EVERGREEN ECONOMICS

PWP Inc.

2013 New Homes Program Process Evaluation

A Report to Energy Trust of Oregon

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1 Executive Summary

This report presents process evaluation findings for Energy Trust's New Homes Program based on in-depth interviews with participating and non-participating builders, homes verifiers, trade ally subcontractors and real estate agents and representatives of lending institutions throughout Oregon. Evergreen staff also completed interviews with program implementation staff and reviewed program participation data in the FastTrack database. The report also includes data on the Oregon single-family new construction market. The evaluation covers the 2012-2013 program years and occurred between July 2013 and March 2014.

Energy Trust's New Homes Program has achieved high market shares of over 20 percent in the recent past, and according to the program implementation staff, program year 2013 is forecasted to finish with 22 percent market share, which would exceed the 2013 market share goal of 20 percent. Full implementation of the 2011 Oregon Code has not had significant, lasting detrimental program impacts. While it is likely that the code change caused some builders to drop out of the program, participating builders have adjusted to the new code and even some non-participating builders regularly include energy efficient features that exceed code. Most interviewed builders also reported that demand for energy efficiency above Oregon State code is increasing.

In addition, the program has established strategic relationships with multiple verifiers to assist builders through the construction process, inspect homes and obtain EPS scores. Overall, 18 different firms completed home verifications in 2012 and 2013. The market based verifier model appears to be working well generally and active verifiers have enough business to continue serving the market. However, in Southern Oregon and Northwest Oregon (not including the Portland metropolitan area) there are only two verifiers per market, while the Eastern Oregon market has only one active verifier. In these markets builders would prefer to have additional choices, particularly if construction volumes increase. Following are some additional key findings from this evaluation:

1. The program's internal delivery processes appear to operate smoothly and have been refined by the current implementation team over several years. There are no critical needs for operational changes.

2. Builders are generally satisfied with the verification process but would like a faster turnaround time for EPS scores, as they have often sold homes before receiving the EPS, partly negating the score's usefulness for marketing. The new Axis database under development should help to rectify these delays.

3. The biggest challenges to participating builders are materials and labor costs, an "uneducated" marketplace and potential subcontractor supply gaps if the market recovers robustly.

4. The primary participation barriers for non-participating builders are:
   - Inadequate program awareness and knowledge – Interviewed, non-participant builders have low self-reported knowledge of the program, and HBA staff reported that non-participants "are either totally slammed or totally checked out, there is no in-between, they need to get the same information repeatedly."
   - Verification fees and construction expenses that are too high for lower cost, entry level homes
   - Program paperwork

5. Participant builders still confuse EPS with the Earth Advantage and ENERGY STAR programs, and do not always understand how the different programs relate and layer.

6. Most builders think that EPS provides a sales advantage, however they requested more program promotions and market actor trainings to raise homebuyer awareness, which still remains low. Builders would like to see more real estate agent trainings delivered, and support the introduction of appraiser training, as appraisers/inspectors could also educate homebuyers and sellers, since realtors do not always do this.

To continue building on the Program's success, Energy Trust should do the following in 2014 (if not already underway):

1. Work to increase verifier numbers in areas outside the Portland Metro area, particularly Southern Oregon.

2. Continue to clarify EPS to builders, emphasizing that EPS complements other certifications and provides more detailed energy consumption information to consumers. It is important that participating builders understand where their incentives are coming from, and they could improve their collaboration with subcontractors and EPS marketing.

3. Promote the program's Early Design Assistance more aggressively to non-participating builders.

4. Monitor verification fees, which are likely to increase initially in 2014 until verifiers become comfortable with the new, variable savings-based incentive schedule.

5. Continue to test and refine consumer messaging for comprehension. In future Smart Homebuyer materials consider more simplified information about energy consumption and efficiency and reduced emphasis on Energy Trust and EPS scoring details.

6. Consider marketing directly to retirees through AARP and other organizations and publications, highlighting the benefits of energy savings for retirees on fixed incomes.

7. Conduct more subcontractor HVAC trainings with a focus on mechanical ventilation.

MEMO

Date: May 22, 2014

To: Board of Directors

From: Matt Braman, Residential Sr. Program Manager

Dan Rubado, Evaluation Project Manager

Subject: Staff Response to the 2012-2013 New Homes Program Process Evaluation

Energy Trust undertook a process evaluation of the New Homes program in 2013. The goal of the process evaluation was to obtain feedback and market intelligence to improve the program. The last evaluation of this program was in 2011 of the 2009-2010 program years. Since this time the program has made some significant changes to the way that the program is implemented and this evaluation was a good opportunity to understand how these changes have been accepted by the market.

The evaluation report had several goals but focused on program effectiveness, market feedback and reach, value of EPS and verification, and geographic trends. These activities helped create a snapshot of the current program design and structure, which is helpful as the program is in the midst of being re-bid. Additionally, the results of these activities provide insight into opportunities for the program moving forward.

It is important to note that this evaluation only covered the first six months of 2013. Since this report was completed, the program has worked with NEEA and their contractor, Pivotal Energy Solutions, to fully implement a web-based tool for verifiers and program staff to submit all required program information, provide EPS score sheets, and queue up incentive payments. The goals of this web tool, called the Axis Database, are to speed up incentive payments, eliminate paperwork and duplicative data entry, provide real time EPS scores, and reduce missing and incorrect information.

Areas to focus on in 2014 and beyond include:

- Increase support and program offerings to better educate and engage subcontractors in high performance home buildering options
- Work with builders, verifiers, realtors and homebuyers to better clarify the role of EPS and Energy Trust incentives in the new homes market and how they complement various certification programs
- Promote home appraiser and realtor trainings more aggressively in conjunction with lenders
- Promote and support HVAC and ventilation trainings for subcontractors
- Revisit single head ductless heat pump requirement for standalone measures
- Assess other potential standalone incentives to better serve market demands
- Work to get EPS on MLS more consistently

The strategies outlined in the process evaluation and above align with the 2014 strategy being implemented by the New Homes program.

2 Introduction

2.1 Program Overview

Energy Trust's residential new construction efficiency program, the New Homes Program, began in 2004. The program seeks to expand the market share of energy-efficient homes in Oregon by creating homebuyer demand and training homebuilders. Participating builders apply to receive an Energy Performance Score (EPS) for each of their homes, which measures the expected energy consumption of the home in millions of British thermal units per year (MBtu/yr). Lower scores denote more efficient homes and help guide homebuyers, just as a miles-per-gallon (MPG) rating helps consumers shop for cars. EPS was launched in 2009 and provides builders with tiered incentives tied to increased efficiency levels and incentives for integrating solar measures.[1] The program also offers standalone incentives for efficiency measures in non-EPS homes. The program is administered for Energy Trust by a third-party program management contractor (PMC). The current PMC - Portland Energy Conservation Inc. (PECI) - has managed the program since its inception.

As with most market transformation programs, the program targets a range of market actors at different points in the home production stream. For builders to participate they must sign a trade ally agreement and provide CCB licenses and qualifying insurance, but they do not need to pass specific knowledge or experience tests. Builders are recruited into the program at homebuilder association (HBA) presentations throughout the state, local "builder breakfasts," homebuilder conferences (e.g., Northwest Green Building Industry Summit) and via personal communications (phone calls, emails from staff).

Builders have high interaction with homes verifiers, who provide technical coaching, conduct pre-drywall and post-completion inspections, submit required paperwork and complete the REM/Rate modeling and EPS calculations. Verifiers are also a primary sales force to builders and receive incentives for each home they bring through the program.

In 2012, the program shifted from in-house (contracted) EPS verification by a single company to market-based verification where third party verifiers test homes for a fee and receive an incentive from the program. This change allowed the program to reduce overall delivery costs and increase the volume of homes for which it provides certification and incentives. Some of the new private verifiers are also building subcontractors that do efficiency work in both EPS and non-EPS homes.

Verifiers must be certified by the Building Performance Institute (BPI) or Residential Energy Services Network (RESNET) to show that they have experience with building science, and attend trainings on the EPS requirements and modeling procedures. Ideally prospective verifiers have access to an active project where they can put the training into practice.

[1] The New Homes program only pays incentives to make homes solar ready. Incentives for solar PV and water heating equipment are paid through Energy Trust's separate solar program.

Besides the verifiers, builders also contact PMC staff to answer technical questions, particularly if they have personal relationships. Conservation Services Group (CSG, a subcontractor to the PMC) has technical "boots on the ground" field staff to help builders implement EPS program requirements and review EPS score sheets, and are the program's primary training providers. PMC staff also collaborate with verifiers to convene Early Design Assistance Charrettes, where builders can get planning and design assistance (e.g., for inside ducts and air sealing) to ensure they meet the EPS requirements. Energy Trust provides funding for verifiers to conduct the charrettes.

Subcontractors (e.g., HVAC and insulation installers) can become program trade allies and often work on both new and existing homes (through Energy Trust's Existing Homes program). Trade ally recruitment for the New Homes Program has focused on builders and verifiers more recently, and in 2013 Energy Trust planned to add plumbing contractors as a new group of trade allies. As Energy Trust's program integrates ENERGY STAR requirements and other measures, subcontractor training is coordinated with other ENERGY STAR trainings that cover the thermal bypass checklist and advanced framing. In particular, ENERGY STAR requirements for HVAC and duct sealing have been a key training focus. Trade ally subcontractors can receive cash incentives for energy efficient measures (discussed subsequently), training incentives, business referrals, and on-site technical support.

Energy Trust also helps to fund two staff positions at the Home Builders Association of Metropolitan Portland (HBAMP) and the Oregon Home Builders Association (OHBA). These staff assist the program in many ways, including:

- Networking within the industry to make sure Energy Trust is represented and "in front of" builders and contractors;
- Recruiting builders to become program trade allies;
- Providing "hands-on" support (distribute EPS incentives paperwork, refer subcontractors to builders);
- Serving as an information hub for multiple Energy Trust programs (answer questions, direct parties to specific program staff, inform builders of new guidance and forms);
- Providing builder feedback to Energy Trust; and
- Conducting the annual Build Right Conference, where Energy Trust can offer its own classes and integrate EPS messaging into other classes too.

Realtors can create awareness of energy efficient homes, present them to potential buyers in a persuasive way and eliminate (some) barriers to purchases. Realtors become Energy Trust program allies by attending EPS training for new and/or existing homes, after first attending more general training on energy efficiency through other homes programs (e.g., Earth

Advantage, LEED). Across the market, some realtors have become very skilled at promoting energy efficient homes, while others pay little attention to energy efficiency.

New homes in Oregon can obtain other construction certifications and incentives such as LEED, Earth Advantage and ENERGY STAR, which add complexity to Energy Trust's market transformation goals. In its marketing, Energy Trust tries to emphasize that EPS *complements* other certifications and brands by providing detailed energy consumption/efficiency information, rather than competing with these brands. In earlier program years it was not cost effective to market a small number of EPS homes to the general public and the program prioritized training builders and subcontractors over widespread marketing to homebuyers. Then in 2012 Energy Trust initiated a Smart Homebuyer marketing campaign utilizing home tours, advertising, EPS infographics and a Smart Homebuyer Checklist to create awareness, educate consumers and encourage sales of EPS homes. In particular, the Checklist was designed to encourage homebuyers to ask their builders or realtors about energy-efficient features when searching for a new home. The program also provides marketing assistance to builders in the form of advertising messaging and co-funding, yard signs and doormats, EPS example score sheets and model home incentives.

Notably, Energy Trust's program is not implemented uniformly throughout the state due to a range of factors. In some parts of the state the program can only provide incentives for either gas or electric measures, as Energy Trust only serves Portland General Electric (PGE), Pacific Power, Northwest Natural, and Cascade Natural Gas customers due to its funding mechanism. While Energy Trust does partner with other utility programs where there is overlap, there are logistical challenges to doing this, services are generally more limited in those places and distinct program budgets and savings goals are created for each utility. Moreover, population densities and construction activity also varies considerably across the state, making it inefficient to provide the same level of services (e.g., subcontractor training) everywhere.[2]

Following are some of the key changes the program made in 2013 and will implement in 2014:

- In 2013, Energy Trust worked with the Northwest Energy Efficiency Alliance (NEEA) to customize a Northwest version of the REM/Rate software for modeling home energy consumption. Energy Trust also required that verifiers obtain modeling training and refers verifiers to existing trainings offered by other building science organizations. Energy Trust has also defrayed the cost of these trainings.

- In August 2013, three new standalone measures were approved and incentivized to capture additional savings in non-EPS homes and entice subcontractors to participate in the program: 0.67 EF tanked gas water heater ($125), single-head ductless heat

[2] For a map of Energy Trust's service territory see: http://energytrust.org/about/

pumps (DHPs - $400) and heat pump water heaters (HPWPs - $400). Program staff do not expect these measures to fully gain traction until 2014.

- In 2014, the program will offer builder incentives that range from $600 to $5,400 per home depending on how much a home surpasses the state energy code. Compared to 2013, the incentives for Paths 3 through 5 will be higher and builders will no longer be able to receive incentives for homes that do not at least meet the Path 1 requirements.

- In 2014, verifiers will get a single, per-home incentive that varies based on savings delivered. In 2013 the program gave a flat $300 incentive to verifiers with an additional $150 for EPS modeling.

- In 2013, Energy Trust continued developing and testing a new online database (Axis) in conjunction with NEEA and their contractor (Pivotal) that will accelerate the EPS scoring process, which currently takes 4 to 6 weeks from start to finish. Currently verifiers use a "cumbersome" spreadsheet tool to calculate EPS scores from manually entered REM/Rate data, and the new database will import the REM/Rate data directly, calculate the EPS score and record information to Energy Trust's FastTrack database. Importantly, the new tool will be able to provide preliminary EPS scores based on builder plans, which can then be improved after new REM/Rate runs. Energy Trust plans to fully implement the new Axis database in Q1 2014.

2.2 Evaluation Goals

At a high level, Energy Trust wanted to explore the effectiveness of program operations, services and incentives in shifting the new homes market towards energy efficient and EPS homes. Thus, the primary goal of this process evaluation was to obtain market intelligence, feedback and recommendations on program design and participation from program participants and market stakeholders that can be used to improve the implementation of the New Homes program.

Some of the specific evaluation goals included:

- Describing the new residential construction market and determining the reach of the program among homebuilders in different size categories;

- Understanding the perceived value of energy efficiency in new homes, and the EPS brand in particular;

- Identifying impacts of the 2011 Oregon building code on the program; and

- Assessing the effectiveness of the market-based home verification model.

3 Evaluation Methodology

The process evaluation consisted of multiple tasks, summarized here. Additional task details appear in individual findings chapters for these tasks.

3.1 Review Program Documents

Early in the evaluation, we reviewed program related materials provided by Energy Trust, including:

- Program Implementation Manuals (including quality control (QC) and quality assurance (QA))
- 2013 Program Plan
- Marketing materials and plans
- FastTrack database of new home projects and measure installations
- PMC program status reports (periodic budgets, participation results, actual/estimated energy savings)

The review was completed to:

- Develop a solid understanding of the current program design and delivery
- Provide context for the staff and market actor interviews
- Confirm/identify research topics in the subsequent data collection and analyses

Some information from this review is included in the previous section of this report, which summarizes the program structure/design (and important recent changes), and delivery processes. Other information from this review is included in subsequent report sections to provide context for findings, as necessary.

3.2 Staff Interviews

Early in the evaluation we conducted strategic, in-depth interviews with nine Energy Trust, PMC and homebuilder associations staff to review the current program design and operations as well as the context in which the program operates. The interviews also covered program goals, participation processes, current challenges and concerns, and emerging plans to inform the development of data collection instruments and program data analyses. Lastly, the interviews also covered respondents' communications with (other) program staff and trade allies, and the perceived effectiveness of these communications. High-level information regarding program implementation is included in the previous section of the report, and findings regarding program effectiveness, challenges and potential future changes are presented in Section 6.

3.3 Market Characterization

One of the key tasks of the evaluation was to characterize the new home construction market in Oregon. In particular, the objectives included:

- Describing the overall market for new homes in Oregon and the number of single-family homebuilders, so that the potential for EPS homes market can be assessed.
- Showing current progress toward program goals, including the number of EPS homes certified and the number of builders participating in the program.

These tasks were addressed by tabulating program builder data provided by the PMC and Oregon housing permits data from *Construction Monitor* for information on new homes and the number of homebuilders in the region.

3.4 Program Data Analysis

For this task, we reviewed program homes data provided by Energy Trust to identify trends in program activity and incented measures (EPS and standalone). In particular, we analyzed measure installation rates, common measure groupings, correlations between EPS scores and home features and sizes and key sources of differences in energy savings.

3.5 Market Actor Interviews

The majority of this evaluation was dedicated to conducting structured, in-depth interviews with key actors that affect the Oregon new single-family housing market. The purpose of these interviews was to collect detailed and nuanced information on market practices and attitudes as well as general process evaluation information on how well the program is being implemented. We conducted extended phone interviews with:

- Homebuilders—both program participants (22) and non-participants (12)
- Subcontractors to builders (7)
- Program verifiers (9)
- Real estate trade allies (14)
- Lenders for home purchases and improvements (e.g., banks, credit unions - 10)

Detailed interview topics are discussed in subsequent findings sections of this report, and the interview guides are included in Appendix A.

4 Market Characterization

This section provides an overview of the single-family residential new construction market in Oregon and Energy Trust's progress within the market, from January 2012 through August 2013. Trade ally participation and EPS home construction data from Energy Trust's FastTrack database are also reviewed and provide context for the evaluation results presented in subsequent chapters.

4.1 New Construction Market Overview

The residential building sector in Oregon is a fragmented market that has historically been comprised of a few very large builders who account for up to half the homes sold as well as numerous builders constructing only a few houses each year. To create a snapshot of the current market, Evergreen Economics analyzed construction permits data compiled by *Construction Monitor* at the individual project/site level. Moreover, to estimate actual home completions during our analysis period we lagged each approved single-family residence permit by six months, acknowledging that builders may complete projects faster or slower. Although some state and regional analyses of housing activity apply a "conversion factor" (e.g., 95 percent) to reflect that not all permitted homes are subsequently constructed, we did not do this at the individual builder level.

According to data compiled by *Construction Monitor*, 1,587 builders likely completed at least one single-family home during the study period, and over 30 percent of these builders are based in the Northwest part of the state. See the map below and Appendix B for information on the regions used for this evaluation. As shown in
Table 1, the vast majority of Oregon homebuilders (76 percent) completed only one unit between 2012 and August 2013. The Portland Metro region had the largest builders, with seven builders who built 25 or more units.

Figure 1: Evaluation Analysis Regions

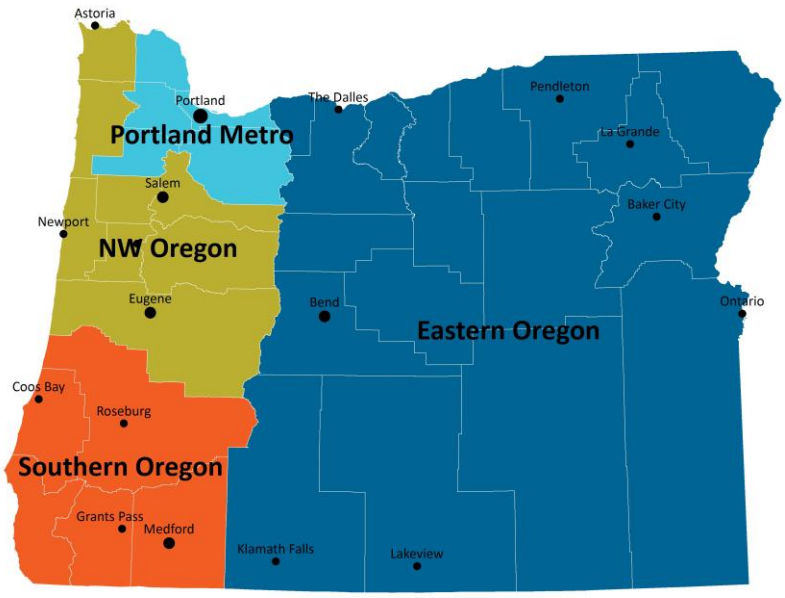


Table 1: All Oregon Builders by Region and Volume: 2012 Through August 2013

Region of State	Number of Units Built							
	1	2-4	5-9	10-24	25-49	50+	Total	Regional % of Total
Northwest Oregon	401	63	20	10	3	1	498	31%
Southern Oregon	317	56	25	9	3	0	410	26%
Portland Metro	253	57	15	15	5	2	347	22%
Eastern Oregon	229	67	19	13	2	2	332	21%
Total	**1,200**	**243**	**79**	**47**	**13**	**5**	**1,587**	
Percentage of Grand Total	**75.6%**	**15.3%**	**5.0%**	**3.0%**	**0.8%**	**0.3%**	**100%**	**100%**

Source: Evergreen Economics analysis of *Construction Monitor data* provided by PMC August 29, 2013.

shows a somewhat different distribution of small and large builders among program builders. The overall percentage of small builders (four or fewer homes) is lower among program builders, with less than half falling in the single unit category. However, the "2-4 Unit" category accounted for over a quarter of program builders throughout the state, with roughly another 20 percent building between 5 and 24 units. Overall, almost 50 percent of program builders were based in the Portland Metro region. For large builders (25 or more homes), this percentage was even greater, as 76 percent worked in the Portland Metro region.

Table 2 shows a somewhat different distribution of small and large builders among program builders. The overall percentage of small builders (four or fewer homes) is lower among program builders, with less than half falling in the single unit category. However, the "2-4 Unit" category accounted for over a quarter of program builders throughout the state, with roughly another 20 percent building between 5 and 24 units. Overall, almost 50 percent of program builders were based in the Portland Metro region. For large builders (25 or more homes), this percentage was even greater, as 76 percent worked in the Portland Metro region.[3]

Table 2: Energy Trust Program Builders by Region and Volume: 2012 Through August 2013

Region of State	Number of Units Built							
	1	2-4	5-9	10-24	25-49	50+	Total	Regional % of Total
Portland Metro	45	23	11	15	5	8	107	49%
Eastern Oregon	30	19	7	3	2	0	61	28%
Northwest Oregon	13	11	3	2	2	0	31	14%
Southern Oregon	9	8	1	3	0	0	21	9%
Total	**97**	**61**	**22**	**23**	**9**	**8**	**220**	
Percentage of Grand Total	**44.1%**	**27.7%**	**10.0%**	**10.5%**	**4.1%**	**3.6%**	**100%**	**100%**

Source: Evergreen Economics analysis of data provided by the PMC August 29, 2013.

Comparing the two tables, we see that a significantly greater proportion of program builders worked in the Portland Metro region compared to the proportion of all builders statewide. Similar to the sample of all builders, the largest percentage of program builders built only one unit during this time. However, for program builders, this percentage accounted for only 44 percent of the total sample. As a result, the percentage of mid-size builders (between 5 and 24) was significantly larger in the group of program builders. This is likely because mid and large-size builders can realize economies of scale to reduce the costs of energy efficient equipment and practices, as crews can be trained on new techniques (e.g., inside ducts) to apply to more homes, and high initial "learning curve" costs can be defrayed over more homes.

4.2 Program Progress in the Market

As shown in Table 3, the New Homes Program has achieved high market shares of over 20 percent in the recent past, and according to the PMC program year 2013 is forecasted to finish with 22 percent market share. This would exceed the 2013 market share goal of 20 percent (which assumed 1,150 program homes would be completed).

[3] The count of 50+ unit builders is greater for program participants (8) than for the state overall (5). This could be because some program builders obtain permits far in advance of actual construction (i.e., longer than 6 months) and thus they were not captured in the Construction Monitor data analysis period. This could be a topic for future research. However, the overall data suggest that the program is enrolling a high percentage of the largest builders throughout the state.

The expected (slight) decrease in 2013 market share relative to 2012 is primarily due to the large increase in the number of homes being built as the housing market recovers. While the program is completing more homes in comparison to years past, the overall housing market is increasing at a faster pace. Moreover, it is possible that new builders and builders re-entering the market are less focused on energy efficiency than builders that have weathered the market downturn (often, by offering more expensive custom homes). Other evaluations (i.e., surveys and interviews) conducted by Evergreen have found that builders that are less able to differentiate their less expensive product are often the first to cease operations during a downturn (particularly when homebuyer credit is also restricted).[4]

Table 3: Program Market Share

Year	Program Homes Completed	Market Share
2011	812	25.7%
2012	1,320	22.8%
2013 (through 12/19)	1,396	19.0%

Source: PMC data provided December 19, 2013

As noted earlier, the program has established strategic relationships with multiple verifiers to assist builders through the construction process, inspect homes and obtain EPS scores. Overall, 18 different firms completed home verifications in 2012 and 2013 (through August), and the Portland Metro area has significantly more participating companies (13) than the other regions, as shown in Table 4.[5] However, the Portland Metro market is concentrated among three leading companies that collectively account for 88 percent of all verifications in that regional submarket. Additionally, the top verifier in the Portland Metro region not only has a 58 percent market share in the region, but accounts for approximately 58 percent of all verifications throughout the entire state, as it is the leading verifier in the Portland Metro, Southern Oregon and Eastern Oregon regions.

In the Southern and Northwest Oregon markets there are only two verifiers per market, while the Eastern Oregon market has only one active verifier. Additionally, verification activity is much lower in these regions than in the Portland Metro area. For example, Southern, Eastern and Northwest Oregon combined have only 181 verifications, less than 10 percent of the total verifications in the Portland Metro area.

[4] See Northwest ENERGY STAR Homes Market Progress Evaluation Report #8, available at: http://neea.org/resource-center/market-research-and-evaluation-reports.

[5] Six other companies have been trained to complete EPS verifications, but had completed no verifications in the past year. (PMC data provided November 7, 2013.)

Table 4: Verifications and Market Concentration by Region: 2012 Through August 2013

Region of State	Number of Firms	Number of Total Projects	% of Projects by Top Verifier
Portland Metro	13	1,952	58%
Southern Oregon	2	72	64%
Eastern Oregon	1	67	100%
Northwest Oregon	2	42	81%
Total	**18**	**2,133**	

Source: Evergreen Economics analysis of homes verification data provided by PMC on August 29, 2013

Regarding subcontractor trade allies, Evergreen Economics received information on 30 subcontracting firms in September 2013, representing various construction specialties: HVAC installation/commissioning, duct installation/sealing/testing, insulation/weatherization and plumbing. During the recruiting process for interviews, we learned that seven of these firms were either inactive in the New Homes Program or could not be reached. Three of the remaining 23 firms are also program verifiers. Most of the active subcontractor firms conduct the majority of their work in the Portland Metro region with only a few companies located in the Willamette Valley.

Overall, the list of realtors used for in-depth interviews consisted of 148 total realtors that had attended Energy Trust realtor training. Based on the provided contact information, including company name, the majority of the realtors appear to be based in the Portland Metro area. Additionally, based on the recruiting process, some of the trade ally realtors are likely out of business and consequently could not participate in the in-depth interviews.

Findings regarding the market perceptions and program participation experiences of these different market actors are presented in subsequent report chapters.

5 Program Data Analysis

Evergreen Economics analyzed FastTrack program data provided by Energy Trust on July 31, 2013 to identify trends in program activity and installed measures. This report section presents information on measure installation rates, common measure groupings and how various home attributes affect EPS scores. In many cases, additional measures were installed at new homes sites that are not directly part of the New Homes program. These include new appliances, solar measures and energy saver kits. Although they are not technically part of the program, they represent additional measures that were installed at new home sites, and these data are also presented in this report section.

A total of 2,895 new homes in 2012 and 2013 (through July 25) installed measures among nine different project types: appliances, energy saver kits, gas, solar electric, solar water heating, standalone, trade ally direct install, weatherization and whole home or EPS. Of these projects, 1,878 qualified for EPS and 742 had standalone measures installed. All of the 742 stand-alone projects had only one measure installed.

The overall breakdown of measures by project type is shown in Table 5. The most common measures installed through the program were windows, insulation, lighting, air sealing, ventilation and tanked water heaters.[6] Except for duct testing and heat pumps in EPS projects, which both saw nearly twice as many installs per project in 2012 than 2013, and clothes washers installed in standalone projects, installation rates for EPS and standalone projects were similar from 2012 to 2013. In spite of the shorter timespan (2013 only includes data through July 25) there were more standalone projects in 2013 than 2012 (384 compared to 358).

[6] Ventilation is a program requirement but is not actually an energy efficiency measure, as it does not save energy.

Table 5: Measures by Project Type

Measure Description[1]	All EPS Projects				All Standalone Projects				EPS Projects with Additional Measures[2]			
	Count		Percent		Count		Percent		Count		Percent	
	2012	2013[3]	2012	2013[3]	2012	2013[3]	2012	2013[3]	2012	2013[3]	2012	2013[3]
Windows	1,373	496	99%	100%	0	0	0%	0%	1	0	1%	0%
Insulation	1,373	496	99%	100%	0	0	0%	0%	0	0	0%	0%
Lighting	1,364	491	99%	99%	0	0	0%	0%	23	18	13%	18%
Air Sealing	1,355	491	98%	99%	331	383	92%	100%	0	0	0%	0%
Ventilation	1,365	489	99%	99%	0	0	0%	0%	0	0	0%	0%
Other Measure	1,313	492	95%	99%	0	0	0%	0%	0	0	0%	0%
Gas Furnace	1,025	401	74%	81%	0	0	0%	0%	0	0	0%	0%
Duct Sealing/Testing	958	173	69%	35%	0	0	0%	0%	0	0	0%	0%
Tanked Water Heater	934	229	67%	46%	0	0	0%	0%	0	0	0%	0%
Tankless Water Heat	422	262	30%	53%	4	0	1%	0%	0	0	0%	0%
Air Conditioning	233	56	17%	11%	0	0	0%	0%	0	0	0%	0%
Heat Pump	199	34	14%	7%	0	0	0%	0%	0	0	0%	0%
Solar Ready	15	0	1%	0%	0	0	0%	0%	0	0	0%	0%
Clothes Washer	0	0	0%	0%	20	0	6%	0%	113	67	64%	67%
Refrigerator	0	0	0%	0%	0	0	0%	0%	32	11	18%	11%
Faucet Aerator	0	0	0%	0%	0	0	0%	0%	23	4	13%	4%
Showerhead	0	0	0%	0%	0	0	0%	0%	23	4	13%	4%
Solar PV	0	0	0%	0%	0	0	0%	0%	12	8	7%	8%
Cold Water Detergent	0	0	0%	0%	0	0	0%	0%	6	0	3%	0%
Freezer	0	0	0%	0%	0	0	0%	0%	3	4	2%	4%
Gas Fireplace	0	2	0%	0%	0	0	0%	0%	1	0	1%	0%
Refrigerator Recycle	0	0	0%	0%	0	0	0%	0%	5	3	3%	3%
Solar Water Heating	0	0	0%	0%	0	0	0%	0%	3	0	2%	0%
Waste Water	0	0	0%	0%	3	1	1%	0%	0	0	0%	0%
Boiler	3	0	0%	0%	0	0	0%	0%	0	0	0%	0%
Zonal Heating	1	1	0%	0%	0	0	0%	0%	0	0	0%	0%

[1] Based on MeasureCategory field in FastTrack database – all counts and percentages are based on total households containing the measure, not total measures installed

[2] These are not formally part of the New Homes Program, but were installed as additional measures at new home sites. The project types include appliances (n=209), energy saver kit (n=39), gas (n=1), solar electric (n=20), solar water heating (n=3), trade ally direct install (n=2) and weatherization (n=1)

[3] Only through July 2013

As depicted in Table 6, nearly half of all ducts installed in EPS projects in 2012 and 2013 were in unconditioned spaces.

Table 6: Location of Ducts

Location*	Count		Percent	
	2012	2013**	2012	2013**
Unconditioned	471	81	49%	47%
Partially Conditioned	46	-	5%	-
Conditioned	441	92	46%	53%
Total	**958**	**173**	**100%**	**100%**

*DuctLocation measure attribute field
** Only through July 2013

Table 7 displays the various types of heat pumps that were installed during the program. Most (61 percent) of the heat pumps were ductless. Just over one-third (36 percent) were ducted and only three percent of the heat pumps were ground source, or geothermal.

Table 7: Type of Heat Pumps Installed

Type*	Count		Percent	
	2012	2013**	2012	2013**
Ducted	67	16	34%	47%
Ductless	125	17	63%	50%
Ground Source/Geothermal	6	1	3%	3%
Total	**198**	**34**	**100%**	**100%**

* HPType measure attribute field
** Only through July 2013

We now take a closer look at EPS projects. Table 8 shows the distribution of measures installed per EPS project. As displayed, nearly all (96 percent) of the projects had between eight and 11 measures installed – with an average of just over nine measures per project. Only nine projects had less than six measures installed, with all of these either having only one or two measures per project.

Table 8: Count and Percent of EPS Projects by Number of Measures Installed

Number of Measures Installed*	Project Count	Percent
1	7	0%
2	2	0%
3	0	0%
4	0	0%
5	0	0%
6	7	0%
7	49	3%
8	248	13%
9	905	48%
10	533	28%
11	127	7%
Total	**1,878**	**100%**

*Number of measures installed is derived by de-duplicating the MeasureCategory field based on SiteID and ProjectType

Since most EPS projects had numerous measures installed, we also performed a cross-tabulation of the number of measures by measure type for each energy source: gas (Table 9) and electric (Table 10). Nearly one-half, 905, of all 2012-2013 projects combined had nine measures installed. All 905 of those projects installed lighting, insulation and windows, while nearly all (99 percent) installed air sealing, water heaters and ventilation.

For heating purposes, 99 percent of gas projects installed gas furnaces while 95 percent of electric projects installed heat pumps. About half of these projects (51 percent of gas and 60 percent electric) also had their ducts sealed and performance tested, and all other measures had a count of less than 10. Thus, a core group of seven measures was typical for most projects: lighting, insulation, windows, air sealing, water heaters, ventilation and either gas furnaces or electric heat pumps, depending on the home heating fuel.

The pattern for projects that installed ten or more measures included the same seven measures, with a few additional measures installed: both groups tended to perform duct sealing/testing when increasing the number of measures (94 percent for gas and 84 percent for electric), 42 percent of gas participants installed air conditioning (compared to 20 percent for electric), and 16 percent of electric projects made their homes solar ready.

As the number of measures drops below nine, the pattern does not change much, but certain measures begin dropping out and the variability in what is installed increases somewhat. As the number of measures installed drops from nine to eight, projects tended to decrease the

installation of heat pumps (22 percent) and gas furnaces (19 percent) while also decreasing the amount of duct sealing and testing (12 percent). This trend continued as the number of measures installed in each project decreased from eight to seven, and only one heat pump was installed when projects had six measures.

Table 9: Frequency of Measures by Number of Measures Installed (Gas Heated Homes)

Measure*	Percent of Projects with Measure, by Number of Measures					
	1	2-6	7	8	9	10+
Windows	0%	83%	100%	100%	100%	100%
Insulation	0%	83%	100%	99%	100%	100%
Other Measure	100%	67%	93%	82%	94%	99%
Ventilation	0%	67%	95%	92%	100%	100%
Water Heat	0%	50%	95%	99%	100%	100%
Air Sealing	0%	50%	95%	90%	100%	100%
Lighting	0%	33%	100%	90%	100%	100%
Gas Furnace	0%	0%	10%	51%	99%	100%
Duct Sealing/Testing	0%	17%	2%	24%	51%	94%
Boiler	0%	17%	2%	1%	0%	0%
Air Conditioning	0%	0%	0%	1%	1%	43%
Solar Ready	0%	0%	0%	1%	0%	1%
Gas Fireplace	0%	0%	0%	0%	0%	0%
Total Number of EPS Projects	2	6	41	92	750	635

*MeasureCategory field

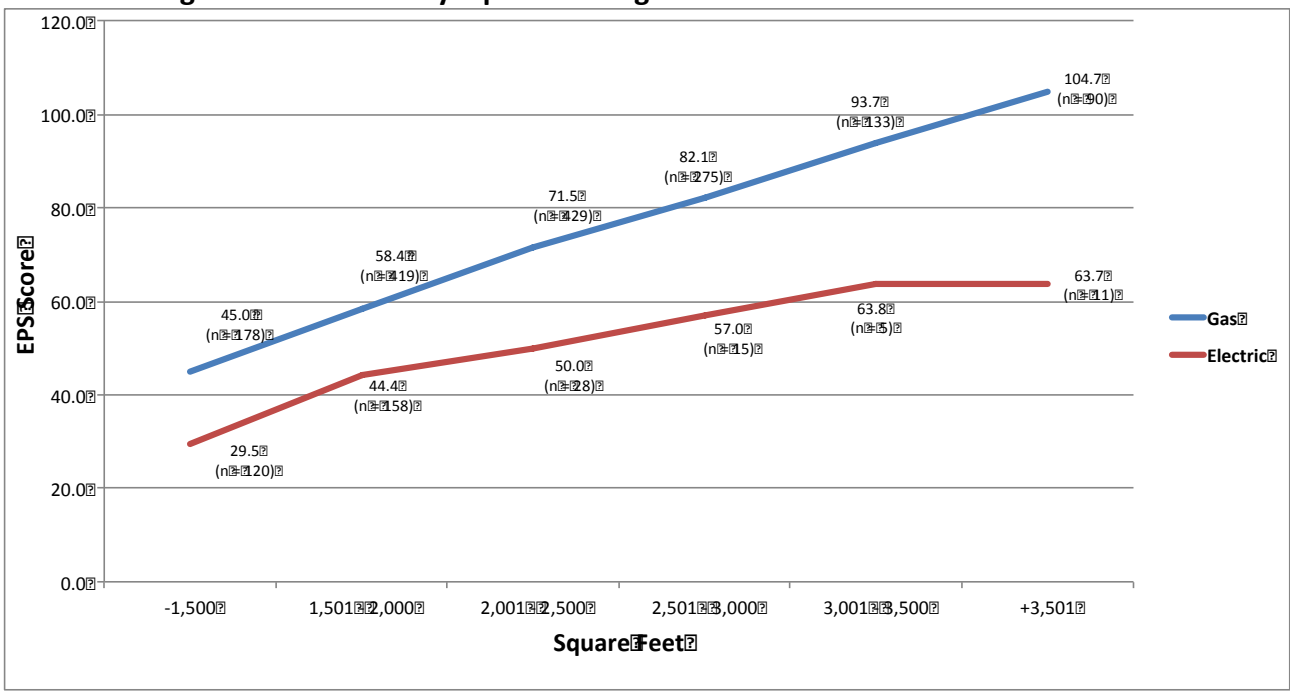
Table 10: Frequency of Measures by Number of Measures Installed (Electric Heated Homes)

Measure*	Percent of Projects with Measure, by Number of Measures					
	1	2-6	7	8	9	10+
Other Measure	100%	100%	88%	98%	100%	100%
Insulation	0%	100%	100%	100%	100%	100%
Lighting	0%	100%	75%	100%	100%	100%
Ventilation	0%	100%	75%	99%	100%	100%
Windows	0%	67%	100%	100%	100%	100%
Air Sealing	0%	100%	63%	99%	99%	100%
Water Heater	0%	0%	75%	96%	97%	100%
Heat Pump	0%	33%	88%	35%	95%	92%
Duct Sealing/Testing	0%	0%	25%	5%	60%	84%
Air Conditioning	0%	0%	0%	1%	1%	20%
Solar Ready	0%	0%	0%	0%	3%	16%
Gas Furnace	0%	0%	0%	0%	1%	0%
Zonal Heating	0%	0%	0%	0%	1%	0%
Total Number of EPS Projects	5	3	8	156	155	25

*MeasureCategory field

To explore how the above patterns affect home efficiency, we plotted mean EPS scores – for those projects that had these data – against the size of the home (Figure 2). EPS rates the efficiency of a home and measures it against a similar sized home. With EPS, the lower the score the more efficient the home. Overall, the average home had an EPS of 65.2.
For gas projects, the average home had an EPS of 70.6, while the average EPS for electric homes was 41.0. For both types of projects, EPS increases as the size of the home gets larger.[7]

Figure 2: Mean EPS by Square Footage for Gas vs. Electric Heated Homes*



*Mean EPS derived from the EPS project attribute field

As larger square footage projects tend to receive more measures while also receiving a higher EPS, Evergreen developed correlations between the three home attributes to explore these relationships. As expected, EPS is strongly and positively correlated (correlation coefficient of 0.826) with the square footage of a project (significant at the 0.01 level). However, while the correlation of square footage with number of measures installed is significant at the 0.05 level, the correlation coefficient is fairly low (0.053) – meaning that there is not a strong, positive, linear correlation between the two variables. Still, a positive correlation (0.324) exists between EPS and the number of measures installed, which may be partially explained by the slight positive relationship between square footage and the amount of measures installed in a home. Overall, the data show that home size is the primary determinant of EPS scores, and

[7] The EPS calculation is changing in 2014 to include transmission and distribution energy losses for electric homes, which will bring electric and gas scores much closer to parity.

that additional measures (e.g., heat pump with air conditioning) do not always improve the EPS score.

Table 11: Correlation of Project EPS, Square feet and Number of Measures Installed

Correlations		EPS*	Square Feet**	No. of Measures
EPS	Pearson Correlation	1	.826***	.324***
	p-value (2-tailed)	--	<0.01	<0.01
	N	1,859	1,859	1,859
Square Feet	Pearson Correlation	.826***	1	.053****
	p-value (2-tailed)	<0.01	--	0.014
	N	1,859	2,153	2,153
No. of Measures	Pearson Correlation	.324***	.053****	1
	p-value (2-tailed)	<0.01	0.014	--
	N	1,859	2,153	2,153

*EPS project attribute field
**SqFt site attribute field
***Correlation is significant at the 0.01 level (2-tailed)
****Correlation is significant at the 0.05 level (2-tailed)

Table 12 and Table 13 display the average EPS and square footage per project by region. Gas projects tend to have the most variability in EPS as well as higher scores: Eastern Oregon tends to have the highest EPS per project (78.7) while Northwest Oregon has the lowest EPS out of all four regions (62.4). Avista, which is not party to Energy Trust's programs, serves Southern Oregon and thus no gas-heated households received an EPS. Variability among these scores is rather low for electric: Northwest Oregon has the lowest average (37.3) and Southern Oregon the highest (44.5). Gas projects across all of the regions also tended to have larger homes (2,315 square feet) compared to electric (1,805 square feet).

Table 12: Average EPS and Square Feet by Region in Oregon - Gas

Region*	Count	Average EPS	Average Sq. Ft.	Average Measure Count
Eastern Oregon	161	78.7	2,077	8.4
Portland Metro	1,102	70.6	2,384	6.2
NW Oregon	85	62.4	2,016	5.0
Southern Oregon	0	-	-	-
TOTAL	**1,348**	**70.6**	**2,315**	**6.2**

*Based on aggregation of County site attribute field

Table 13: Average EPS and Square Feet by Region in Oregon - Electric

Region*	Count	Average EPS	Average Sq. Ft.	Average Measure Count
Eastern Oregon	34	43.4	1,870	7.0
Portland Metro	143	44.4	1,907	7.2
NW Oregon	34	37.3	1,568	7.1
Southern Oregon	57	44.5	1,653	7.2
TOTAL	**268**	**43.4**	**1,805**	**7.2**

*Based on aggregation of County site attribute field

Table 14 shows the distribution of homes with EPS Path information by Oregon region, including "Code plus Best Practice" homes (which met the code and included a few improvements considered to be best practices), "EPS Only" homes (which installed only a few measures and received an EPS score but did not achieve Path 1), as well as "Zonal Electric Efficient" homes. See Appendix C for additional details about the EPS Paths.

Nearly 65 percent of EPS homes in all of the regions met requirements for Paths 1 and 2; however, the mix differs by region. Northwest Oregon and Eastern Oregon had a similar combination: most homes were constructed to meet Path 1 (42 and 48 percent, respectively), followed by Path 2 (32 and 24 percent), with varying percentages for Code plus Best Practice, EPS Only and Path 3. While both Portland Metro and Southern Oregon builders tended toward Path 2 (37 and 56 percent), the Portland Metro region had more homes built to Code plus Best Practices (27 percent) than Path 1 (25 percent) – opposed to Southern Oregon (6 and 22 percent). Across all the regions, only 6 out of 1,045 homes with EPS Path information were Path 4 or 5.

Table 14: EPS Path by Region

Region and Path*	Count	Percent
Eastern Oregon (n = 120)		
Code plus Best Practice	8	7%
EPS Only**	15	13%
Zonal Electric Efficient***	2	2%
Path 1	58	48%
Path 2	29	24%
Path 3	5	4%
Path 4	1	1%
Path 5	2	2%
Portland Metro (n = 838)		
Code plus Best Practice	227	27%
EPS Only	11	1%
Zonal Electric Efficient	2	0%
Path 1	208	25%
Path 2	313	37%
Path 3	75	9%
Path 4	0	0%
Path 5	2	0%
NW Oregon (n = 53)		
Code plus Best Practice	6	11%
EPS Only	1	2%
Path 1	22	42%
Path 2	17	32%
Path 3	6	11%
Path 4	0	0%
Path 5	1	2%
Southern Oregon (n = 34)		
Code plus Best Practice	2	6%
EPS Only	2	6%
Path 1	8	24%
Path 2	19	56%
Path 3	3	9%
Path 4	0	0%
Path 5	0	0%

* Path project attribute field – higher EPS Paths indicate more efficient homes
**Installed a few efficiency measures, received an EPS score, but did not achieve Path 1
***Lower end Path for electric resistance heated homes

6 Staff Interview Findings

The program staff interviewed in July 2013 included individuals at Energy Trust (2), PECI (4) and CSG (1). In addition we talked with two individuals at OHBA and HBAMP, whose positions are partially funded by Energy Trust, and with building code specialists at NEEA.

As noted in Section 3.2, the interviews covered a wide range of topics and were tailored to the role of the respondent, but generally focused on program effectiveness, challenges and potential future changes so that issues could be identified and incorporated into the various trade ally and stakeholder data collection instruments.

Overall, the interviewed program and implementation team staff were generally satisfied with the New Homes program's performance and the transition to market-based verification, and did not have major concerns about the current program design and delivery (i.e., no "fatal flaws" were mentioned). Although some program changes were planned for the remainder of 2013 and 2014 to enhance program participation and cost-effectiveness, respondents were primarily focused on continuing support for the transition to a market-based verification system and increasing adoption of EPS as a validation and marketing tool for builders and other trade allies promoting energy efficient new homes.

Detailed results of the interviews are presented next under several broad headings, including staff roles, responsibilities and experience; perceptions of communications; and specific areas of concern regarding present and future program implementation.

6.1 Staff Roles

Most of the staff interviewed have been in their current position or held jobs with similar responsibilities for several years and were thoroughly familiar with the New Homes Program, the Oregon residential new construction market and the specific technologies and measures driving energy efficiency in new home design. There were, however, several key positions where turnover had recently occurred, including the PMC Program Manager and a subcontractor outreach specialist. As the new Program Manager had just started in the position when we were conducting interviews, they were not interviewed. Fortunately the interim Program Manager (who was interviewed) has extensive experience with the New Homes Program, but the shift was still somewhat disruptive. One respondent noted that, "I think we lost a bit in the loss of senior program management when the old manager left." They added, however, that the interim manager "used to be the Senior Program Manager and therefore was able to handle the transition smoothly. [The new PECI PM] is getting up to speed and I think she will be great."

6.2 Communications

Communications and coordination among Energy Trust, the PMC and its subcontractors and other organizations were generally described as excellent, with regular weekly meetings, frequent phone calls, defined communication channels and reporting that have always been

open and collegial. Working relationships with other organizations such as NEEA and Earth Advantage have also been productive, and interviewed staff say the ability to leverage resources through Energy Trust-funded positions at OHBA and HBAMP has proven valuable to the New Homes Program.

6.3 Areas of Concern

Much of the focus for interviewed program staff had been two key topics: the recent shift to the market-based verifier model and the evolving EPS rating system. These two topics also triggered related areas of concern, discussed below.

Links to Other Programs and Market Confusion

Up until 2013 the New Homes program had been linked to some aspects of the Northwest Energy Efficiency Alliance's (NEEA's) Northwest ENERGY STAR Homes program, and until 2012 had close ties with Earth Advantage, which performed verifications for many Oregon-built ENERGY STAR homes, and also offered its own program certification. While some of the key characteristics of ENERGY STAR homes are still consistent with the current EPS-based system, ENERGY STAR certification is no longer required in order to receive either an EPS or an incentive through the Energy Trust New Homes Program.

Multiple interviewees noted that builders and subcontractors can still have difficulty understanding how the different programs relate and layer. One program manager explained that, "builders have been very confused, because they see ENERGY STAR, Earth Advantage and EPS from Energy Trust. When it was Earth Advantage who was verifying for our program and ENERGY STAR it was really confusing, because they promoted both brands." Now there is still some confusion in the market between ENERGY STAR and the New Homes Program, but confusion seems to be diminishing. One problem cited by a PECI staff member was that builders are increasingly asking them ENERGY STAR-related questions that should instead be directed to NEEA's ENERGY STAR program implementer (CLEAResult).

Program staff said any confusion in the marketplace will have to be addressed by working with builders and other trade allies rather than the final home buyer, since it is prohibitively expensive to market to home buyers directly. The hope is that EPS will become as integral to the new homes market in Oregon as the ubiquitous yellow Energy Guide labels are to appliance purchases and miles per gallon ratings are to automobiles. Respondents said they have been encouraging homebuilders to incorporate EPS in marketing materials, including providing the EPS in multiple listing service (MLS) home descriptions. So far, they note, success has been limited by the fact that EPS was initially applicable to new homes only, but now that EPS has been rolled out for existing homes, the scores may become more widely accepted.

A related hurdle to the acceptance of EPS (and all energy efficient homes) mentioned by staff is the failure of appraisers to monetize the value of efficient homes and give them a higher

market value. One respondent pointed out that "within Oregon this has been quite an issue, with the legislature saying they need to recognize energy efficiency. Some appraisers try to do that, but EPS is so new there aren't the years of comparable sales that they want to see." This is being addressed both by New Homes Program outreach to educate appraisers about the specific economic benefits of efficiency and through state level advocacy efforts.

Market-Based Verification System

Although in place for only a year at the time of the interviews, the transition to a market-based system of verifiers was generally seen as a success by the program staff we interviewed. Respondents recognized that the new system makes verifiers a critical-path component of program delivery, and program staff had been focused for more than a year on preparing for a smooth transition. On the one hand, they had to be sure that there would be an adequate pool of skilled verifiers to support existing builders and recruit new ones, even as program incentives were linked to the performance of the new homes verified (which in practice meant a reduction in business/incentives for some verifiers). On the other hand they had to hope that there would be enough participating builders and new homes to sustain individuals and companies in the verification business – a particular concern since a number of builders had ceased operations during the prolonged construction slump.

Supply side challenges were addressed primarily by providing extensive training, both in the technical aspects of the program's new requirements and in how to market the program and be the primary interface with builders.

- Training on the new program format and EPS requirements encompassed everything from application forms to marketing to energy modeling. While Energy Trust and its contractors initially provided much of the training directly, there has also been an effort by the program to support private sector training providers with leads and curriculum, while still maintaining quality control over the training that gets delivered.

- One staff member with training responsibility said that "We tell them 'we can give you training curriculum and we can drive people to you…' We're trying to get different companies involved, and would like to have more local training providers because trade allies are more receptive to local firms. But when needed, we will reach out to out-of-state." Individual training providers are free to set their own fees.

- At the time of the interviews, three new trainings were said to be under development:
    - Smart home design for architects and designers
    - EPS and other certifications and how they differ and overlap
    - Modeling training for verifiers (which is also a refresher course)

Program staff also reported a growing emphasis on the use of on-demand training delivered over the internet, since this provides verifiers, builders, subcontractors and others with access to information when they need it, including the ability to go back for "refresher" training. Overall, the current trainings seem to be working well, but that may be in part because CSG and PECI provide a great deal of as-needed, one-on-one training in the field, particularly with subcontractors.

While training has resulted in enough trained verifiers that there is generally adequate coverage across Energy Trust's territory, most verifiers are concentrated in the greater Portland area, with only a handful of verifiers active in the rest of the state.

Builder Participation and Market Demand

The second challenge associated with the shift to market-based verification is ensuring that participation is sufficient to provide an adequate market for sustainable verification services. A few builders stopped submitting homes to the program because of the shift, although some of those builders have since returned. As one respondent explained, "because they (Earth Advantage) were getting extra money from Energy Trust before, now it's more expensive (due to their new pricing structure). They (builders) didn't know or care about the structure or who reported to whom, just the fact that they have to pay more (under the new system)."

On the other hand, program staff were optimistic that the overall market is improving, noting a 35 percent increase in new home starts from 2011 to 2012 and a smaller, but still significant increase expected for 2013. The percentage of homes participating in the program in Energy Trust territory is currently estimated at about 20 percent (28 percent in the Portland area), and any increase in the overall market is expected to increase program participation as well.

While program staff believe that they are aware of most builders in the state who have an interest in building above-code homes, they are equally aware that some builders either define themselves as "proud code builders" or target buyers of lower-priced entry level homes and are therefore very reluctant to incur any extra cost. Program staff said the New Homes Program's EPS approach is designed to emphasize performance and give builders maximum flexibility, but recognize that some of the specific program requirements (e.g., infiltration, ENERGY STAR checklists) can be an insurmountable hurdle for some builders.

Specifically, one respondent said that the thermal enclosure checklist caused many builders to stop submitting their homes to the program when this requirement was introduced in the ENERGY STAR New Homes Program (version 3.0), and the inclusion of the checklist in the Energy Trust program keeps them from participating now. He mentioned a prominent production builder who basically still builds to ENERGY STAR 2.0 requirements but balked at the new checklist. This builder currently participates in the New Homes Program to the extent that homes receive an EPS and a rebate of several hundred dollars, but they do not meet the "best practices" requirements needed for Path 1 and the associated $600 incentive. Another program manager noted that, "We have the full range of paths that builders are conforming to.

We have some who go only a little above code and others who are near net zero, but the average is right around ENERGY STAR level -- right at that 15 percent better than code."

To provide builders (and subcontractors) a relatively easy way to offer energy efficiency and market differentiation through the New Homes Program, three new standalone measures were recently approved. Unfortunately, program staff who work with subcontractors say the three measures have been a disappointment to potential participating subcontractors. Two measures – a 2.0 coefficient of performance (COP) heat pump water heater and .67 energy factor (EF) tank water heater – reportedly offer only modest savings relative to high upfront costs, while the third measure, ductless heat pumps, provides incentives only for single-head units, making the measure impractical as a whole-house heating system. "Builders who would have been interested in standalone measures would have been those that are on the fence," said one respondent who works with trade allies. "It would be great to get them into the program to get it (the measures) into the market. But if measures are not viable, it won't draw them in." As an example of the kind of standalone measure that would have been more likely to attract participants, this respondent mentioned 95% AFUE furnaces with ECM motors.

Another standalone measure, air sealing, was piloted in 2012 and was recently accepted as a fully tested measure. This measure had to be (and was) supported by training, with program staff working closely with insulators to properly air seal the top plate of homes to bring down the number of air changes per hour. Additional training in air sealing is planned, and Energy Trust has also prepared and distributed a Best Practices Pocket Guide to help educate both builders and subcontractors.[8]

Uncertainty Regarding Code

As the Oregon Code has become more stringent in the past few years, changes have been a consistent area of concern. As code increases are implemented over a relatively short three-year cycle, program requirements are also tightened, which challenges participating builders who feel that they are being pushed toward building net-zero homes. However, an agreement seems to have been forged between NEEA and the Oregon Home Builders Association (OHBA) to join forces to guide future code increases so that significant efficiency targets can be attained in the next 10-15 years, while not requiring builders to move to net-zero construction. Retaining the structure of the Oregon Code with a set of mandatory requirements and a series of six or seven options builders can choose from, the plan is to gradually make some of the options mandatory and improve the efficiency levels for the remaining options. This approach would entail small changes every code cycle and larger steps every five or so years, with the goal of reaching 35-40 percent savings beyond the current code by 2025. OHBA is currently working with NEEA to develop a better understanding of actual incremental costs, particularly for requirements that require changes

[8] The guide is available on Energy Trust's website: http://energytrust.org/trade-ally/programs/new-homes/resources/

in practices, rather than just more efficient equipment. One of the code specialists interviewed noted that for some of these practice changes, the incremental costs are often significant for the first few homes, but become smaller as crews and subcontractors learn the new techniques.

6.4 Process Evaluation Issues

For all the issues mentioned above, program staff said they are looking for feedback from builders and other market actors on how effective the transition to the new verifier model and the EPS-based incentives has been. In particular, they wanted to know what builders see as the greatest obstacles to participation; what additional training or assistance is needed by verifiers, builders and other subcontractors; and how other trade allies, such as realtors, lenders and appraisers can be influenced to more actively support the program. All of these topics were incorporated into the interview guides, the results of which are presented in the following chapters.

7 Builder Interview Findings

Evergreen Economics completed 22 interviews with builders that participate in the program and 12 interviews with non-participating builders from October to December of 2013. Some of the key interview objectives were to:

- Understand the importance of energy efficiency to builders
- Characterize builders' construction practices and preferred EPS paths and measures
- Understand builders' air sealing and ventilation practices
- Understand perceptions and utilization of solar measures
- Assess non-participating builders' knowledge of EPS
- Understand the perceived value of EPS to builders and homebuyers
- Identify barriers to builder participation
- Understand interactions with verifiers and program staff
- Identify desired program assistance

7.1 Participating Builders

Business Scope

As shown in Table 15, most of the interviewed participating builders are constructing new homes in the Portland Metro area followed by Eastern Oregon, Southern Oregon and Northwest Oregon (excluding the Portland metro area). The companies represented by the interviewees account for approximately 23 percent of EPS projects, and ranged from small, one-builder firms building less than five homes in 2013 to larger organizations with many employees, building up to 100 homes in 2013. All builders expected the number of homes they build in 2014 to either remain the same or increase.

Table 15: Distribution of Interviewed Participating Builders

Region of State	Number
Portland Metro	9
Eastern Oregon	6
Southern Oregon	4
Northwest Oregon	3
Total	**22**

We asked the builders a series of questions about their target market for new homes, the type of homes that they build to appeal to their target market and the importance of energy efficiency in their building practices and marketing. Builders identified three main market segments for their new homes: move-up homebuyers, downsizing retirees and first time homebuyers. With the exception of one builder who builds low-income homes for Habitat for Humanity, all of the participant builders mentioned either move-up buyers or downsizing retirees as their primary target market, and 13 builders stated that they target these segments exclusively. Eight builders primarily build for move-up homebuyers or retirees but also target

first time homebuyers to a lesser extent. Larger companies tend to have more variation in their target market, while smaller companies tend to focus on one group in particular. In the Portland Metro area, no builders mentioned retirees as a target market. In each of the other geographic regions, all but three of the builders mentioned retirees as a target market for their company. Several builders explained that the reason first time homebuyers are not a priority market for them is because this market has contracted due in part to the recession.

Participating builders construct a wide variety of homes to appeal to these buyers. New home sizes ranged from 650 square feet to over 4,000 square feet, with the majority of builders constructing homes between 1,500 and 3,000 square feet. Home prices also varied considerably, ranging from a low of $220,000 to over a million dollars, with most homes selling for over $300,000. Builders in the Portland Metro area tend to build larger homes and sell their homes at higher price points. To further appeal to their target markets, builders offer a range of energy related special features including certifications from Earth Advantage, ENERGY STAR and LEED, high efficiency furnaces and water heaters, ventilation systems, envelope sealing measures, passive solar design and energy use monitors. The majority of builders we spoke with also offer or include various "luxury" features such as custom cabinetry and granite countertops as well as amenities utilized by senior retirees. Half of the interviewed builders primarily build custom homes, with seven primarily building spec homes and four building a 50/50 mix of spec and custom homes.

We asked participating builders to rate the importance of energy efficiency in their building practices and marketing on a scale of 1 to 5 where 5 was very important and 1 was not at all important. Answers ranged from a low of 2.5 to a high of 5. The average across the 22 builders was 4.37, with 82 percent giving scores of 4 or 5. No regional differences were noted.

We also asked builders how long they had been trade ally builders and why they decided to become trade ally builders. Of the builders who could recall when they enrolled to be a trade ally, the most recent enrollment was in 2011 and the longest serving trade ally joined in 2002. The average length of time a builder had been a trade ally was five years. Those who could not recall indicated they had been part of the program for a "long time" so the actual average is likely higher than reported here.

Table 16 below shows the most common reasons why builders became trade allies (multiple responses were accepted).

Table 16: Reasons for Participating in the New Homes Program

Reason Provided	% of Builders Mentioning
Company commitment to energy efficiency	73%
Incentives	41%
Technical assistance and education	36%
Increasing demand for energy efficiency in the marketplace	36%

Regarding the growing demand for energy efficiency, builders stated that, "there are more people getting into green building," and that there are "a lot of educated second and third home buyers and older people looking for energy efficient homes." Builders also joined the New Homes Program because it complements other programs they are involved with (e.g., Earth Advantage, ENERGY STAR), the program can add value to their homes, and it demonstrates their commitment to environmental protection and providing high-quality homes.

Building Practices

Before we asked builders about their specific building practices, we asked them to rate their knowledge of the Energy Trust New Homes Program on a scale from 1 to 5 with 5 being very knowledgeable and 1 being not at all knowledgeable. Overall, 66 percent of builders gave themselves scores of 4 or 5. Builders in Southern Oregon gave themselves the highest knowledge scores (all 4 or 5) followed by Portland Metro, Eastern Oregon and Northwest Oregon. Several builders said they would have given themselves a higher score in the past and that they are working to understand the most recent program changes. A number of builders also seemed to conflate or confuse Earth Advantage, ENERGY STAR and Energy Trust New Homes when explaining their scores.

Builders who gave a score of 3 or more where then asked to score their knowledge of the EPS paths using the same 1 through 5 scale. Scores ranged from 3 to 5, with 65 percent giving scores of 4 or 5. Some builders initially mentioned some confusion with the program, but most still felt they were knowledgeable about the program, acknowledging they still had some things to learn. Again, a few builders seemed to be confused about who was delivering the EPS program, with some builders associating the program with Earth Advantage and others with ENERGY STAR. One likely reason for this is that many verifiers work with Earth Advantage, leading builders to think this is who delivers the program.

Nine builders (in Portland Metro and Southern Oregon) were able to report which of the five specific performance paths they build to. These nine builders most often built to paths 1 or 2, with some builders building to paths 3, 4 or 5. Four other builders explained that they build to their own designs and are not influenced by the EPS prescriptive paths. Another four builders stated that they build to meet Earth Advantage certification levels rather than EPS paths - three of these builders were in Eastern Oregon with one in the Portland Metro area. The remaining five builders could not report which path they typically build to.[9]

[9] Notably, the program does not try to steer builders towards specific prescriptive paths, and instead encourages them to build as far above code as they feasibly can. The paths only serve as recommendations for obtaining energy savings, particularly for builders that do not have pre-determined plans. Planned program communications in 2014 will more strongly emphasize the flexible, performance-based nature of the program.

Builders who built to a specific path typically did so because the path fit with their existing home plans and offered the best balance between the cost in upgrading systems and measures, the improvement in quality of the home and the level of incentives provided.

In general, builders did not have many difficulties meeting their desired paths. However, builders raised the following issues:

- Two builders in the Portland Metro area have had some problems getting sufficient hot water supply with tankless hot water heaters. Another builder in the Portland Metro area mentioned that they have had trouble sourcing tankless hot water heaters that meet the 0.82 EF requirement. An additional builder explained that it is difficult to provide adequate venting for a tankless water heater in homes with limited space.
- One builder stated that AFUE 94% furnaces are only available in sizes that are almost twice the required capacity for their homes. They require a 25,000 Btu system, but the smallest on the market is 45,000 Btu.
- Three builders stated that placing ducts inside conditioned spaces is not viable for them, as it reduces the space that could be devoted to closets and other uses. Selling inside ducts to buyers of smaller homes and town homes is especially difficult. Also, one builder said that the costs incurred for this practice is better spent on other energy efficient components such as air sealing as long as the ducts have adequate insulation and sealing.
- One builder expressed concern that homebuyers are replacing the CFLs that they install with incandescents, although this may subside with the phasing out of incandescents from the market.
- Some builders that install ductless heat pumps as primary heating systems were frustrated that they could not receive incentives for multi-head units.

Almost across the board, builders stated that the 2011 Oregon building code has had no effect on the EPS homes that they build. One builder mentioned that they have raised their level of energy efficiency to be 15 percent above code. Another builder, however, stated that they now build solely to code and have not changed their building standards, so they no longer build EPS-eligible homes.

We asked builders to describe their air sealing and ventilation practices. Of the 19 builders who could explain their practices, in general they claimed “to pay a lot of attention” to air sealing practices. Several builders stated that they follow the ENERGY STAR thermal enclosure checklist. All builders mentioned that they seal penetrations to unconditioned space, such as ductwork, plumbing and electrical wiring with foam or caulk. Many builders mentioned that they use some form of sealant, foam, caulk or drywall adhesive to seal gaps between walls and plates and use gaskets for attic and door sealing. Some builders also mentioned using weather wraps to seal their homes in addition to foam and caulk sealing.

To ventilate their new homes, interviewed builders employ whole-home ventilation fans, mechanical supply systems, mechanical exhaust systems and heat or energy recovery

ventilation (HRV/ERV) systems. Of the 17 builders who described the ventilation systems they primarily install, five use mechanical exhaust systems with and without timers (represented in all regions), five use heat recovery ventilation systems (represented in all regions), four use balanced supply and exhaust systems (in Southern Oregon or Portland Metro only), two use mechanical supply systems (both in the Portland Metro area) and one uses energy recovery ventilators (Eastern Oregon).

Twenty-one builders were able to describe their ductwork practices, as shown in the next table. The majority of participating builders were always or sometimes placing ducts inside conditioned spaces, while two builders use ductless heat pumps. There were no obvious regional differences in ductwork practices.

Table 17: Ductwork Practices – Participating Builders

Ductwork Practice	Number of Builders
Ducts inside always	9
Ducts inside sometimes	5
No ducts inside	5
Ductless homes	2
Unknown	1

We asked builders if they build solar ready homes or homes with solar electric systems. Half of the builders (11) indicated that all or some of their homes are solar ready. Six of these were in the Portland Metro area, two in Southern Oregon, one in Northwest Oregon and two in Eastern Oregon. Eight builders stated that they have built some homes that have solar electric systems, four in the Portland Metro area, one each in Southern Oregon and Northwest Oregon and two in Eastern Oregon. As these builder counts are relatively high considering the number of solar ready projects recorded in Table 5 (15), we surmise that some builders are not meeting all of Energy Trust's requirements, and/or some builders are not obtaining these incentives ($200 per home).

Builders of solar ready homes reported that they do not experience many challenges once they have learned how to do it, and several builders stated that they offer solar readiness as a standard feature in their homes and that this "is a good marketing avenue." One builder feels that making homes solar ready is a "responsible" building practice and always does this, even if the homebuyer does not request this and the builder has to absorb the "minimal" cost increment. Overall, these builders estimate that about 50 percent of their customers want to make their homes solar ready. The majority of these solar ready builders are hoping to increase the number of solar ready homes in the future. Builders who do not make their homes solar ready or have not installed solar electric systems unanimously stated that the main reason for this is that the systems are cost prohibitive, have a long payback period and the subsidies are insufficient to change this equation. Most of these builders, however, said

they would consider making solar homes if requested by a buyer or if overall demand increases.

Most builders determine the designs and features of their homes and only use subcontractors as equipment installers. Several builders commented that the builder usually educates the subcontractor. When subcontractors offer a range of efficiency options to builders, it is usually at the request of the builder. Only two builders said that subcontractors proactively come to them with new technologies or efficiency options.

Most builders felt that their contractors were adequate in supply and able to provide the energy efficiency services they required. No builders in the Portland Metro area noted any skill or supply gaps with subcontractors. In the other three regions, the only noted problems pertained to HVAC contractors and heat pump water heater installations. Several builders mentioned the need for more HVAC contractor training. In particular, some HVAC contractors are not aware of the technologies available, have difficulty appropriately sizing systems for homes (typically overestimating the size of systems required) and experience difficulty installing some ventilation systems, particularly balanced mechanical ventilation systems. Some builders also suggested that subcontractors were not willing to take the time to learn about new HVAC technologies and were averse to additional paperwork. Several builders also indicated that there are skill deficiencies for heat pump water heater and on-demand hot water heater installations. Specific issues are difficulty in setting temperatures and installing equipment to maximize effectiveness. A few builders noted that with the new homes market picking up they were experiencing or anticipating problems scheduling their subcontractors.

Interviewed builders described the following challenges to building energy efficient homes in 2014:

- Controlling overall costs as prices of building materials, energy efficient measures and labor increase
- Learning about and incorporating new technologies and efficiency techniques into their homes effectively
- Educating homebuyers about the value of energy efficiency to maintain demand
- Concerns about potentially reduced "net income" from the program, if verifiers increase their prices to builders in response to their changing incentive structure in 2014 (i.e., in excess of the increased rebates levels for builders)
- Staying informed about ever-changing energy efficiency programs and tax benefits
- Keeping up with demand as the market recovers, especially if the pool of available labor and subcontractors does not grow

Marketing and Financing

We asked builders a series of questions about their marketing and financing practices in relation to the Energy Trust New Homes Program and EPS. The majority of interviewed builders (15) believe that demand for energy efficiency above Oregon State code is increasing.

Six builders feel that demand is remaining the same, while one builder was not sure how homebuyers would continue to value energy efficiency. Most of the interviewed builders think that EPS does provide a sales advantage (8) or could provide a sales advantage (10), with the following caveats:

- EPS would provide a sales advantage if appraisers could reflect the value of energy efficiency in a house. EPS would then have a monetary value that homeowners could understand
- EPS will provide a sales advantage if homebuyers are better educated about what the EPS means
- EPS can provide a sales advantage among educated, energy efficiency conscious buyers

Builders who thought that EPS provides a sales advantage explained that it was a useful way to communicate energy efficiency to a consumer in a similar way as MPG ratings for cars. These builders also saw EPS as a way to communicate high home quality (i.e., premium product) to homebuyers. Builders who did not think that EPS provides a sales advantage cited lack of awareness and education about EPS, and some builders' lack of confidence in the score as the primary reasons.

Fourteen of 22 builders believe that homebuyer awareness and understanding of EPS is increasing, however the majority of these builders perceived that this increase is "slight" and remains "fairly low." One builder in Eastern Oregon noted that there has been an increase in media interest in energy efficiency and EPS in their region, which was a positive sign. Another builder noted that there is interest in the EPS score among their buyers *after* homes have sold, in part because the EPS score is often not available until they sell the homes. Others stated that there is awareness among builders, real estate agents and developers but this has not transferred to homebuyers. Some builders were concerned that their own perceptions of increased awareness might not extend to the wider market.

Builders who did not think that EPS awareness was increasing stated that they did not hear their homebuyers referring to or asking questions about EPS. They attributed this to a lack of awareness of energy efficiency programs in general and to low comprehension of the program.

Interviewed builders had the following suggestions for increasing awareness and interest in EPS homes among homebuyers:

- Provide custom EPS reports to builders with builder logos to encourage builders to distribute them as marketing material
- Simplify the EPS reporting graphics to make them easier for homebuyers to understand [detailed suggestions not provided]
- Increase television, radio and billboard advertising and also signage on existing EPS homes to get people asking, "What's the EPS on your house?"
- In addition to focusing on energy efficiency, tie EPS scores to home comfort

- Educate realtors about EPS and how to market energy efficiency
- Work with realtors to advertise EPS scores such as a field in the MLS
- Provide realtor certifications
- Conduct education and outreach to state realtor and building associations
- Do more outreach to lenders to raise awareness of the value of energy efficiency
- Deliver EPS scores to builders faster so builders can have scores before homes are sold

Builders had the following thoughts regarding specific marketing messages and tools that could convince homebuyers of the value of EPS homes:

- Continue to compare EPS to MPG ratings for cars
- Provide information on other benefits besides energy costs and CO_2 emissions, including health benefits and comfort levels of energy efficient homes.
- Include information about long term savings, particularly if energy costs are expected to increase

Almost universally, interviewed builders thought that Energy Trust should offer EPS training to home appraisers. Most builders highlighted home appraisals as a key barrier for the success of energy efficient homes. Several builders feel that appraisers understand that there is value in energy efficiency they just do not know how to measure this or how to compare energy efficient houses with houses without energy efficient features. Builders also perceived that home appraisers are unable to give fair evaluations for energy efficient homes because they are constrained by federal and state regulations. Some builders in the Portland Metro area feel that appraisers are actually fairly well educated about energy efficiency and provide fair assessments of value for their homes, crediting the Earth Advantage green certified appraiser program.

Although most builders we spoke with were comfortable with the accuracy of the program's EPS scores for new homes, some concerns were raised:

- One builder was concerned that energy use values for fireplaces and ventilation are underestimated.
- One builder felt that energy use estimates for EPS homes are based on optimal use of energy efficient equipment in homes. In reality, this builder believes that many homeowners do not use these systems optimally, meaning energy use is systematically underestimated.
- One builder believed that the models for EPS scores do not account for energy savings from passive solar design.

Aside from these concerns, some builders felt that the scores were accurate but would like more information about how the scores are calculated.

Program Interactions

Trade ally builders turn to a variety of sources when they need information about program participation or technical requirements. Table 18 below presents the number of builders who turned to each information source, and also the level of satisfaction they had with each source on a scale from 1 to 5, where 5 was very satisfied and 1 was not at all satisfied.

Table 18: EPS Program Information Source and Satisfaction*

		Satisfaction		
Information Source*	Number of Builders	Low	High	% Satisfied** (4,5)
PECI / CSG / ETO Staff	13	3.5	5	92%
Verifier	22	2.5	5	86%
Subcontractor	5	4	5	80%
Program materials, website, emails	18	2	5	72%
Home Builder Association staff	5	2.5	5	40%

* Multiple responses allowed.
** Percent satisfied represents the proportion of respondents that answered 4 (satisfied) or 5 (very satisfied).

All interviewed builders mentioned their verifier as a key source of program information, and expressed a high level of satisfaction with their interactions with their verifier. Key reasons for relying on verifiers include: they know specific details about the program and modeling, they are knowledgeable about energy efficient technologies, they are local and readily available both by phone and in person, and they have a good relationship and rapport with their verifier.

The next most utilized information sources are the program materials, website and emails. In most cases, builders also found these to be good sources of information that were easy to access and readily available. A few builders were not entirely satisfied with the website materials, explaining that some forms were hard to find. Others noted that they sometimes overlook emailed information because of the large number of emails they receive each day.

PECI, CSG and Energy Trust staff are also used as a resource by several builders and receive high ratings. Two builders described past communication difficulties with Energy Trust or PECI staff and attributed this to changes in administration staff, making it difficult to develop relationships.

Interviewees had the following suggestions to improve communications between builders and program staff:

- Develop a periodic builder-focused newsletter with key points on program changes and events
- Develop a calendar of events detailing dates that program changes go into effect, dates of classes and possibly dates of other events such as building association meetings and meetings of other semi-formal events such as the Southern Oregon builders Green Drinks meetings
- Conduct office visits with higher volume builders when new information or program changes are rolled out
- Introduce meetings at model home construction sites between Energy Trust staff, verifiers and builders to discuss optimal building methods and technical details of the program[10]

The builders generally have high satisfaction with the verification process. On the 1- to-5 scale, 95 percent of builders gave scores of 4 or 5, with an average of 4.31. Most builders work with one individual verifier although some work with multiple verifiers from a single company. Most builders sourced their verifiers through Earth Advantage, and some builders were recommended verifiers by Energy Trust program staff, their local utility, their subcontractors, a local building association or other builders. Some builders in Eastern Oregon and Southern Oregon reported that there was only one choice for verification - Earth Advantage – and one builder in Eastern Oregon believed that all verifications had to go through Earth Advantage. Builders in Southern Oregon stated that they would appreciate more verifier options, because they perceive that the most active local verifier is overburdened. All of the Southern Oregon builders praised this verifier very highly, explaining that he was very knowledgeable about the program and energy efficiency in general and delivers excellent service. However, they were concerned that the verifier is often very busy and maintains a very high workload.

Builders noted very few problems with the verification process and were generally satisfied and thought the process was working smoothly. Some builders expressed some frustration at the length of time it takes to get a finalized EPS score, explaining that timely receipt of EPS scores is important for their marketing of new homes. Some builders are using EPS scores from similar houses they have built in the past to market their current sales but would prefer to have the actual home EPS scores sooner. A few builders also mentioned that some verifiers' prices were high, but these builders had been able to source other verifiers at a lower price.

Only six builders recalled having a quality assurance (QA) inspection performed on their homes, and none recalled having an inspection in the past 12 months. Of the six builders who had QA inspections, three did not remember receiving any information about the inspection, two received information from the QA staff in person and one received an emailed report from QA staff. Overall, no problems were reported about the QA process.

[10] The program already offers Early Design Assistance to builders, however many builders are unaware of this service.

Lastly, we asked builders if they had taken advantage of the program's Early Design Assistance to help plan new projects. Only one builder in the Portland Metro area recalled utilizing this service, and found the process to be helpful.

Satisfaction and Needs

Overall satisfaction with the New Homes Program is high. On the 1-to-5 scale, 80 percent of builders gave scores of 4 or 5. Builders highlighted the following as the biggest challenges to program participation:

- Balancing the cost of EPS path options (and energy efficiency measures in general) with home benefits and sales price
- Keeping up with program changes, which are sometimes perceived as too complicated or restrictive
- Completing paperwork
- Obtaining and maintaining homebuyer interest in the program and energy efficiency in general
- Obtaining EPS scores in a timely manner so they can be used in marketing
- Making sure that subcontractors are up to date and educated about the program
- Southern Oregon builders described a feeling of isolation from the program. These builders feel that there is a lack of ongoing education and resources in their region.

Going forward, the participating builders would like additional program support in the following areas:

- Subcontractor training, particularly in HVAC, framing and air sealing and ventilation
- Marketing assistance for EPS and sales training
- Appraiser training to get home values to a "fairer level"
- Realtor training
- Increased program presence and outreach in Southern Oregon

7.2 Non-participating Builders

As shown in Table 19, Evergreen Economics interviewed 12 builders that do not currently participate in the New Homes Program. Of the 12 builders, five build in the Portland Metro area, three build in Eastern and Central Oregon, one builds in Northwest Oregon and three build in Southern Oregon. We found it much more difficult to obtain interviews with non-participating builders, who were less willing to dedicate time for our interviews. As a result we were not able to reach our target of 20 completed interviews with non-participating builders.

Table 19: Distribution of Interviewed Non-participating Builders

Region of State	Number
Portland Metro	5
Eastern Oregon	3
Southern Oregon	3
Northwest Oregon	1
Total	**12**

Business Scope

Similar to the participating builders, non-participating builders also target move-up buyers, first time buyers and downsizing retirees. Non-participating builders tended to have a greater focus on entry level, first homes. Of the 12 builders, two target first-time homebuyers exclusively; five mainly focus on first time buyers but also build some more expensive homes aimed at the move up market or retirees. Two builders target move up buyers exclusively and one builder targets retirees exclusively. One builder did not divulge information about his target market. Non-participating builders who market to retirees were in either Southern or Eastern Oregon.

To appeal to these buyers, most builders build smaller homes that range from 1,300 to 2,500 square feet, with starting prices ranging from $130,000 to $270,000. The two builders who market to move up buyers build significantly larger homes in the 2,500 to 5,000 square foot range with more luxury features. Their prices range from $280,000 to over $600,000. Seven of the builders we interviewed build spec homes primarily or exclusively. One builder builds homes for a non-profit organization that rents homes. The remaining builders build primarily custom homes.

We asked non-participating builders to rate the importance of energy efficiency in their building practices and marketing on a scale of 1 to 5, where 5 was very important and 1 was not at all important. Answers ranged from a low of 2 to a high of 5, with 58 percent of respondents giving scores of 4 or 5 (compared to 82 percent for participating builders). No significant regional differences were noted, however, one builder in Eastern Oregon explained that energy efficiency was very important in their construction practices due to high code standards enforced by their local county Another builder in Southern Oregon noted that they are dedicated to energy efficiency because that is what the market in their area dictates, consumers are interested in energy efficient homes, and therefore builders have to deliver energy efficiency.

Building Practices

Five of the non-participating builders exceed Oregon State code efficiency requirements in some aspects, while six builders build to code almost exclusively. Of the builders who exceed Oregon code, the above-code features they include in their single-family homes are additional

insulation, more efficient windows, more stringent air sealing techniques, additional efficient lighting technologies and efficient appliances including high efficiency furnaces.

We asked non-participating builders to describe their air sealing and ventilation practices. Builders who responded to this question appear to be diligent in their air sealing practices. These builders seal penetrations to unconditioned spaces, such as ductwork, plumbing and electrical wiring with foam or caulk and use mastic to seal ductwork. Of the seven builders who described their ventilation systems, three builders use mechanical exhaust or supply ventilation systems, two use a whole house fan, and two explained they do not have any mechanical ventilation systems aside from kitchen and bathroom exhaust fans. Ten builders stated that they did not put any ductwork in conditioned space, while two builders do put ductwork in conditioned space. One puts the ductwork in conditioned space routinely; the other sometimes puts ductwork in conditioned space at the homebuyer's request.

Builders who do not put ductwork in conditioned space cited cost, aesthetics and the loss of usable space as the main reasons. The one builder who sometimes puts ducts inside explained that it is usually retiree customers who request this, because they are more interested in keeping costs down and are more likely to consider the payback period of energy efficiency measures.

Two of the 12 builders have made homes solar ready, but neither of these builders install solar electric systems. Both builders (in Southern Oregon) rated the importance of energy efficiency in their building practices highly. Neither builder experienced technical challenges in making their homes solar ready, explaining that it is relatively easy and inexpensive to do. One of these builders believes that the solar market is increasing while the other has seen demand for solar and other energy efficiency solutions fall due to the housing market downturn. Builders who do not make their new homes solar ready cite lack of demand and high cost, especially for entry level homes, as the main factors stopping them from making homes solar ready.

Marketing

Generally, non-participating builders see homebuyer demand for energy efficiency remaining level or slightly decreasing. Most non-participating builders explained that the main concern for their customers is price per square foot and the customer is either unaware of energy efficiency or sees it as something they are not willing to pay extra for. This is especially the case for builders targeting entry-level customers. One builder noted that the demand for energy efficiency is dependent on the target market segment, with the lower price range of the market not educated about energy efficiency and the upper end of the market tending to be more energy savvy. A second builder perceived that many customers see energy efficiency as "a fad." Other builders mentioned that their customers are concerned about energy efficiency but not interested in going above Oregon code.

Most non-participating builders did not see EPS as providing a sales advantage in their markets. One builder who had been an Energy Trust trade ally in the past believed that his target market did not care at all about EPS. One builder who did think EPS could provide a sales advantage marketed to move-up buyers and was a participant in Earth Advantage; given that the Earth Advantage certification has been a good sales tool in some cases, he could see EPS offering an advantage. Another builder who had received an EPS for homes in the past stated that once customers were educated about the meaning of EPS it became a good marketing and sales tool.

Non-participating builders offered the following suggestions to get more homebuyers asking about EPS homes.

- One builder who had a good understanding of the program suggested making the verifications less expensive, and would even prefer to have free inspections rather than rebates.
- Another builder suggested starting education programs in schools as a way of introducing the program to the general public.
- Another builder suggested getting equipment suppliers involved as a way of promoting new products.

Program Perceptions and Barriers

Five of the 12 builders participate in some other certification program. Four participate in Earth Advantage, one in LEED and two in ENERGY STAR.

We asked non-participating builders to rate their knowledge of the Energy Trust New Homes Program on a scale from 1 to 5, with 5 being very knowledgeable. Five non-participating builders rated themselves 3 or higher with one rating himself a 5. Knowledge of the EPS, specifically, among these five builders was also strong, as two builders had received an EPS for homes in the past but no longer participate in the program.

The two builders that participated in the EPS program in the past had differing attitudes toward the program. The first builder was generally positive about the program and hoped to participate again in the future. The only barrier to their participation was that they are a small volume custom builder who will only build above code on request from clients. The second builder was less positive about the program. This builder explained that he builds homes that are 15 percent above code and often solar ready, targeted mainly at retirees. This builder is seeing falling demand for energy efficiency in his market, as customers do not want to incur additional up-front costs. This builder did not perceive any sales advantage to participating in the program so he dropped out. This builder also noted that Southern Oregon utilities are oil and gas driven, which means their EPS scores, particularly for emissions, were relatively higher, making the program less attractive.

The two builders that were knowledgeable about the program but had not participated both gave high scores for the importance of energy efficiency in their building and marketing

practices. The first builder explained that he does not participate primarily because the cost of inspections is too high. He is not building high-end homes and the inspection cost is often more than the rebate he would likely receive. Moreover, this builder perceived that there is little demand for energy efficiency/EPS in his target market (first-time home buyers). In order for this builder to participate, the cost of inspections would have to come down and education about energy efficiency in his target market would have to increase. The second builder expressed similar concerns about high verification costs and lagging consumer demand. This builder is also skeptical about the accuracy of EPS and would like to see more comparisons and get more information about the calculations that go into the score.

The seven builders that were not knowledgeable about the program gave the following reasons for not participating:

- There is no perceived demand for EPS or energy efficiency in their base market
- The high cost of inspections is prohibitive
- Lack of knowledge about the program
- Concerns that the program will add paperwork for (already busy) builders

Several of these builders stated that they might become more interested in the program but currently "lack information." None of the builders, however, were able to provide details about the information they are lacking.

8 Subcontractor Interview Findings

Evergreen Economics completed seven interviews with subcontractors that are recognized as active trade allies in October and November of 2013.[11] Some of the key interview objectives were to:

- Understand business practices, including marketing to builders and measures selection
- Identify subcontractors' challenges getting builders to adopt required techniques and standalone measures
- Assess effectiveness of program processes for standalone measures
- Obtain feedback on the program's subcontractor training and additional training needed
- Understand subcontractor interactions with builders, verifiers and quality assurance staff
- Identify desired program assistance

Business Scope

Aside from one participant who joined the New Homes Program last year as a trade ally, all have been with the program for more than three years. The subcontracting services they provide to homebuilders in Oregon range from duct installation, sealing and testing, to HVAC installation/commissioning, as well as insulation/weatherization and water main replacements. Only two respondents were certain that they had worked on EPS homes; others stated that they probably had, but were not sure since builders do not always tell them if the home is going to be attaining EPS or ENERGY STAR status.

Numbers and percentages of homes serviced varied for the two builders that had definitely worked with EPS homes. One subcontractor that only works on new homes with Habitat for Humanity had serviced between 20 and 25 new homes – expecting only three or four to be completed in 2013 – while the other had completed work for three different builders on about 200 new homes – 80 to 100 of which will complete in 2013. Similarly, these two subcontractors stated that almost all of the new homes they service (between 80 and 100 percent) are for the New Homes Program and receive an EPS, whereas the rest of respondents estimated that maybe five or 10 percent of the new homes they work on are EPS. Approximately one percent of the "Habitat" subcontractor's total revenues are generated from EPS New Homes while about 10 percent of the other's revenue is from this line of work (the rest is from existing homes).

[11] PECI provided information for 30 companies that had attended trade ally trainings. Not all of these companies are actively doing work for new homes, however, and some companies were no longer operating or the trained staff had left. In the end, there were only 20 companies that we had not already interviewed as verifiers for the program, and several were non-responsive, which is the reason for the lower than anticipated number of completed interviews.

One subcontractor had worked with 15 to 20 energy efficient, custom home builders while the other interviewees had worked with between one and three builders of energy efficient new homes (which may have included some EPS homes; they were not sure). Most of the subcontractors expect their builder clients to remain the same over the coming 12 months, although two expect their builder clients to increase due to the improving housing market and strengthening economy.

The subcontractors stated that energy efficiency was either "important" or "very important" in their installation practices. However, they do not always get to promote or encourage energy efficiency, since builders tend to already have their project scopes written when they look for a contractor to do the work. Nevertheless, the respondents decided to become trade ally subcontractors in order to generate business by staying competitive with other contractors in their area, improve their exposure in the region and remain educated about the energy efficiency marketplace.

Standard Practices

Besides the subcontractor that only services new homes with Habitat for Humanity, which always builds to Path 3 (ENERGY STAR and Earth Advantage specifications), all of the respondents offer a range of options while pushing for higher-than-code features. Ultimately, though, the decision is always left to the builder. Despite offering recommendations, only three subcontractors were knowledgeable of the New Homes Program's requirements, and of these, only one was very familiar with the details of the five EPS paths. When asked which path(s) the homes they work on were built to, the two less knowledgeable subcontractors stated that the builders they tend to work with only construct energy efficient homes to the minimum requirement necessary; therefore, they probably serviced Path 1 or, possibly, 2.

Aside from the extra paperwork, the subcontractors did not feel that meeting the path requirements is difficult. Rather, they stated that builders tend to construct homes to the minimum efficiency level necessary while meeting program requirements – they want to be able to market EPS or ENERGY STAR homes, but do not care about the detailed EPS rating.

Three subcontractors stated that they had installed standalone measures – two installed heat pump water heaters and one installed ductless heat pumps – in new homes that qualified for an Energy Trust incentive. However, one of these three participants also listed a measure that is not included in the New Construction Incentive Application: a variable speed gas furnace. Moreover, one respondent did not know that incentives existed for standalone measures in new homes. These finding are not surprising, however, as the new standalone incentives were announced shortly before the time of the interviews, and some contractors had probably not reviewed this information closely. That said, it might be advisable to reeducate subcontractors on the various standalone measures that qualify for a rebate so they can include accurate information while offering various options.

As for why standalone measures rarely get installed in new homes, one respondent stated that heat pump water heaters do not perform "as advertised," and the $125 rebate for tanked gas water heaters is not enough to compensate for the specification requirements. Likewise, the two subcontractors that had actually installed heat pump water heaters were not satisfied with the amount of the standalone incentives to offset the (high) upfront cost. On the other hand, the subcontractor that had installed ductless heat pumps was satisfied with the rebate – though, he did not necessarily expect an increase in installations.

Training

While opinions and responses differed among interviewees, the majority gave positive feedback about the training they received about the EPS rating system. Four of the seven participants did not remember going through much training - only one hour if any at all - while the two duct installers recalled attending as much as three days of training, including in-the-field training by program staff. Most of the information in these sessions pertained to technical building practice topics, and everyone said the training provided was about the right amount, except for one subcontractor who thought it was more detailed than necessary. Also, one participant would have liked more discussion of marketing materials for EPS homes in order to recruit more builders. Only one participant – a duct and HVAC installer – was dissatisfied with the training, although he did not attend any of it. Instead, some of his employees completed the training (and said it was "good"), but are still not comfortable doing some tasks out in the field (details were not offered).

Program Interactions

When they need information or clarification on the program's participation or technical requirements, most subcontractors turn to Energy Trust or CLEAResult staff, who implements the ENERGY STAR Homes program for NEEA. A few also said they contact Earth Advantage and one participant uses the Energy Trust website. As subcontractors do not work exclusively for any energy efficiency program, they tend to contact staff that originally trained them on technical practices, although some measures and practices cross programs. None of the subcontractors use the aforementioned sources often, however, and the ones that use multiple sources know whom to contact for specific information.

Six of the seven subcontractors stated that they were very satisfied with the availability, knowledge level and accuracy from all of the sources used. One subcontractor, however, was very unhappy with a lack of communication from Energy Trust and its representatives when he has inquired with them. This participant reported that program staff were not knowledgeable about high efficiency HVAC, duct, or heat pump installations and did not know whom to contact for better information, and cited staff turnover as the likely culprit. Since this subcontractor had not always received return phone calls after leaving messages, they "use the website and hope for the best." To improve the program delivery for subcontractors, interviewees recommended: listing which trainings are available in the email newsletters, creating a one-page index of staff to contact regarding various issues, and sending out an

email blast if Energy Trust has any unique or beneficial future construction opportunities to highlight.

Verification Process

For the most part, builders manage the verification process and the subcontractors are only called in if anything needs to be fixed – which is very rare. However, one subcontractor mentioned that he has shadowed a verifier to further his knowledge of the process. If a verifier requires remediation, the subcontractors tend to fix these minor problems immediately. All of the subcontractors are satisfied with this process and did not mention any problems they are having with passing the verification.

Satisfaction and Needs

Aside from the one subcontractor who is very dissatisfied with the communications from program staff, all of the other subcontractors are satisfied with their experience as Energy Trust New Homes trade allies. However, a few subcontractors expressed disappointment in not having worked on many EPS homes. Suggestions for the program included:

- Making the quarterly trade ally roundtable meetings more succinct and providing information in less technical terms (and with more "realistic" program goals)
- Assigning specific program staff to help subcontractors fill out forms and proactively communicate staffing changes
- Allocating more program budget to incentives (versus program management)

9 Verifier Interview Findings

Evergreen Economics completed interviews with nine new homes verifiers from September to November of 2013.[12] Some of the key interview objectives were to:

- Understand verification practices and challenges, including marketing to builders
- Understand interactions with builders, subcontractors and quality assurance staff
- Assess the effectiveness of program processes and private verification model
- Obtain feedback on new EPS Homes training
- Identify key program challenges for builders and subcontractors
- Identify verifiers' challenges obtaining RESNET certification and/or using REM/Rate software to analyze homes
- Identify desired program assistance

Business Scope

Except for two interviewees who joined the program in the past year, all of the verifiers that took part in the interviews had been involved in the New Homes Program for over two years – most being involved since its transition to a market-based system. About half of the interviewees were company owners or self-employed, with the rest being employees of public or private companies and non-profit enterprises. The verifiers gave numerous reasons for joining the program. However, the majority of participants stated that it was a natural complement to services already offered (especially since many offered duct testing, energy efficiency construction consulting, insulation and weatherization services) and they wanted to benefit their existing customer base by offering additional services and incentives.

Aside from two verifiers that had not completed any verifications for the New Homes Program, and two that had done more than 1,500 verifications, the average respondent had verified 50 EPS homes with nearly half of these done or nearing completion in 2013. Currently, verifiers work with an average of 10 builders and most expect their client base to increase slightly over the next 12 months as the housing market continues to grow.

About half of the respondents' companies earn between 10 and 20 percent of their revenues from EPS home verifications, while one verifier obtains 75 percent of their revenues from verifications. Nearly all of the verifiers charge between $400 and $450 per home verification after receiving Energy Trust incentives. One of the respondents, however, had not yet verified an EPS home, was looking for opportunities, and planned on charging $1,200 per home. All of the verifiers had maintained their average per-home fee over the past 12 months, except one

[12] PECI provided information for 18 verifiers. Not all of these companies were actively doing work for new homes, however, and several were non-responsive. Nevertheless, the top five verifiers ranked by verified homes were interviewed (along with four others) – these five performed roughly 90 percent of the identifiable verifications.

respondent who varies their fees based on builder volume – more experienced builders tend to have a smoother verification process, in turn reducing costs. The respondents were split on whether they would increase their rates or not in the next 12 months: nearly half anticipate increasing their rates owing to an expected decrease in EPS verification incentives, with the rest stating they would not increase their going rate. All of the active verifiers were either satisfied or very satisfied with the current revenues they were generating from the new homes verifications.

Training

The verifiers had a difficult time remembering how many total hours of training they received as well as breaking down the percentage into various categories (e.g., technical material, program procedures and forms, marketing and business practices and other). However, nearly all of them agreed that the training was sufficient and prepared them well to verify EPS homes. Especially helpful are the monthly phone calls with program staff and supplemental PowerPoint presentations. However, one verifier suggested distributing a recording of the monthly phone calls to go along with the PowerPoint, and another would like to have additional training available for home energy modeling.

None of the active verifiers encountered any challenges in attaining the RESNET certification necessary to become an EPS homes verifier. However, one inactive verifier is having difficulties getting a RESNET certification. His main obstacle is getting access to the REM/Rate software: he has to hire somebody that is certified, which is not only difficult to find, but expensive. This obstacle was also mentioned by an active verifier that is concerned about the future of the program. This respondent's primary concern was not just with how difficult it is to access the modeling software, but also the requirement that all verifiers be HERS certified. According to the interviewees, the root of the problem lies in finding somebody to mentor an apprentice through 10 inspections. Moreover, becoming a mentor requires 25 HERS certifications and this minimum volume (something not many people have) is reportedly increasing soon.

Verification Process

Verifiers tend to schedule their visits in two ways: they either receive updated verification schedules, monthly or weekly, via email from their builders, or they get a phone call from the job superintendent a few days prior to or the same day of the required inspection. In order to ensure that the house is ready to be verified, most of the participants email, text, or call the superintendent the day before a scheduled visit.

On average, not including travel time, the initial rough inspection takes an hour to complete while the final inspection takes between 90 minutes to two hours. Most of the verifiers stated that the time to verify a home does not vary by the EPS path the builders select; however, a few respondents stated that the time it takes to verify a home differs according to the size of the home, whether it needs a duct test and the experience of the builder. The most challenging

EPS requirement for many verifiers is inspecting everything on the thermal enclosure checklist, especially air sealing of the band joists and insulation behind showers and tubs.

The percentage of homes that require remediation based on the initial, rough, inspection varied among respondents: between one and 100 percent. However, all of the verifiers claimed that these issues tended to be minor – missed air sealing, extra foam around penetrations or wires, cavity without insulation, etc. – and are either fixed immediately or within a few days. Depending on the severity of the issue, and whether it is a new builder, pictures of the improved work are sometimes accepted by the verifier. If everything looks fine, the verifier does not need to make another pre-drywall visit to ensure that the problem is resolved. Aside from wanting to understand why something needs to be fixed, these issues tend not to be disputed by builders or subcontractors.

Once the EPS verification process is finished, it currently takes each verifier about 90 minutes to model each home, another 90 minutes to put the data in the calculator and 30 to 45 minutes to enter these results into the program database. Aside from one verifier who had been taught a few shortcuts and was "more experienced than average" with the old software, the new Axis database tended to slow this process down quite a bit for all verifiers.

Of the seven active verifiers, none were pleased with the new Axis database software thus far, however they all stated that it has improved since their initial usage.[13] Many of their complaints stemmed from the amount of questions asked, especially repetitive questions, and the flow of the questions – it tends to jump from one subject to the next without a well-defined pattern. One verifier did not like the order with which the utility information was recorded into the database (electric then gas) because it was different than the order of the 640S form (gas then electric). Recommendations to improve the process of entering or searching for homes data included attaching links to various websites – ENERGY STAR and other appliances that qualify for rebates – as well as including the State Construction Office identification number for homes.

Quality Assurance (QA) Process

Verifiers typically receive a phone call from CLEAResult asking to schedule QA inspections in any upcoming homes. Normally, a date range is given, the verifier then notifies the builder's superintendent of the request, and the superintendent does the final scheduling. CLEAResult typically sends the results from these inspections to the verifier via email, although one respondent stated that he had not received this information in a long time, and another explained that he preferred to go on visits periodically to obtain feedback on the spot.

[13] At the time of the interviews the verifiers were not using Axis for Energy Trust programs. The Axis database was first deployed by NEEA for use by ENERGY STAR verifiers and has since been adopted and further built out for the New Homes program.

Overall, verifiers are satisfied with this process and believe the information they receive is either "useful" or "very useful". However, one verifier would like to receive more notice and time to schedule these appointments, while another believes the process could be improved if inspections were done completely randomly, as currently builders can nominate specific homes for inspections, and there is potential to "game the system" if verifiers are not doing thorough inspections on their end.

Overall, the program tries to strike a balance between random inspections and efficient use of inspection staff resources. Builders and verifiers are usually contacted randomly to see if homes are ready for QA inspections, but homes must also be open and unoccupied (or QA cannot be completed). Thus builders have to identify homes at appropriate stages of construction for QA to occur (and prevent "squandered" visits). According to program staff, builders that proactively nominate homes are usually "better" builders, and where quality concerns exist, program staff will work with builder's verifier to ensure that some QA gets done. Overall, program staff try to work through the verifiers as much as possible, since they are encouraged to the primary support staff for builders.

Marketing and Builder Assistance

Aside from the two interviewed verifiers that have not worked with any EPS new homes, the majority of verifiers were contacted by builders regarding their verifier services. Therefore, marketing has not been a high priority for many verifiers. However, when they do try to market their services to builders, verifiers tend to make in-person visits or reach builders on the phone, while a few market their services when attending builder meetings, conferences, or workshops. The program benefit that is most often emphasized to builders is the cash incentive, or rebate, followed by differentiation benefits, reduced callbacks, home durability and less noise. Besides changing some language to better educate smaller builders who may not have as much experience with the program, the verifiers do not emphasize different benefits to large (production) and small (custom) builders.

About half of the verifiers stated that the main obstacle to getting builders enrolled in the program is the cost of a verification and/or additional constructions costs, followed by difficulties meeting the EPS path requirements – especially framing and insulation. Verifiers mentioned that the builders think they cannot cover the incremental program costs in their sales and are looking for the cheapest subcontractors to do the work, which translates into not meeting the EPS requirements. Meeting the requirements is most challenging for custom builders, and large builders often cannot rewrite their project scopes.

To overcome these obstacles, verifiers try to educate the builders and subcontractors, with help from Energy Trust, and also direct them to the Best Practices guide. They tend to emphasize the benefits mentioned above – reduced callbacks, home durability, and less noise – and also described several things which may help them recruit more builders to the program:

- Do follow-up presentations a few years from now and prove energy and bill savings
- Create a one-page leaflet listing the benefits of becoming an EPS builder
- Create different marketing materials by region – rural builders market to a different demographic than urban builders
- Develop homebuyer marketing that builds trust in EPS home builders

Overall, verifiers stated that they provide a "significant amount of assistance" to builders. Only one active verifier claimed not to have been asked by any builders for technical guidance to meet the program requirements, while all of the others provided a list of topics on which they have advised builders. These actions range from helping builders sign-up on the program website, assisting with the requirements of the thermal enclosure checklist and rewriting scopes to meet requirements. All of the verifiers are "comfortable" or "very comfortable" in answering technical questions received from builders.

Program Interactions and Satisfaction

Most verifiers contact PECI or CSG staff when they want to get the most current technical information about the program and a few said they call various New Homes Program staff or check the website. For the most part, they know where to turn when a question arises or they would like to receive technical advice; however, owing to staff turnover and unfamiliarity with the program, several verifiers mentioned that a one-page chart with contact names, phone numbers and a brief description of their role would help expedite this process. Nevertheless, all of the active verifiers are satisfied with the information they receive when contacting these sources and are also pleased with how timely the information is communicated.

Various recommendations were given to improve Energy Trust communications with verifiers: when emailing about training seminars, note if continuing education (CEU) credits are available for specific programs (e.g., BPI, RESNET, HERs); record verifier conference calls and distribute them along with the PowerPoint; and differentiate more thoroughly between EPS and ENERGY STAR.

Likewise, suggestions were provided for the program as a whole: similar to the commercial program, do not require Energy Trust to be an additional insured – it increases costs for builders[14]; make sure builders know that they will be taxed on the incentives they receive (especially net-zero homes); decrease the barriers of entry to becoming a verifier (especially training costs and the difficult mentorship requirements), so smaller/rural communities are served adequately. Regardless, all of the interviewed verifiers were "satisfied" or "very satisfied" with the Energy Trust and its contractors for the New Homes Program.

[14] Builders' commercial general liability policies must include an "additional insured" provision providing that Energy Trust of Oregon, Inc. and its directors, officers and employees are included as an Additional Insured.

10 Real Estate Trade Ally Interview Findings

In October and November of 2013, Evergreen Economics completed interviews with 14 realtors that had attended EPS trainings in the past. Some of the key interview objectives were to:

- Get feedback on the quality of EPS training and identify additional training needs
- Assess realtors' comprehension of EPS homes
- Understand realtors' marketing practices related to EPS, and perceived value of EPS to realtors and homebuyers
- Identify potential program improvements, particularly related to EPS marketing
- Gauge realtors' satisfaction working with the New Homes Program

This section summarizes the results of the interviews. Although only four realtors in the sample had experience selling or buying an EPS home, the interviews still yielded feedback on Energy Trust's training, how customers value energy efficiency generally and other interactions that realtors have had with Energy Trust.

Business Scope

On average the interviewees had just over 13 years of experience as a licensed realtor, with a range of 7 to 34 years. A majority of interviewed realtors work primarily with older, existing homes, although approximately 70 percent of the sample had sold at least one new home in 2012 or 2013. Three of the realtors said they currently do or have specialized in energy efficient properties, while the remaining participants do not specialize in any particular type of home. Below, Table 20 provides a more detailed breakdown of the interviewed realtors' experience.

Table 20: Homes Sold/Purchased by Interviewed Realtors

Realtor Primary Market Area	# of Realtors Interviewed	Average # of Existing Homes 2012 & 2013	Average # of New Homes 2012 & 2013	Total # of Existing Homes with EPS	Total # of New Homes with EPS
Portland Metro	10	41	3	2	6
Eastern Oregon	3	18	10	0	2
Northwest Oregon	1	6	0	0	0
Total	**14**	**34**	**4**	**2**	**8**

As the table illustrates, a majority of the interviewed realtors work in the Portland Metro area. Over the course of the last two years, the average realtor sold or helped customers purchase 34 existing single-family homes and only four newly constructed single-family homes. Very few existing homes had received Energy Performance Scores through Energy Trust's program (approximately one percent), while 13 percent of new homes had received an EPS.

Training and EPS Comprehension

Nearly all of the realtors took Energy Trust's trade ally training program for one of two reasons: because of their own personal interest in energy efficiency, or because they wanted to gain more knowledge about efficiency programs to be more informed when speaking with clients. Several of the interviewed realtors admitted to not remembering many of the specific topics the training covered, as a majority of participants had taken the training between 2-5 years ago. However, multiple participants recalled training topics such as "Energy Trust marketing initiatives," "EPS is mostly for newer homes," and "general energy efficiency." Among the realtors, only six claimed they were "extremely" or "very" knowledgeable about the EPS scoring system, while nine said they were "extremely" or "very" knowledgeable about the typical energy efficient features of EPS homes. On the other end of the scale, four realtors rated their understanding of the EPS scoring system and the energy efficient features of EPS labeled homes as "a little" or "not at all" knowledgeable.

To help assess the training's effectiveness the realtors were asked if the training provided the necessary tools to effectively present and promote EPS homes to their clients. The realtors had mixed feelings in this regard. About one-third of the realtors said they do feel the training provided adequate information to promote EPS homes, while a quarter of participants felt the training did not. The remaining participants fell somewhere in the middle, with responses such as "up to a point…. there are missing pieces," "I don't think the tools were around," and "I don't think it was in play," in reference to the lack of EPS homes on the market. Additionally, several participants noted that they have not been able to utilize their training fully, since general public awareness and demand for EPS is still low.

While a majority of realtors in the sample had not bought or sold any EPS homes, every realtor except one said they received regular email updates from Energy Trust regarding the New Homes Program. However, only one participant in the sample found the email updates useful, with several realtors indicating that the updates contain "too much information" that is not applicable to their business on a day-to-day basis. Multiple realtors would prefer more specific information on available tax credits for energy efficient features (e.g., heating, windows), information on emerging trends in the green realty industry, and other topics that pertain directly to realtors. In addition, while over half of the realtors said they have gone to Energy Trust's website when they need additional information about EPS homes or strategies to help sell them, several realtors said the website also contained an "overwhelming amount of information," with only one realtor saying the website was easy to navigate. One participant indicated that "it would be helpful [for the website] to have information that realtors use a lot" versus information targeted at the general public or builders.

Besides the Energy Trust program training, a majority of realtors said they have received other technical training focused on home construction, retrofit practices, or residential building science. These trainings include, Green Home Concepts training, Earth Advantage remodeler and realtor training, Eco Broker (out of Colorado), e-PRO and other builder practices focused on general upgrades. Among these trainings, the Earth Advantage realtor

training was the most popular, with five participants taking the course. Six out of the 14 realtors had received no additional technical construction training. Among those six, five realtors said they would want to learn more about home construction practices and attend further trainings in the future if energy efficiency topics become more relevant to their clients.

Marketing Practices and Homebuyer Perceptions

The interviewed realtors market their homes in a variety of methods, including online, in print and via in-person presentations. Specifically, the most common marketing techniques used by the interviewed realtors include Multiple Listing Service (MLS), online postings through personal and company websites and print brochures or flyers. Additionally, multiple realtors said they use local newspaper or magazine print ads, postcards, or have marketing departments within their companies that fulfill their marketing needs.

All four realtors that have actually sold or been involved with the purchase of an EPS home said they actively promoted the benefits of EPS homes to customers. Among those four, only one realtor utilized strategies presented at the Energy Trust training and mentioned Energy Trust while promoting EPS. Several realtors indicated they "haven't found an opportunity to market EPS," "don't think it is really available," or simply "promote higher efficiency features" but not specifically EPS.

When promoting energy efficient homes, the interviewed realtors said the most important benefit they market is the overall or long-term energy cost savings. Several realtors said clients found this to be the most important benefit also, due to the higher upfront costs for energy efficient homes. In addition, about a third of interviewed realtors said they promote improved comfort and health levels of energy efficient homes to clients. There was near consensus among the realtors that the best approach to marketing energy efficient homes is to focus on broad overarching topics, such as overall savings, rather than focus on specific details or features. Reinforcing this practice is the fact that realtors say they have little time to market each individual home, and most homebuyers have limited understanding of specific energy efficient features. However, multiple realtors said that if clients are looking for specific energy efficient features they ask about heat pumps, appliances, furnaces, insulation, windows, or solar panels.

Half of the interviewed realtors said they believe homebuyers recognize the benefits of an EPS home generally (i.e., high energy efficiency), but do not understand the EPS scoring system. Additionally, 11 of 14 realtors said that clients commonly confuse EPS homes with other home certifications such as LEED, ENERGY STAR or Earth Advantage. The other three realtors said that clients do not seem to be confused, but rather do not know what EPS is.

Five realtors in the sample said they have had a client ask to see energy efficient homes, and one said they have had a client ask specifically to see an EPS home. While all the realtors agreed homebuyers value energy efficiency, several said the EPS label carries "not very much [value] at all" and is "unfortunately not nearly as important as one would think." This overall

lack of consumer knowledge and perceived value, combined with the lack of EPS homes in the market, are the biggest challenges in marketing EPS homes according to the interviewed realtors.

To help combat these challenges, almost all the realtors in the sample said that a database of homes with EPS scores or having EPS scores as a feature in the MLS would be valuable to both themselves and their clients. However, some realtors feel that this integration would only be valuable if more EPS become available and consumers become more informed about EPS.

Satisfaction and Needs

None of the realtors in the sample said that they have benefitted significantly from partnering with Energy Trust to sell more energy efficient homes. About half said the training information and limited marketing partnerships were somewhat beneficial, but overall expressed that the partnership "didn't generate any business." As a result, when realtors were asked to rate their experience "working with Energy Trust on a scale from 1 to 5, where 5 is very satisfied and 1 is not at all satisfied," 50 percent gave a score of 4 or higher. Overall satisfaction does not seem to differ between geographical regions of Oregon, as realtors across the state expressed similar sentiments regarding their experiences with EPS homes and Energy Trust.

To help improve the EPS training, Energy Trust's communication with realtors, and the overall experience working with Energy Trust, realtors offered the following recommendations:

- Provide more realtor training sessions, including follow-up trainings to help keep realtors informed and updated on how EPS works either in person or online
- To help increase general public awareness, make the EPS system more customer-oriented by providing a clear description of what an energy efficient home entails without "getting bogged down by details"
- If possible, target not only homeowners but also single-family home renters, who are frequently looking to lower utility bills
- Explore putting EPS scores on MLS to help increase customer awareness and increase builder inducements to go through the EPS process

11 Lender Interview Findings

From October to December of 2013, Evergreen Economics completed 10 interviews with nine institutions and brokers that provide financing for home purchases and upgrades (i.e., lenders). Lenders can help to finalize transactions by offering favorable terms for energy efficient homes and upgrades. Each interviewee was experienced in the mortgage industry with roles from Mortgage Loan Officer up to Vice President of Lending. Interviewee contacts were sourced from Energy Trust lending allies, builder recommendations and "cold calls." Some of the key interview objectives were to:

- Characterize lenders' practices and plans regarding financing for energy efficient home mortgages and upgrades
- Identify institutional barriers to developing favorable lending for energy efficiency
- Understand lenders' experiences with loan utilization and problems encountered
- Identify potential market interventions by Energy Trust to increase lending options for energy efficiency

The nine institutions represented in our interview sample include three credit unions, four commercial banks and two mortgage brokers. These institutions provide services across Oregon and Southwest Washington.

We asked lenders to describe the different types of financing they offer for energy efficiency improvements for new and existing single-family homes. Specifically, we asked if they provide specialized mortgage products, such as Energy Efficient Mortgages (EEMs) or forms of financing for energy efficient upgrades to existing homes such as home equity lines of credit. Of the nine lending institutions represented by our interviewees, three offer mortgage products or specialized terms of purchase for energy efficient homes that differ from traditional mortgages. Eight of the nine institutions offer some form of financing for energy efficient upgrades.

Mortgage Financing

Three lenders offer EEMs for new and existing LEED, ENERGY STAR and Earth Advantage homes through the Federal Housing Authority (FHA) EEM, Department of Veterans Affairs (VA) EEM and FHA 203(k) (Rehabilitation) mortgage programs.[15] Another lender provided EEMs until 2011 but discontinued these programs "because they were more complicated than standard mortgages, the market for energy efficiency was more volatile and they had more customers wanting standard mortgages." Interviewees stated that their institutions were motivated to offer EEMs because: borrowers who seek to make energy efficiency improvements are perceived to have lower default risk; there was demand from their

[15] More information on these loan programs can be found at: FHA - http://portal.hud.gov/hudportal/HUD?src=/program_offices/housing/sfh/eem/energy-r; VA - http://benefits.va.gov/WARMS/docs/admin26/handbook/ChapterLendersHanbookChapter7.pdf

customers and members; and because EEMs fit with the goals and commitments of their organizations.

To qualify for EEMs, homes have to meet certain criteria. Lenders explained that for FHA and VA EEMs homes must be undergo a full independent Building Performance Institute (BPI) audit or HERS audit. The lenders use the results of the audit to establish the cost effectiveness of specific energy efficient upgrades.[16] One lender noted that the more recent allowance of BPI audits has made it easier to find enough savings from energy efficiency measures to make an EEM feasible. Another reported that homes must have some energy efficiency certification in order to qualify for an EEM but provided no specific information on the type of certification. For FHA 203(k) loans, home rehabilitation plans and costs must be pre-approved by the Department of Housing and Urban Development (HUD). These homes must meet certain minimum energy conservation standards including weather stripping, caulking and sealing of the building envelope and adequate ventilation. None of the lenders with EEMs offers preferential interest rates or loan payback periods, however homebuyers can benefit from:

- The ability to finance energy efficiency upgrades through increased maximum loan values (resulting in higher loan payments but a greater reduction in energy costs);[17]
- Discounted closing costs or loan fees; and/or
- Some lenders offer free appraisals for EEMs.

The three lenders who provide EEMs have developed specific marketing collateral for their products. They each have detailed information on their EEM products and procedures available on their websites. Despite this, only one lender introduces the idea of using an EEM as part of a typical mortgage application. This lender explained that as part of their standard application process they explain the benefits of an energy audit to their customers and the potential for building an energy efficiency component into their home loan.

Two of the interviewees who currently provide EEMs and one lender who has offered them in the past provided information on their experiences with EEMs.

The first lender explained that their customers are utilizing EEMs, but there are some significant problems with EEM transactions, including:

[16] Cost effective in this case means that the total cost of improvements is less than the present value of the energy saved over the useful life of the energy improvement.

[17] The FHA and VA programs dictate maximum increases to loan amounts that can be used for energy efficient upgrades. FHA EEMs will finance the cost of upgrades to a maximum of the lesser of the following three options: 5% of the value of the property, 115% of the median area price of a single family dwelling, or 150% of the conforming Freddie Mac limit, which. VA EEMs cap the cost of upgrades to $6,000. Lenders are able to reduce the amount of funds available at their discretion.

- BPI auditors are not knowledgeable about the requirements of EEMs; specifically, they are not aware that auditors and contractors must be independent from one another, and they are not willing to provide output from modeling software that is required by lenders
- There is no standardized pricing for BPI audits
- BPI auditors do not turn around audit results quickly enough to facilitate timely loan closing
- Realtors are fearful about additional inspections and delays in closing
- Sellers are concerned with risks of contractors installing energy efficiency measures in their home before sale is complete and being saddled with the cost of the improvements
- Lenders sometimes are required to hold back funds in escrow to cover costs of contractor and auditor services

Despite these problems, this lender has seen an increase in utilization and interest in EEMs over the past 12 months, in part because their institution "can message that energy improvements are a permanent record for their home by getting an EPS score." Additionally, now that the cost has come down and BPI audits are now an allowed metric, they are seeing higher savings estimates in their audits, making loan approvals more likely. This lender sees EEMs as providing a competitive advantage for their institution.

The second lender was not seeing significant utilization of their EEM products, nor had they seen any change in utilization in the recent past. The reason for this is that inventory of qualified homes is very limited due in part to limited new construction since 2008. This lender is starting to see more EE certifications being issued so it is possible that the inventory of qualified homes will start to increase and utilization of EEM products may grow.

The third lender, who ceased providing EEMs in 2011, provided some insight into the utilization of EEMs. This interviewee suggested that EEM products are not in high demand because they are highly susceptible to market volatility, are often perceived as overcomplicated by lenders and borrowers and do not provide enough benefits to lenders to offer the products. For this institution, the strain of administering EEMs outweighed the potential advantages. The interviewee suggested that the biggest reason for these perceptions was a lack of understanding of the programs among lenders, contractors and buyers.

Of these interviewees, one expressed willingness to work with Energy Trust to develop specific energy efficient loan products. In particular, this lender believed that the most important aspect of EEMs to work on was developing messages and materials aimed at the secondary mortgage market.[18] These materials could emphasize the lower rate of default of

[18] In this market, numerous "original" mortgage loans to homebuyers are packaged together by banks and other mortgage lenders and sold to investors as securities or bonds collateralized by the value of original mortgages. Investors typically prefer securities based on traditional home mortgages, since they are easier to valuate than non-standard loans.

EEMs and how lenders and loan servicers could grow their portfolios by including energy efficient products.

Six of the nine institutions represented in our interviews did not offer EEM products. The main reason given for this was the lack of demand for these products on the secondary market. This is especially critical for large commercial banks. These banks are typically very conservative in their approach to loans, generally selling their loans on to Freddie Mac and therefore subject to very strict guidelines for loan origination. A related reason for low uptake of EEMs is appraisal value. Because appraisals are largely based on comparable sales and energy efficient homes have higher building costs, the valuations for non-conventional homes are often not sufficient to increase loan values. Some lenders also are unsure if energy efficiency is a viable reason to increase appraisal or loan values. No lenders mentioned concerns about default risk of energy efficient homeowners, or concerns about actual energy savings as a reason for failing to offer EEM products.

These six lenders noted the following changes that would need to occur before they would consider offering EEM products:

- The secondary market, particularly at the federal level with Freddie Mac, would need to accept and desire EEMs for their portfolios. Many smaller banks cannot hold long-term mortgages and must sell to the secondary market. One respondent speculated that their first EEM products would have to be shorter-term adjustable rate mortgages.
- EE home sales would need to be more frequent and customary, so appraisers could find more EE homes to use as comparable purchases
- EEM products and regulations would need to be better understood in the market, so that brokers do not have to be in charge of "getting everyone on the same page"

Two lenders that do not currently sell EEM products would be willing to work with Energy Trust on this, but their key focus would be on structuring products that the secondary market would accept.

Upgrades Financing

Eight lenders we spoke with provide some form of financing for EE upgrade projects through personal loans and home equity lines of credit (HELOCs). In four cases, these institutions market specialized instruments for EE upgrades, either in partnership with Clean Energy Works Oregon (CEWO - two lenders) or through their own products. For the remaining four lenders, energy efficiency upgrades can be financed through their conventional financing instruments. Two lenders who offer their own energy efficiency loan products allow financing of solar water heating and solar electric systems. All four lenders who use conventional financing instruments allow borrowing for solar installations. Institutions that have specialized energy efficiency products typically lend for projects that include insulation, heating, duct sealing, water heating, HVAC and envelope upgrades. The most popular projects,

according to lenders, are upgrades to windows and insulation, heat pump and water heater installations and in some cases additional solar panels. Lenders try to have customers prioritize upgrades that will result in the highest efficiency gains using information provided by HERs or BPI audits.

Lending practices and financing terms varied somewhat across the lenders we spoke with. Personal loans for energy efficiency typically have an upper lending limit of $15,000 to $20,000 for unsecured loans with rates ranging from 4.49 percent to 5.75 percent over terms from 5 to 10 years. In some cases, energy efficiency must make up 51 percent of the project costs. HELOCs allow for higher loan amounts and longer terms. Loan amounts for HELOCs range from a minimum of $5,000 to a maximum of $200,000 with rates from 3.99 percent. HELOCs are secured against the value of the home with loan-to-value ratios ranging from 80 percent to 95 percent depending on the lender. Overall, the rates provided through these programs tend to be lower than traditional personal loans or HELOCs. Additional benefits include low or no fees and reduced closing costs.

None of the lenders we spoke with have experienced problems with default rates or other issues for energy efficiency project lending. One lender explained that they have had 75 total HELOC and personal loans through the CEWO program with zero defaults or delinquencies, which is much lower than for conventional loans. No lenders were able to identify any specific barriers to obtaining loans for energy efficiency upgrades beyond those typically seen in the general lending industry, such as poor credit or low loan-to-valuation ratios.

Perceptions of EPS

Three lenders we interviewed had heard of the Energy Performance Score (EPS). One of these lenders is part of the Home Performance Guild and is quite knowledgeable about EPS. The remaining two lenders said they were “somewhat knowledgeable” about the EPS.

Only one lender was able to provide us with information on their institution’s perception of EPS. This lender, a mortgage broker, believes that EPS homes are perceived as having more value because they typically will have lower utility bills. This lender explained that while EPS is not very pervasive in the market, it is becoming better known among homebuyers as a way of documenting the impact of energy efficiency improvements to their homes. For this lender the association with Energy Trust is mainly positive. One concern this lender expressed was that while Energy Trust has done a good job of getting contractors to buy into BPI audits and EPS to increase their business, they have not supplied adequate training for contractors on the requirements of lenders to approve loans for these projects. This lender explained that he has to educate every new contractor he deals with about EPS.

Two lenders use the EPS as a tool to determine if a home qualifies for energy efficiency financing. Neither lender requires minimum EPS scores, and instead they use the score as an input into monthly savings estimations, which can increase the loan value up to $8,000.

Desired Market Changes

Lenders identified the following areas as desired market changes:

- EEMs need to have a higher profile and recognition in the secondary mortgage market
- Appraisers need to have a better understanding of energy efficiency in homes and appraise energy efficient homes appropriately
- Realtors need better understanding of energy efficiency measures so they can better market energy efficient homes

In order to help expanding financing options for efficient homes, lenders suggested that Energy Trust could:

- Engage larger banks that drive the secondary market to educate them about the value of EEMs
- Continue to increase training to contractors, particularly focusing on the financial viability of energy efficient upgrades and the availability of incentives
- Create or enhance training for appraisers and realtors to improve their understanding of energy efficiency and the value it adds to a home
- Expand marketing of energy efficiency to Southern Oregon and the Oregon Coast, as program budget allows.

12 DEQ Accessory Dwelling Units Study

Accessory dwelling units (ADUs) can receive incentives similar to single-family homes through the New Homes Program, provided they meet the following requirements:

- The main residence on the property must be built better than code and apply for incentives through the New Homes Program
- The ADU must be built in an energy-efficient manner comparable to the main residence (same envelope as main residence)
- The ADU must be detached from the main residence (no basements or bonus rooms)
- The ADU must receive a separate third party verification and EPS.

During the summer of 2013, the Oregon Department of Environmental Quality (DEQ) hired the Portland State University Survey Research Lab (PSU-SRL) to conduct a survey of ADU owners. The survey was primarily designed to get information on how ADUs are built, occupied and used in the Portland, Eugene and Ashland metro areas, and also to obtain limited information about fuel sources and energy efficient features.

In this report section, we present selected findings on the energy efficient features of ADUs from the DEQ report on 290 ADUs in the Portland Metro area and additional data analyses completed by Energy Trust staff on 259 ADUs that are used as year-round primary residences in Portland, Eugene and Ashland. Additional details on the DEQ study methodology and findings are available in the full, published report and the Energy Trust analysis is included as an appendix.[19] Where possible we focus our results on detached ADUs, as only these ADUs qualify for the EPS program.

ADUs often share utilities and energy consuming devices, in particular, space heating and hot water heating, with the main dwelling. Table 21 presents the proportion of all ADUs in the Portland Metro area that are metered separately from the main dwelling for selected utilities.

Table 21: ADUs with Utilities that are Metered Separately – Portland (n=290)

Utility	% of ADUs
Electricity	59%
Natural Gas	28%
Water	16%
None	26%

Source: DEQ study.

[19] Portland State University Survey Research Lab. Accessory Dwelling Unit Survey for Portland, Eugene and Ashland, Oregon. September, 2013. Prepared for Oregon Department of Environmental Quality. http://www.deq.state.or.us/lq/sw/docs/ADUReportFRev.pdf

The majority of ADUs in the Portland Metro have separately metered electric services. However, gas and water, if available, tend to be shared with the main dwelling.

Table 22 presents the primary source of energy for space heating and hot water for all ADUs in the Portland Metro Area.

Table 22: ADU Energy Source for Space Heating and Hot Water Heating – Portland (n=290)

	Space Heat	Hot Water Heat
Energy Source	**% of ADUs**	**% of ADUs**
Electricity	60%	51%
Natural Gas	33%	44%
Solar	1%	1%
Wood or Pellets	1%	N/A
Other	3%	2%

Source: DEQ study.
* Percentages may not sum to 100% because respondents did not always provide a valid answer to each survey question.

Table 23 shows the proportion of detached ADUs that share space or water heating with the main dwelling in the Portland Metro, Eugene and Ashland areas.

Table 23: Proportion of Detached ADUs that Share Space and Water Heating with Main Dwelling – Portland, Eugene and Ashland (n=125)

	Yes	No
Space heating shared with main dwelling?	10%	90%
Water heating shared with main dwelling?	21%	79%

Source: Energy Trust ADU Survey Data Analysis

Sixty-two percent of ADUs that do not share space heating with a main dwelling use electric heat, while 29 percent use gas heat. Of detached ADUs that use electric heat, more than 80 percent used electric wall heaters, of which, less than 20 percent were energy efficient. Fifty-five percent of ADUs that do not share water heaters with a main dwelling use electric water heaters, approximately one-quarter of which are energy efficient.

The majority of detached ADUs have a full complement of kitchen and clothes washing appliances. Table 24 presents the proportion of detached ADUs with different appliances in Portland, Ashland and Eugene.

Table 24: Presence of Selected Appliances in Detached ADUs – Portland, Eugene and Ashland (n=140)

Appliance	% with Appliance
Refrigerator	94%
Stove	91%
Water heater	89%
Clothes washer	78%
Dishwasher	76%
Clothes dryer	66%
Wall heater	62%
Central heat	21%
Gas fireplace	16%
Other	16%

Source: Energy Trust ADU Survey Data Analysis

Table 25 below presents the proportion of detached ADUs that had selected energy efficient features installed at the time of construction. More than half of detached ADUs have an ENERGY STAR appliance, energy efficient windows and energy efficient weatherization measures. Energy efficient heating units are present in only 22 percent of ADUs heating with electricity and 33 percent of gas ADUs. Similarly, efficient water heating units are present in only 20 percent of electric ADUs.

Table 25: Proportion of Detached ADUs with Selected Energy Efficient Features by Heating Fuel – Portland, Eugene and Ashland (n=113)

Feature	% with Feature	
	Electric (n=79)	Gas (n=34)
Weatherized	60%	64%
ENERGY STAR Appliances	57%	74%
Windows	51%	72%
Lighting (ADUs with CFL/LED)	51%	49%
Heating	22%	33%
Water heating	20%	59%
Don't know	13%	3%
Other	8%	13%
Solar	7%	3%
None	7%	3%

Source: Energy Trust ADU Survey Data Analysis

Among ADUs with efficient lighting, 61 percent of the light sockets have an efficient lamp installed. The average number of light sockets with an installed bulb (any type) is 14.4, and the average number of bulbs that are compact fluorescent or LEDs is 8.74.

Overall, the data highlight several areas of energy savings potential in the new ADU market:

- Space heating, particularly in detached ADUs using electric heat, where approximately 65 percent of structures are using inefficient wall heating units, has significant potential for energy savings. Potential also exists in other ADUs, as the presence of efficient heating measures in general is low.
- Similarly, water heating presents an opportunity for energy savings in detached ADUs using electric water heat, with only 20 percent of appliances being efficient.
- Potential for energy savings from weatherization and envelope upgrades exist, as only 59 percent of detached ADUs have energy efficient weatherization measures and windows.
- There is more energy savings potential from efficient lighting, as approximately half of detached ADUs have no efficient lighting installed at all, and among ADUs with efficient lighting, only 61 percent of the sockets have CFLs or LEDs.
- Solar PV systems are present in only eight percent of detached ADUs. Promotion of solar PV in appropriately sited structures could offer potential for electricity generation.

13 Key Findings and Recommendations

Overall, Energy Trust's New Homes Program is continuing to perform well and make progress towards market transformation. In this section we present some of the key findings from the evaluation activities and recommendations for Program continuation and refinements.

13.1 Key Findings

Builders:

1. Full implementation of the 2011 Oregon Code has not had significant, lasting, detrimental program impacts. While it is likely that the code change caused some builders to drop out of the program, participating builders have adjusted to the new code, and even some non-participating builders regularly include energy efficient features that exceed code. Most interviewed builders also reported that demand for energy efficiency above Oregon State code is increasing.

2. Participating builders tend to build to option paths that fit their existing home designs, rather than altering their designs to fit the program paths.

3. The interviewed, participating builders do not take advantage of the Early Design Assistance with only one builder having used this program element. In addition, interviewed HBA staff reported that production infill builders do not want to pay to upgrade their existing plans and desire assistance from Energy Trust.

4. While some builders were confused by recent changes in the program, most state that they are now comfortable with the changes and do not have any technical or participation difficulties with the program and its paths.

5. Some builders, however, still have knowledge gaps, and mistakenly believe that the program only has prescriptive paths to follow, that the EPS is not calculated relative to similar-sized homes and/or that subcontractors do not receive their own incentives.

6. The majority of interviewed, participating builders install ducts inside sometimes or always. Those who do not, see inside ducts as unfeasible for their home plans and/or not cost effective.

7. Half of the interviewed, participating builders construct homes that they claim are solar ready and 8 of 22 have built homes with solar electric systems. These are most common in the Portland Metro area. Builders of solar ready homes reported that they do not experience many challenges once they have learned how to do it. Several builders stated that they offer solar readiness as a standard feature in their homes and

that this "is a good marketing avenue." However, some of these builders may not be meeting all of Energy Trust's requirements for solar homes, and/or are not applying for these incentives based on the FastTrack data that was reviewed.

8. All interviewed builders mentioned their verifier as their primary information source for technical or participation requirements, and expressed a high level of satisfaction with their verifier interactions.

9. Builders are generally satisfied with the verification process but would like a faster turnaround time for EPS scores, as they have often sold homes before receiving the EPS, partly negating the EPS scores usefulness for marketing. The new Axis database under development should help to rectify these delays.

10. Builders outside the Portland Metro described a shortage of verifiers, particularly in Southern Oregon.

11. Satisfaction with the program is high among participating builders.

12. The biggest challenges to participating builders are materials and labor costs, and an "uneducated" marketplace. In addition, some builders in Southern Oregon reported difficulty participating because their gas utility (Avista) is not a party to the program.

13. The primary participation barriers for non-participating builders are:
    - Inadequate program awareness and knowledge – Interviewed, non-participating builders have low self-reported knowledge of the program, and HBA staff reported that they "are either totally slammed or totally checked out; there is no in-between. They need to get the same information repeatedly."
    - Verification fees and other construction expenses that are too high for lower cost, entry level homes
    - Perception that the EPS does not provide a strong market advantage, due to low customer awareness
    - Program participation paperwork

Subcontractors:

1. Subcontractors refer to a wide variety of resources for technical issues – Energy Trust, ENERGY STAR implementers and Earth Advantage - and reportedly understand whom to contact regarding particular program home requirements.

2. Builders outside of Portland would like to see more subcontractor training, especially HVAC training. Reportedly, some HVAC contractors are not aware of the technologies available, have difficulty appropriately sizing systems for homes (typically overestimating the size of systems required) and have difficulty installing some ventilation systems, particularly balanced mechanical ventilation systems.

3. Some interviewed subcontractors had incomplete knowledge about eligible standalone measures.

4. Subcontractors try to promote or encourage energy efficiency, but do not always get to do this since builders tend to already have their project scopes written when they look for a contractor. Similarly, builders do not always tell subcontractors when they are seeking an EPS.

Verification and Quality Assurance:

1. Among interviewed verifiers, verification costs averaged $400 to $450 per home (not including incentives paid by Energy Trust). Prior to 2012, Earth Advantage was the sole verifier and could defray verification costs with other revenues from the program. Verification costs initially increased under the private market model (causing some builders to leave the program), but have since declined according to staff.

2. For most companies, verification is a complementary service that does not "make or break" the company. All of the active verifiers were either satisfied or very satisfied with the current revenues they were generating from new homes verifications.

3. About half of the verifiers planned to increase their fees in 2014 to cover declining fixed verification incentives.

4. Verifiers are satisfied with the QA process and believe the information they receive is either "useful" or "very useful." Program staff say that they are doing at least five percent QA per verifier per year, and most issues pertain to the thermal enclosure checklist (i.e., air sealing at the top of homes and mechanical ventilation). In particular, there are failures to comply with whole-house mechanical ventilation specifications and ASHRAE 62.2. This is due to new requirements to measure and commission the HVAC system. In the past, contractors were not required to do this.

5. Overall, the market based verifier model is working pretty well and the interviewed active verifiers have enough business to continue serving the market. Among verifiers that that are not getting builder clients, one was trying to charge $1,200 per home (significantly more than other firms) and another new entrant was competing with a large, experienced firm in a rural market with few builders.

6. That said, in the Southern and Northwest Oregon markets (outside of Portland) there are only two verifiers per market, and Eastern Oregon has only one active verifier. Builders would prefer to have additional choices, particularly if construction volumes increase. Program staff would still like to train more local verifiers to serve the Columbia River Gorge and Astoria markets.

Realtors:

1. The interviewed trade allies had a wide range of self-reported program knowledge, ranging from "extremely" to "not at all" knowledgeable.

2. Realtors often focus on marketing the overall energy savings of energy efficient and EPS homes, rather than individual features. This is because they have limited time to market individual homes, and homebuyers have low comprehension levels of specific measures.
3. Most realtors perceive that their customers do not understand the EPS scoring system and/or confuse EPS with other certifications, although they do recognize the benefits of EPS homes generally (i.e., energy savings, improved comfort).

4. Several realtors indicated that the email updates they receive contain "too much information" that is not applicable to their day-to-day business. They also have difficulty finding information that is relevant to them on Energy Trust's website.

Lenders:

1. Energy efficient mortgages (EEMs) do not appear to be commonly offered. Preferential treatment with EEMs can include higher loan values (up to $10,000 more) and reduced or waived closing or appraisal costs.

2. EEMs are not usually proactively pushed to consumers. One reason is that many energy efficient homes are custom built by owners who have sufficient income to afford the higher upfront costs.

3. There is modest awareness and usage of EPS among lenders.

4. Most institutions have products to finance energy efficiency upgrades, and solar projects are generally eligible.

5. According to lenders with EEMs and a lender that has closely tracked their upgrades loans, borrowers for energy efficient homes and projects appear to have lower default rates than the general population.

6. Primary EEM barriers include:
   - Little interest on the secondary market, where most larger banks sell their mortgages
   - BPI audits are slow, the prices vary and the results are not transparent to lenders
   - Realtors are wary of additional inspections/delays in proving energy efficiency
   - Home sellers are wary of doing new energy efficiency projects
   - Additional paperwork and administration

7. Inconsistent appraisals are also a large barrier to EEMs. Some Oregon appraisers try to recognize energy efficiency, but EPS is still relatively new and there are few comparable sales in general, since energy efficient homes are typically more expensive and comprise a small part of the overall market.

EPS Brand and Marketing:

1. Energy efficiency is very important to participating builders, and many builders are enrolled in other programs such as Earth Advantage, ENERGY STAR and LEED.

2. Earth Advantage used to do PECI's builder outreach and was the sole verifier. HBA staff perceive that builder confusion has declined with the addition of more verifiers besides Earth Advantage. However, interviewed participant builders still conflate or confuse EPS with the Earth Advantage and ENERGY STAR programs, and do not always understand how the different programs relate and layer.

3. Builders see EPS as a useful way to communicate energy efficiency to their customers, comparing it with MPG ratings for cars.

4. Participating builders largely target move-up buyers and retirees over first time homebuyers. Their houses are generally larger and have more luxury or custom features.

5. In the Portland Metro area, participating builders are focused on move up buyers. In the other regions they are focused on a combination of move up and retirees.

6. The majority of participating builders outside of Portland include retirees in their target markets.

7. Most builders think that EPS provides a sales advantage, however they requested more program promotions and market actor trainings to raise homebuyer awareness, which still remains low. Builders would like to see more real estate agent trainings delivered, and support the introduction of appraiser training, as appraisers and inspectors could also educate homebuyers and sellers, since realtors do not always do this.

Overall Program Design and Delivery:

1. The program's internal administration and delivery processes appear to operate smoothly and have been refined by the current implementation team over several years. There are no critical needs for operational changes.

2. Builders are generally comfortable with the accuracy of the EPS scores.

3. Southern Oregon builders expressed a sense of isolation from the program. These builders feel that there is a lack of ongoing education and resources in their region.

4. Regarding the program's standalone measures:
   - Builders who install ductless heat pumps are frustrated that they cannot get credit for installing multi-head units. The vast majority of single-family homes are two stories and cannot be effectively served with single-head systems. Builders are reluctant to "overbuild" heating/cooling systems with one DHP.
   - Some builders have experienced problems sourcing tankless water heaters, and some perceived that tankless water heaters cannot keep up with their customers hot water needs.
   - Some builders perceived that HPWHs are unreliable and cannot meet demand for hot water in their homes, and noted that many consumers do not know about them yet.
   - Regarding the gas water heater standalone measure, builders noted that it is only marginally more efficient than code (e.g., 5 percent) with an incremental cost of $500 to $600.

13.2 Recommendations

Pending available budget and program priorities, Energy Trust should consider implementing the following recommendations in 2014 (if they are not already underway):

Market Actor Recruitment and Training:

1. Work to increase verifier numbers in areas outside the Portland Metro area, particularly Southern and Eastern Oregon.

2. As part of builder outreach consider attending local builder gatherings such as the "Green Drinks Night" in Southern Oregon, and incentivizing participating builders to offer onsite trainings to others.

3. According to HBA staff, as attached housing becomes more commonplace in Portland and builders look to hold down single-family home costs, focus builder recruitment on the broader Portland-to-Salem commuting corridor (e.g., Happy Valley, Newberg) where more future single-family construction is likely to occur.

4. Continue to clarify EPS to builders, emphasizing that EPS complements other certifications and provides more detailed energy consumption information to consumers. It is important

that participating builders understand where their incentives are coming from, and they could improve their coordination with subcontractors and EPS marketing.

5. Develop a builders "fact sheet" that provides information on expected improvements to EPS scores from the installation of some standard measures.

6. Promote Early Design Assistance more aggressively to builders.

7. Promote Energy Trust's home appraiser trainings more aggressively in collaboration with lending institutions.

8. Conduct more HVAC trainings for subcontractors with particular focus on mechanical ventilation and proper furnace sizing.

9. Encourage builders and subcontractors to install ductless heat pumps and tankless water heaters (or small heat pump water heaters) in ADUs, since many ADUs are not including efficient space and water heating.

Verification:

1. Monitor verification fees, which are likely to increase initially in 2014 until verifiers become comfortable with the new, variable incentive schedule.

2. Optimize the new Axis database system so EPS scores are calculated as quickly as possible. As this occurs, inform prospective builders of improvements and that EPS scores can be provided quickly and used as an effective marketing tool.

Marketing:

1. Consider marketing directly to retirees through AARP and other organizations and publications, highlighting the benefits of energy savings for retirees on fixed incomes.

2. Continue to test and refine consumer messaging for comprehension. In future Smart Homebuyer materials, consider more simplified information about energy consumption and efficiency and reduced emphasis on Energy Trust and EPS scoring details.

3. Look for ways to get EPS into MLS more consistently.[20] Or consider developing a separate marketing tool/database, since ENERGY STAR labeling in MLS has been inaccurate sometimes. Adding this information for existing homes will improve awareness of EPS for new homes also.

[20] Some builders have resorted to attaching a PDF of the EPS score to the MLS listing.

4. Ensure that subcontractors get training and reminders about standalone measures.

Realtors:

1. Encourage realtors to suggest that homeowners who have already made upgrades get an EPS before putting their home on the market.

2. Invite trained realtors back for EPS refresher courses, rather than send them lots of materials.

3. Filter email content to realtors so it is more relevant for them. Conduct additional outreach to realtors to confirm desired communications contents.

4. Improve navigation from the New Homes program webpage to the realtors section on Energy Trust's website, where trained realtors could be listed.

Lenders:

1. Concentrate EEM advocacy efforts on locally focused credit unions, which are driven by the needs (including energy efficiency) of their members and often have more flexibility regarding their lending products, since fewer are sold to secondary markets.

2. Ensure that lenders with products to fund energy efficiency (e.g., through CEWO) have an opportunity to be listed on Energy Trust's website; this may require reaching out to them proactively.

3. As a lower priority, work with larger banks and energy efficiency advocacy groups to affect the national secondary mortgage market, to increase interest in energy efficiency and develop standard products. Consider sponsoring additional research to quantify the extent to which energy efficient homebuyers have lower default risk.

Program Design:

1. Consider including multi-head DHPs as a standalone measure for new construction (while single-heads can still be promoted for existing home retrofits).

2. Consider subsidizing verification costs for builders targeting first homebuyers, perhaps on a sliding scale based on home price or size.

Appendix A: Interview Guides

Builders Interview Guide

FINAL September 18, 2013

Key Objectives:

- Understand importance of energy efficiency to builders
- Characterize builders' building practices and preferred EPS paths, measures
- Understand builders' air sealing and ventilation practices
- Understand perceptions and utilization of solar measures
- Assess non-participant knowledge of EPS
- Understand perceived value of EPS to builders and homebuyers
- Identify barriers to builder participation
- Understand interactions with verifiers and program staff
- Identify desired program assistance

Target Audiences: 20 to 25 trade ally (participating) builders and 20 to 25 non-participating builders, for a total of 45 completed interviews. Both groups will include builders of varying size (construction volume) distributed throughout the state.

Hello, my name is _____ with Evergreen Economics, an energy market research firm based in Portland. I want to assure you that this is not a sales call. Energy Trust of Oregon has asked us to help them better understand how well their New Homes Program is working, and we are speaking with home builders to understand their business practices and get feedback to improve Energy Trust's program.

Could I speak to _____?

[IF NECESSARY:] This study will help Energy Trust to make its programs as successful as possible for builders like you. Our survey should take about (PARTICIPANTS: 30 minutes, NON-PARTICIPANTS: 20 minutes) and all your answers are confidential; we never link any information to a particular person or company.

Business Scope

First, I'd like to start by getting some general information about your company.

1. In what parts of Oregon do you build new single-family homes?

2. Who is the target market for your single-family homes? (Probe on income level, family size, first time v. move-up buyers, etc.)

3. What type of homes do you build to appeal to these buyers, in terms of square footage, price range, special features or layouts?

4. Do you mostly build spec homes, or do buyers have input into the final designs?

5. How important is energy efficiency in your company's building practices and marketing on a scale from 1 to 5, where 5 is very important and 1 is not at all important?

6. (PARTICIPANTS) When did you become a trade ally builder in Energy Trust's new homes program?

7. (PARTICIPANTS) Why did you decide to become a trade ally builder? (Probe on: financial incentives, product differentiation, company mission, reduced buyer callbacks, etc.)

Building Practices

Now I'd like to ask some questions about your company's typical building practices.

8. (NON-PARTICIPANTS) Are your new homes sometimes or usually more efficient than Oregon state code in some aspects, or do you mostly build to code?

9. (NON-PARTICIPANTS – IF MORE EFFICIENT IN SOME ASPECTS) What types of above-code energy efficient features do you include in your single-family homes? (Probe on lighting, space/water heating, windows, insulation, duct testing, appliances)

10. How would you describe your knowledge of Energy Trust's New Homes Program on a scale from 1 to 5, where 5 is very knowledgeable and 1 is not at all knowledgeable?

11. (IF ABOVE 3 or HIGHER) And how knowledgeable are you on the details of the program's 5 Energy Performance Score (EPS) paths with performance-based incentives, using the same 1 to 5 scale, where 5 is very knowledgeable.

12. (PARTICIPANTS) What percentage of the homes you build in Energy Trust territory receives an EPS score? (IF LESS THAN 100%: Confirm that the remaining XX percent do not participate in the program.)

13. (PARTICIPANTS) Which EPS performance path do you mostly build to, and why is that? (Probe to see if they are very experienced with some measures, if incentive levels for any paths are too low.)

    - Note: Interviewer will have path summary descriptions available if builder needs a refresher or says, "don't know."

14. (PARTICIPANTS, IF NOT ALREADY MENTIONED) Are any particular performance paths difficult for you to meet, due to cost or other reasons? Probe to see if any specific measures particularly problematic.

15. (PARTICIPANTS) How has adoption of the 2011 Oregon building code affected the EPS homes you build?

16. Please describe your air sealing and ventilation practices (PARTICIPANTS: for your EPS homes).

17. Do you currently put ALL ductwork in conditioned space? If not, why?

18. Do you build homes with solar electric systems or homes that are solar-ready? (If needed: These are homes that have been designed and pre-wired so the owner can install solar measures later.)
    a. If YES: How has your experience been with these measures; have you had any technical or marketing challenges?
    b. If YES: Do you plan to increase your solar measure installations or solar ready homes in the future?
    c. If NO: Why don't you install these measures, and might you install them in the future?

19. How are subcontractors involved in determining which energy efficient features you install? For instance, do they provide you with a range of efficiency options, or promote higher-than-code options?

20. (PARTICIPANTS) Do you have any subcontractor supply or skill gaps that hinder you from building more EPS homes or installing more standalone measures? If YES, get details.

21. (PARTICIPANTS) How many EPS homes do you expect to complete in 2013?

22. (PARTICIPANTS) In 2014, do you expect the number/percent of homes you build that receive EPS scores will increase, decrease, or stay about the same?

23. (PARTICIPANTS) What do you think will be your biggest challenges building energy efficient homes in 2014?

24. (IF RESPONDENT IS AT LEAST SOMEWHAT KNOWLEDGABLE ABOUT EPS PATHS – Q11 = 3 or higher) Do you have any recommended changes to any of the program's current option paths (PARTICIPANTS: whether or not you build to them)? (If needed: These changes could pertain to the equipment requirements or rebate amounts, for instance.)

Marketing and Financing

Now I have some questions about public perceptions of EPS and EPS marketing.

25. Among new homebuyers, do you think demand for energy efficiency, above Oregon state code, is increasing, decreasing or remaining level? Why do you say that?

26. Does EPS provide a sales advantage in the current housing market? Why/why not?

27. (PARTICIPANTS) Do you think that homebuyer awareness and understanding of EPS is increasing? Why/why not? (Probe on effectiveness of ETO marketing, realtor presentations)

28. What could Energy Trust do to get more people asking about EPS homes or energy efficient homes?

29. (PARTICIPANTS) Do you have any suggestions for changes to realtor training to improve EPS marketing by them?

30. (PARTICIPANTS) Do you think the program should offer EPS training to home appraisers? Why do you say that?

31. (PARTICIPANTS) Do you have any thoughts regarding specific marketing messages that could be used to convince buyers of the value of EPS homes? If YES: Get details.

32. Do you have any concerns about the accuracy of the program's EPS scores for new homes?

33. Are there any lenders for new homes you recommend we interview to learn about successful lending options for efficient homes, or barriers to such programs? (Get name and contact info)

Program Interactions - PARTICIPANTS ONLY

Let's discuss your interactions with the people involved in the new homes program, and then we'll be done soon.

34. Who do you turn to when you need information or clarification on the program's participation or technical requirements? (DO NOT READ AND PROBE AS NEEDED, ACCEPT MULTIPLES)

    a. Verifier
    b. Subcontractors
    c. PECI or CSG staff
    d. Energy Trust New Homes program staff
    e. Home Builder Association staff
    f. Program materials, website, emails
    g. Other (Specify)

35. Why do you turn to EACH SOURCE MENTIONED? Probe on availability, knowledge level, accuracy, good rapport, etc.

36. Overall, how satisfied are you with the interactions you've had with EACH ACTOR MENTIONED, on a scale from 1 to 5, where 5 is extremely satisfied and 1 is not at all satisfied?

37. What changes, if any, would you recommend to improve program communications with builders?

38. Have you ever utilized Energy Trust's Early Design Assistants to help you plan new projects?
    a. If YES: How did they help you, and how well did this go?

39. How many homes verifiers are you working with right now?

40. How did you choose the verifier(s) that you are working with?

41. How is the homes verification process working for you? Have you had any significant or recurring problems? If YES: Get details.

42. Overall, how satisfied are you with the homes verification process on a scale from 1 to 5, where 5 is very satisfied and 1 is not at all satisfied?

43. Have any of your EPS homes ever received a QA inspection by Energy Trust?

44. (IF YES) How do you receive information about the outcomes of the QA inspections? (ACCEPT MULTIPLES)
    a. Don't get this information
    b. From the verifiers
    c. QA staff tell me in person
    d. QA staff send me a report
    e. It is in a database
    f. Other methods (Specify)

45. Do you have any suggestions for improving the QA process?

Program Perceptions and Barriers – NON-PARTICIPANTS ONLY

46. Do you participate in any other certification or efficiency programs, such as Earth Advantage?

47. What are the main reasons you don't participate in Energy Trust's new homes program? (Probe on comprehension level, paperwork, cost, market demand for EPS, technical/equipment issues.)

48. (IF EPS KNOWLDEGE (Q11) IS 3 OR MORE) What do you see as the pros and cons of EPS scores?

49. What would have to change for you to become an Energy Trust program participant?

Conclusion

50. (PARTICIPANTS) Overall, how would you rate your satisfaction with Energy Trust's program on a scale from 1 to 5, where 5 is very satisfied and 1 is not at all satisfied?

51. (PARTICIPANTS) What has been the biggest challenge for you in participating in Energy Trust's program?

52. (PARTICIPANTS) What is the most critical support the program could provide to program builders and subcontractors in the near future? (Probe to see if technical/field support, consumer marketing, subcontractor training, other preferred) Why do you say that?

53. What additional information or assistance do you want, if any, regarding the Energy Trust program participation process or technical requirements?

54. In addition to building new homes, do you also do home remodels?

    55. If YES: Are you a trade ally in Energy Trust's Existing Homes program?

    56. If YES: How has your experience been working in the Existing Homes program?

57. Is there anything else you would like to tell us?

Those are all the questions I have for you today. Thank you very much for your time and good information!

Subcontractors Interview Guide

FINAL October 14, 2013

Objectives:

- Understand business practices, including marketing to builders
- Role of subcontractors in selection of equipment, other measures and practices
- Identify subcontractors' challenges getting builders to adopt required techniques, standalone measures
- Assess effectiveness of program processes for standalone measures in particular
- Obtain feedback on subcontractors training
- What aspects of EPS standards pose greatest challenges for subcontractors?
- Identify contractors' challenges getting training in required techniques
- Interactions with builders, verifiers, and quality assurance staff
- Identify desired program assistance

Target Audience: Up to 15 subcontractors that installed equipment for at least 1 EPS home since the change to the new program approach in 2012, with a focus on "key" company staff (1 per company).

Hello, my name is _____ with Evergreen Economics, an energy market research firm based in Portland. I want to assure you that this is not a sales call. Energy Trust of Oregon has asked us to help them better understand how well their New Homes Program is working, and we are speaking with subcontractors that are program Trade Allies to understand your business practices and get feedback to improve Energy Trust's program.

Could I speak to _____?

[IF NECESSARY:] This study will help Energy Trust to make its programs as successful as possible for builders and subcontractors like you. Our survey will take about 30 minutes and all your answers are confidential; we never link any information to a particular person or company.

Business Scope

First, I'd like to get some general information about your experience with the program and about your company or organization.

1. When did you become an Energy Trust trade ally to do subcontract work on efficient new homes?

2. What services does your company offer to homebuilders in Oregon? (Possible responses below, but accept others)
   a. HVAC installation/commissioning
   b. Duct installation
   c. Duct sealing

d. Duct testing
e. Insulation/weatherization
f. Lighting
g. Energy modeling for code compliance
h. General construction consulting
i. Green/EE construction consulting
j. Other (Specify)

3. Do you recall when you first worked on a home that received an EPS score through Energy Trust's New Homes program?

    a. IF NEVER WORKED ON EPS HOME: Do you expect to work on homes that receive an EPS through the New Homes program in the future? Why or why not? AFTER THIS QUESTION, SKIP TO Q 6)

4. About how many Energy Trust EPS homes have you provided subcontracting services on?

5. How many EPS homes do you expect your company to work on in 2013?

6. Approximately what percent of your company's revenues are from work on new homes that are built through the Energy Trust new homes program?

7. How many different builders does your company currently work with as a subcontractor on homes built through the Energy Trust New Homes program?

8. Do you expect this number to increase, decrease, or remain about the same over the next 12 months? Why do you say that?

9. How important is energy efficiency in your company's installation practices, on a scale from 1 to 5, where 5 is very important and 1 is not at all important?

10. How important is energy efficiency to marketing your company's services to builders, on a scale from 1 to 5, where 5 is very important and 1 is not at all important?

11. Why did you decide to become a trade ally subcontractor? (Probe on: financial incentives, product differentiation, company mission, reduced callbacks, etc.)

Standard Practices

Now I'd like to ask some questions about your company's typical building practices.

12. Are you involved in determining which energy efficient features you install on new homes? For instance, do you simply respond to the builder's specification, or do you provide builders with a range of efficiency options, or promote higher-than-code options?

13. How would you describe your knowledge of Energy Trust's New Homes Program requirements on a scale from 1 to 5, where 5 is very knowledgeable and 1 is not at all knowledgeable?

14. (IF ABOVE 3 or HIGHER) And how knowledgeable are you on the details of the program's 5 Energy
Performance Score (EPS) paths with performance-based incentives, using the same 1 to scale, where 5 is very knowledgeable.

* IF NO WORK ON EPS HOMES (FROM Q 3), SKIP Q15-18*

15. What percentage of the new homes you work on in Energy Trust territory receives an EPS score? (IF LESS THAN 100%: Confirm that the remaining XX percent do not participate in the program.)

16. Which EPS performance paths do the builders you work with mostly build to, and why is that? (Probe to see if they are very experienced with some measures, if incentive levels for any paths are too low. Probe for challenges with ducts, equipment, lighting, ACH)

- Note: Interviewer will have path summary descriptions available if subcontractor needs a refresher or says, "don't know."

17. Are any particular performance paths difficult for you to meet, due to cost or other reasons? Probe to see if any specific measures are particularly problematic.

18. How has Energy Trust's adoption of the EPS rating system affected your work on homes that participate in the program?

19. Have you installed any standalone measures in new homes that qualified for an Energy Trust incentive (probe for DHP, heat pump water heater, .67 EF water heater, air sealing)?

20. If not, why not? (Probe to see if incentives sufficient; or if ALL builders they work with doing EPS)

21. IF INSTALLED: Were these installations recommended by you or at the direction of the builder?

22. IF INSTALLED: Overall, how satisfied are you with the standalone incentives offered to subcontractors through the program, using a 1 to 5 scale where 1 is not at all satisfied and 5 is extremely satisfied? IF 3 OR LESS: Why do you give that rating?

Technical and Other Training (If no EPS homes, skip to 26 and replace "EPS Homes" with "Energy Trust program homes.")

Next, I'd like to ask you some questions about how you and your staff were trained on the requirements of the EPS program.

23. How many hours of training did you attend as part of Energy Trust's transition to the EPS rating system, including in-the-field training provided by program staff? Would you say:
    a. 8 hours (one day) or fewer
    b. 9-24 hours (more than one day to three days)
    c. 25-40 hours (more than three days to five days)
    d. More than 40 but less than 80 hours (1 – 2 weeks)
    e. More than 80 hours (two weeks or more)

24. Thinking about the training you received, in percentage terms, about how much of the training was devoted to each of the following (read list of categories and then ask for breakdown; make sure total is roughly 100%).
    a. Technical material (requirements, techniques, best practices) ____ %
    b. Program procedures and forms____ %
    c. Marketing and business practices ____ %
    d. Other material (Specify) ____ %

25. For each of the above types of training, would you say the training provided was a) not enough, b) about the right amount c) too much or more detailed than needed:
    a. Technical material (requirements, techniques)
    b. Program procedures and forms
    c. Marketing and business practices
    d. Other material (Specify)

26. Thinking about the training you received, how well would you say your training prepared you to work on EPS Homes, on a scale from 1 to 5, where 5 is very well and 1 is not well at all?

    (If 1 or 2) How do you think the training could have been done differently so that you would have been better prepared? Probe: Are there specific topics or areas that are not currently addressed in existing trainings

Program Interactions

Let's discuss your interactions with the people involved in the new homes program. We'll be done pretty soon.

27. Who do you turn to when you need information or clarification on the program's participation or technical requirements? (DO NOT READ AND PROBE AS NEEDED, ACCEPT MULTIPLES)
    a. Verifier
    b. Builder
    c. Energy Trust New Homes program staff (including PECI or CSG staff)
    d. Program materials, website, emails
    e. Other (Specify)

28. Why do you turn to EACH SOURCE MENTIONED? Probe on availability, knowledge level, accuracy, good rapport, etc.

29. How timely is the information you get from EACH SOURCE MENTIONED, on a scale from 1 to 5, where 5 is very timely and 1 is not at all timely?

30. Overall, how satisfied are you with the technical information provided to subcontractors through the program, on a scale from 1 to 5, where 5 is very satisfied and 1 is not at all satisfied?

    31. (IF 3 OR LESS) Why do you give that rating?

32. What changes, if any, would you recommend to improve program communications with subcontractors?

Verification Process (If no EPS homes, replace "EPS" with "Energy Trust New Homes")

Now I'd like to ask you a few questions about the EPS verification process.

33. First, how do you schedule EPS verification visits to ensure that the home you are working on is ready to be verified? (They may say they coordinate with their builders; that's fine, get details.)

34. Please describe your interaction with the verifier when they have raised questions or identified issues. How were those issues resolved?

35. Overall, how satisfied are you with the verification process, on a scale from 1 to 5, where 1 is not at all satisfied and 5 is very satisfied? IF 3 OR LESS: Why do you give it that rating?

Overall Program Interaction/Conclusions

36. And finally, how would you rate your satisfaction with your overall experience as an Energy Trust New Homes trade ally, on a scale from 1 to 5, where 5 is very satisfied and 1 is not at all satisfied?

    37. (IF 3 OR LESS) Why do you say that?

38. Do you have any other suggestions for how the program or the way you interact with it could be improved?

Those are all the questions I have for you today. Thank you very much for your time and good information!

Verifiers Interview Guide

FINAL September 9, 2013

Objectives:

- Understand business practices, including marketing to builders
- Assess effectiveness of program processes and private verification model in particular
- Obtain feedback on new EPS Homes training
- What aspects of EPS standards pose greatest challenges for builders, contractors?
- Which aspects of EPS are most difficult to verify?
- What percentage of homes requires remediation?
- Understand builder, contractor responses to issues identified by verifiers
- Identify verifiers' challenges obtaining RESNET certification and/or using REM/Rate software to analyze homes
- Issues hindering final EPS designations and experiences using the Axis database
- Interactions with builders, verifiers, subcontractors and quality assurance staff
- Identify desired program assistance

Target Audience: 5 to 10 verifiers that verified at least 1 home since the change to the new program approach in 2012, with a focus on "key" company staff (1 per company).

Hello, my name is _____ with Evergreen Economics, an energy market research firm based in Portland. I want to assure you that this is not a sales call. The Energy Trust of Oregon has asked us to help them better understand how well their New Homes Program is working, and we are speaking with program [VERIFIERS/SUBCONTRACTORS] to understand their business practices and get feedback to improve Energy Trust's program.

Could I speak to _____?

[IF NECESSARY:] This study will help Energy Trust to make its programs as successful as possible for builders and verifiers like you. Our survey will take about 40 to 60 minutes and all your answers are confidential; we never link any information to a particular person or company.

Business Scope

First, I'd like to get some general information about your experience as a program verifier and your company or organization.

1. When did you first become a verifier for EPS Homes?

2. And what was your involvement with the Energy Trust New Homes program before that?

3. Which of the following best describes how you work as a verifier? Are you: (READ LIST)
   a. A company owner or key manager of a multi-employee company

b. Self-employed or a single-employee company
c. An employee of a private company
d. A contractor to a private company
e. Other (Specify)

4. Why did you decide to verify homes for the Energy Trust New Homes program?

5. Besides verifications, what other services does your company offer to builders or their contractors, if any? (Possible responses below, but accept others)
   a. HVAC installation/commissioning
   b. Duct sealing
   c. Duct testing
   d. Insulation/weatherization
   e. Lighting
   f. Permitting
   g. Energy modeling for code compliance
   h. Inspections for other building programs
   i. General construction consulting
   j. Green/EE construction consulting
   k. Other (Specify)

6. About how many Energy Trust EPS home verifications have you done personally since you first began verifying?

7. And approximately what percent of your company's revenues are from EPS home verifications?

8. How many EPS homes do you expect your company to verify in 2013?

9. How much do you charge for your verification services per home, on average?

10. Have your charges for verifications changed over the past 12 months? If yes: How and why?

11. Do you plan to increase or decrease your charges for verifications in the next 12 months? If expected to change, how and why?

12. How many different builders does your company currently work with as a verifier for Energy Trust's New Homes program?

13. Do you expect this number to increase, decrease, or remain about the same over the next 12 months? Why do you say that?

14. How satisfied are you with the overall revenues you are generating from Energy Trust New Homes verifications, on a scale from 1 to 5, where 5 is very satisfied and 1 is not at all satisfied?

Technical and Other Training

Next, I'd like to ask you some questions about your verifier and EPS program training experiences.

15. About how many hours of training did you attend as part of Energy Trust's transition to a market-based Verifier system – this would include all aspects of training, including program procedures as well as technical material and on-site training provided by the program. Would you say:
    a. 8 hours (one day) or fewer
    b. 9-24 hours (more than one day to three days)
    c. 25-40 hours (more than three days to five days)
    d. More than 40 but less than 80 hours (1 – 2 weeks)
    e. More than 80 hours (two weeks or more)

16. Thinking about the training you received, in percentage terms, about how much of the training was devoted to each of the following (read list of categories and then ask for breakdown; make sure total is roughly 100%).
    a. Technical material (requirements, techniques, best practices) ____ %
    b. Program procedures and forms____ %
    c. Marketing and business practices ____ %
    d. Other material (Specify) ____ %

17. For each of the above types of training, would you say the training provided was a) not enough, b) about the right amount c) too much or more detailed than needed:
    a. Technical material (requirements, techniques)
    b. Program procedures and forms
    c. Marketing and business practices
    d. Other material (Specify)

18. Thinking about the training you received, how well would you say your training prepared you to verify EPS Homes, on a scale from 1 to 5, where 5 is very well and 1 is not well at all?

19. If 1 or 2: How do you think the training could have been done differently so that you would have been better prepared?

20. Did you encounter any challenges in attaining the certification (e.g., RESNET) needed to become an Energy Trust EPS Homes verifier? What were they and how did you overcome them?

Verification Process

Now I'd like to ask you a few questions about the verification process.

21. First, how do you plan your verification visits, in terms of scheduling with the builder and subcontractors to ensure that the home is ready for verifying?
22. How long does it take to verify each EPS home, not including travel time? Please consider the total time across multiple visits, if these are needed.
23. Does the time needed to verify vary by the EPS Path the builders select?
24. Have you had any experience with the new Axis database that will be adopted by the New Homes program later this year or early next year?
25. IF YES: IF PREVIOUSLY WORKED WITH DATABASE FOR NORTHWEST ENERGY STAR PROGRAM. What has been you experience working with the Axis database? Why do you say that?

26. With the current system, how long does it take for you or your staff to enter the results for each home into the program database?

27. About how much time does it take for you to calculate an EPS for each participating home?

28. What additional program database functions do you need, if any, to help you enter or search for homes data?

29. What aspects of the current EPS requirements have been the most challenging for you to verify?

    a. Do you use the Best Practices Guide provided by Energy Trust? What do you think of the guide and of the overall requirements?

30. What percentage of homes that you have verified have required remediation based on your first visit? What are the most common reasons? Were they rectified right then?

    a. If not: How soon after? Did you make another pre-drywall visit to verify the problems were resolved?

31. What has been the response of builders and subcontractors to instances where you have identified issues? Do builders ever dispute your EPS results?

Quality Assurance (QA) Process

Now I'd like to ask you some questions about the quality assurance (QA) process.

32. How does Fluid schedule its QA inspections with you and your builders? (ACCEPT MULTIPLES)

33. How do you receive information about the outcomes of the QA inspections? (ACCEPT MULTIPLES)
    a. Don't get this information
    b. From the builders
    c. QA staff tell me in person
    d. QA staff send me a report
    e. It is in a database
    f. Other methods (Specify)

34. (IF they receive info) How useful is the inspection information you receive, on a scale from 1 to 5, where 5 is very useful and 1 is not at all useful?

    (IF 1 or 2) Why do you say that?

35. Do you have any suggestions for improving the QA process?

Marketing and Builder Assistance

36. Next I'd like to ask you some questions about your marketing and assistance to builders.

37. Of the builders you are currently working with, how many contacted you regarding verifier services and how many did you contact?

38. How does your company market its EPS home verification services to builders? ACCEPT MULTIPLE ANSWERS
    a. In-person visits to builders to see if they need verification services
    b. Phone calls to builders to see if they need verification services
    c. Mailing or emailing verification information to builders
    d. Having information on your company website
    e. Having information on the Energy Trust website
    f. Attending builder meetings or workshops
    g. Having information in building trade publications
    h. READ: Any other methods (Specify)

39. What program benefits do you emphasize to builders? (Probe for list below)
    a. Marketing/ Product differentiation benefits
    b. Higher home prices/profits
    c. Faster home sales
    d. Program cash incentives
    e. Promotion assistance available
    f. Reduced callbacks from homebuyers
    g. Are guaranteed to meet state energy code
    h. Help meet corporate sustainability goals
    i. READ: Any other benefits (Specify)

40. Do you emphasize different benefits to large (production) and small (custom) builders? If so, how do they differ?

41. What have you found to be the main obstacles to getting builders enrolled in the program? (Probe for list below; record all that apply; ask "which is the greatest obstacle?")
    a. Cost of complying
    b. Cost of participation (verification, etc.)
    c. Difficulty of meeting requirements
    d. Incentives too low
    e. Too much paperwork
    f. No demand from customers
    g. Not enough marketing support
    h. Subcontractors cannot meet requirements
    i. Participation disrupts building schedule
    j. Prefer other certifications (e.g. Earth Advantage, ENERGY STAR)

42. Again, are those obstacles different for large and small builders?

43. How have you overcome those obstacles?

44. What training or marketing messaging from the program would help you to recruit more builders?

45. Have you recruited any new builders to start building EPS homes in the past 12 months? How many builders?

46. Have any builders asked you for technical guidance to meet the program requirements? If yes, what construction issues have you assisted them with?

47. How comfortable are you answering technical questions you receive from your builders, on a scale from 1 to 5, where 5 is very comfortable and 1 is not at all comfortable?

48. Overall, would you say that you have provided (a):
    a. Significant amount of assistance
    b. Fair amount of assistance
    c. Relatively minor assistance
    d. Very little assistance

Overall Program Interaction/Conclusions

Finally, I'd like to conclude by asking you a few questions about the overall program.

49. Where do you turn when you want to get the most current technical information about the program? (READ and ACCEPT MULTIPLES)
    a. PECI or CSG staff – personal communications
    b. Energy Trust New Homes program staff – personal communications
    c. Energy Trust New Homes program materials – website/emails
    d. Other (Specify)

50. How timely is the information you get from this source/these sources, on a scale from 1 to 5, where 5 is very timely and 1 is not at all timely?

51. Overall, how satisfied are you with the technical information provided to verifiers through the program, on a scale from 1 to 5, where 5 is very satisfied and 1 is not at all satisfied?

52. What changes, if any, would you recommend to improve program communications with verifiers?

53. And finally, overall, how would you rate your satisfaction working with Energy Trust and its contractors, on a scale from 1 to 5, where 5 is very satisfied and 1 is not at all satisfied?

    54. (IF 1 or 2) Why do you say that?

Those are all the questions I have for you today. Thank you very much for your time and good information!

Realtors Interview Guide

FINAL September 26, 2013

Key Objectives:

- Get feedback on quality of EPS training and identify additional training needs
- Assess realtors comprehension of EPS homes
- Understand realtors' marketing practices related to EPS, and perceived value of EPS to realtors and homebuyers
- Identify potential program improvements, particularly related to EPS marketing
- Gauge realtors' satisfaction working with the New Homes Program

Target Audiences: Up to 17 Trade Ally realtors that have received EPS training through the program.

Hello, my name is _____ with Evergreen Economics, an energy market research firm based in Portland. I want to assure you that this is not a sales call. The Energy Trust of Oregon has asked us to help them assess how well their New Homes Program is working, and we are speaking with real estate professionals like you that received program training to learn about your experiences working with homes that received Energy Performance Scores and to get feedback to improve Energy Trust's program.

Could I speak to _____?

[IF NECESSARY:] This study will help Energy Trust to make its programs as successful as possible for realtors like you. Our survey will take about 30 to 40 minutes and all your answers are confidential; we never link any information to a particular person or company.

[IF THEY SAY, "I haven't sold any EPS homes":] That is OK, we would still like to get your feedback on the training you received, how customers value energy efficiency and other interactions you may have had with Energy Trust.

Business Scope

First, I'd like to start by getting some general background information.

1) For which company are you currently working?

2) And how long have you been a licensed realtor?

3) Approximately how many newly constructed, detached single-family homes did you sell or help customers purchase in 2012? And how many older, existing single-family homes did you help buy or sell?

4) And what are your projections for 2013 – how many newly built and older single-family homes do you expect to help buy or sell? (Get new/existing split)

5) In what parts of Oregon do you do most of your work? (Get details on cities/portions of, counties, regions, etc.)

6) Do you specialize in or focus on any particular types of homes – for instance new homes, suburban homes, custom or energy efficient homes, or homes for first-time buyers?

7) How many of the **newly constructed** homes you sold or purchased in 2012 or 2013 had received Energy Performance Scores through Energy Trust of Oregon's program? (Probe for number, or if they have any on the market at the moment.)

8) Will you work with any newly constructed home, or do you work with a single builder, or just a few builders with whom you have an established relationship?

9) How many **older, existing homes** you sold or purchased in 2012 or 2013 had received Energy Performance Scores? (Probe for number, or if they have any on the market at the moment.)

Training and EPS Comprehension

Now lets discuss the training you received on homes that receive Energy Performance Scores – we'll call these EPS homes. For these questions, I'm referring to training offered by Energy Trust – and not the STAR (Sustainability Training for Accredited Real Estate Professionals) training offered by Earth Advantage (aka E.A. Broker), which may have reviewed EPS scores at a high level.

10) First, why did you decide to take Energy Trust's training and become a Real Estate trade ally?

11) Do you recall if the training covered EPS only for newly built homes, or for existing homes also?

12) What topics did the training cover? (Probe on EPS scale and interpretation, greenhouse gas reductions, common efficiency measures, benefits of EPS scores for homebuyers, marketing tips, incentives, etc.)

13) How would you rate your understanding of the EPS scoring system? Would you say you are:

    a) Extremely knowledgeable
    b) Very knowledgeable
    c) Somewhat knowledgeable
    d) A little knowledgeable
    e) Not at all knowledgeable

14) And how would you rate your understanding of the energy efficient features of EPS labeled homes? Would you say you are:

a) Extremely knowledgeable
b) Very knowledgeable
c) Somewhat knowledgeable
d) A little knowledgeable
e) Not at all knowledgeable

15) Do you feel that the training gave you the tools needed to effectively present and promote EPS homes for your clients?
    a) If NOT: What additional information or tools do you need to work with these homes?

16) Do you receive information about Energy Trust program updates, clarifications or accomplishments? If YES: Get details on topics, mode, frequency.

17) (IF PROGRAM UPDATES RECEIVED) How would you rate the usefulness of the program information that you receive on a scale from 1 to 5, where 5 is very useful and 1 is not at all useful?

18) If you need additional information about EPS homes or strategies to help you sell them, whom do you go to? Are they generally able to answer your questions?

19) Do you ever refer to Energy Trust's website for information? If YES: What are your impressions about the website?

20) Besides the Energy Trust program training we just discussed, have you taken any other technical trainings focused on home construction or retrofit practices, or residential building science? If YES: Get details.

21) (IF NO TECHNICAL TRAINING OBTAINED) What would cause you to want to learn more about home construction practices?

Marketing Practices and Homebuyer Perceptions

Lets discuss how you market your homes.

22) How do you market the homes you sell?

    LISTEN FOR BUT DO NOT READ:
    a) Newspaper ads
    b) TV/Radio
    c) Real estate ads
    d) Outdoor signs
    e) Model homes
    f) Brochures / Sales materials
    g) Internet
    h) Multiple Listing Service

23) In general, do you actively promote the benefits of EPS homes to customers?
   a) If YES: Have you utilized any of the messages or strategies presented at the training? Have they helped you to sell more EPS homes?
      i) Do you mention Energy Trust in your marketing of these homes?
         (1) If YES: Does this add credibility or raise concerns to customers?
   b) If NO: Why don't you promote the benefits of EPS homes?

24) (IF PROMOTING BENEFITS) What benefits of EPS homes do you promote to customers?

   LISTEN FOR BUT DO NOT READ:
   a) Overall energy efficiency
   b) Energy bill savings
   c) High comfort/temperature control
   d) Indoor air quality
   e) Good for environment
   f) Verification / 3rd party certification
   g) Other:_____

25) And which of these benefits are homebuyers most interested in?

26) What features or equipment in EPS homes do you promote to customers?

   LISTEN FOR BUT DO NOT READ:
   a) Nothing specific
   b) Tight construction/low air leakage
   c) Higher insulation
   d) Efficient windows
   e) High efficiency heating/cooling systems, HVAC
   f) Efficient water heating
   g) Efficient lighting
   h) Duct sealing/testing
   i) Energy efficient appliances
   j) Other:_____

27) Are there any energy efficient home features that customers often ask about or are looking for? (Probe on solar PV, water heating and solar-ready homes)

28) Do you believe that homebuyers recognize the benefits of an EPS home? Are there particular benefits that customers have a difficult time understanding?
   a) If YES: How do you try to address their questions or concerns?

29) Do many customers confuse EPS homes with other home certifications, such as LEED, ENERGY STAR or Earth Advantage? How do you address or avoid that confusion?

30) Do many customers specifically ask to see energy efficient or EPS homes that are for sale? (Probe to see if increasing trend)

31) Given your experience, how valuable is the EPS label to customers? Do EPS homes sell faster than other homes, or for a higher price? (If so, get details) Is there a difference between customers looking at new construction vs. existing homes?

32) Given your experience, how valuable is energy efficiency to customers? Do homes with energy efficient features sell faster than other homes, or for a higher price? Is there a difference between customers looking at new construction vs. existing homes?

33) What are the biggest challenges you face in marketing and selling EPS homes? (Probe on customer comprehension, issues with specific features, added costs)

34) (IF NEEDED) How important is it for customers to have access to favorable lending terms for EPS homes? (Probe to see if minor/major barrier, if higher income buyers not affected, etc.)

35) What do you think Energy Trust should be doing to help market EPS homes to homebuyers?

36) Is there an optimal target customer market for newly built or existing EPS homes?

37) Would you use a database of homes with EPS scores? Would this be valuable to you or your clients?

38) How valuable would it be to have EPS scores as a feature in the MLS?

Conclusion

We're almost done. I just have some last questions for you.

39) How have you benefited from partnering with Energy Trust to sell more energy efficient homes?

40) Overall, how would you rate your experience working with Energy Trust, on a scale from 1 to 5, where 5 is very satisfied and 1 is not at all satisfied?

41) Is there anything about Energy Trust's work with energy efficient homes that is unclear to you? If YES: Get details.

42) What, if any, recommendations do you have for improving the EPS training or Energy Trust communications with realtors?

Those are all the questions I have for you today. Thank you very much for your time and good information!

Lenders Interview Guide

FINAL October 3, 2013

Key Objectives:

- Characterize lenders' practices and plans regarding finance for EE home mortgages and upgrades
- Identify institutional barriers to developing favorable lending for EE
- Understand lenders' experiences with loan utilization and problems encountered
- Identify potential market interventions by Energy Trust to increase lending options for energy efficiency

Target Audiences: Up to 10 managers of lending institutions (e.g., banks) that may or may not offer preferential lending terms for energy efficient homes and projects.

Hi, this is _____ with Evergreen Economics, an energy market research firm based in Portland. Energy Trust of Oregon has asked us to help them better understand the market for energy efficient homes - this is not a sales call. As part of our research we are speaking with several lending institutions like yours to learn about your experiences with loan products for energy efficient homes.

Could I speak with NAME IN CONTACTS LIST, IF GIVEN?

Or, ….. to the person that is most familiar with your lending options for residential homes?

[IF THEY SAY, "We don't have special loans/funding for energy efficient homes/equipment":] That's OK, we would still like to learn about how energy efficiency is viewed at your institution and what factors influence your lending policies.

[IF NECESSARY:] This study will help Energy Trust to make its programs as successful as possible for homebuyers, builders and lending institutions. Our survey should take about 20 minutes, and all your answers are confidential; we never link any information to a particular person or company.

Business Scope

Note: For "INSTITUTION" insert bank, credit union, etc. – whatever they are.

I'd like to start by getting some general information about your INSTITUTION.

1. First, can you please describe your role at your INSTITUTION, and how long you have been in that role? (Get title too)

2. In what parts of Oregon are most of your loans for single-family home purchases and upgrades?

3. About how many mortgage loans do you provide a year, for newly constructed homes? How about for existing homes? (Try to get split)

Loans for Energy Efficiency

Now lets talk about the different types of financing you offer for single-family homes.

4. Do you offer different mortgage products or terms for purchases of energy efficient homes? These are often called Energy Efficient Mortgages, and can apply to homes with ENERGY STAR, Earth Advantage or LEED certifications, for instance, or homes with an energy rating like Energy Performance Score from Energy Trust of Oregon. Sometimes energy efficient FHA and Veteran's Administration homes get these mortgages.

Questions if they <u>DO</u> have EE home mortgages:

5. What are the criteria **a home** has to meet to qualify for your mortgage products for energy efficient homes?

6. How do these mortgages differ from mortgages for standard homes? Probe on:
    a. Maximum loan amounts
    b. Interest rates (how much different?)
    c. Loan payback periods
    d. Fee waivers
    e. Other preferential terms or qualification criteria

7. How long have you offered this mortgage product for energy efficient homes? Have there been any recent changes?

8. What are the criteria **a homebuyer** has to meet to qualify for your mortgage products for energy efficient homes?

9. Who introduces the idea of using an EE mortgage in a typical mortgage application? Is it the buyer, the builder or builder's realtor/sales rep., or your loan officer?

10. Do you have marketing collateral or information on your website that describes the availability of EE mortgages?

11. What motivated your INSTITUTION to offer EE mortgages? (Probe on: differences in perceived/observed risk of buyer default, corporate mission to support energy efficiency, etc.) (Note: respondent may not know if policies developed by others, that's fine.)

12. What has your experience been regarding energy efficient mortgages? How much utilization is there and have there been any loan problems?

13. Has there been an increase in utilization or interest in the past year?

14. (IF NOT MENTIONED) Do mortgages for energy efficient homes have different default rates than standard loans?

    15. (IF YES) What is the difference? Why do you think that is?

16. Are there any barriers that prevent customers from getting your mortgages for energy efficient homes? (Probe on paperwork/documentation, appraisal issues, etc.)

17. Do your mortgages for energy efficient homes give you a competitive advantage? Why/why not?

18. Do you have any plans to change your mortgage terms or products for energy efficient homes in any way? If YES: How? And why is that? Would you be interested in working with Energy Trust to develop specific energy efficient loan products?

Questions if they <u>DON'T</u> have EE home mortgages:

19. Why doesn't your INSTITUTION offer specialized mortgages for energy efficient homes? (Probe on, do not read:
    a. Corporate policy
    b. Appraisal or underwriting issues; difficulty monetizing energy savings
    c. Do not view EE homes differently than standard homes
    d. Default risk of EE homeowners
    e. Concerns about actual energy savings from certifications
    f. Lack of competitive need

20. Have you offered specialized mortgages for EE homes in the past? (IF NO, SKIP TO 25.)

    21. (IF YES) What was your experience with those mortgages; how much utilization was there and were there any loan problems?

    22. Why did you stop offering energy efficient mortgages?

23. (IF NOT MENTIONED) Do mortgages for energy efficient homes have different default rates than standard loans?

    24. (IF YES) What is the difference? Why do you think that is?

25. What would have to change for your INSTITUTION to begin offering favorable lending terms for energy efficient homes?

26. Would you be interested in working with Energy Trust to develop specific energy efficient loan products?

Now let's talk about financing for energy efficiency upgrades in existing homes, like installing insulation, air sealing, high efficiency windows, or efficient new furnaces and water heaters.

27. Do you offer financing for any types of energy efficiency projects?

28. How about financing for solar electric or solar water heating systems?

Questions if they <u>DO</u> finance EE upgrades:

29. What types of energy projects are eligible for financing? (Get as much detail as possible re: min/max project size/value, equipment specifications, etc.)

30. Are energy upgrades financed through personal loans or home equity lines of credit, or do you also offer specialized loans for energy upgrades?

31. What are the typical terms of financing for EE projects? (Get details/distinctions for different loan types – personal, home equity, specialized)

32. What has your experience been regarding loans for energy upgrade projects? What types of projects are most popular and have there been any loan problems? (Windows, whole home energy retrofit, solar, etc.?)

33. Are there any barriers that prevent customers from getting your financing for energy upgrades? IF YES: Get details.

34. Do you have any plans to change your financing terms or eligibility for energy projects? If YES: How? And why is that?

Questions if they <u>DON'T</u> finance EE upgrades:

35. Why doesn't your INSTITUTION offer financing for home energy projects? (Probe on:
    a. Corporate policy
    b. Appraisal or underwriting issues; difficulty monetizing energy savings
    c. Do not view energy upgrades differently from other home improvement projects
    d. Default risk of borrowers, unsecured loan constraints
    e. Concerns about actual energy savings
    f. Lack of competitive need

36. Have you offered financing for home energy upgrades in the past?

    37. (IF YES) What was your experience with this financing; how much utilization was there and were there any loan problems?

38. (IF NOT MENTIONED) Do homeowners that do energy projects have different default rates than other homeowners?

    39. (IF YES) What is the difference? Why do you think that is?

40. What would have to change for your INSTITUTION to begin offering financing for energy upgrade projects?

Perceptions of EPS

Now I'd like to talk about Energy Trust of Oregon's Energy Performance Score, or EPS. EPS was developed by Energy Trust to measures a home's energy consumption and utility costs – kind of like the miles per gallon rating for automobiles. Homes with a low EPS are more energy efficient than other similarly sized homes.

41. (IF EPS NOT MENTIONED EARLIER IN INTERVIEW) Before this call had you heard of EPS scores for new and existing homes?

    IF NO – Go to CONCLUSION

42. (IF AWARE OF EPS) How knowledgeable would you say your lending staff are about EPS on a scale from 1 to 5, where 5 is very knowledgeable and 1 is not at all knowledgeable?

43. What is your INSTITUTION'S perception of EPS homes? Are these homes perceived to have more value? Probes:

    a. Is this a trusted brand in the homes marketplace – does the association with Energy Trust enhance or reduce this trust?

44. (IF USING EPS FOR EE MORTGAGES) Earlier you said that EPS homes can get different mortgage terms from your INSTITUTION. How do you use the EPS to determine whether a home qualifies for an EE mortgage?

    45. Has customer interest in financing for EPS homes increased at all in the past year? IF YES get details.

46. (IF AWARE OF EPS BUT NOT USING FOR EE MORTGAGES) Has your INSTITUTION considered offering preferential mortgage terms for efficient homes with low EPS scores? Why or why not?

Conclusion

We're just about done – I just have some final questions.

47. Thinking about the lending sector as a whole in Oregon, do you see a pathway to increase energy efficient mortgage products and lending? Are any changes needed in appraisers' or underwriters' practices, or mortgage regulations?

48. Is there anything that Energy Trust of Oregon could do to help expand home finance options for efficient homes throughout the state? (IF NEEDED: This could include specific incentives or new program initiatives focused on the appraisal or lending sectors.)

49. Is there anything else you would like to tell us about financing for energy efficient homes or projects?

Those are all the questions I have for you today. Thank you very much for your time and good information!

Appendix B: Analysis Regions

County	Analysis Region
Clackamas	Portland Metro
Columbia	Portland Metro
Multnomah	Portland Metro
Washington	Portland Metro
Yamhill	Portland Metro
Clatsop	Northwest Oregon
Lincoln	Northwest Oregon
Tillamook	Northwest Oregon
Marion	Northwest Oregon
Polk	Northwest Oregon
Benton	Northwest Oregon
Lane	Northwest Oregon
Linn	Northwest Oregon
Coos	Southern Oregon
Curry	Southern Oregon
Douglas	Southern Oregon
Jackson	Southern Oregon
Josephine	Southern Oregon
Gilliam	Eastern Oregon
Hood River	Eastern Oregon
Sherman	Eastern Oregon
Wasco	Eastern Oregon
Crook	Eastern Oregon
Deschutes	Eastern Oregon
Jefferson	Eastern Oregon
Wheeler	Eastern Oregon
Klamath	Eastern Oregon
Lake	Eastern Oregon
Morrow	Eastern Oregon
Umatilla	Eastern Oregon
Union	Eastern Oregon
Wallowa	Eastern Oregon
Baker	Eastern Oregon
Grant	Eastern Oregon
Harney	Eastern Oregon
Malheur	Eastern Oregon

Appendix C: 2013 Builder Paths

BUILDER OVERVIEW

CASH INCENTIVES FOR ENERGY-EFFICIENT NEW HOMES

EPS™, brought to you by Energy Trust of Oregon, is an energy performance score that measures a newly built home's energy consumption, carbon footprint and utility costs. Homes that have an EPS qualify for cash incentives from Energy Trust depending on the energy-ef ciency improvements installed during construction. Review the chart below to see how dif erent improvements can af ect a home's EPS and the correlating incentive.

NEW HOME INCENTIVE OPTIONS

These examples are for illustration only and are a small fraction of the options available to trade ally builders for improving a home's EPS and maximizing energy savings. Incentives will vary depending on energy-ef ciency improvements.

	2011 Oregon Code	Path 1: EPS Best Practices	Path 2: ENERGY STAR® Equipment Upgrade	Path 3: ENERGY STAR Equipment Upgrade with Ducts Inside*	Path 4: Performance Plus with Ducts Inside*	Path 5: Advanced Performance	Your Efficient Home Pathway
Estimated EPS	88	77	69	64	59	55	
Example Incentive†	$0	$600	$1200	$1,600	$2,400	$4,000	
Ceiling	R-38	R-49	R-49	R-49	R-60	R-60	
Wall	R-21	R-23	R-23	R-23	R-25	R-40	
Floor	R-30	R-30 (R-38‡)	R-30	R-30	R-38	R-38	
Window	U-0.35	U-0.30	U-0.30	U-0.30	U-0.25	U-0.20	
Furnace AFUE	92%	92%	94%	94%	94%	85% Non Ducted	
Ducts	Mastic Sealed and Tested	Mastic Sealed and Tested	Mastic Sealed and Tested	Ducts Inside and Sealed	Ducts Inside and Sealed	No Ducts	
CFL Lighting %	50%	80%	80%	80%	100%	100%	
Water Heater	0.59 EF 50 gal.	0.61 EF 50 gal.	0.82 EF Tankless	0.82 EF Tankless	0.82 EF Tankless	0.82 EF Tankless	
Air Sealing ACH50	6.0	4.0 (5.0‡)	4.0	4.0	2.5	2.5	
Ventilation	Mechanical Ventilation	ENERGY STAR	ENERGY STAR	ENERGY STAR	Qualified HRV/ERV	Qualified HRV/ERV	

Incentives above are calculated by computer modeling of a 2,200 sq. ft. house plan in full Energy Trust territory. The dif erence between the Oregon code path and proposed annual energy use determines the incentives for improvements beyond code. Incentive of ers are subject to funding availability and may change. Incentive examples are based on the 2011 Oregon Residential Specialty Code.

*All HVAC equipment and ducting must be located inside a conditioned space to qualify for this path.

†Homes can qualify for an additional incentive, up to $400, if built to be solar ready. For more information, contact a program-approved verif er.

‡Alternate pathway option.

Learn more about Energy Trust and builder incentives by contacting the trade ally coordinator at **1.877.283.0698**, option 1, or visiting **www.energytrust.org/nhresources**.

Energy Trust of Oregon

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Energy Trust of Oregon is an independent nonprofit organization dedicated to helping utility customers benefit from saving energy and tapping renewable resources. Our services, cash incentives and energy solutions have helped participating customers of Portland General Electric, Pacific Power, NW Natural and Cascade Natural Gas save on energy costs. Our work helps keep energy costs as low as possible, creates jobs and builds a sustainable energy future. 1 2 0 13

Appendix D: Energy Trust ADU Survey Data Analysis

MEMO

ADU Survey Data Analysis, By Aaron Wythe – 11/6/2013

During the summer of 2013, the Oregon Department of Environmental Quality (DEQ) hired the Portland State University Survey Research Lab (PSU-SRL) to conduct a survey of Accessory Dwelling Unit (ADU) owners. The survey was designed to get information on how ADUs are built and used in the metro areas of Oregon, specifically Portland, Eugene and Ashland. ADU owners in those three areas were identified through building permits and tax records and targeted with an introductory letter. The letter gave owners the choice between taking the survey online or waiting for a paper version to arrive in the mail. Of the 839 owners that were targeted, 369 completed the survey for an overall response rate of 45%. The full report from PSU-SRL can be viewed online at: http://www.deq.state.or.us/lq/sw/docs/ADUReportFRev.pdf.

This memo provides further crosstab analysis of the ADU survey. All of the following results pertain to ADUs that are used as year-round primary residences in order to understand energy use in ADUs when they are fully occupied. This sample contains 259 ADUs that are a primary residence year-round, representing 70% of the survey respondents. To further examine ADU energy use, results were broken down by free standing versus attached units and ADU owners that employed a contractor during construction versus those that did not in order to isolate the differing results expected from those categories.

Characteristics of all ADUs used as a primary, year-round residence:

ADU Characteristics	All Units N=251	Attached Units N=110	Detached Units N=141
Size (square feet)	690	715	672
Number of adults	1.37	1.37	1.37
Number of children	0.10	0.15	0.06
Number of Bedrooms	**All Units N=256**	**Attached Units N=113**	**Detached Units N=143**
Studio	20%	17%	22%
1 bedroom	55%	55%	53%
2+ bedrooms	26%	28%	25%

Percent of light sockets with efficient lamps (CFL or LED) installed in the average ADU:

CFL or LED Use	
Efficient lamp usage - all (n=211)	61%
Efficient lamp usage - detached (n=120)	64%
Efficient lamp usage - attached (n=91)	57%

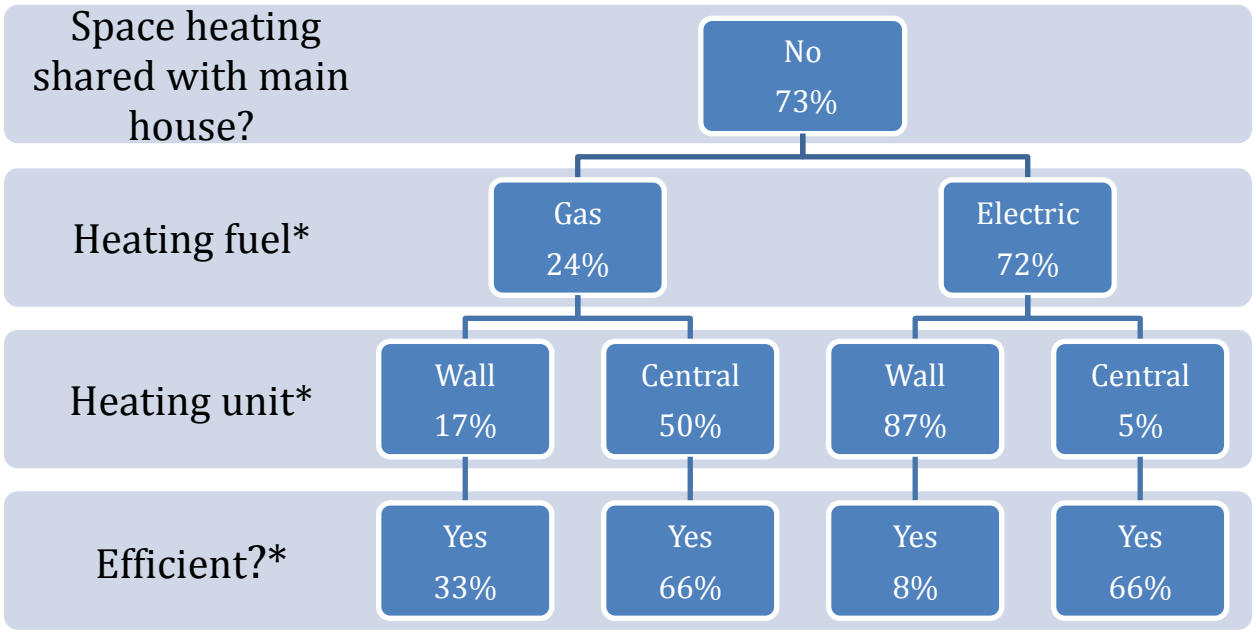
Potential differences were explored in the installation of energy efficiency measures between ADUs that were constructed by a contractor and those that were not. 88% of ADU owners employed a contractor to construct their ADU, 12% did not (implying that the owner built the ADU). The differences were found to be minor and inconsistent, showing no prevailing trend.

Installation of Efficient Features by Builder

	Contractor (t=176)	No Contractor (t=24)
Energy Star	65%	58%
Weatherized	63%	54%
Lighting (ADUs with CFL/LED)	55%	63%
Windows	66%	50%
Water heating	34%	38%
Heating equipment	30%	21%
Solar	7%	4%
Don't know	5%	4%
Other	10%	13%
None	3%	8%

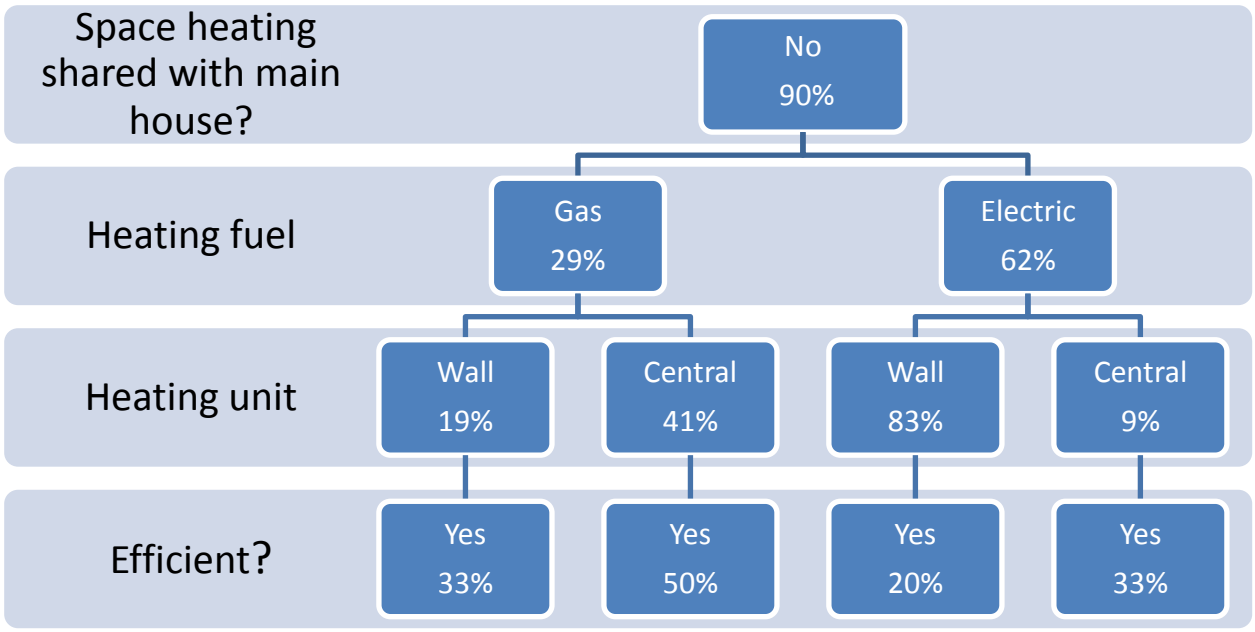
For questions pertaining to efficiency efforts, appliances, and space/water heating, primary residence ADUs are separated by construction type (attached vs. detached):

Space Heating System for Attached Units (n=105)



* Sub-category percentages may not sum to 100% because respondents did not necessarily provide a valid answer to each survey question.

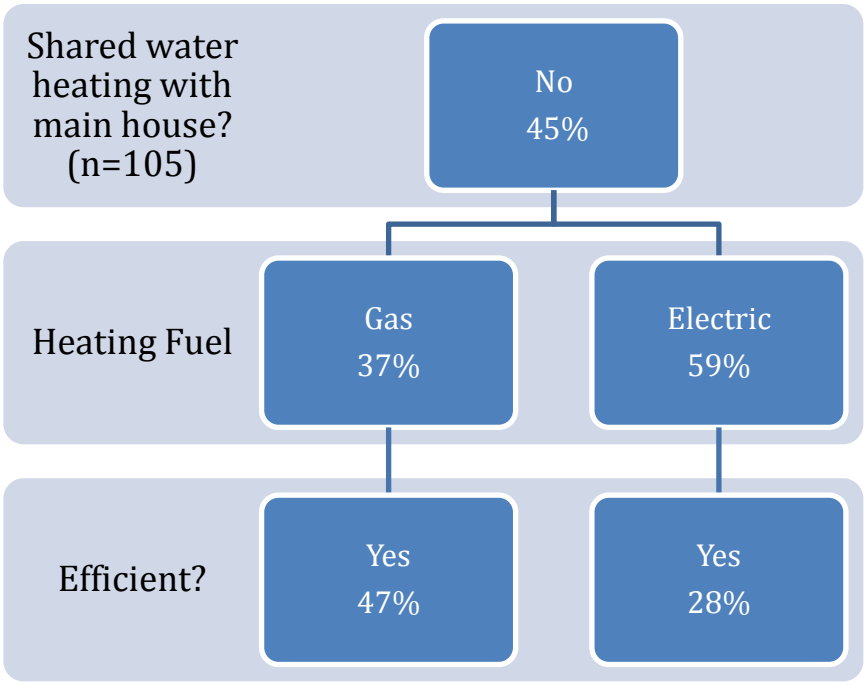
Space Heating System for Detached Units (n=125)*



* Sub-category percentages may not sum to 100% because respondents did not necessarily provide a valid answer to each survey question.

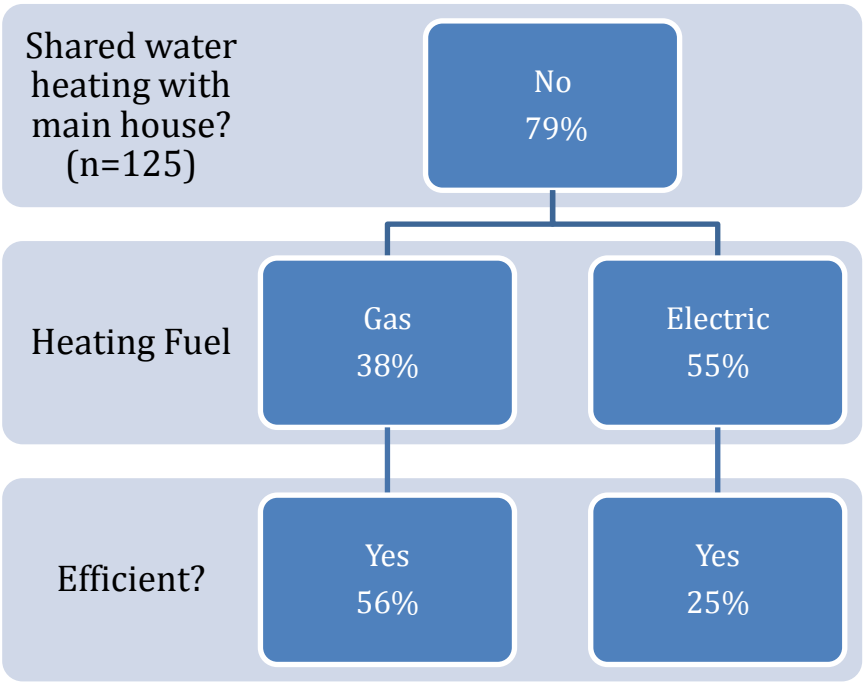
For space heating we see in the figures above that the majority of both attached and detached units have a space heat source separate from the main house. This is expected for detached units; in the case of attached units this result is presumably driven by City of Portland building codes that require separate heating in almost all cases. Of these units with separate heating systems, most utilize electric heat and the vast majority of those electric heaters are inefficient wall heaters. Given the fact that approximately 75% of the ADUs in this sample are studio or one-bedroom units, there is an opportunity for substantial energy savings through the use of ductless heat pumps.

Water Heating System for Attached Units*



* Sub-category percentages may not sum to 100% because respondents did not necessarily provide a valid answer to each survey question.

Water Heating System for Detached Units*

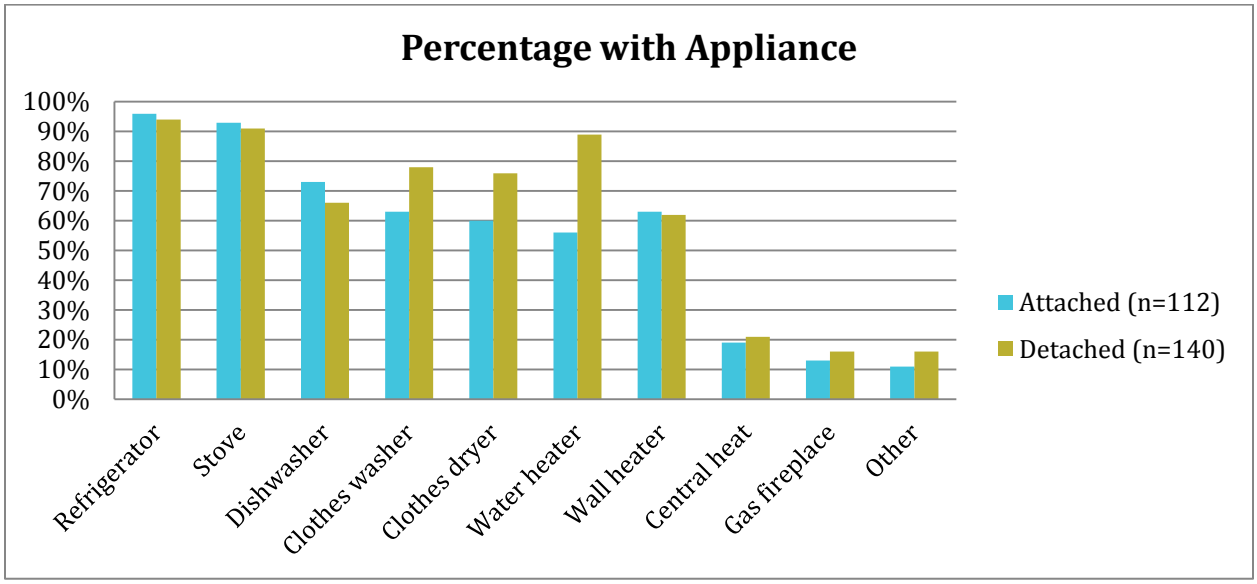


* Sub-category percentages may not sum to 100% because respondents did not necessarily provide a valid answer to each survey question.

In the above water heating system figures we see that hot water is shared with the main house more often than space heat, in 55% of attached units. As with space heat, the vast majority of water heaters in units with separate water heat are inefficient electric heaters. This is a smaller opportunity than space heat but the prevalence of inefficient heaters points to an opportunity for savings both in water heaters and appliances using hot water.

Percentage of ADUs with each appliance

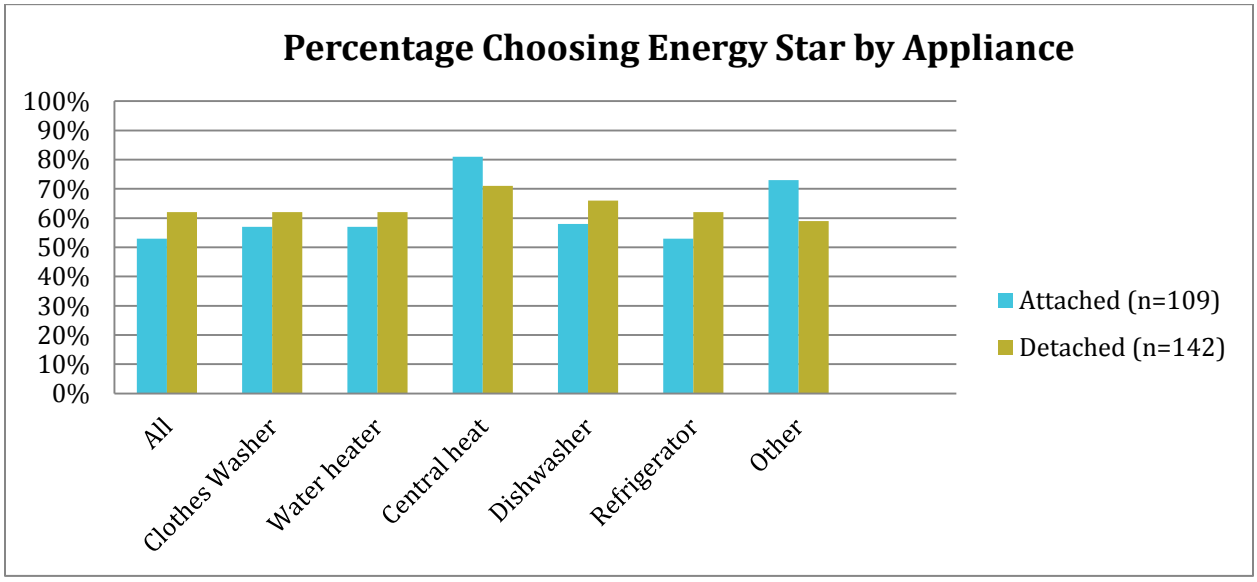
	Attached (n=112)	Detached (n=140)
Refrigerator	96%	94%
Stove	93%	91%
Dishwasher	73%	66%
Clothes washer	63%	78%
Clothes dryer	60%	76%
Water heater	56%	89%
Wall heater	63%	62%
Central heat	19%	21%
Gas fireplace	13%	16%
Other	11%	16%



Over two-thirds of ADUs, attached and detached, have a full complement of kitchen appliances, with virtually all having a fridge and stove. The largest differences between attached and detached units are in water heaters and laundry appliances, attributable to the aforementioned prevalence of shared water heating in attached ADUs.

Percentage Choosing Energy Star by Appliance

	Attached (n=109)	Detached (n=142)
All	53%	62%
Clothes washer	57%	62%
Water heater	57%	62%
Central heat	81%	71%
Dishwasher	58%	66%
Refrigerator	53%	62%
Other	73%	59%



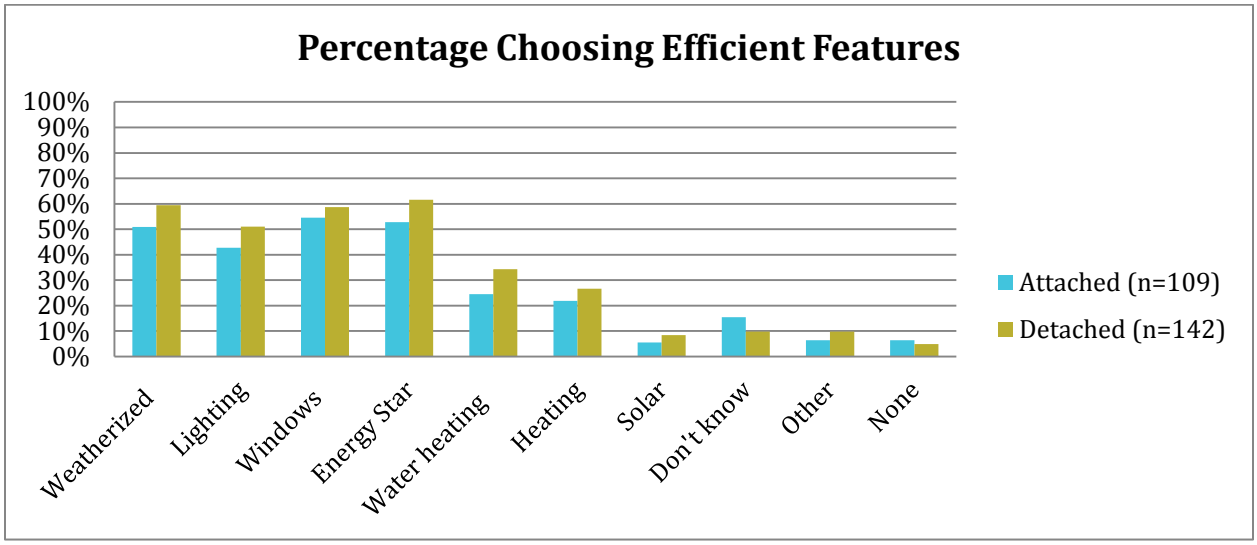
Due to the way the question was asked in the survey, we cannot determine if particular appliances are Energy Star or not. The above percentages represent the number of ADU owners who reported installing each appliance and reported choosing Energy Star appliances in survey question #30 below:

30. When the ADU was being built, what energy efficient features or equipment, beyond what was required by code, did you install?

Answers to question 30 are detailed in the following table.

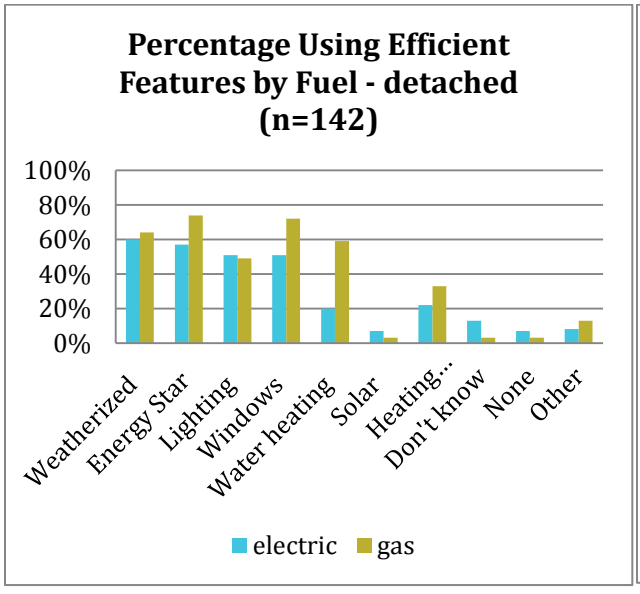
Percentage Choosing Efficient Features

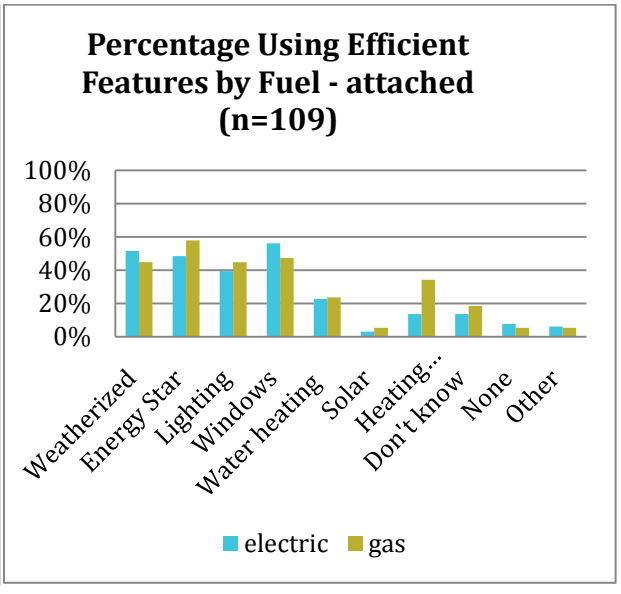
	Attached (n=109)	Detached (n=142)
Weatherized	51%	59%
Lighting (ADUs with CFL/LED)	43%	51%
Windows	55%	59%
Energy Star	53%	62%
Water heating	25%	34%
Heating	22%	27%
Solar	5%	8%
Don't know	15%	10%
Other	6%	10%
None	6%	5%



Percentage Using Efficient Features by Heating Fuel

	Detached		Attached	
	Electric (n=79)	Gas (n=34)	Electric (n=69)	Gas (n=38)
Weatherized	60%	64%	52%	45%
Lighting (ADUs with CFL/LED)	51%	49%	39%	45%
Windows	51%	72%	56%	47%
Water heating	20%	59%	23%	24%
Solar PV	7%	3%	3%	5%
Don't know	13%	3%	14%	18%
Energy Star appliances	57%	74%	48%	58%
Heating equipment	22%	33%	14%	34%
None	7%	3%	6%	5%
Other	8%	13%	8%	5%





The above figures show a general trend toward higher adoption of efficient features during construction of detached units. ADUs heated by natural gas also show higher rates of efficiency measures in several categories, most notably water heating and space heating.

The characteristics of ADUs that have solar PV installed were explored. As would be expected, owners who installed solar spent significantly more on the construction of their ADUs (beyond the cost of the solar system itself). The existence of a solar array corresponds with higher rates of adoption of efficiency measures across the board, although the sample size of ADUs with solar is very small, so these results are indicative but not definitive.

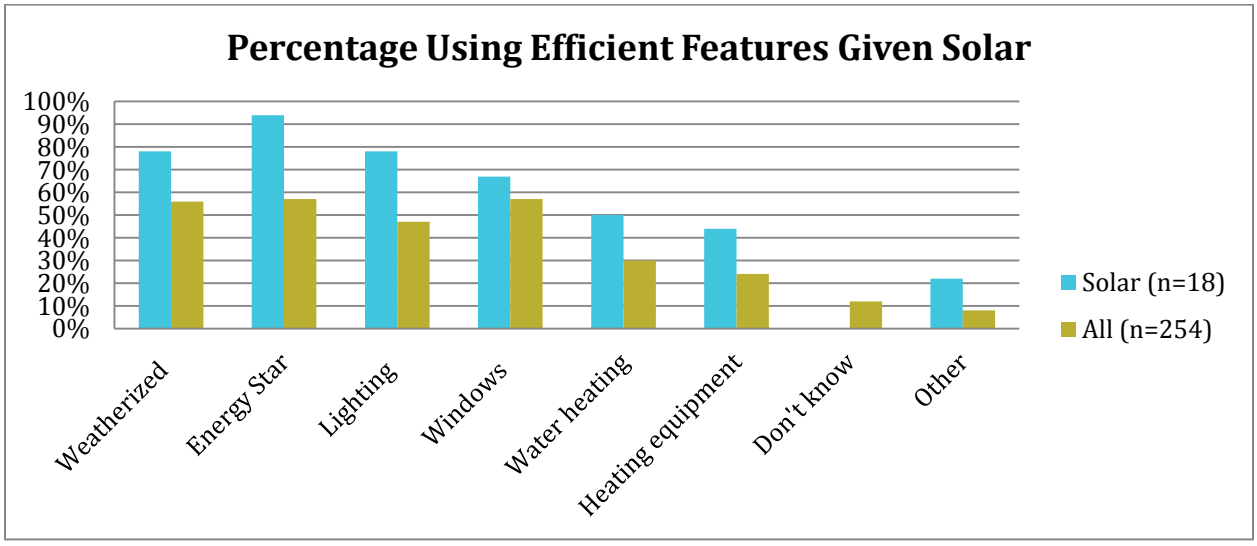
Average percent of light sockets with efficient lamps (CFL or LED) installed in ADUs with solar:

CFL or LED Use in Solar ADUs

Efficient lamp usage - all ADUs (n=221)	61%
Efficient lamp usage – solar ADUs (n=18)	87%

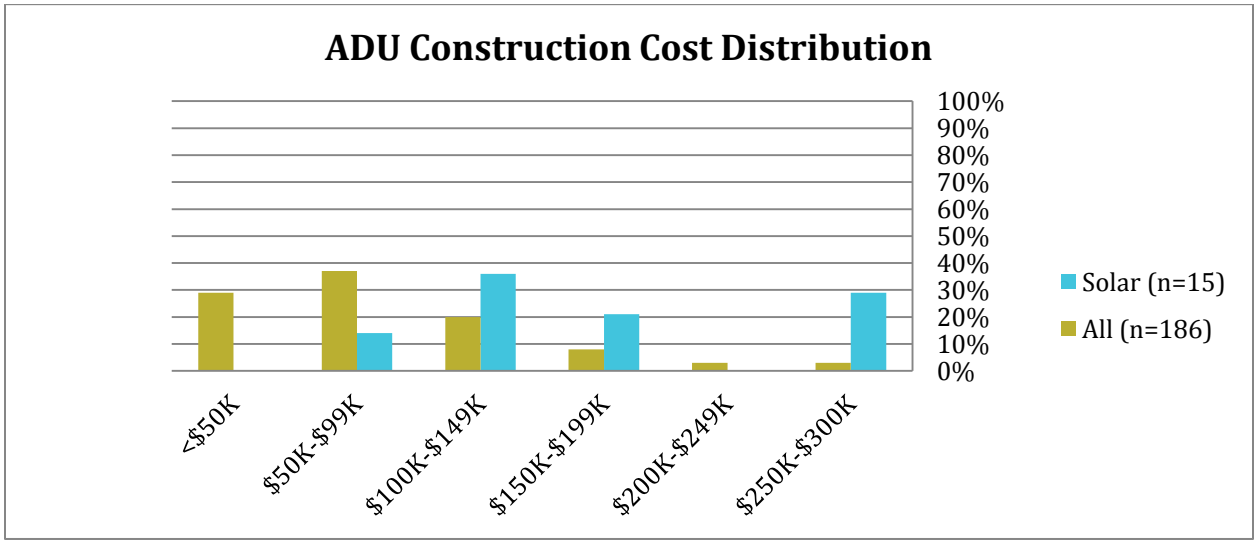
Percentage Using Efficient Features Given Solar

	Solar (n=18)	All (n=254)
Weatherized	78%	56%
Energy Star appliances	94%	57%
Lighting (ADUs with CFL/LED)	78%	47%
Windows	67%	57%
Water heating	50%	30%
Heating equipment	44%	24%
Don't know	0%	12%
Other	22%	8%



ADU Construction Cost

	Mean	Std Dev
All (n=186)	$83,400	$56,700
Solar (n=14)	$162,000	$81,400

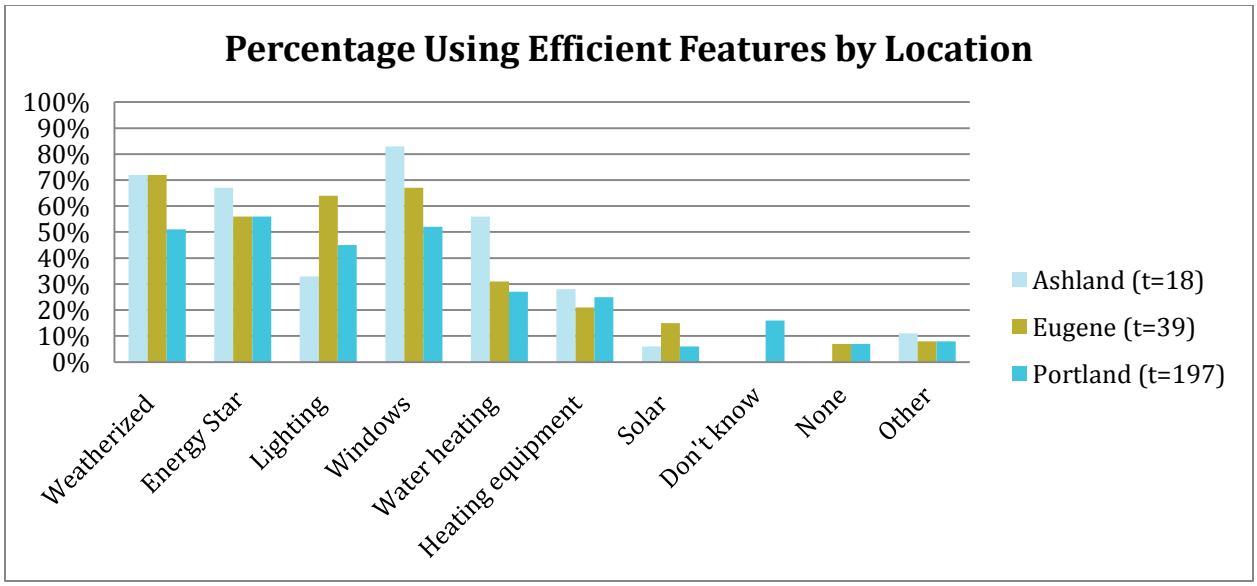


The disparity in the above figure may point to the high upfront cost of solar PV. The decline in solar costs combined with a continued expansion of solar leasing programs could possibly open up solar as an option for owners building less expensive ADUs.

Differences between ADUs located in Portland, Ashland, and Eugene were analyzed. These jurisdictions were the three target areas for the survey. Sample sizes for Ashland and Eugene are quite small, so these results may simply be random. The adoption of efficiency measures does show some variation between jurisdictions.

Percent Using Efficient Features by Location

	Ashland (t=18)	Eugene (t=39)	Portland (t=197)
Weatherized	72%	72%	51%
Energy Star appliances	67%	56%	56%
Lighting (ADUs with CFL/LED)	33%	64%	45%
Windows	83%	67%	52%
Water heating	56%	31%	27%
Heating equipment	28%	21%	25%
Solar	6%	15%	6%
Don't know	0%	0%	16%
None	0%	7%	7%
Other	11%	8%	8%



Conclusions

In considering the market for energy efficiency investments in ADUs there are several points to be made:

- Important differences exist in the opportunities between attached and detached units; this is due to the relative prevalence of systems being shared with the main house.
- 71% of ADUs in this survey are occupied by renters (29% by the owner or owner's family member) with 74% of ADUs receiving a separate electric bill and 31% a separate gas bill. This may affect the method of decision making regarding energy efficiency improvements for owners of ADUs.
- Use of efficient lighting appears to be significantly higher than in existing single family homes
- ADU owners who invested in solar PV also appear to take on more energy efficiency improvements than non-solar units. This is a similar outcome to that seen in the single family homes market.

ADUs look to have several opportunities for energy savings. The largest opportunity is in electric space heating. The vast majority of ADUs in this sample are using inefficient electric wall heaters, making ductless heat pumps a good source of efficiency gains. The small size of most ADUs, 75% are studios or one bedroom, increases the amount of the heating load that may be replaced by a ductless heat pump as opposed to larger residences. This small size could come into play in water heating as well. The survey results show low adoption of efficient water heaters; coupled with limited space and low occupancy, this may be an opportunity for promoting tankless water heaters. The low rates of efficient water heater adoption also points to larger potential efficiency gains from installing efficient hot water using appliances, clothes and dishwashers, as well as low flow showerheads. While a higher percentage of gas space heaters utilized was efficient than electric, both are low. Improvements in furnace efficiency as well as the use of efficient gas fireplaces may be areas of efficiency gains.