelectric facilities located outside protected areas as defined by federal law in effect on July 23, 1999

Renewable Portfolio Standard
A legislative requirement, including in Oregon, for utilities to meet specified percentages of their electric load with renewable resources by specified dates, or a similar requirement. May be referred to as Renewable Energy Standard.

Retrofit
A retrofit involves the installation of new, usually more efficient equipment into an existing building or process prior to the existing equipment's failure or end of its economic life. In buildings, retrofits may involve either structural enhancements to increase strength, or replacing major equipment central to the building's functions, such as HVAC or water heating systems. In

industrial applications, retrofits involve the replacement of functioning equipment with new equipment.

Roof-top Units (RTU)
Packaged heating, ventilating and air conditioning unit that generally provides air conditioning and ventilating services for zones in low-rise buildings. Roof-top units often include a heating section, either resistance electric, heat pump or non-condensing gas (the latter are called “gas-paks”). Roof-top units are the most prevalent comfort conditioning systems for smaller commercial buildings. Generally small (<10 ton) commodity products, but very sophisticated high-efficiency versions are available, as are units larger than 50 tons.

R-Value
A unit of thermal resistance used for comparing insulating values of different material. It is basically a measure of the effectiveness of insulation in stopping heat flow. The higher the R-Value number for a material the greater its insulating properties and the slower the heat flow through it. The specific value needed to insulate a home depends on climate, type of heating system and other factors.

SB 1149
Oregon legislation enacted in 1999 allowing for the creation of a third party, nonprofit organization to receive approximately 74 percent of a 3 percent utility surcharge (public purpose charge) and deliver energy-efficiency and renewable energy programs to the funding Oregon ratepayers of Portland General Electric and Pacific Power. Energy Trust was approved by the OPUC to deliver the services. The rest of the surcharge is distributed to school districts through the Oregon Department of Energy and to low-income customers through Oregon Housing and Community Services. SB 1149 is one stream of funding for Energy Trust, which is also funded through SB 838 to deliver achievable energy efficiency above the 3 percent and identified in utility integrated resource planning processes, and individual contracts with NW Natural and Cascade Natural Gas to deliver natural gas efficiency programs.

SB 838
SB 838, enacted in 2007, augmented Energy Trust’s mission in many ways. It provided a vehicle for additional electric efficiency funding for customers under 1 aMW in load by allowing PGE and Pacific Power to fund cost-effective energy efficiency above the 3 percent, and restructured the renewable energy role to focus on renewable energy systems that are 20 MW or less in size. SB 838 is also the legislation creating the state’s Renewable Portfolio Standard and extended Energy Trust’s sunset year from 2012 to 2026.

SB 838 is often categorized as supplemental funding in Energy Trust budget documents.

Sectors
For energy planning purposes, the economy is divided into four sectors: residential, commercial, industrial and irrigation. At Energy Trust, programs are divided into four sectors: residential, commercial (including multifamily), industrial (including irrigation) and renewable energy.

Self-Directing Consumers
A retail electricity consumer that has used more than one aMW of electricity at any one site in the prior calendar year or an aluminum plant that averages more than 100 aMW of electricity use in the prior calendar year, that has received final certification from the Oregon Department of Energy for expenditures for new energy conservation or new renewable energy resources and that has notified the electric company that it will pay the public purpose charge, net of

credits, directly to the electric company in accordance with the terms of the electric company's tariff regarding public purpose credits.

Solar Power
Using energy from the sun to make electricity through the use of photovoltaic cells.

Solar Thermal
The process of concentrating sunlight on a relatively small area to create the high temperatures needed to vaporize water or other fluids to drive a turbine for generation of electric power.

Spillover
Additional measures that were implemented by the program participant for which the participant did not receive an incentive. They undertook the project on their own, influenced by prior program participation.

Strategic Energy Management (SEM)
A program offering for both commercial and industrial customers: commercial Strategic Energy Management and industrial Strategic Energy Management. Through SEM, customers engage with Energy Trust for a year or more in a systematic and ongoing approach to lowering energy usage. Energy Trust helps customers track and monitor energy use and performance, identify and implement no-cost and low-cost operations and maintenance changes, develop an energy management plan and more. SEM creates culture change around energy, training employees at all levels that energy use can be tracked, reduced and managed.

Therm
One hundred thousand (100,000) British thermal units (1 therm = 100,000 Btu).

Total Resource Cost Test
The OPUC has used the total resource cost (TRC) test as the primary basis for determining conservation cost-effectiveness as determined in Order No. 94-590 (docket UM 551). SB 1149 allows the "self-directing consumers" to use a simple payback of one to 10 years as the cost-effectiveness criterion. This test is central to how Energy Trust delivers on its mission. This test is the main test that determines whether Energy Trust can offer an incentive for a project. It also reflects the region's approach to long-term energy planning by prioritizing investment in low-cost energy resources. *Reference the Board Cost-Effectiveness Policy and General Methodology*

Tidal Energy
Energy captured from tidal movements of water.

Trade Ally Contractor (Trade Ally)
Energy Trust trade allies are valued ambassadors in the field. The network of independent contractors andother allied professionals helps homeowners, businesses, public and nonprofit entities, developers and others complete energy-efficiency and renewable energy projects across Oregon and in southwest Washington. Quite often, trade allies are the first, last and only Energy Trust representative a customer will see.

Trade Ally Network
Energy Trust statewide network of trained contractors and other allied businesses.

Utility Cost Test
This test is used to indicate the incentive amount for a project. It helps Energy Trust determine whether providing an incentive is cost effective for the utility system. *Reference the Board Cost-Effectiveness Policy and General Methodology*

U-Value (U-Factor)
A measure of how well heat is transferred by the entire window—the frame, sash and glass—either into or out of the building. U-Value is the opposite of R-Value. The lower the U-Value number, the better the window will keep heat inside a home on a cold day.

Wave Energy
Energy captured by the cyclical movement of waves in the ocean or large bodies of water.

Watt
A unit of measure of electric power at a point in time, as capacity or demand. One watt of power maintained over time is equal to one joule per second.

Wind Power
Harnessing the energy stored in wind via turbines, which then convert the energy into electricity. Mechanical power of wind can also be used directly.

Weatherization
The activity of making a building (generally a residential structure) more energy efficient by reducing air infiltration, improving insulation and taking other actions to reduce the energy consumption required to heat or cool the building. In practice, “weatherization programs” may also include other measures to reduce energy used for water heating, lighting and other end uses.

Acronyms Related to Energy Trust of Oregon's Work

AAMA	American Architectural Manufacturers Association	Trade group for window, door manufacturers
A/C	Air Conditioning	
ACEEE	American Council for an Energy-Efficient Economy	Environmental Advocacy, Researcher
AEE	Association of Energy Engineers	
AEO	Annual Energy Outlook	
AESP	Association of Energy Services Professionals	Energy services and energy efficiency trade organization
AFUE	Annual Fuel Utilization Efficiency	The measure of seasonal or annual efficiency of a furnace or boiler
AIA	American Institute of Architects	Trade organization
AOC	Association of Oregon Counties	
aMW	Average Megawatt	A way to equally distribute annual energy over all the hours in one year; there are 8,760 hours in a year
AOI	Associated Oregon Industries	
APEM	Association of Professional Energy Managers	
ARI	Air-Conditioning and Refrigeration Institute	AC trade association
ASE	Alliance to Save Energy	Environmental advocacy organization
ASERTTI	Association of State Energy Research and Technology Transfer Institutions, Inc.	
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers	Technical (engineers) association
ASME	American Society of Mechanical Engineers	Professional organization
BACT	Best Achievable Control Technology	
BCR	Benefit/Cost ratio	See definition in text
BEF	Bonneville Environmental Foundation	Nonprofit that funds renewable energy projects
BETC	Business Energy Tax Credit	Former Oregon tax credit
BOC	Building Operator Certification	Trains and certifies building operators
BOMA	Building Owners and Managers Association	
BPA	Bonneville Power Administration	Federal power authority
BPS	Bureau of Planning and Sustainability	City of Portland government agency
CAC	Conservation Advisory Council	Energy Trust advisory council to the board
CCS	Communications and Customer Service	A group within Energy Trust
CCCT	Combined Cycle Combustion Turbine	
CEE	Consortium for Energy Efficiency	National energy efficiency group
CEW	Clean Energy Works	
CFL	Compact Fluorescent Light bulb	
CHP	Combined Heat and Power	
CNG	Cascade Natural Gas	Investor-owned utility
ConAug	Conservation Augmentation Program	BPA program

CHT	Coefficient of Heat Transmission (U-Value)	A value that describes the ability of a material to conduct heat. The number of Btu that flow through 1 square foot of material, in one hour. It is the reciprocal of the R-Value (U-Value = 1/R-Value.
COU	Consumer-Owned Utility	
COP	Coefficient of Performance	The ratio of heat output to electrical energy input for a heat pump
CR	CLEAResult	Program Management Contractor for Existing Homes, New Homes and New Buildings
CRM	Customer Relationship Management system	Energy Trust's system to capture information on program participants and non-participants that have communicated with us
CT	Combustion Turbine	
CUB	Citizens' Utility Board of Oregon	Public interest group
Cx	Commissioning	
DG	Distributed Generation	
DSI	Direct Service Industries	Direct Access customers to BPA
DOE	Department of Energy	Federal agency
DSM	Demand Side Management	
EA	Environmental Assessment	
EA	Earth Advantage	
EASA	Electrical Apparatus Service Association	Trade association
ECM	Electrically Commutation Motor	Also known as a variable-speed blower motor, can vary the blower speed in accordance with the needs of the system
EE	Energy Efficiency	
EER	Energy Efficiency Ratio	The cooling capacity of the unit (in Btu/hour) divided by its electrical input (in watts) at standard peak rating conditions
EF	Energy Factor	An efficiency ratio of the energy supplied in heated water divided by the energy input to the water heater
EIA	Energy Information Administration	
EMS	Energy Management System	See definition in text
EPA	Environmental Protection Agency	Federal agency
EPRI	Electric Power Resource Institute	Utility organization
EPS™	Energy Performance Score	Energy Trust rating that assesses a newly built or existing home's energy use, carbon impact and estimated monthly utility costs

EQIP	Environmental Quality Incentive Program	
EREN	Energy Efficiency and Renewable Energy Network	DOE program
ESS	Energy Services Supplier	
EUI	Energy Use Intensity	See definition in text
EWEB	Eugene Water & Electric Board	Utility organization
FCEC	Fair and Clean Energy Coalition	Environmental advocacy organization
FEMP	Federal Energy Management Program	
FERC	Federal Energy Regulatory Commission	Federal regulator
GHG	Greenhouse gas	
GP	Great Plains	Energy Trust's financial tracking system
HBA	Home Builders Association	
HER	Home Energy Review	Online review of a residential customer's home
HSPF	Heating Season Performance Factor	
HVAC	Heating, Ventilation and Air Conditioning	
IBEW	International Brotherhood of Electrical Workers	
ICNU	Industrial Customers of Northwest Utilities	Trade interest group
ICF	ICF International	Existing Buildings Program Management Contractor
IEEE	Institute of Electrical and Electronic Engineers	Professional association
IESNA	Illuminating Engineering Society of America	
IOU	Investor-Owned Utility	
IRP	Integrated Resource Plan	
ISIP	Integrated Solution Implementation Project	
ISM	Instant-Savings Measure	See definition in text
ITC	Investment Tax Credit	Federal
kW	Kilowatt	
kWh	Kilowatt Hours	8,760,000 kWh = 1 aMW
LBL	Lawrence Berkeley Laboratory	
LED	Lighting Emitting Diode	Solid state lighting technology
LEED	Leadership in Energy & Environmental Design	Building rating system from the U.S. Green Building Council
LIHEAP	Low Income Housing Energy Assistance Program	
LIWA	Low Income Weatherization Assistance	
LM	Lockheed Martin	Existing Multifamily Program Management Contractor
LOC	League of Oregon Cities	Local government organization
MEEA	Midwest Energy Efficiency Alliance	Midwest Market Transformation organization, Alliance counterpart
MT&R	Monitoring, Targeting and Reporting	See definition in text
MW	Megawatt	Unit of electric power equal to one thousand kilowatts

MWh	Megawatt Hour	Unit of electric energy, which is equivalent to one megawatt of power used for one hour
NAHB	National Association of Home Builders	Trade association
NCBC	National Conference on Building Commissioning	
NEB	Non-Energy Benefit	See definition in text
NEEA	Northwest Energy Efficiency Alliance	
NEEC	Northwest Energy Efficiency Council	Trade organization
NEEI	Northwest Energy Education Institute	Training organization
NEEP	Northeast Energy Efficiency Partnership	Northwest market transformation organization
NEMA	National Electrical Manufacturer's Association	Trade organization
NERC	North American Electricity Reliability Council	
NFRC	National Fenestration Rating Council	
NRC	National Regulatory Council	Federal regulator
NRCS	Natural Resources Conservation Service	
NRDC	Natural Resources Defense Council	
NREL	National Renewable Energy Lab	
NRTA	Northwest Regional Transmission Authority	
NWEC	Northwest Energy Coalition	Environmental advocacy organization
NWBOA	Northwest Building Operators Association	Trade organization
NWFPA	Northwest Food Processors Association	Trade organization
NWN	NW Natural	Investor-owned utility
NWPPA	Northwest Public Power Association	Trade organization
NWPCC	Northwest Power and Conservation Council	Regional energy planning organization, "the council"
NYSERDA	New York State Energy Research & Development Authority	New York energy efficiency and renewable energy organization funded by a systems benefit charge
OBA	Oregon Business Association	Business lobby group
OEFSC	Oregon Energy Facility Siting Council	Authority to site energy facilities in Oregon
ODOE	Oregon Department of Energy	Oregon state energy agency and one of three public purpose charge administrators
OHCS	Oregon Housing and Community Services	One of three public purpose charge administrator
OPUC	Oregon Public Utility Commission	
OPUDA	Oregon Public Utility District Association	Utility trade organization
OPEC	Organization of Petroleum Exporting Countries	
ORECA	Oregon Rural Electric Cooperative Association	Utility trade organization
OSEIA	Solar Energy Industries Association of Oregon	Volunteer nonprofit organization dedicated to education/promotion
P&E	Planning and Evaluation	A group within Energy Trust
PAC	Pacific Power	

PDC	Program Delivery Contractor	Company contracted with Energy Trust to identify and deliver industrial and agricultural services, and commercial Strategic Energy Management services, to Energy Trust customers
PECI	Portland Energy Conservation, Inc.	Portland nonprofit; former Energy Trust PMC
PGE	Portland General Electric	Investor-owned utility
PG&E	Pacific Gas & Electric	California investor-owned utility
PMC	Program Management Contractor	Company contracted with Energy Trust to deliver a program
PNUCC	Pacific Northwest Utilities Conference Committee	
PPC	Public Power Council	National trade group
PPL	Pacific Power	Formerly Pacific Power and Light
PSE	Puget Sound Energy	Investor-owned utility
PT	Project Tracking	Energy Trust's database that tracks details on customer projects
PTC	Production Tax Credit	Federal incentive that provides financial support for the first 10 years of a renewable energy facility's operation
PTCS	Performance Tested Comfort Systems	Promotes the efficiency of air-systems in residential homes
PTNZ	Path to Net Zero	See definition in text
PUC	Public Utility Commission	
PUD	Public Utility District	
PURPA	Public Utility Regulatory Policies Act	See definition in text
QF	Qualifying Facility	
RAC	Renewable Energy Advisory Council	Energy Trust advisory council to the board
RE	Renewable Energy	
REIT	Real Estate Investment Trust	
RETC	Residential Energy Tax Credit	Oregon tax credit
RFI	Request for Information	
RFP	Request for Proposal	
RFQ	Request for Qualification	
RNW	Renewable Northwest	Renewable energy advocacy group
RSES	Refrigeration Service Engineers Society	Trade association
RTF	Regional Technical Forum	BPA funded research group
RTU	Rooftop HVAC Unit Tune Up	Rooftop HVAC unit tune up
SCCT	Single Cycle Combustion Turbine	
SCL	Seattle City Light	Public utility
SEED	State Energy Efficient Design	Established in 1991, requires all state facilities to exceed the Oregon Energy Code by 20 percent or more

SEER	Seasonal Energy Efficiency Ratio	A measure of cooling efficiency for air conditioners; the higher the SEER, the more energy efficient the unit
SIS	Scientific Irrigation Scheduling	Agricultural information program
SNOPUD	Snohomish Public Utility District	Washington State PUD
SEIA	Solar Energy Industries Association	Volunteer nonprofit organization dedicated to education/promotion
SWEEP	Southwest Energy Efficiency Partnership	Southwest market transformation group
T&D	Transmission & Distribution	
TRC	Total Resource Cost	See definition in text
U-Value		The reciprocal of R-Value; the lower the number, the greater the heat transfer resistance (insulating) characteristics of the material
USGBC	U.S. Green Building Council	Sustainability advocacy organization responsible for LEED
VFD	Variable Frequency Drive	An electronic control to adjust motion
WUTC	Washington Utilities and Transportation Commission	
Wx	Weatherization	
W	Watt	