EVERGREEN ECONOMICS

2014 - 2015 New Homes Program Process Evaluation

A Report to Energy Trust of Oregon

FINAL Report March 17, 2016

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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 homes verifiers and a web-based survey of real estate trade allies that received training on Energy Trust's Energy Performance Score ™ (EPS). Evergreen staff also completed interviews with several program implementation staff and their subcontractors, and reviewed program participation data in the Project Tracking database. The report also includes data on the Oregon single-family new construction market. The evaluation covers the 2014-2015 program years and occurred between July 2015 and March 2016. This evaluation does not cover program operations in southwest Washington.

Overall, Energy Trust's New Homes program is continuing to perform well and make progress towards market transformation. EPS market share in Oregon has increased robustly— from almost 21 percent in 2013 to 36 percent in 2015— and the program attained its electric and gas savings goals in both 2014 and 2015. Notably, the adjusted 2014 - 2015 incentive structure for builders and verifiers has increased the overall efficiency of EPS homes. Whereas the typical EPS home followed Path 2 under the previous incentives scheme, the majority of homes completed in 2014 – 2015 are equivalent to Path 3 (i.e., at least 25 percent more efficient than state code). The program has also continued to add new builder trade allies. Almost 250 program builders constructed EPS homes in 2014 and 2015, compared to 220 program builders in 2012 and 2013.

In addition, the program has maintained positive relationships with multiple verifiers to assist builders through the construction process, inspect homes and obtain EPS scores. Overall, 17 different firms completed home verifications in 2014 and 2015 (through August). The market based verifier model appears to be working well generally and active verifiers are trying to recruit new participant builders. Following are some additional findings from this evaluation:

1. Interviewed verifiers liked the 2014 - 2015 incentive structure as they are directly rewarded for pushing builders to construct more efficient homes.
2. Verifiers are also very satisfied with technical guidance provided in the program Field Guide and from communications with program staff.
3. Verifiers have high satisfaction using the online Axis database now, as the initial software "bugs" have been fixed and their hands-on experience has increased.
4. Seven of 10 interviewed verifiers plan to grow their verification business over the next year, with three verifiers planning for aggressive expansions by targeting new builders.
5. The Axis database has made the home verification and incentive delivery process much more efficient and eliminated most of the manual data entry that was required.
6. Primary reasons for builder non-participation include: higher equipment costs, perceived low customer demand for EPS, perceptions of "onerous" paperwork, lack of educated local subcontractors, and/or objections to the program's relatively high insurance requirements. In addition, the current "hot" housing market reduces the need for (some) builders to differentiate themselves from competitors.

7. Surveyed real estate agents provided positive course evaluation feedback. Training elements that they value most are: site visits to actual EPS homes, information/tools that can be directly applied to their business, and peer-to-peer role playing activities that help trainees become comfortable talking about EPS homes.
8. Over half of the surveyed realtors said that they have changed the way they promote and sell EPS homes and/or energy efficiency to their clients as a result of Energy Trust's training.
9. Over half of the realtors said that an EPS has a positive sales impact (faster sale or higher price), and none said that it has a negative sales impact. Overall, customer demand for energy efficiency is increasing slowly.
10. All of the surveyed realtors believed that having EPS scores automatically uploaded into the Multiple Listing Service that they use would be useful.

To continue building on the program's success, Energy Trust should do the following in 2016 (if not already underway):

1. The program should try to recruit more builders in the Bend and southern coast regions, where homebuyers may be particularly inclined to seek out energy efficient homes based on their demographics and environmental values.
2. Collaborate with affordable housing builders to see if the program can better serve them, with or without program design changes.
3. Conduct more Early Design Assistance charrettes in Eastern and Southern Oregon to build upon the lunch-and-learns that the program has already been offering.
4. Continue to educate newer larger volume participant builders on energy efficient measures and practices, so they can increase the efficiency of their program homes over time.
5. Future realtor trainings could focus more on high efficiency windows and HVAC systems, since these are measures where the gap between customer interest and realtor self-reported knowledge is greatest.
6. Give more attention on how to interpret the EPS in the realtor trainings, so realtors can accurately convey this information to their customers and enhance EPS credibility.
7. Develop a system for automatically uploading EPS scores to a central repository where real estate agents have access to all EPS homes (new and existing). Ideally these would be the same listing services that realtors already use. Currently, real estate agents are not inclined to upload EPS information themselves (provided they get it from a builder or verifier), which is hindering public awareness of EPS.
8. Continue to advocate that EPS scoring be included in the updated residential building code as a performance-scoring pathway to code compliance. This would likely be the most efficient way to rapidly increase builder and consumer acceptance of EPS.

MEMO

Date: April 14, 2016
To: Board of Directors
From: Mark Wyman, Residential Sector Program Manager
Dan Rubado, Evaluation Project Manager
Subject: Staff Response to the 2014-2015 New Homes Program Process Evaluation

This evaluation report underscores that the New Homes program has been very successful in building market share and achieving its energy savings goals. EPS is starting to get a strong foothold in the market and more builders and realtors are familiar with it. Lagging consumer demand for EPS, and efficient homes in general, is still a limiting factor in driving the new construction market further. Outlying rural areas trail the urban areas in efficient building practices and it will continue to take more effort and support from the program to develop those markets. Energy Trust are continuing efforts to recruit additional builders and verifiers.

The report recommends only incremental improvements to the program's systems and processes and some changes are already under way. For instance, good progress has already been made on the recommendation to improve coordination during the measure development process. Another issue for Energy Trust to watch is the impact of high volume builders and verifiers on the program. While these firms are the key to obtaining a larger market share, their actions have proportionately significant impact on the program's budget and quality control processes.

2 Introduction and Study Objectives

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.[1] 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/year). 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 incremental incentives tied to increased efficiency levels and incentives for integrating solar measures.[2] The program also offers standalone incentives for efficiency measures in non-EPS homes.

Independent, third-party verifiers help builders navigate the program, do performance testing and energy modeling of homes, facilitate EPS certifications, and enter all project information into the program's online project database, Axis. Verifiers charge builders a market based fee dependent on their services offer but also receive an incentive from Energy Trust to help offset the fee charged to the builder. Once a home passes verification, the program issues an EPS and provides an incentive to the builder based on its energy performance above code, plus the corresponding incentive to the verifier. Over time the independent verifier model has allowed the program to reduce delivery costs and increase the volume of homes for which it provides EPS and incentives. In addition to builders and verifiers, the program works with subcontractors and real estate professionals to provide a comprehensive approach to integrating energy efficiency into new construction and homes sales.

A third-party program management contractor (PMC) administers the program for Energy Trust. The current PMC – CLEAResult (formerly Portland Energy Conservation Inc.) – 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. Section 6 of this report presents additional details about the program implementation and participants.

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, NW Natural, and Cascade Natural Gas customers. While Energy Trust does partner

[1] The program also operates in southwest Washington, however this territory was not included in this evaluation.

[2] The New Homes program only pays incentives to make homes "solar ready PV." Incentives for installed solar PV are paid through Energy Trust's solar program.

with other utility programs where there is overlap, there are logistical challenges to doing this and services are generally more limited in those places. Moreover, population densities and construction activity also varies considerably across Oregon, making it inefficient to provide the same level of services (e.g., subcontractor training) everywhere.[3]

This process evaluation covers the program years 2014 and 2015. Following are some of the key changes the program made starting in 2014:

1) In 2014 the program increased the incentives paid to the builders for the top three prescriptive pathways to encourage builders to increase their level of performance (i.e., energy savings per home). The new 2014-2015 incentive ranged from $600 for a path 1 or 10 percent improvement over code home to $5,000 for a path 5 or 40 percent improvement over code home.[4] See Appendix D for information about the program's performance paths in 2014 – 2015, and Appendix E for the previous program paths. The program does not promote one pathway over the other, and many builders opt for the flexible "performance path" instead of the prescriptive paths as a result of verifier influence and/or individual builder preferences. High energy savings and incentives can be achieved through both the prescriptive and performance pathways. Section 5 provides additional details about the pathways builders have followed in 2014 and 2015.

2) As of 2014, verifiers now get a single, variable per-home incentive equal to 25 percent of the builder's incentive, with a minimum baseline of $300. This structure is intended to motivate verifiers to help builders construct more efficient homes; now, a more efficient home yields increased incentives for both the builder and verifier. In 2013, the program gave a flat $300 incentive to verifiers with an additional $150 for EPS modeling.

3) In 2014, the program completed a full implementation of the online Axis database, which was developed and is administered by Pivotal Energy Solutions for use by verifiers and program staff. The Axis database tool imports verifiers' REM/Rate energy modeling data directly, calculates the incentive and EPS then transfers homes information to Energy Trust's Project Tracking database. The Axis database also includes various data quality-checking tools to quickly alert program staff and verifiers about problematic data entries. Provided that accurate data are uploaded into Axis, the tool can greatly accelerate the EPS scoring process for each home. Axis can also provide preliminary EPS derived from builder plans, which can then be improved after new REM/Rate runs. Pivotal provides initial training and ongoing support to the verifiers.

4) Energy Trust dedicated part-time staff based in eastern Oregon to support multiple Energy Trust programs. For the New Homes program, this staff person recruits and supports new builders, recruits new verifiers, and coordinates with local media on program promotions.

[3] For a map of Energy Trust's service territory see: http://energytrust.org/about/.
[4] An additional $200 is available to builders that install solar ready PV.

5) The program has increased its field support to verifiers and subcontractors by shifting staff resources from the office to field. These staff have also increased the number of Early Design Assistance charrettes for builders and verifiers outside of the Portland Metro market.

6) Energy Trust contracted with Balanced Energy Solutions in June 2015 to provide third-party quality assurance inspections of homes in the Portland Metro area. PMC staff provide quality assurance inspections in other parts of the state, and also in the Portland Metro area.

2.2 Evaluation Goals

Evergreen completed the previous process evaluation of the New Homes program, which was focused on the 2013 program year and was completed in 2014. Given the many program changes described above, in June 2015, Energy Trust contracted with Evergreen Economics to undertake a process evaluation of the 2014-2015 program years. A key focus of this process evaluation was on program operations: identifying what the program is doing well, what the problem areas are, and what improvements need to be made. Subsequent sections of this report provide more details on objectives for specific data collection activities. At a high-level, however, key objectives included:

1. Document and obtain feedback on the current program design and operations;
2. Identify program operations that are working well and ones that require improvement;
3. Document key program achievements;
4. Document planned changes and enhancements; and
5. Develop recommendations to streamline program participation and potentially reduce delivery costs, while increasing program influence and market share.

3 Evaluation Methodology

The process evaluation consisted of multiple tasks, summarized here. Additional task details appear in the corresponding sections summarizing the results of 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))
- 2015 Program Plan
- Marketing materials and plans
- Project Tracking database extract 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
- Identify research topics for the subsequent data collection and analyses

Selected information from this review is integrated into Section 6, which summarizes the program structure/design and delivery processes.

3.2 Staff Interviews

Early in the evaluation, we conducted strategic, in-depth interviews with multiple Energy Trust, PMC, Earth Advantage, and homebuilder association staff to review the current program design and operations as well as the context in which the program operates. The interviews covered program goals, participation processes, current challenges and concerns, and emerging plans. The interviews also covered respondents' communications with (other) program staff and trade allies, and the perceived effectiveness of these communications. Interview findings regarding program implementation, effectiveness, challenges and potential future changes are presented in Section 6. The various staff interview guides can be found in Appendix A.

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 the EPS homes market can be assessed.

- Showing current progress toward program goals, including the estimated market share of EPS homes 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. The results for this task can be found in section 4.

3.4 Program Data Analysis

For this task, we reviewed program homes data in Energy Trust's Project Tracking database to identify trends in program activity and incented measures (EPS and standalone). In particular, we analyzed measure installation rates, installed measure types and efficiencies, and EPS score ranges for gas and electric homes. The results for this task can be found in section 5.

3.5 Verifier Interviews

Evergreen conducted structured, in-depth interviews with 10 verifier companies for a variety of purposes, including: gauging verifier satisfaction with the new incentive structure, documenting verifier successes and challenges using the Axis database system, documenting current construction challenges for builders and subcontractors, and obtaining feedback on program requirements and operations. The interview guide for verifiers is included in Appendix A. The results for this task can be found in section 7.

3.6 Homebuilder Association Interviews

Evergreen conducted in-depth interviews with two staff at the Oregon Home Builders Association and Home Builders Association of Metropolitan Portland who help Energy Trust promote the program to homebuilders, subcontractors, remodelers and real estate allies. Some of the interview objectives were to gauge builder perceptions of the program, understand current market conditions for new homes, and identify future program opportunities. The interview guide for homebuilder association staff is included in Appendix A. The results for this task can be found in section 8.

3.7 Real Estate Trade Ally Web Survey

In October and November 2015, Evergreen administered a web survey for realtors that attended Real Estate Ally (REA) trainings offered by Energy Trust between October 2014 and July 2015. The survey was programmed and hosted by CIC Research. Some of the key survey objectives were to obtain feedback about the program trainings, the EPS brand and its influence in the market, and program communications with REAs. The survey instrument guide for real estate allies is included in Appendix B. The results for this task can be found in section 9.

Interviews were not conducted with builders as part of this process evaluation, since Evergreen completed interviews with builders as part of a separate study on gas fireplaces

that was completed just before the start of this process evaluation. As part of that separate study, Evergreen spoke with builders about gas fireplaces (summarized in section 10) and also asked a few questions about their satisfaction working with the new homes program (summarized in section 6.4).

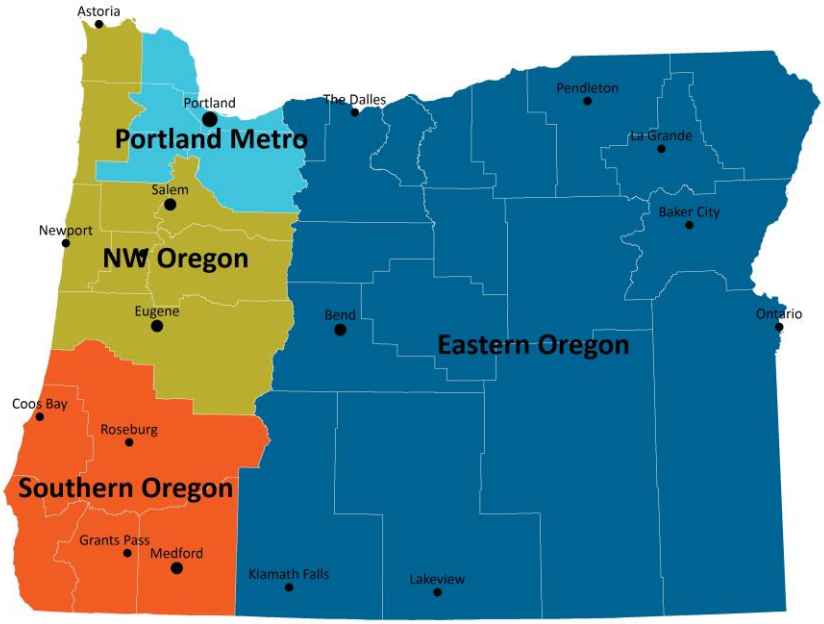
4 Market Characterization

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 2014 through August 2015. Trade ally participation and EPS home construction data from Energy Trust's Project Tracking database are also reviewed and provide context for the evaluation results presented in subsequent sections.

4.1 New Construction Market Overview

The residential building sector in Oregon is a fragmented market that has historically been comprised of a few high volume builders as well as numerous builders constructing only a few houses each year. To create a snapshot of the current market, Evergreen analyzed construction permits data compiled by *Construction Monitor* at the individual project/site level. 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. Figure 1 shows the analysis regions we used for this evaluation, and Appendix C provides additional details about the counties that comprise each region.

Figure 1: Evaluation Analysis Regions



As shown in Table 1, according to data compiled by *Construction Monitor*, 2,769 builders likely completed at least one single-family home during the current study period (January 2014 through August 2015). In comparison, approximately 1,600 builders were active during the previous evaluation period (January 2012 through August 2013). Moreover, Table 2 shows that an estimated 10,553 homes were constructed during the January 2014 through August 2015 study period compared to only 6,115 homes during the January 2012 through August 2013 evaluation period. All of the analysis regions across the state had significant increases in the number of total homes built between the previous evaluation period and the current evaluation period. Both of these tables confirm the robust state of Oregon's new construction sector.

Table 1: All Builders by Region: 2012-2013 Compared to 2014-2015

Region of State	2012-2013		2014-2015		
	# of Builders	% of Total	# of Builders	% of Total	Percentage Change
Portland Metro	347	22%	951	34%	174%
Northwest Oregon	498	31%	814	29%	63%
Eastern Oregon	332	21%	533	19%	61%
Southern Oregon	410	26%	471	17%	15%
Total Builders	**1,587**	**100%**	**2,769**	**100%**	**74%**

Table 2: Total Number of Homes Built by Region: 2012-2013 Compared to 2014-2015

Region of State	2012-2013		2014-2015		
	# of Homes	% of Total	# of Homes	% of Total	Percentage Change
Portland Metro	3,217	53%	5,359	51%	67%
Northwest Oregon	1,141	19%	2,177	21%	91%
Eastern Oregon	1,063	17%	1,863	18%	75%
Southern Oregon	694	11%	1,154	11%	66%
Total Builders	**6,115**	**100%**	**10,553**	**100%**	**73%**

In comparison, as shown in Table 3, the amount of program builders did not dramatically increase between the current and previous evaluation periods. Both the Portland Metro and Eastern Oregon regions saw an increased number of program builders (approximately 23 percent), while Northwest Oregon saw a decrease in the number of active program builders and Southern Oregon remained the same. As a result, the percentage of program builders to total active builders in each region decreased between the previous evaluation period and the current period, especially in the Portland Metro region where program builders accounted for 31 percent of all builders during 2012 and 2013 compared to only 14 percent of builders in 2014 and 2015. Overall, program builders accounted for 14 percent of all builders in the

previous evaluation period compared to only nine percent during the current evaluation period.

Table 3: Program Builders by Region: 2012-2013 Compared to 2014-2015

Region of State	2012-2013		2014-2015		
	# of Builders	% of Total	# of Builders	% of Total	Percentage Change
Portland Metro	107	49%	131	53%	22%
Eastern Oregon	61	28%	77	31%	26%
Northwest Oregon	31	14%	20	8%	-35%
Southern Oregon	21	10%	21	8%	0%
Total Builders	**220**	**100%**	**249**	**100%**	**13%**

While the number of program builders did not increase significantly between the previous and current evaluation periods, the number of program homes throughout the state, especially in the Portland Metro region, did increase.

Table 4: Program Homes Built by Region: 2012-2013 Compared to 2014-2015

Region of State	2012-2013		2014-2015		
	# of Homes	% of Total	# of Homes	% of Total	Percentage Change
Portland Metro	1,980	79%	3,446	83%	74%
Northwest Oregon	216	9%	338	5%	56%
Eastern Oregon	230	9%	334	10%	45%
Southern Oregon	71	3%	74	2%	4%
Total Builders	**2,497**[5]	**100%**	**4,192**	**100%**	**68%**

The next series of tables provide additional details about the composition of active homebuilders. As shown in Table 5, two-thirds of all Oregon homebuilders completed only one unit between 2014 and August 2015, while an additional 20 percent completed between two and four homes. The Portland Metro region had the largest builders, with 32 builders who built 25 or more units, accounting for over half of large builders across the state (55 percent). In comparison, Portland only had seven large builders (completed 25 or more homes) in the previous evaluation period.

[5] Approximately 400 additional homes were completed during the current evaluation period, however the location data was not included for analysis

Table 5: All Oregon Builders by Region and Volume: 2014 Through August 2015

Region of State	Count of Builders, by Number of Units Built							
	1	2-4	5-9	10-24	25-49	50+	Total	Regional % of Builders
Portland Metro	573	199	92	55	16	16	951	34%
Northwest Oregon	580	144	54	26	6	4	814	29%
Eastern Oregon	359	113	34	19	5	3	533	19%
Southern Oregon	333	95	20	15	8	0	471	17%
Total Builders	**1,845**	**551**	**200**	**115**	**35**	**23**	**2,769**	
Percentage of Grand Total	**66.6%**	**19.9%**	**7.2%**	**4.2%**	**1.3%**	**0.8%**	**100%**	**100%**

Source: Evergreen Economics analysis of *Construction Monitor data* provided by PMC, October 2, 2015.

Table 6 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 (71 percent) than all builders (87 percent), while the percentage of mid-range builders (between five and 25 homes) is twice as large as the total builder population. 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. Similarly, program participation costs (e.g., enrolling as a Trade Ally, recruiting trained subcontractors and contracting with a verifier) can also be defrayed over more homes. As discussed above, in the current study period, 249 program builders were active building homes, reflecting a modest increase over the 220 program builders active during the prior evaluation period.

Overall, over 50 percent of program builders were based in the Portland Metro region, with an additional 31 percent in Eastern Oregon. Only eight percent of program builders were based in each of the Northwest Oregon and Southern Oregon regions, significantly less than their total builder population percentages of 29 percent and 17 percent, respectively. For large builders (25 or more homes), 83 percent worked in the Portland Metro region, while 11 percent worked in Eastern Oregon and six percent worked in Northwest Oregon.

In comparison to the previous evaluation period results (2012 and 2013), the current program builder market is very similar in terms of regional distribution and builder size. However, the percentages of program builders in the Portland Metro and Eastern Oregon regions both increased slightly (4 percent and 3 percent, respectively) while the percentage of Northwest Oregon program builders decreased from 14 percent to eight percent and the percentage of Southern Oregon program builders decreased from nine percent to eight percent.

Table 6: Program Builders by Region and Volume: 2014 Through August 2015

Region of State	Count of Builders, by Number of Units Built							
	1	2-4	5-9	10-24	25-49	50+	Total	Regional % of Builders
Portland Metro	50	32	16	18	5	10	131	53%
Eastern Oregon	31	32	8	4	2	0	77	31%
Northwest Oregon	7	5	5	2	0	1	20	8%
Southern Oregon	12	7	0	2	0	0	21	8%
Total Builders	**100**	**76**	**29**	**26**	**7**	**11**	**249**	
Percentage of Grand Total	**40.2%**	**30.5%**	**11.6%**	**10.4%**	**2.8%**	**4.4%**	**100%**	**100%**

Source: Evergreen Economics analysis of data provided by the PMC, September 2015.

4.2 Program Progress in the Market

As shown in Table 7, the New Homes program has achieved high market shares of over 20 percent since 2011. The decrease in 2013 market share relative to 2012 was primarily due to the large increase in constructed code homes as the housing market recovered from a multi-year recession.[6] While the program completed more EPS homes compared to years past, the overall housing market increased at a faster pace. In 2014, however, the program was able to recruit some large "production home" builder companies, which increased program market share considerably.

Table 7: Program Market Share

Year	Market Share
2009	12.0%
2010	12.5%
2011	20.0%
2012	25.3%
2013	20.9%
2014	34.0%
2015	36.0%

Source: PMC data provided January 22, 2016.

Table 8 shows that the program attained its gas and electric savings goals in both 2014 and 2015, even while the electric savings goal increased almost 150 percent from 2014 to 2015.

[6] 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).

Table 8: Program Annual Savings Goals and Reported Savings (Oregon Only)

Year	Fuel	Goal	Reported Savings	% of Goal Achieved
2014	Gas (Therms)	270,782	277,308	102%
2014	Electric (kWh)	1,388,820	2,661,498	192%
2015	Gas (Therms)	281,805	366,320	130%
2015	Electric (kWh)	3,379,442	3,420,172	101%

Source: Data provided by Energy Trust March 3, 2016.

As detailed later in this report, the program has established strategic relationships with multiple verifier companies to assist builders through the construction process, inspect homes, and obtain EPS. Overall, 17 different firms completed home verifications in 2014 and 2015 (through August).

Six of the participating verifiers completed verifications in multiple regions across the state, including two verifiers that completed projects in three or four regions. Approximately 75 percent of all verifier firms completed verifications in the Portland Metro region, while 50 percent completed verifications in the Northwest Oregon region. The number of Northwest Oregon verifiers (eight) is four times as many as were active in 2012 and 2013, despite a decrease in program builders in that region. As a result, the Northwest Oregon submarket is considerably more fragmented than the other Oregon regions with several verifiers completing less than 10 projects.

Comparatively, the largest verifiers operating in the Portland Metro region collectively completed over 1,500 verifications. The Portland Metro region overall accounted for 83 percent of all verifications completed between 2014 and August 2015 with a total of 2,635 projects. The Eastern Oregon region was the second largest region in terms of completed verifications with 321, compared to only 67 verifications between 2012 and August 2013.

Overall, the number of verifiers has remained relatively constant over the last four years and the verifier market is concentrated among a small percentage of leading companies. Specifically, the largest two verifiers collectively accounted for 87 percent of all verifications across the state, including 90 percent of the Portland Metro market. The Southern Oregon region was served by only one verifier that completed 100 percent of verifications between 2014 and August 2015 and operates exclusively in the Southern Oregon submarket. The program enrolled an additional verifier in Southern Oregon in June 2015, however this verifier did not complete any projects during the evaluation period.

Table 9: Verifications and Market Concentration by Region: 2014 Through August 2015

Region of State	Number of Firms	Number of Total EPS Projects	Percentage of Total EPS Projects	% of Projects by Top Verifier
Portland Metro	13	2,635	83%	73%
Southern Oregon	1	66	2%	100%
Eastern Oregon	3	321	10%	81%
Northwest Oregon	8	160	5%	49%
Total	**24***	**3,182**	**100%**	

Source: Evergreen Economics analysis of homes verification data provided by PMC, August 2015.
*There are 17 unique firms, however some companies are active in multiple regions.

4.3 EPS Path and Scores Analysis

Most builders now opt for the Performance Path instead of the prescriptive paths because it is easier to do (i.e., the path is the most flexible) and builders can get higher incentives based on actual modeled energy savings. Program verifiers proactively encourage builders to try the Performance Path, since incremental measures and savings are directly related to higher incentive payments. Starting in 2016, the EPS Overview sheet for builders will not include any prescriptive pathways information.

Since the program data do not include a field for "Percent Savings (over state code)" and most homes are labeled as "Performance Path" homes, Evergreen used largely complete incentives data to map each to home to an equivalent path/savings category for illustrative purposes. Table 10 shows the distribution of homes by energy savings category, by Oregon region. See Appendix D for additional details about the 2014-2015 EPS Paths.

Over 60 percent of EPS homes in all of the regions were equivalent to Path 2 or Path 3 projects, indicating between a 20 and 25 percent improvement in the home. An additional 24 percent of EPS homes were classified as Path 1 (10 percent improvement), while 12 percent were either Path 4 or Path 5 homes with 35 percent of more improvement. Regionally, the EPS homes had similar distributions across the pathways, however, Eastern Oregon (16 percent) and Southern Oregon (18 percent) had a greater percentage of Path 4 and Path 5 equivalent homes than Portland Metro and Northwest Oregon.

Overall, these findings appear to show a greater adoption of Path 3, Path 4, and Path 5 EPS homes across the state. For example, in 2013, Path 3, Path 4, and Path 5 accounted for only nine percent of Portland Metro EPS homes, compared to over 45 percent of Portland Metro EPS homes in 2014 and 2015.

Table 10: EPS Path-Equivalent by Region: 2014 Through August 2015

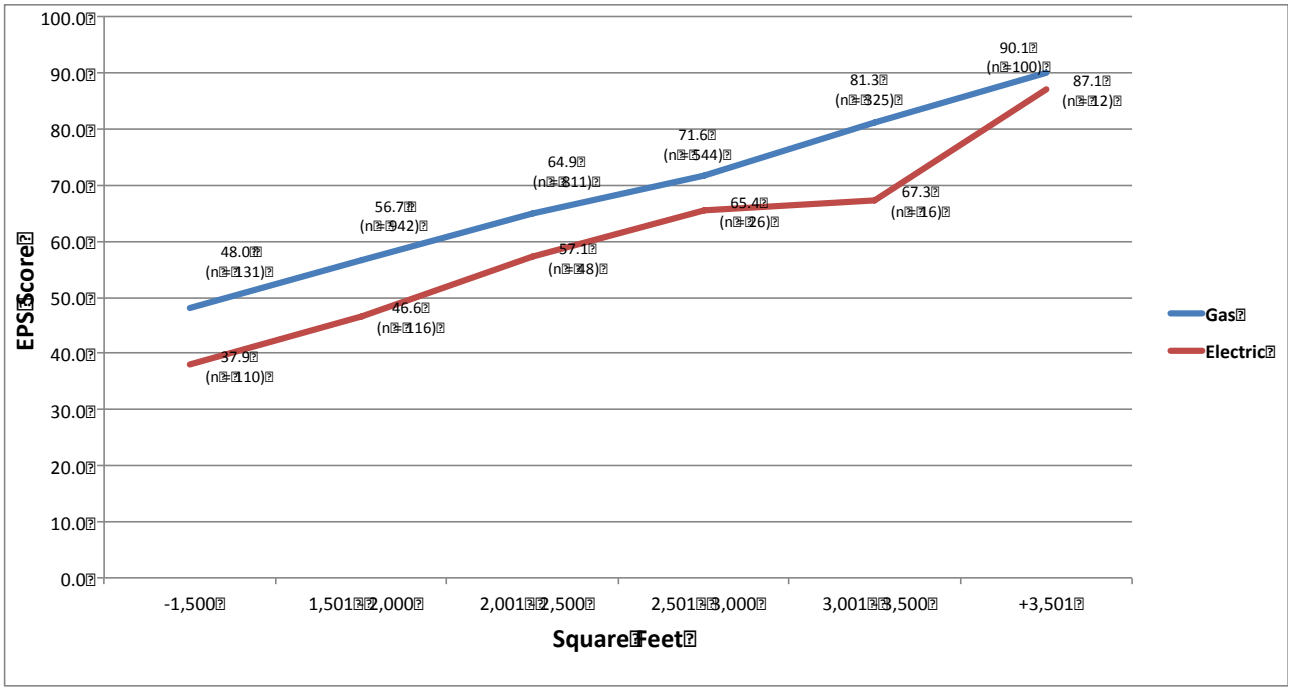
Region	Path 1 (at least 10% better than code)		Path 2 (at least 20% better than code)		Path 3 (at least 25% better than code)		Path 4 (at least 35% better than code)		Path 5 (at least 40% better than code)	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Eastern Oregon	32	10%	145	45%	96	30%	17	5%	34	11%
Portland Metro	650	25%	816	31%	849	32%	164	6%	161	6%
NW Oregon	82	51%	37	23%	33	21%	2	1%	5	3%
Southern Oregon	16	24%	26	39%	6	9%	9	13%	3	5%
TOTAL*	**780**	**24%**	**1,024**	**32%**	**984**	**31%**	**192**	**6%**	**203**	**6%**

*8 EPS homes had incentive levels below Path 1 and were not included in the table above, including 7 within the Southern Oregon region (10%)

Figure 2 shows how mean EPS scores vary by home square footage and by heating fuel. With EPS, the lower the score the more efficient the home. Overall, the average electric heated home had an EPS of 49.2. For gas heated homes, the average EPS was 65.4, almost five points lower than the average in 2012 and 2013. Both electric and gas heated home show an increase to the EPS as the size of the home gets larger.[7]

[7] The EPS calculation was modified in 2014 to include transmission and distribution energy losses for electric homes, bringing electric and gas scores closer to parity.

Figure 2: Mean EPS by Square Footage for Gas vs. Electric Heated Homes: 2014 Through August 2015*



*Mean EPS derived from the EPS project score attribute field.

Table 11 and Table 12 display the average EPS and square footage per project by region for both gas and electric EPS homes. The vast majority (84 percent) of all gas projects were completed in the Portland Metro area. With the exception of the Eastern Oregon region, gas EPS scores averaged around 63, and had higher scores than most electric homes. Eastern Oregon, with state's coldest climate and highest heating loads, tends to have the highest EPS per project (80.6) while Northwest Oregon has the lowest EPS out of all four regions (62.4). Eastern Oregon also had the largest homes, averaging 2,230 square feet, compared to an average of only 1,670 square feet for Southern Oregon homes.

Variability among EPS scores is relatively low for electric heated homes across the regions. Northwest Oregon has the lowest average (39.1) and Eastern Oregon the highest (53). Similar to gas homes, a majority of electric homes were completed in the Portland Metro region (70 percent) with an average EPS score of 48.7. On average, electric homes were smaller than gas homes, averaging 1,883 square feet compared to 2,303 for gas homes.

Table 11: Average EPS and Square Feet by Region in Oregon – Gas Heated

Region*	Count	Average EPS	Average Sq. Ft.
Eastern Oregon	277	80.6	2,230
Portland Metro	2,406	63.9	2,326
NW Oregon	145	62.9	2,174
Southern Oregon	25	63.3	1,670
TOTAL	**2,853**	**65.4**	**2,303**

*Based on aggregation of County site attribute field.

Table 12: Average EPS and Square Feet by Region in Oregon – Electric Heated

Region*	Count	Average EPS	Average Sq. Ft.
Eastern Oregon	44	53.0	1,956
Portland Metro	228	48.7	1,904
NW Oregon	15	39.1	1,662
Southern Oregon	41	51.8	1,769
TOTAL	**328**	**49.2**	**1,883**

*Based on aggregation of County site attribute field.

5 Program Data Analysis

Evergreen Economics analyzed Project Tracking data provided by Energy Trust in September 2015 to identify trends in installed measures. A total of 4,192 new homes in 2014 and 2015 (through September 14th) installed measures through the New Homes program, with 2,649 of the projects (63 percent) completed in 2014 and 1,543 of the projects (37 percent) completed in 2015. Of these projects, 3,191 qualified for EPS and 1,001 other projects had standalone measures installed. All but three of the 1,001 standalone projects had only one measure installed, including 99 percent of air sealing projects.

Table 13 shows the overall breakdown of measures by heating fuel type for EPS qualifying homes. The most common measures installed through the program were air sealing, lighting, ventilation, windows, and insulation, which were installed in over 96 percent of all homes, including nearly 100 percent of program homes in 2014.[8] Duct testing/sealing was also installed in over 90 percent of program homes, including 99 percent of gas homes. Tanked water heaters were installed in approximately 64 percent of homes in 2014 and 2015, while tankless water heaters were installed in 27 percent of homes. Solar measures, along with air conditioners and heat pumps, were the least common measures installed in program homes, accounting for less than 10 percent of all homes.

Overall, these findings were very consistent with the previous evaluation results, especially with regards to windows, insulation, lighting, air sealing, and ventilation being the most commonly installed measures. One of the primary differences between the 2014 - 2015 evaluation period and the previous evaluation period was that the percentage of projects that installed a tanked water heater decreased from approximately 98 percent to less than 70 percent. Conversely, duct testing and sealing increased from about 60 percent of homes during the previous evaluation period to over 96 percent of the new homes in the 2014 - 2015 evaluation period.

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

Table 13: Measures Installed in EPS Homes[2]

Measure Description[1]	Gas Heated Homes				Electric Heated Homes				Total Homes			
	Count		Percent		Count		Percent		Count		Percent	
	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
Air sealing	1,714	958	100%	84%	217	72	100%	63%	1,931	1,030	100%	82%
Lighting	1,714	958	100%	84%	216	72	100%	63%	1,930	1,030	100%	82%
Ventilation	1,714	958	100%	84%	217	72	100%	63%	1,931	1,030	100%	82%
Windows	1,714	958	100%	84%	217	72	100%	63%	1,931	1,030	100%	82%
Insulation	1,711	958	100%	84%	209	72	96%	63%	1,920	1,030	99%	82%
Duct testing/sealing	1,708	958	99%	84%	200	72	92%	63%	1,908	1,030	99%	82%
Tanked water heater	1,235	665	72%	58%	120	31	55%	27%	1,355	696	70%	55%
Tankless water heater	462	284	27%	25%	80	33	37%	29%	542	317	28%	25%
Gas furnace	1,665	943	97%	83%	11	8	5%	7%	1,676	951	87%	76%
Other measure	1,544	19	90%	2%	170	4	78%	3%	1,714	23	89%	2%
Solar-ready	25	14	1%	1%	30	1	14%	1%	55	15	3%	1%
Air conditioning	20	0	1%	0%	1	0	0%	0%	21	0	1%	0%
Heat pump	0	0	0%	0%	191	63	88%	55%	191	63	10%	5%

[1] Based on MeasureCategory field in Project Tracking database – all counts and percentages are based on total homes containing the measure, not total measures installed.
[2] Only through September 14, 2015.

As shown in Table 14, almost all New Homes program standalone incentives from 2014 through 2015 were for air sealing measures. Other standalone measures included ductless heat pumps, heat pump water heaters (HPWHs), tanked water heaters, and waste water measures, all of which were installed in fewer than 20 homes during 2014 and 2015. These results are consistent with past standalone projects, as 92 percent of 2012 standalone projects and 100 percent of 2013 standalone projects also consisted of air sealing measures.

Table 14: Standalone Measures Installed in Code Homes[2]

Measure Description[1]	Gas Heated Homes				Electric Heated Homes				Total Homes			
	Count		Percent		Count		Percent		Count		Percent	
	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
Air Sealing	690	273	99%	100%	17	2	74%	15%	707	275	99%	96%
Ductless Heat Pump	-	-	-	-	2	7	9%	54%	2	7	<1%	2%
HPWH	-	-	-	-	1	3	4%	23%	1	3	<1%	1%
Tanked Water Heater	1	-	<1%	-	-	-	-	-	1	-	<1%	-
Waste Water	1	-	<1%	-	3	1	13%	8%	4	1	<1%	<1%

[1]Based on entitydesc field in Project Tracking database.
[2] Only through September 14, 2015.

The next series of tables provide additional details about specific types of measures that have been installed in EPS homes. Most of these analyses are new for this evaluation period; where similar analyses were completed for the 2012 – 2013 evaluation we have summarized key

trends. Going forward the more comprehensive 2014 – 2015 analyses can serve to benchmark future program progress.

As depicted in Table 15, almost half of all ducts installed in EPS projects in 2014 and 2015 were in conditioned spaces (44 %). These findings are similar to the results from the previous evaluation, where approximately 47 percent of ducts were installed in conditioned spaces.

Table 15: Location of Ducts

Location*	Count		Percent	
	2014	2015**	2014	2015**
Unconditioned	1,077	574	56%	56%
Conditioned	831	456	44%	44%
Total	**1,908**	**1,030**	**100%**	**100%**

*DuctLocation measure attribute field
** Only through September 14, 2015

Table 16 displays the ranges of U-values for EPS homes with recorded window efficiency values. As shown, 94 percent of all windows had a U-value between 0.28 and 0.30, while the majority of remaining windows had less efficient U-values between 0.31 and 0.35. Lower U-values indicate greater energy efficiency. Only 13 total homes in 2014 and 2015 included ultra high-efficient windows with U-values of 0.20 or below.

Table 16: Windows by U-Value

U-value*	Count		Percent	
	2014	2015**	2014	2015**
0.20 or less	7	6	1%	1%
0.21-0.24	22	5	1%	1%
0.25-0.27	41	22	2%	2%
0.28-0.30	1,806	960	94%	93%
0.31-0.35	55	36	3%	4%
+0.35[9]	0	1	0%	<1%
Total	**1,931**	**1,030**	**100%**	**100%**

*u-value measure attribute field.
** Only through September 14, 2015.

As shown in

[9] This is likely a data entry error, since state code requires .35 or less.

Table 17, over 60 percent of EPS homes with recorded ceiling insulation values had R-values between R-49 and R-59, a vast majority of which had R-values of R-49. Higher R-values indicate greater energy efficiency. The remaining homes primarily had R-values of R-38 (33%), while only three percent of homes had R-values for ceiling insulation greater than or equal to R-60.

Table 17: Ceiling Insulation by R-Value

	Count		Percent	
R-value*	2014	2015**	2014	2015**
38-48	595	367	32%	37%
49-59	1,217	619	65%	62%
60-69	51	7	3%	1%
70+	2	4	<1%	<1%
Total	**1,865**	**997**	**100%**	**100%**

*R-value measure attribute field.
** Only through September 14, 2015.

Table 18 shows that 95 percent of 2014 and 2015 EPS homes with air conditioner installations had a SEER values between 13, with the remaining home having an air conditioner with a SEER value of 14.[10] Overall, while approximately 15 percent of EPS homes during the previous evaluation period installed air conditioners, less than one percent of EPS homes installed air conditioners during 2014 and 2015.

Table 18: Air Conditioners by SEER

	Count		Percent	
SEER*	2014	2015**	2014	2015**
13	20	0	95%	0%
14	1	0	5%	0%
Total	**21**	**0**	**100%**	**0%**

*SEER measure attribute field.
** Only through September 14, 2015.

As reflected in Table 19, a majority of homes that installed whole home air sealing (62%) had ACH values between 3.0 and 4.9.[11] Lower ACH values indicate greater energy efficiency.

[10] Seasonal Energy Efficiency Ratio (SEER) measures air conditioning and heat pump cooling efficiency, which is calculated by the cooling output for a typical cooling season divided by the total electric energy input during the same time frame. ENERGY STAR qualified central air conditioners must have a SEER of at least 14.5.

[11] "ACH" denotes air changes per hour, and is a measure of home tightness.

Almost all of the remaining EPS homes with air sealing measures (36%) had ACH values less than three, while the remaining homes had ACH values greater than or equal to five.

Table 19: Air Sealing by ACH

	Count		Percent	
ACH*	2014	2015**	2014	2015**
0.0-2.9	641	423	33%	41%
3.0-4.9	1238	596	64%	58%
5.0-5.9	44	8	2%	<1%
6.0+	8	3	<1%	<1%
Total	**1,931**	**1030**	**100%**	**100%**

*ACH measure attribute field.
** Only through September 14, 2015.

For gas furnace installations, Table 20 shows that all but seven gas EPS projects installed furnaces with an AFUE rating greater than 90, including 90 percent of projects that had AFUE ratings between 91 and 95.[12] Higher AFUE ratings indicate greater energy efficiency.

Table 20: Gas Furnaces by AFUE

	Count		Percent	
AFUE*	2014	2015**	2014	2015**
80-85	3	1	<1%	<1%
86-90	2	1	<1%	<1%
91-92	719	376	42%	40%
93-95	842	470	50%	49%
96-99	133	103	8%	11%
Total	**1,699**	**951**	**100%**	**100%**

*AFUE measure attribute field.
** Only through September 14, 2015.

Additionally, as shown in Table 21, over 95 percent of 2014 and 2015 EPS homes with gas and electric tanked water heater installations had energy factors between 0.51 and 1.[13] Higher energy factors indicate greater energy efficiency, and units with an energy factor greater than 1 are heat pump water heaters. While 2015 homes appear to have a slightly higher uptake of tanked water heaters with higher energy factors, overall the distributions appear to be very

[12] AFUE denotes Annual Fuel Utilization Efficiency. AFUE a measure of how efficient the appliance is in converting the energy in its fuel to heat over the course of a typical year. Specifically, AFUE is the ratio of annual heat output of the furnace or boiler compared to the total annual fossil fuel energy consumed by a furnace or boiler.

[13] The energy factor (EF) is based on the amount of hot water produced per unit of fuel consumed over a typical day.

similar between 2014 and 2015. Additionally, electric water heaters were generally more energy efficient than gas water heaters as 85 percent of 2014 electric tanked water heaters and 65 percent of 2015 electric tanked water heaters had energy factors greater than 0.90, compared to only 35 percent of 2014 gas tanked water heaters and 39 percent of 2015 gas water heaters.

Table 21: Tanked Water Heaters by Energy Factor

Energy Factor*	Count				Percent			
	2014		2015**		2014		2015**	
	Electric	Gas	Electric	Gas	Electric	Gas	Electric	Gas
0.50 or less	0	3	0	1	0%	<1%	0%	<1%
0.51-0.60	9	556	4	271	8%	45%	13%	41%
0.61-0.70	1	225	3	99	1%	18%	10%	15%
0.71-0.80	0	3	0	1	0%	<1%	0%	<1%
0.81-0.90	8	8	4	36	7%	1%	13%	5%
0.91-1.00	84	426	7	251	70%	34%	23%	38%
1.01+	18	14	13	6	15%	1%	42%	1%
Total	**120**	**1,235**	**31**	**665**	**100%**	**100%**	**100%**	**100%**

*Energy Factor measure attribute field.
** Only through September 14, 2015.

For tankless water heaters, Table 22 shows that in 2014 and 2015 a large majority (87%) were gas tankless water heaters. Approximately 67 percent of the gas tankless water heaters had energy factors between 0.81 and 0.91, while the majority (58%) of electric tankless water heaters had energy factors between 0.91 and 1. Overall, tankless water heaters accounted for 30 percent of all water heater installations during the 2014 and 2015 evaluation period.

Table 22: Tankless Water Heaters by Energy Factor

Energy Factor*	Count				Percent			
	2014		2015**		2014		2015**	
	Electric	Gas	Electric	Gas	Electric	Gas	Electric	Gas
0.50 or less	0	0	0	0	0%	0%	0%	0%
0.51-0.60	0	2	0	0	0%	<1%	0%	0%
0.61-0.70	0	3	0	3	0%	1%	0%	1%
0.71-0.80	5	18	0	0	6%	4%	0%	0%
0.81-0.90	31	298	13	200	39%	65%	39%	70%
0.91-1.00	44	141	20	81	55%	31%	61%	29%
+1.01	0	0	0	0	0%	0%	0%	0%
Total	**80**	**462**	**33**	**284**	**100%**	**100%**	**100%**	**100%**

*Energy Factor measure attribute field.
** Only through September 14, 2015.

Lastly, Table 23 outlines the HSPF ranges for EPS homes with heat pump installations.[14] Higher HSPF values indicate greater energy efficiency. As shown, a vast majority of heat pumps had HSPF values greater than 9 (82%), indicating that a significant portion of installed heat pumps from 2014 and 2015 were substantially above the federal code of approximately 8 HSPF. Similar to tanked water heaters, the uptake in higher efficiency heat pumps also appears to be increasing in 2015 in comparison to 2014 and previous years.

Table 23: Heat Pump by HSPF

HSPF*	Count		Percent	
	2014	2015**	2014	2015**
8-8.9	29	10	17%	20%
9-9.9	103	17	62%	33%
10-11.9	25	12	15%	24%
+12	9	12	5%	24%
Total	**166**	**51**	**100%**	**100%**

*HSPF measure attribute field
** Only through September 14, 2015

[14] HSPF denotes Heating Seasonal Performance Factor. The higher the HSPF rating of a unit, the more energy efficient it is. HSPF is a ratio of BTU heat output over the heating season to watt-hours of electricity used. It has units of BTU/watt-hr.

6 Program Implementation and Reported Issues

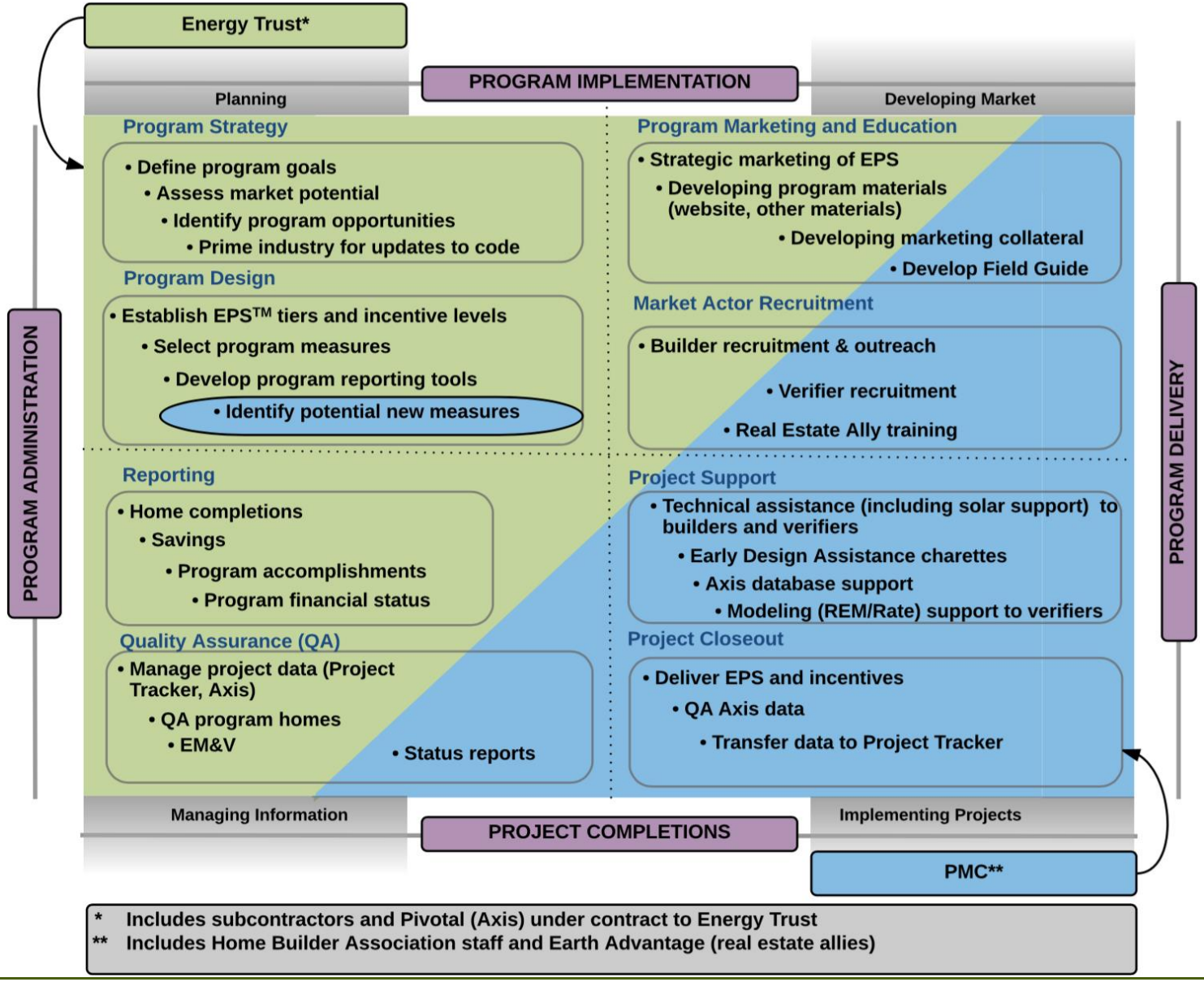
This section presents a summary of the program implementation, key participants, and implementation issues noted in multiple staff interviews. In July 2015 Evergreen conducted interviews with program staff from Energy Trust (4), CLEAResult (5) and Conservation Services Group (CSG, 3).[15] We also interviewed one staff member from Earth Advantage who is contracted by CLEAResult to conduct real estate trade ally training and outreach. The interviewed individuals covered a wide range of roles including program management, operations, marketing, engineering, technical support and quality assurance. The interviews covered a wide range of topics and were tailored to the role of individual respondents, generally focusing 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 satisfied with the New Homes program's performance, and did not have major concerns about the current program design and delivery (i.e., no "fatal flaws" were mentioned).

Figure 3 presents a systematic overview of New Homes program activities. The schematic presents the key program activities falling into four generalized stages; program administration (left), program implementation (top), program delivery (right), and project completion (bottom). The four quadrants of the schematic represent the program's major activity areas: planning, developing the market, implementing projects, and managing information (labeled in grey). Within each quadrant, we highlight key activities of each major activity area, grouped into themes. The background shading of the schematic indicates whether Energy Trust (green) or the PMC and its contractors (blue) are responsible for various activities; some activities are conducted collaboratively.

[15] CLEAResult recently acquired CSG, but we list these staff separately to acknowledge their differing roles in the New Homes program.

Figure 3: New Homes Program Operations Schematic



6.1 Energy Trust Staff Roles

Energy Trust staff roles in the New Homes program include a program manager, marketing manager, and outreach manager for Eastern Oregon as well as engineering and assistance staff. Energy Trust staff are responsible for the program planning and design, and work closely with program contractors, providing general oversight of the New Homes program including oversight of the program budget, program development, program delivery, Energy Trust website content and public-facing marketing materials. Energy Trust staff also maintain program tracking systems and approve incentives issued to program builders and verifiers. Additionally, Energy Trust staff research, develop and approve new program measures, often in consultation with the implementation contractor, CLEAResult.

6.2 CLEAResult Staff Roles (including CSG & Earth Advantage)

CLEAResult is contracted by Energy Trust to implement and manage the day-to-day operations of the New Homes Program. In July 2015 CLEAResult acquired Conservation Services Group, and former CSG staff manage the quality assurance process and provide ongoing training and development to participating trade allies, including verifiers, builders and subcontractors. CLEAResult also has a contract with Earth Advantage to provide training to real estate trade allies.

Primary CLEAResult implementation staff include:

- **Program management**: CLEAResult's program manager oversees the day-to-day implementation of the New Homes program and communicates program progress to Energy Trust staff in weekly and monthly program meetings as well as via written monthly and annual reports.
- **Marketing:** CLEAResult's marketing staff work closely with Energy Trust marketing staff to design marketing campaigns and strategies and develop and publish marketing collateral.
- **Engineering:** CLEAResult's engineering staff help to develop the program requirements and EPS Field Guide, provide modeling assistance to verifiers, provide quality control on homes data and propose new standalone measures for the New Homes program.
- **Outreach:** These staff provide in-the-field support to trade allies including builders, subcontractors, and verifiers. This support includes on-site training, troubleshooting and program advice over the phone, and updating TAs about changes to the program design. TA liaisons are also responsible for delivering early design assistance to builders. Lastly, TA liaisons are involved in recruiting and training of new trade allies.
- **Operations Support:** Operations support staff's primary role is maintaining the Axis database, processing incentives and transferring new homes program data from Axis to Energy Trust's Project Tracking database.

The introduction of the Axis database has led to an important change in CLEAResult's staffing structure. CLEAResult staff stated that the Axis database has automated a large quantity of work that previously required manual data entry. Prior to the introduction of Axis,

CLEAResult employed two full-time staff for New Homes program data entry. Using Axis, data entry only requires the equivalent of 0.25 full time employees. This has allowed CLEAResult to reallocate staff resources to the field, providing more advisory resources directly to program builders, verifiers and subcontractors.

As noted above, CLEAResult acquired CSG in July 2015. Evergreen's staff interviews also occurred in July 2015, so these staff were interviewed separately, but are included in the CLEAResult section. CSG staff are responsible for leading subcontractor outreach, the project/data quality assurance process, developing training materials for verifiers and trade allies and enhancing the Axis database, including working with Pivotal to develop the EPS calculator.

CLEAResult also contracts with Earth Advantage to recruit and train real estate allies. Earth Advantage recruits real estate allies through a variety of channels, primarily through their partner education providers, title companies, and direct contact with real estate brokers via phone and email. Once real estate agents are recruited, Earth Advantage delivers pre-requisite training to certify the agents as real estate allies.

6.3 Homebuilder Associations

Energy Trust partially funds two staff positions at the Home Builders Association of Metropolitan Portland (HBAMP) and the Oregon Home Builders Association (OHBA) to assist with the New Homes program. These staff assist the program by:

HBAMP and OHBA

- 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;
- 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;

HBAMP

- Conducting the annual Build Right, and Appraise Right conferences where Energy Trust can offer its own classes and integrate EPS messaging into other classes;
- Promoting Energy Trust's New Homes program at industry events such as the Street of Dreams home tours; and

OHBA

- Providing "hands-on" support to builders (distribute EPS incentive paperwork, refer subcontractors to builders);

- Advising Energy Trust in planning for upcoming state code changes and facilitating communication between energy advocates and the code committee.

6.4 Program Builders

The key participant in the New Homes program is the homebuilder. Builder participation requirements have not changed in the past 24 months. To participate, builders must sign a trade ally agreement and provide Construction Contractors Board (CCB) licenses and qualifying insurance. Builders do not need to pass specific knowledge or experience tests. The program recruits new builders through several channels, including homebuilder association (HBA) presentations throughout the state, local "builder breakfasts," homebuilder conferences (e.g., Northwest Green Building Industry Summit) and via direct recruiting contacts from program implementation staff. Program staff stated that verifiers have now become the primary recruitment channel, with their private business models driving the program. Specifically, the program's market based verification approach directly motivates verifiers to reach out to new builders to build their own verification business. According to staff this approach is working well and appears to have improved EPS market share.

The New Homes program achieved market share of 34 percent for new construction EPS homes in 2014, compared with about 21 percent in 2013 (see section 4.2). According to staff, verifiers' enrollment of new, high production builder participants in 2013 was a major driver of the high program market share in 2014. While this is a positive trend for the program, staff noted that these high production builders might be constructing homes at the lower end of the EPS spectrum. While they are transitioning to higher than code homes, they are not yet building highly energy efficient homes. Overall, marketing staff noted that there is a positive trend in builder participation, which they believe will encourage even more builders to participate in order to keep up with the competition.

Home verifiers are the primary contact for builders to learn about the program and receive technical assistance. In addition to verifiers, builders can also contact CLEAResult staff with technical questions. Energy Trust and CLEAResult program staff are also involved in marketing to builders. Primary methods of builder focused marketing have historically included promotions in industry publications, local HBA training on EPS, home tours, cooperative marketing with other industry organizations, advertising on social media and personal outreach to individual builders. With the shift to verifier-led recruitment, the marketing effort has moved toward development of marketing collateral, materials, and program tools that verifiers can use to recruit new builders. Despite this shift, marketing staff still engage in direct recruiting efforts, including a recent direct mailing effort to non-participating builders. Marketing staff perceived that non-participants are most inclined to sign up after direct, personalized outreach by a program representative - either a trade ally coordinator or verifier.

While New Homes program market share has grown, staff noted that there are still market segments that are hard to reach or difficult to market to. EPS is well established in urban markets such as the Portland Metro area, but in more remote, rural areas such as Central and

Eastern Oregon there is still a market transformation lag. Builders in these areas are only just starting to adopt EPS and require more intensive marketing efforts and program support to get builders regularly participating in the program. Some interviewed staff were concerned that the program's reliance on independent verifiers is leading to less interaction with new builders in remote areas. Specifically, because independent verifiers are driven by high construction volumes, they might be more motivated to work with builders who are in the program already rather than investing in training and outreach to new builders. Program staff are aware of this potential issue and are working together to recruit more new builders into the program from Eastern Oregon in particular.

According to program staff, builders are generally satisfied with their program experience and generally offer positive feedback, primarily due to the "ease of participation." Over time the program has increasingly relied on verifiers to improve builder experience and ease of participation. Because verifiers take care of most program interactions and paperwork, the burden on builders is limited, making participation relatively easy.

In early 2015, for a separate study, Evergreen interviewed homebuilders about installation of gas hearth products in new homes. [16] Since that study was done prior to this process evaluation, Energy Trust decided to use the results of the study for this process evaluation, rather than re-contact these (and other) builders as part of this evaluation. As part of that study, Evergreen asked ten participating builders a small battery of questions regarding their satisfaction with the New Homes program in general. Overall, participating builders indicated they have been satisfied with Energy Trust's New Homes program. Table 24 shows a detailed breakdown of the participants' satisfaction levels ranging from 1 to 5, where 5 denotes "very satisfied" and 1 is "not at all satisfied."

Table 24: Participating Builder Satisfaction with New Homes Program

Satisfaction Score	Oregon Builders
5 – Very Satisfied	3
4	2
3	2
2	-
1 – Not At All Satisfied	-
Total	**7**

6.5 Verifiers

Verifiers are the "front line" of the program with most direct builder interactions. Verifiers recruit builders, educate builders about the program, provide technical coaching, conduct pre-

[16] Energy Trust of Oregon New Homes Gas Fireplace Builder Interviews Memorandum. 6 April 2015. http://assets.energytrust.org/api/assets/reports/NewHomes_Gas_Fireplace_Studies.pdf.

drywall and post-completion inspections, submit required paperwork, complete the REM/Rate modeling, enter homes data into Axis, and deliver EPS scores to the builders. Verifiers receive incentives for each home they bring through the program. Prior to 2014 verifiers received a flat rate incentive of $300 plus $150 for home modeling. Since 2014, the incentive to verifiers has changed to a sliding scale rate based on the performance of the home. The incentive is now linked to the builder incentive with verifiers receiving an incentive of 25 percent of the builder incentive, with a minimum of $300.[17] According to staff this is popular with verifiers, encouraging verifiers to push builders to construct higher performance homes.

The requirements to become a verifier have not changed since 2013. Verifiers must obtain certification from the Building Performance Institute (BPI), or Residential Energy Services Network (RESNET), and attend program training sessions on the EPS requirements and modeling procedures, and pass an online modeling test. The program training includes eleven online training modules and a final four-hour in-person training session with the program's trade ally coordinator. Ideally, prospective verifiers have access to an active project where they can put the training into practice. Beginning in 2016, verifiers will need to obtain a CCB license in order to comply with Oregon House Bill 2801.[18]

As of July 2015 there were 18 active verifiers working with the program. The verifiers range in size, with a minority bringing in the majority of EPS homes. Most verifiers operate in the Portland Metro area. The program has tried to boost the number of verifiers in outlying regions but this has been challenging since these regions have lower building activity and low demand for verification services. Despite these challenges, the program enrolled one new verifier in Eastern Oregon (Q4 2014) and one new verifier in Southern Oregon (Q2 2015).

The biggest change to the verification process since 2013 was the full implementation of the Axis database in 2014. The Axis database collects and stores all information related to program homes for verification purposes. The program adopted Axis to have an online tool for new home submissions from verifiers that automates the transfer of information from verifier to the PMC and from the PMC to Energy Trust. The end goal of Axis was to streamline the verification process, reduce resources spent on data entry and speed the process of incentive delivery. According to staff, the initial introduction of Axis proved challenging with several issues related to user experience and functionality of the tool. Over the past 18 months, however, PMC staff have worked with verifiers and the software developer to eliminate bugs in the software. As of July 2015, staff believed that the majority of user issues had been resolved. The majority of reported Axis issues are now due to user error rather than problems

[17] In field quality control processes are in place to confirm verifier results and protect against potential over reporting of home performance.

[18] House Bill 2801 prohibits individuals and businesses from undertaking work as home energy assessor or assign home energy performance scores unless the individual is certified as home energy assessor by Construction Contractors Board. https://olis.leg.state.or.us/liz/2013R1/Measures/Overview/HB2801.

with the software. Verifiers have also reported to staff that their experience with Axis has improved greatly.

Verifiers also assist the program in promoting Early Design Assistance (EDA) to builders. The New Homes program offers EDA as an opportunity for builders to work with verifiers and subcontractors before building begins, to incorporate energy efficient design into the whole house design. EDA are organized and moderated by a member of the CLEAResult staff and builders are offered a $500 incentive to participate. Program staff explained that the value of EDA lies in getting all the stakeholders in the same room prior to construction to design the home with the program requirements in mind. Staff reported that they conduct approximately one EDA every three to four weeks, with 12 completed in 2014 and 15 completed in 2015. Builder and subcontractor attendance has increased significantly in the past two years due to greater promotion by the trade ally coordinator (EDA have been offered for five years). One staff perceived that the EDA incentive might not be the main attendance driver; rather, getting all the stakeholders involved early in the design process is of high value to builders. According to staff, additional advantages of the EDA are:

- Early education of builders and subcontractors about the requirements of the program, taking away some of the uncertainty about the program and mitigating the impression that the process is onerous.
- Focusing builders on high value upgrades that can be made to their homes so they can plan, budget, and bid appropriately. Builders who have not built energy-efficient housing may bid too high if they are worried about costs of unfamiliar new technology, or too low if they don't consider the added cost of improvements.
- Stimulating additional savings by reinforcing best practices, identifying savings opportunities early so they can be incorporated in home design, and planning staged work by subcontractors to ensure work is conducted in an appropriate order, especially with regard to envelope sealing.

6.6 Subcontractors

Requirements for trade ally subcontractors (e.g., HVAC and insulation installers) have not changed in the past two years. Trade allies sign a trade ally agreement and provide CCB licenses and qualifying insurance to Energy Trust. Any subcontractor, however, can work on both new and existing homes (through Energy Trust's Existing Homes program). Trade ally subcontractors receive training, business referrals, and on-site technical support, however they do not receive incentives directly from the New Homes program unless they install standalone measures, which they are expected to promote. While the program is designed so any trade ally can receive an incentive for standalone measures, the program is focused on educating subcontractors to be "the drivers" of these measures. Similar to builders and verifiers, staff noted that there are gaps in subcontractor services in some regions outside the Portland Metro area.

Staff noted that subcontractors are generally satisfied with their experiences in the program, however staff did suggest that participation could be simplified by integrating subcontractor services for the New Homes and Existing Homes programs. Unlike builders, subcontractors often install the same technologies in existing and new homes, but there are significant differences in participation requirements and incentives between the two programs. Some staff suggested that these differences are artifacts of past program development and design activities and may not be warranted in the current construction/remodeling market.

6.7 Real Estate Allies

Realtors are a key connection to the new homes market and can create awareness of energy-efficient homes, present them to potential buyers in a persuasive way, and eliminate some barriers to purchases. Earth Advantage is contracted to recruit and train realtors on how to promote EPS homes. Earth Advantage recruits new realtors to the program through:

- Email marketing;
- Partner education providers – such as realtor associations and listing services;
- Principal brokers at real estate firms;
- Social media; and
- Title companies

Real Estate Ally Training

Evergreen spoke with staff from Earth Advantage to understand the real estate ally training process. Realtors become Energy Trust real estate allies by earning an Earth Advantage Broker accreditation and enrolling as an Energy Trust Real Estate Ally (REA). To earn an Earth Advantage Broker accreditation, realtors must complete training on energy-efficient homes and EPS. Earth Advantage offers training in person (14 hours) and online (8 hours), after which realtors must pass an accreditation exam. The cost of the training is between $0 and $245, depending on the course chosen, and is subsidized by Energy Trust. To maintain their accreditation, realtors must complete continuing education credits every two years. Earth Advantage staff explained that realtor enrollment has increased in 2015 with 39 new real estate allies trained (through July 2015), for a 12 percent increase over all of 2014. In addition, Earth Advantage engaged 84 new brokers and 964 real estate professionals in some other form of energy-efficient home training (e.g., with Earth Advantage or a partner education provider). According to staff the only barrier to participating in the real estate ally training is real estate agents' busy schedules. Interviewed staff attribute the increase in real estate ally participation to:

1. A new 'step-ladder' training approach gets new brokers in the door with free in-house outreach presentations that leads to full scale training;
2. A new education framework that provides clear, concise information that realtors can use at specific times in the home transaction process; and
3. Moving from targeting only "early adopters" to also including "the late majority" by using broader messaging and course topics.

4. Real estate agents have reacted positively toward the Energy Trust Real Estate Ally training, according to course evaluation feedback. The training elements that real estate agents value most are: site visits to EPS homes where they can see a real example of an EPS home, information/tools that can be directly applied to their business and add value to their customers' experience (e.g., energy saver kits, EPS listed on the Regional Multiple Listing Service (RMLS), EPS talking points documents), and interactive peer-to-peer role playing activities that help trainees become comfortable talking about EPS homes. According to staff, participants leave the training with a good understanding of how the EPS scoring works. After the training, Earth Advantage asks real estate allies to make pledges as EPS ambassadors, and sends these participants a variety of additional tools and resources to help promote EPS.

Earth Advantage and program staff from Energy Trust and CLEAResult collaborate to develop the EPS training content, and staff from all organizations feel that the process works well. Some aspects of the realtor trainings that have gone particularly well, according to interviewed staff, include:

1. The availability of frequent and on-going continuing education opportunities;
2. Recruiting;
3. The variety of training formats and direct outreach channels to deliver EPS info;
4. Increased number of education delivery partners across Energy Trust's service territory – there are now 17 education delivery partners and five train-the-trainer approved providers;
5. Development of courses and marketing messages that attract a broader audience of "early majority" and "late majority" participants; and
6. Translating energy efficiency improvements to other benefits such as health, comfort, durability, and safety.
7. The New Homes team is planning several new training activities including:
   - Expansion via more diverse delivery partners and strategic collaboration with the Existing Homes program;
   - New broker reminder cards with contact information and key resources;
   - New periodic (monthly or bi-monthly) real estate ally meet-ups that will provide a consistent touch point to the program and other green realtors, as well as add a social and networking aspect to the real estate ally program; and
   - More touch points focused on broader topics (e.g., health, comfort, durability, etc.) and condensed formats on focused topics with clear takeaways that can be applied to real estate professionals' daily client interactions.
8. Energy Trust is positioning EPS as a valuable sales tool for homebuilders and realtors. We asked the Earth Advantage staff what they hear from realtors regarding the efficacy of EPS in helping to sell energy efficient features of new homes. Realtors are generally aware of the benefits of EPS and understand the potential of EPS as a sales tool. However, realtors suggest that EPS could be more realtor- and consumer-friendly by providing clearer connections between home features and benefits. Realtors also

suggest that the EPS scoresheet provide information on other home benefits, such as home quality and durability, health, greater comfort, and improved safety that homes with EPS provide.

6.8 Other Program Implementation Topics

In addition to the stakeholder topics above, Evergreen discussed several other topics with program staff that are detailed in the following sections.

6.8.1 Program Communications

Program staff generally described communications and coordination among Energy Trust, CLEAResult, subcontractors and other organizations as excellent. Program staff have regular weekly check-in meetings, monthly program meetings, frequent phone calls, defined communication channels and monthly and annual reporting. All staff noted that communications continue to be open and collegial. Working relationships with other organizations such as Northwest Energy Efficiency Alliance (NEEA) and Earth Advantage also continue to be productive, and interviewed staff say the ability to leverage resources through Energy Trust-funded positions at OHBA and HBAMP continues to add value to the program. While communications were described as being excellent overall, staff mentioned two areas with room for improvement.

1. CLEAResult staff desired clearer, more formal lines of communication regarding new measure development. Current communications are informal and collaborative. While this has created a collegial process, there have been some cases where information was not communicated effectively or to the correct parties. To mitigate these issues CLEAResult would like to develop more formal communication protocols including designated contacts, deadlines for submitting material and a formal new measure review process. In 2016 CLEAResult and Energy Trust are implementing a new coordination process for new measure development.

2. CLEAResult staff provide monthly and annual reports on program achievements, but are unsure if Energy Trust continues to find value in the reports or if they could be changed to provide more useful information. More formal feedback would help CLEAResult to ensure the reports provide valuable information to Energy Trust.

6.8.2 Marketing to Homebuyers

EPS for new homes is marketed to the public via several mediums including newsprint advertising, radio advertising, and online advertising including audio adverts on Pandora.com. The program also relies on builders and realtors to market to the public. Staff noted that there are unique challenges to marketing to new homebuyers, specifically:

- New homes comprise only 10 percent of all single-family homes sales, making this a small segment to target.
- Most homebuyers looking at new homes are also looking at existing homes.

- There are other green building brands that crowd the market.
- Homebuyers often do not have energy efficiency as a high priority in their buying preferences.

To address these challenges with its relatively small advertising budget, the program develops targeted campaigns using cheaper media such as radio, print, and online outlets that can leverage behavioral and contextual marketing approaches. Program staff also change their advertising campaign approach periodically to adapt to the market, typically every two to three years. New Homes EPS marketing has evolved through three marketing campaigns. The first was the "Be a Smart Homebuyer" campaign that focused on detailed explanation of EPS and how it impacted energy efficiency. This was followed by the "Look Behind the Walls" campaign that encouraged homebuyers to understand the built-in energy savings in the home and compare the home against other homes in Oregon. The next campaign, due to be released at the end of 2015, is the "Welcome to Efficiency Town" campaign, which encourages homebuyers to join the community of EPS homes that are more comfortable, safe and durable, as well as being energy efficient and having lower operation costs (i.e., energy efficiency is a secondary focus).

EPS itself is an important tool to market to homebuyers, but getting EPS in the hands of the homebuyer is challenging for two primary reasons. Firstly, in the current hot market, homes are often selling before a final EPS is issued, so it is unable to influence the purchase decision. While this issue is hard for the program to address, the introduction and streamlining of the Axis database has reduced lag times for EPS delivery to builders significantly, so now an EPS can be issued within hours of a finalized home verification. Secondly, the program has had difficulty getting real estate agents to post the EPS to listing sites (e.g., RMLS). The program uses several strategies to encourage EPS posting on home listing sites. First, the real estate ally training teaches all participants how to list and upload EPS to multiple listing service (MLS) systems. Earth Advantage has also worked with RMLS and other education partners to support "greening the MLS" initiatives, as several different MLS systems are used in Energy Trust territory. Finally, program staff are investigating approaches to automatically upload EPS to MLS sites. Earth Advantage staff reported that they are currently on target to meet their goal of increasing the rate of EPS on RMLS by 15 percent. This has been achieved by:

- Sending preliminary and final EPSs directly to brokers when Earth Advantage produces them, along with EPS info and RMLS upload instructions -cutting down the lag time of builders forwarding them on to their brokers;
- Obtaining preliminary scores when asked by builders or brokers;
- Requesting EPS listing on RMLS within incentive emails that are sent to builders of EPS homes verified by Earth Advantage; and
- Asking brokers to "pledge" to upload the score whenever possible, during the trainings.

Again, the biggest challenge to getting the EPS on listing sites is the timing of EPS delivery, which can be mitigated by delivery of preliminary EPS results.

6.8.3 Quality Assurance

CLEAResult staff (formerly with CSG) oversees the homes quality assurance (QA) process. Quality assurance is performed on a minimum of 5 percent of program homes. All findings are reported to the verifier and the verifier must document all remediation with photographs before the site is approved. Historically, there have been issues with contracting third party QA services and scheduling QA visits to homes. Specifically, Energy Trust's contracting often took longer than anticipated, forcing the QA contractor to try to complete all required QA inspections in November and December of each calendar year. In June 2015, Balanced Energy Solutions (BES) was contracted by Energy Trust to perform QA in the Portland Metro area; the PMC continues to do QA outside the Portland Metro. In July 2015, PMC staff reported that coordination with BES was going well, however, this was very early in BES' contract period.

The most common issues found in the 2014 QA inspections were:

- Thermal enclosure checklist errors[19]
- Mechanical ventilation errors
- Problems with test outs for internal duct systems – duct systems are not required to be tested if a visual inspection is completed; in these cases a default value is applied. However, during QA testing, inspectors found higher leakage than the default leakage assumed in the models.

In addition to onsite QA issues, staff noted that there have also been some issues with verifier data entry into Axis. Specifically staff noted that some verifiers (typically larger companies) periodically enter incorrect batch data into Axis (e.g., duplicate data for unique homes, duplicate home addresses). Staff believes these verifiers are trying to enter data quickly to save time, leading to additional PMC labor for iterative reviews. Staff speculated that verifiers that get incentives redirected from their builder clients are less motivated to correct their internal procedures, since the builders can no longer withhold their payments to exert leverage.

6.8.4 Energy Modeling and EPS Scoring

Earth Advantage assisted Energy Trust in developing the program's energy modeling and energy performance scoring approaches in 2009 when the program was initially launched. To learn more about how the current modeling and scoring is performing, we asked Earth Advantage staff about the process. With regards to modeling, Earth Advantage staff said that the modeling tool, REM/Rate, is the national standard for single-family homes and performs well when used by an experienced user on a regular basis. However, there are known issues with REM/Rate modeling results that typically become apparent as a home reaches high levels of performance, such as extreme air tightness. While REM/Rate is the national standard, Earth

[19] The ENERGY STAR Thermal Enclosure Checklist identifies key locations of air leakage and thermal transmission in a house. The Thermal Enclosure Checklist is a required component of Energy Trust's New Homes program.

Advantage staff explained that the industry is investigating whether there are better tools for modeling single-family home energy use. Specifically, the U.S. Department of Energy (DOE) has tasked the National Renewable Energy Laboratory (NREL) with determining whether a new modeling tool can be built that could surpass the performance of REM/Rate in meeting the needs of raters, especially when modeling very high performance homes. California also recently conducted a software review and created an energy model adapted from an older version of modeling software called eQuest. Earth Advantage suggested that this tool could be considered if it proves to be accurate for high performance homes.[20]

Regarding the accuracy of the verification and scoring process, Earth Advantage staff have a high degree of confidence in the accuracy of the results, with the following caveats:

1. **Mechanical ventilation** modeled hours are potentially inaccurate. Staff would prefer that verifiers enter exact run times into REM/Rate rather than allowing the program to provide default values that are likely to underestimate energy use for these systems.
2. **Heat Recovery Ventilators (HRV)** are required to be modeled at running 24 hours a day, which disincentivizes builders to use HRVs because their incentive will be lower, per home, compared to supply-side only mechanical ventilation (described above).

Overall, Earth Advantage staff believe that the mechanics of the modeling and scoring system work well. Interviewees suggested the following for continued improvement of the process:

- Continued focus on streamlining the modeling and scoring process steps.
- Revise the EPS scorecard to provide appraisers with basic information to estimate the additional monetary value of a home's energy performance.
- Consider eliminating the Fuel Weighting Methodology, so EPS scores would reflect the actual energy used. [21]

[20] Recent analyses by Energy Trust found that for gas-heated homes, the average differences between actual normalized and modeled gas use were less than 10 percent and variability for individual homes was relatively low. The average differences for electric base load usage were also less than 10 percent, although variability was much higher. For electric-heated homes, sample sizes were too small to provide reliable results. Analysis of actual energy usage over time showed that the energy models consistently underestimated average annual gas and electric use by a small amount. The study concludes that that REM/Rate is a reliable tool, on average, for estimating energy use in gas heated EPS new homes and provides a sound basis for calculating energy savings. Small calibrations may further improve modeled usage estimates. Source: Energy Trust of Oregon 2009-2011 New Homes Billing Analysis: Comparison of Modeled vs. Actual Energy Usage. Internal Staff Analysis. June 2015.

[21] This weighting system takes into account equipment efficiency levels typically seen in Energy Trust programs and provides a consistent basis for comparison that places electric and gas equipment on a level playing field where "high efficiency" systems score well, regardless of fuel. Currently, fuel weights are calculated for space and water heating by taking the ratio of the electric equipment efficiency to gas equipment efficiency. These weights are then applied in the calculation of the EPS for homes with electric space and/or water heat to normalize scores for fuel source.

6.8.5 Overall Implementation

Lastly, we asked staff to elaborate on the biggest challenges to program implementation and the biggest opportunities to improve operational efficiency or increase program participation.

Challenges

- Program staff noted that cost-effectiveness is going to remain an ongoing challenge for the New Homes program, although this is a challenge faced across the energy efficiency industry.
- The program continues to face some challenges with information technology infrastructure, specifically regarding aspects of Axis and modeling software, but these challenges have been greatly reduced with streamlining of Axis.
- Inability to upload trade ally enrollment documentation and obtaining approval is a challenge noted by CLEAResult staff.[22]
- New measure development has been challenging in some cases, however, staff feel that recent experiences have provided valuable lessons that will help improve the process in the future.
- The program faces some uncertainty about code changes due in 2017.

Opportunities

- There may be potential for operational efficiencies by combining the existing and new homes teams to eliminate potential redundancies, if CLEAResult remains the implementer for both programs.
- More production builders are becoming interested in the program, presenting opportunities to develop greater market share.
- Possible opportunities may exist to recruit more affordable housing builders.

[22] Functionality to add trade ally documentation is planned in 2016.

7 Verifier Interview Findings

Evergreen completed interviews with ten of the program's 17 active new homes verifiers between August and September 2015. The objectives of the verifier interviews were to:

- Understand verifiers' business scope and practices;
- Assess the effectiveness of program training and processes;
- Understand verifiers' interactions with program builders, subcontractors and quality assurance staff;
- Identify key program challenges for program builders and subcontractors;
- Identify verifiers' challenges using the Axis database system;
- Identify verifiers' challenges obtaining RESNET certification and using REM/Rate software to analyze homes; and
- Identify desired program assistance.

The verifiers we spoke with operate in the Portland Metro area, Central Oregon, the Willamette Valley, and Southern Oregon. Four verifiers operate in the Portland Metro only (including Clark County, Washington), one operates in Eugene and one operates in Southern Oregon, primarily Ashland and Medford. The remaining four verifiers work in the Portland Metro area as well as other regions including Central Oregon, the Willamette Valley and Southern Oregon. Table 25 presents number of interviewed verifiers operating in four regions.

Table 25: Service Territories of Interviewed Verifiers

Region of State	Number*
Portland Metro	8
Central Oregon	2
Southern Oregon	2
Willamette Valley Oregon	2

* Verifiers can work in more than one region.

7.1 Business Scope

The interviewed verifiers have a range of experience and work for a variety of organization types. Eight of the ten verifiers have more than two years of experience with the program, and three of these eight verifiers have worked with the program since its inception. The remaining two verifiers have approximately one year of experience with the program each. Table 26 shows the company roles of interviewed verifiers.

Table 26: Company Role of Interviewed Verifiers

Interviewee Role	Number
Company owner or key manager of a multi-employee company	4
Self-employed or a single-employee company	4
Employee of a private company	2

The number of program homes the verifiers had inspected personally ranged from 44 to approximately 1,500. The average number of homes verified was 334. If one "outlier" verifier with 1,500 homes is removed, the average decreases to 200 homes. The number of builders that verifiers work with ranged from 1 to 75. On average, the verifiers work with 13 builders. Again, there was an outlier who worked with 75 builders; if this verifier is removed the average number of builders that the respondents work with is 6. Three verifiers primarily work with production builders, including the verifiers who worked with the most and the least numbers of builders (1 and 75 builders, respectively). The other seven verifiers mostly worked with custom builders or owner-builders.

Seven of the ten verifiers stated that they plan on growing their verification business over the next 12 months, with three of these verifiers planning for aggressive expansions within their existing service territories from targeting new builders. The remaining three verifiers expect their verification activity to stay about the same.

Three respondents earn 10 percent or less of their revenues from verification services, and three respondents earn between 25 percent and 50 percent of revenues from verification services. Of the remaining four verifiers, one earns between 50 percent and 75 percent, and three earn more than 75 percent of revenues from verification services. Verifiers that earn a smaller portion of their total revenues from verification services are large companies that offer a broad range of other services. In contrast, verifiers that have a greater proportion of revenues from verification services tend to provide verification as their primary service.

Seven verifiers charge a fee for verification services, two have the rebate redirected to them and provide a discount to their builders on other services (e.g., insulation), and one verifier—a utility— provides the service free of charge[23]. Of the seven verifiers who charge a verification fee, the fee ranges from on $450 to $1,000 per home on average. Verifiers noted that the difference in verification fees they charge is primarily related to how far the construction site is from their home base, and the complexity of the construction. Four respondents anticipated increasing their fees slightly over the coming twelve months. The remaining six verifiers do not expect to increase their fees over the next twelve months.

[23] Builders can sign a redirect application, which directs the builder's incentive to go to the verifier. This allows the verifier to charge the builder little to no verification fee since they get paid on the back end by the builder incentive.

Table 27, below, presents summary information on the number of homes verifiers have worked on, the number of builders they work with, their verification fees and the proportion of total company revenues derived from verification services.

Table 27: Business Profile of Interviewed Verifiers

Region of State	Average	Minimum	Maximum
Program Homes Verified	334	44	1,500
Program Builder Clients	13	1	75
Verification Fee*	$581	$450	$1,000
Revenues from Verifications	42%	1%	90%

* Excludes three verifiers who do not charge a verification fee.

All interviewed verifiers offer some other services. Other services offered by verifiers include insulation installation, duct testing, green construction consulting, weatherization services, other performance testing services, energy modeling for code compliance, and heat pump commissioning.

7.2 Program Training

Several verifiers had difficulty recalling how they received their initial training on the current New Homes program design and EPS requirements, although all verifiers stated that they have attended the annual New Homes training and learned a lot through the monthly verifier calls and direct contact with program staff. We asked respondents to tell us if they thought the training was enough, not enough, or too much for three topics: technical material (program requirements and construction techniques), program procedures and forms, and marketing to builders and subcontractors. Nine of the ten verifiers felt that the technical training provided was the right amount while one verifier thought there was not enough technical training. This verifier stated that while there was sufficient training for a "basic" home verification, each home is different and there are not enough venues for verifiers and program staff to discuss unique things learned in the verification process. This verifier suggested that an annual voluntary training session providing an overview of the program and Q&A with program staff would be helpful. Again, all but one verifier thought the program procedures and forms training was sufficient. The one verifier who thought the training was insufficient stated that it was difficult for a new verifier to understand all the technical aspects of the forms, and felt that a basic introduction to green building would be beneficial for new verifiers.

Lastly, several verifiers desire more training and assistance with marketing EPS to new homebuilders and subcontractors. Four verifiers stated that the training on this topic was insufficient; one stated that there was too much training on this topic with the remaining five stating that the training was sufficient. The four verifiers who thought the training was insufficient listed three primary deficiencies: training on how to use marketing materials developed by Energy Trust, training on how to get real estate agents involved, and training on how to improve consumer demand. One of the four verifiers stated that while the marketing materials produced by the program are good, he is unsure how to use them effectively. Two of the four verifiers stated that they believe focusing on real estate agents is likely to be more

successful than marketing to builders and would like more training for real estate agents as well as training for builders on how to approach real estate agents about promoting EPS and the energy efficiency of their homes. Lastly, two of the four verifiers stated that marketing the program to builders in the current "hot market" is difficult because there is less need for builders to differentiate themselves from their competition. To address this, verifiers believe that there has to be an increased focus on marketing directly to consumers to increase demand for energy efficient homes so builders will respond to this demand.

While some verifiers noted training deficiencies, overall satisfaction with the program training is high; verifiers believe that the training prepared them well to verify EPS homes. We asked verifiers to rate how well the training prepared them on a 1 to 5 scale, where 5 is very well and 1 is not well at all. Ratings ranged from 3 to 5 with an average response of 4.1.

While generally verifiers have been able to maintain their RESNET certifications, six of the ten verifiers stated that scheduling classes to maintain the required continuing education units (CEUs) was difficult and at times very frustrating. One verifier reported that they were not able to update their certification last year because only one training was available for them and they could not attend it.

7.3 Verification Process

The percentage of homes that require remediation after the first or second visit varied from 5 percent to 75 percent. On average across all verifiers, approximately one third (32%) of homes require some form of remediation. The verifier who stated that 75 percent of homes required remediation explained that this figure was so high because they are particularly rigorous in their approach. All of the verifiers noted that the issues requiring remediation tended to be minor and relatively easy to address. The most commonly mentioned remediation issues were related to air sealing, including air sealing failures, subcontractors punching holes in air barriers, or air barriers not being in place. Verifiers also noted other common problems including missing or incorrectly installed insulation, incorrect framing techniques, and incorrect installation of mechanical ventilation systems. All verifiers noted that the majority of problems are either fixed immediately or within a few days. In many cases, verifiers did not need to revisit sites for minor problems. Aside from wanting to understand why something needs to be fixed, these issues tend not to be disputed by builders or subcontractors.

All verifiers were generally satisfied with the REM/Rate modeling and had no significant concerns. One verifier mentioned that complex homes can be difficult to model, while three verifiers noted that it can be challenging to adjust the REM/Rate software for different programs, for example ENERGY STAR, because each program is slightly different.

Across the board all verifiers reported that the Axis database has improved significantly since it was brought online. All respondents noted that Axis was very difficult to work with initially, but over the last six to nine months the system has been incrementally improved and now there are very few challenges or complaints. Several verifiers noted that they have worked

with program staff to resolve current issues and these experiences have been positive. While in general verifiers are satisfied with Axis, there were still some issues brought up by respondents:

- Two verifiers stated that the database is still not intuitive and is difficult to navigate.
- One verifier stated that the database still requires some information to be entered in multiple places, increasing the risk of errors.
- One verifier claimed that the process of uploading home information information from REM/Rate is cumbersome compared with the previous Excel calculator tool.
- The 640 form (the site inspection completion certificate) is still causing problems for three verifiers. Specifically, some fields only allow whole numbers where decimals places are required and they are unable to override the field. One of the three verifiers stated that he still has trouble uploading the Excel form and enters the 640 information manually.
- One verifier stated that some of the messages produced in the new messaging system are irrelevant.
- One verifier noted that it is difficult to find out if a new builder has entered all the required information.

Despite some remaining challenges with Axis, the amount of time spent on Axis per home is relatively short, ranging from 10 minutes to 30 minutes. The average time spent on Axis across the respondents was 25 minutes. After a home is approved with no quality assurance issues, the verifiers receive the final EPS within five days. The average time varied across respondents between 2 days and 5 days, with an average time of 3.8 days. All verifiers claim to send the EPS to the builder the same day it is received, via email.

The interviewed verifiers had no suggestions for changing the way they use the REM/Rate software or Axis database.

7.4 Quality Assurance (QA) Process

Two companies conduct quality assurance inspections for the program—Balanced Energy Solutions and CLEAResult (the PMC). Verifiers typically receive a phone call or email from one of these firms asking to schedule QA inspections in any homes nearing completion. Normally, verifiers are given a range of dates that the inspector is available and they try and work in homes that fit with this schedule. Once the QA inspection is completed, all respondents stated they receive the results via email, although some verifiers are also present at the inspection to receive the results from the inspector immediately.

Overall, verifiers are satisfied with this process, giving responses between 3 and 5 on a 1 to 5 scale, where 5 is very useful and 1 is not useful at all. The average response was 4.4. Half of the verifiers noted that scheduling the inspections can be challenging but acknowledged that this is due to the nature of the building industry with tight construction and subcontractor

schedules. Two verifiers still stated that they would like to receive more notice and time to schedule these appointments.

One verifier noted that while the inspections have educational value, the inspections are not an adequate enforcement tool. This verifier explained that they have experienced QA inspections where some problems have been allowed to go unresolved, and believes that there are not enough inspections, with the program relying too much on the honesty of the builders and verifiers.

7.5 Marketing and Builder Assistance

Several approaches to marketing were mentioned by the interviewed verifiers:

- Two interviewed verifiers claimed that they do no marketing to builders, relying solely on their existing business, word of mouth, or leads through Energy Trust.
- Three verifiers stated that they offer EPS as part of a wider package of services. One of these verifiers markets EPS as part of a broader green certification package, while the other two verifiers offer EPS as part of a package with insulation and HVAC services.
- The remaining four verifiers stated that they utilize phone calls, in-person visits or emails to conduct their marketing. Two verifiers noted that they attend builder meetings, conferences, or workshops as well.

While all verifiers noted the importance of the cash incentive or rebate as a program benefit they emphasize to builders, they also emphasize other benefits including reduced energy expenses for the home owner, increased home values, a certification that indicates a higher quality home and greater comfort. While the verifiers describe the same benefits to both large and small volume builders, several verifiers noted that it is harder to sell the program to large production builders who are generally more budget-constrained and less focused on the quality of a home.

All verifiers stated that the main obstacle to getting builders enrolled in the program is the cost of participating, specifically the cost of meeting the program requirements. Other obstacles mentioned were: concerns about paperwork, difficulty meeting EPS path requirements, meeting the program's insurance requirements, lack of subcontractors that can meet the program requirements, and disruptions to the building schedule. Half of the verifiers reported that the program has become harder to sell over the past 12 to 24 months because the housing market has picked up significantly. In this climate, builders are selling their homes very quickly and have less need to differentiate their product from other builders. They noted that this is particularly the case for larger builders rather than custom builders or owner-builders.

Eight of the ten verifiers stated that they provide a "significant amount of assistance" to builders. The areas where verifiers provide assistance include:

- Air barrier installation

- Air sealing
- Correct insulation installation, particuarly bat insulation
- Duct leakage failures
- Framing
- General design assistance
- HVAC sizing, selelction and installation
- Information about program specifications
- Ventilation requirements and installation
- Water heater sizing, selection and installation

Two verifiers, both insulation companies, stated that the program has improved their installation practices, but the builders they work with do not fully recognize the additional assistance provided by the verification services. All interviewed verifiers claimed to use the EPS Field Guide and across the board verifiers found it to be a useful tool, stating that "it is a great resource" and "it is the best thing out there especially with owner builders.[24] They [the program] have done a really good job and there is nothing comparable in the country." The only suggested improvement was to include more pictures and diagrams generally. Eight of the ten verifiers stated that they have had at least one builder utilize the program's Early Design Assistance and all eight of these verifiers believed it was a very valuable service.

7.6 Program Interactions and Satisfaction

All verifiers stated that they primarily contact PMC staff when they want more information about different options builders can use to meet EPS requirements. In general, communication is conducted either by email or phone with occasional in-person meetings. All verifiers also accessed the Energy Trust website from time to time and all verifiers found the EPS Field Guide to be very helpful. All verifiers are satisfied with the information they receive when they contact program staff and the information available online and through the EPS Field Guide. All verifiers were very complimentary about the interactions they have had with all program staff and no improvements were suggested for communications between verifiers and program staff.

Overall, the interviewed verifiers were very satisfied with Energy Trust's New Homes program, with all verifiers giving a score of 4 or 5 when asked to rate their satisfaction working with the program, on a scale from 1 to 5, where 5 is very satisfied and 1 is not at all satisfied. One verifier stated that "having participated in a number of programs nationwide, the ETO guys are technically the most savvy of the entire region, hands down. They know more about what they are doing than any other program." The only suggestion for improvement verifiers offered was improved communications between verifiers and QA inspectors with regards to scheduling QA inspections.

[24] https://energytrust.org/library/forms/eps_field_guide.pdf

8 Homebuilder Associations Interview Findings

In September 2015 we interviewed two individuals at OHBA and HBAMP, whose positions are partially funded by Energy Trust. The two individuals had been in their positions for 18 months and three years, respectively. The role of the OHBA staff is to increase awareness of Energy Trust's New Homes program and encourage participation among eligible builders and subcontractors around Oregon. This individual also participates in state building code update activities and is actively trying to promote EPS as a potential inclusion in state code. The role of the HBAMP staff is to work with Energy Trust as an advocate for the program within the Portland Metro area, promoting the program among builders, remodelers and subcontractors by identifying builder needs and directing them to program staff or verifiers that can best assist them. Both interviewees primarily work with CLEAResult program and marketing staff.

8.1 Builder Services and Participation

Builder Services

The OHBA provides EPS training through their field classes as well as online classes. The OHBA has shifted toward online classes and away from field classes because they have found that builders—with many time constraints— are more likely to participate. These trainings are provided by a member of OHBA and are offered free of charge to member builders. In addition, OHBA has bi-annual statewide meetings with builders and frequent meetings with local HBA branches at which they discuss the advantages of participating in the New Homes program. Lastly, the OHBA maintains a monthly blog that contains information about the New Homes program. OHBA's training focuses more on specific measures that help builders get EPS scores rather than covering "EPS homes" as a whole. The OHBA does not market the training heavily, as members are generally aware of their offerings. The OHBA also offers classes for builders to get continuing education credits and they are willing and eager to offer EPS training as part of this program, however they have not been able to arrange this with Energy Trust as it requires EPS training material approval for CEUs by a provider.

The HBAMP provides EPS training at their annual BuildRight conference as well as their AppraiseRight conference. The training provided at the BuildRight conference covers EPS homes explicitly as well as pathways to attain an EPS. The appraiser conference training explains how EPS works and how it can affect home valuations. Energy Trust program staff run the trainings. The training is only available for conference attendees and the cost of attending the conference is $125 per person. HBAMP heavily promotes the conferences to both members and non-members through a variety of mediums including email blasts and advertising in homebuilding publications.

The two interviewees mentioned a number of program benefits they focus on when promoting EPS to builders, including:

- Design assistance, particularly for new builders
- Program incentives

- Advertising assistance
- Improved quality of building practices and the ability to market as an elite builder
- Reduced operational costs of homes
- Marketing advantages - EPS is an easy to understand tool that quickly conveys the energy efficiency of a home

The HBAMP organizes the Street of Dreams and requires that every home on display have an EPS. This raises the visibility of EPS among builders that come to view the Street of Dreams.

Builder Participation

Both interviewees noted that they have seen small but steady increases in builder participation in Energy Trust's program. They attributed this to increased awareness of EPS and a general interest in greater home performance. The HBAMP interviewee noted that EPS has been around a while now and is known among builders, so many builders have already made a decision about whether to participate or not. Both interviewees stated that that EPS uptake differs among different types of builders. Builders focused on starter homes or other lower price homes are less interested in EPS, whereas custom builders and high-end builders are more interested in EPS. The interviewee from the OHBA also stated that there are regional differences, with Portland Metro and Bend area builders being more interested in EPS, whereas rural areas and smaller cities such as Salem are much harder to penetrate. Both interviewees noted that the improvement in the housing market is negatively impacting EPS uptake because builders have less need to differentiate themselves from their competition, and less time available to undertake training.

In addition to the improving housing market, the interviewees highlighted the following challenges in promoting EPS to builders, and their strategies for overcoming these challenges:

- Builders are often too busy to meet with them to learn the mechanics of the program. In response, the OHBA is planning on having annual member meetings to try to get more "face time" with builders.
- Regional apathy in rural and smaller urban areas.
- Lack of consumer awareness of EPS. Builders are driven by customer demand; if customers are not demanding EPS, builders are unlikely to undertake the additional cost and effort to obtain an EPS. The HBAs regularly considers strategies to improve customer awareness, in particular leveraging the Street of Dreams to more effectively to promote EPS.

We asked the interviewees how Energy Trust could support their EPS promotion efforts. The OHBA interviewee would like Energy Trust to work with them to develop and approve a course through the Construction Contractors Board focused on energy efficiency and EPS that would be eligible as a continuing education credit. The HBAMP would like to see more coordination between Energy Trust's new and existing homes programs with cross promotion between the two programs because many new construction contractors are also remodelers.

Neither interviewee mentioned difficulty of participation as a challenge in promoting EPS. Both interviewees stated that most builders face challenges at the beginning of their participation but quickly adapt to the program. The HBAMP interviewee praised the New Homes program's flexibility to choose measures, but noted that the thermal enclosure checklist is sometimes challenging for some builders, because there is little flexibility within the checklist.

The most common reason for builders not participating in the program is the cost of the program requirements. For small builders there is greater risk on a per project basis in adopting the program requirements. For large builders it is can be difficult and expensive to change their practices across their portfolio of homes. All builders need to be convinced that the benefits of participation in the program will be worth the higher construction costs. Both interviewees stated that the best way to overcome these challenges is to increase consumer demand for energy efficient homes and for EPS specifically.

Neither interviewee believed that builders see EPS as a significant marketing differentiator for their homes. The OHBA interviewee explained that while many builders understand that EPS *could* be a marketing differentiator, until real estate agents are actively advertising EPS, builders will not see it as a major selling point. The HBAMP interviewee reiterated the need for increased consumer demand for EPS, explaining that until customers are asking about EPS builders will not see it as a strong marketing tool.

8.2 Builder Practices and Program Impacts

The OHBA interviewee was able to speak at length about current builder practices, while the other explained that they are not engaged in builder practices. Regarding program measures, builders are most receptive to high efficiency furnaces, air sealing, and air barriers (e.g., Tyvek), while there is not a lot of support for blower door testing or duct blasting. Many builders believe that these tests are not really necessary and just drive up construction costs. According to this interviewee, participating builders who are engaged with energy efficiency will always be receptive to ways that they can build even more efficient homes, so promoting new products or construction methods to this group is a good way for the program to deliver more efficient homes in aggregate.

We solicited suggestions from the interviewees for ways to get code-home builders to install more standalone measures. Again, the interviewees stated that higher customer demand will need to be a key driver for builders to install more standalone measures. Both interviewees also thought that manufacturer and sales representative education, or promotion of new products at events like Build Right, could help connect vendors of new technologies with builders.

Neither interviewee could think of ways that Energy Trust could promote construction of accessory dwelling units (ADUs), with both interviewees noting that there is very little ADU construction due to local zoning restrictions and low demand for ADUs throughout Oregon. Both interviewees noted that while they are not seeing any increased demand for solar PV

installation, there is an increase in awareness and demand for homes built to be solar ready. According to the interviewees, the two biggest barriers to solar PV installation are aesthetic concerns and sub-optimal home siting, which reduces generation potential. Neither interviewee could think of ways that Energy Trust's New Homes program could increase builder understanding or installation of solar measures, with both explaining that the biggest barriers are on the demand side of the equation.

We asked the interviewees how much Energy Trust's program has shifted the overall Oregon market to higher efficiency homes. Both interviewees believed, anecdotally, that the program is in fact shifting the market toward higher efficiency homes, but noted that they had no supporting data on hand. In some areas of the state where code enforcement is lax, the program may be encouraging builders to at least build to code.

8.3 Market Conditions

We asked the interviewees to describe the outlook for new single-family construction in Portland and Oregon over the next year. Both interviewees estimated that market demand for new construction will continue to increase over the next year. While there is positive momentum in the market, both noted that there are potential barriers or challenges to continued growth. The biggest issue is the availability of building sites in the Portland Metro area and Bend. In addition, the changing demographic makeup of homebuyers is going to be a challenge, with younger buyers and baby boomers looking for different housing options than the traditional new home.

The OHBA interviewee stated that the submarkets with the greatest opportunities for Energy Trust to increase EPS market share are Southern Oregon and along the coast, where there is untapped potential among a customer base that is aware of energy issues.[25] This interviewee also believed that custom builders are still a source of untapped potential, particularly those catering to downsizing retirees who may have greater wealth to invest in a new energy efficient home. These retirees are aware that they will be on fixed incomes going forward so they are conscious of reducing the overall operational costs of the home. The HBAMP interviewee stated that Bend is a region with untapped potential and a growing market that is interested in environmental issues and energy efficiency. In this submarket, production builders offer an opportunity to increase EPS market share significantly because they are currently building high volumes of homes.

The OHBA interviewee explained that he is working closely with Energy Trust in planning for upcoming state code changes and is facilitating communication between energy advocates and the code committee. This interviewee is aggressively advocating that an EPS be required for *all* newly constructed homes to prove code compliance,. The biggest changes to code in the long term are likely to be related to renewable energy sources. In the short term, the biggest

[25] Many buyers of new homes in coastal and Southern Oregon migrate from California and bring with them a high awareness of energy efficiency.

changes will relate to building science practices that are proven to improve energy performance, and including more use of performance scoring (EPS or other systems) as a pathway to compliance. The interviewees did not expect that the program will need to make any changes in the near term to adapt to code changes, as there will not be any significant changes until 2017-2018. However, if EPS scoring is included in the code as a performance-scoring pathway to code compliance then Energy Trust may have to increase the scale of the program and training availability.

8.4 Program Satisfaction

Both interviewees are very satisfied with the communications between themselves and Energy Trust New Homes program staff, although the OHBA interviewee is sometimes unclear about what the program would like him to do. This interviewee stated that, from his perspective, he has enough opportunities to communicate with the program staff but is concerned that the program may not be communicating their needs back to him sufficiently.

Aspects of the program that the interviewees perceived as going particularly well include the penetration of the program into Southern Oregon; greater effort to coordinate with other programs, including the Existing Homes program and Earth Advantage; and the allocation of more resources to real estate ally training. New activities being planned by the HBAs include continuing code development and lobbying for inclusion of EPS as a way to meet code, proposing joint EPS training with Energy Trust, and continued planning for EPS training at the Build Right and Appraise Right conferences.

Overall satisfaction with program interactions was high between the two interviewees and neither had any recommendations for program changes to increase builder participation or changes that would help facilitate their relationship with Energy Trust.

9 Real Estate Trade Ally Survey Findings

In October and November 2015 Evergreen Economics administered a web survey for realtors that attended Real Estate Ally (REA) trainings offered by Energy Trust between October 2014 and July 2015. The survey was programmed and hosted by CIC Research. Some of the key survey objectives were to obtain feedback about the program trainings, the EPS brand and its influence in the market and program communications with REAs.[26] This section summarizes the results of the surveys.

A total of 12 realtors completed the web survey, corresponding to a response rate of 32 percent. Although not all realtors in the sample had experience selling or buying an EPS home, the surveys still yielded feedback on Energy Trust's training, how customers value energy efficiency in general, and other interactions that realtors have had with Energy Trust.

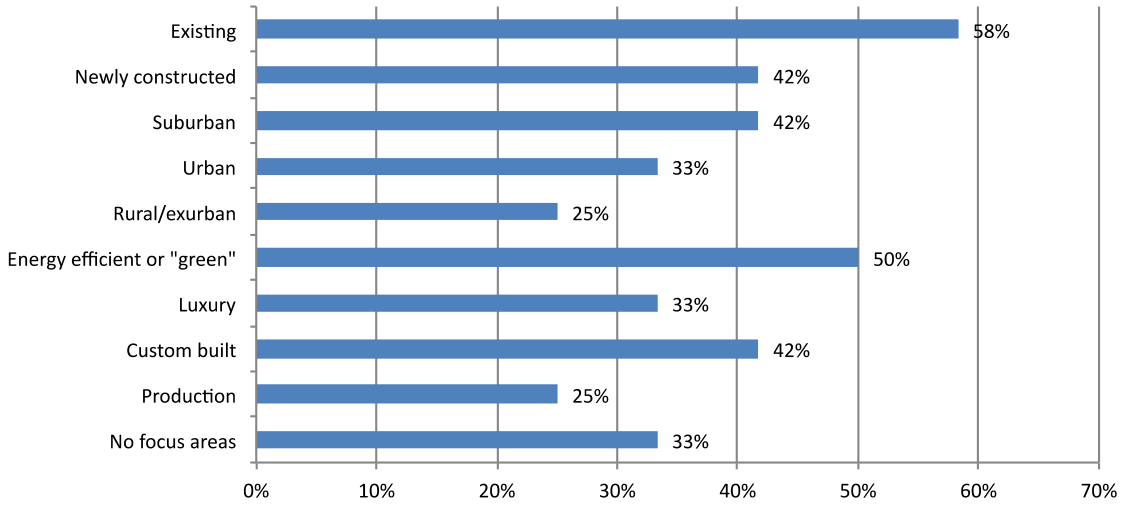
9.1 Business Scope

On average the survey respondents had 7.5 years of experience as a licensed realtors, with a range of 1 to 26 years. Six of the 12 realtors (50%) indicated that they buy and sell most of their residential homes in the Portland Metro area and the other six realtors work with homes in Eastern Oregon. Specifically, they work in the following counties: Deschutes (n=6), Multnomah (n=5), Clackamas (n=4), Washington (n=2), and Crook (n=1).

As shown in Figure 4, four realtors said that they do not have any focus areas; they work with all home types. The other 8 realtors (67%) reported between 3 and 9 different specialties, with the most common being existing homes (58%) and energy efficient or "green" homes (50%).

[26] Energy Trust also offers EPS for existing homes, which measures a home's energy consumption, costs and carbon footprint before and after improvements. Homes that implement improvements are compared to similarly sized *existing* homes in Oregon. For more information see: https://energytrust.org/residential/eps/existing-homes-eps.aspx.

Figure 4: Realtors' Reported Specialties (n=12)



We asked all of the realtors to tell us how many detached single-family homes they helped customers sell or purchase in Oregon since July 2014, and how many of these homes had received an EPS through Energy Trust's program (Table 28). Overall, the realtors sold or purchased between 7 and 69 homes since July 2014. All of these realtors worked primarily with existing homes, although 83 percent of the sample sold at least one newly constructed home since July 2014. The average number of EPS homes these realtors sold or purchased was quite similar across home types, with an average of 1.7 new homes and 1.4 existing homes per realtor. However, as a proportion of total home sales, EPS was clearly more prevalent among new homes, with 37 percent of new homes having an EPS compared to 6 percent of existing homes. Just over half of the realtors we surveyed sold at least one home with an EPS, including 50 percent who sold a new home with an EPS and 42 percent who sold an existing home with an EPS.

Table 28: Detached Single-Family Homes Sold or Purchased in Oregon by Surveyed Realtors, since July 2014 (n=12)

	Total Number of Homes		Number with EPS		Proportion with EPS		Realtors Selling 1+
Home Type	Average #	Range	Average #	Range	Average %	Range	EPS Home
New Homes	4.4	0-24	1.7	0-5	37%	0-100%	50%
Existing Homes	22.4	6-45	1.4	0-10	6%	0-33%	42%
Total	**26.8**	**7-69**	**2.8**	**0-14**	**10%**	**0-40%**	**58%**

9.2 EPS Training

The reasons realtors gave for enrolling in Energy Trust's training program and becoming a Real Estate Ally were varied (Table 29), but nearly all reasons were associated with a desire to become more knowledgeable so they could help their clients and/or the environment.

Table 29: Reason for Enrolling in Training and Becoming a Real Estate Ally (n=12)

Reason	Responses (n)	Percent (%)
Increase knowledge of energy efficient homes	4	33%
Help clients save money with energy efficiency	4	33%
Help/support the environment	3	25%
Stay ahead of client demand and market changes	2	17%
Business commitment to being green	1	8%
For the discount on the EA Broker course	1	8%

NOTE: Multiple responses allowed, percentages might not add up to 100.

Awareness of EPS prior to attending the training was disparate (Table 30). Two realtors said they were *very aware* and two said they had *never heard of it*, while the remaining eight had heard of EPS but were not very aware.

Table 30: Awareness of EPS Prior to Training (n=12)

Prior Awareness of EPS	Responses (n)	Percent (%)
Very aware	2	17%
Somewhat aware	5	42%
Not very aware	3	25%
Never heard of it	2	17%
Total	**12**	**100%**

We asked the realtors to rate their agreement with the following statement: "Energy Trust's EPS training gave me effective tools & information to present and promote EPS homes to my clients." The vast majority of realtors (92%) agreed with this statement, with 5 saying they *strongly agree* and another 6 saying they *somewhat agree*.

The one remaining realtor said they *strongly disagree* with the statement. This person wanted more detail on all aspects of EPS. They seemed mystified about how a single number can represent the impact of varied energy efficiency measures, so they are not convinced EPS has any value. This realtor reported that they sold or purchased 14 homes with EPS since July 2014 but they did not believe EPS had an impact on home sales.

As shown in Table 31, just over half of the realtors (58%) said that they have changed the way they promote and sell EPS homes and/or energy efficiency to their clients as a result of Energy Trust's training. Specifically, four said they discuss energy efficiency more often or in greater detail than before, two said they are more aware of energy efficiency features of the homes, and one said they now provide clients with useful links to help them get an EPS for their existing home.

Table 31: Changes in Approach to Promoting and Selling EPS or Other Efficient Homes (n=12)

Change in Approach for Efficient Homes	Responses (n)	Percent (%)
Able to discuss energy efficiency more often and/or in more detail	4	33%
More aware of energy efficiency	2	17%
Can provide links to help clients get an EPS	1	8%
Not yet, no client interest	1	8%
No changes	2	17%
No response	2	17%

NOTE: Multiple responses allowed, percentages might not add up to 100.

Among the seven realtors who have sold at least one EPS home, less than half (43%) said they have increased their sales of EPS homes as a result of Energy Trust's training (Table 32). All of the realtors whose EPS sales increased (n=3) said that the training increased their knowledge of energy efficiency and enabled them to communicate this information to their clients.

Table 32: Impacts of Energy Trust Training on Sales of EPS Homes (n=7)

Training Increased EPS Sales	Responses (n)	Percent (%)
Yes, definitely	1	14%
Yes, somewhat	2	29%
No, not really	3	43%
No, not at all	1	14%
Total	**7**	**100%**

NOTE: Only asked if they sold at least one EPS home since July 2014.

We asked all 12 realtors what they think would help them better promote and sell EPS homes; their responses are summarized in Table 33. Six realtors said that they would benefit from additional assistance from Energy Trust, asking for more detail about specific energy efficiency features (n=2), more guidance on customer education and advertising strategies (n=2), and training on brokerage or incorporating EPS into the sales pitch (n=2). Four realtors said that what they need to sell more EPS homes is increased customer demand for energy efficiency (n=3) and/or increased supply of EPS homes (n=2).

Table 33: Realtor Needs for Promoting and Selling EPS Homes (n=12)

Resources for EPS Homes	Responses (n)	Percent (%)
More detailed info on each type of EE	2	17%
More info on customer education and advertising (e.g. details of EPS program)	2	17%
Info on brokerage, how to incorporate this info into sales pitch for these homes	2	17%
Increased customer demand for energy efficiency	3	25%
Increased supply of EPS homes (ideally under $600k)	2	17%
No response	2	17%

NOTE: Multiple responses allowed, percentages might not add up to 100.

All of the realtors believed that having EPS scores automatically uploaded into the Multiple Listing Service (MLS) that they use would be at least *somewhat valuable* (Table 34). One realtor explained that their co-workers are not very interested in EPS. They believe uploading EPS into the Multiple Listing Service would motivate realtors to become more educated in case their clients start asking more questions about EPS.

Table 34: Value of Having EPS Automatically Uploaded into Multiple Listing Service (n=12)

Value of EPS in Listing Service	Responses (n)	Percent (%)
Very valuable	4	33%
Somewhat valuable	8	67%
Not very valuable	0	0%
Not at all valuable	0	0%
Total	**12**	**100%**

As shown in Table 35, some specific recommendations the realtors gave for improving EPS training and communications included offering shorter classes (n=2), encouraging realtors to include EPS on their listings (n=2), and offering additional trainings on energy efficiency measures and current Energy Trust programs (n=2).

Table 35: Recommendations for Improving EPS Training (n=12)

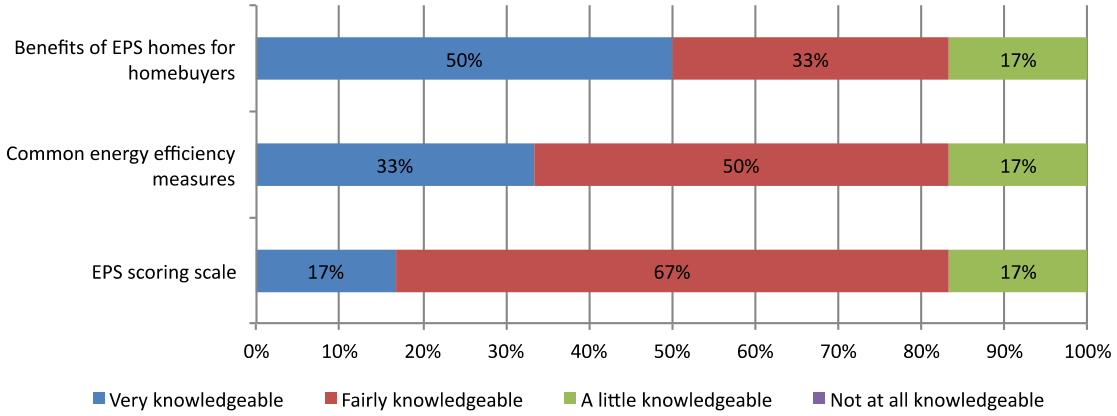
Recommendation for EPS Training	Responses (n)	Percent (%)
Offer shorter classes (2-3 hours) with more sessions, going in-depth on a few topics each session	2	17%
Encourage realtors to put EPS (or any other green certifications) on their listings	2	17%
Offer additional trainings on energy efficiency and current programs	2	17%
Educate more realtors	1	8%
Keep realtors informed about new technologies and programs	1	8%
No response	6	50%

NOTE: Multiple responses allowed, percentages might not add up to 100.

9.3 Current Knowledge and Practices

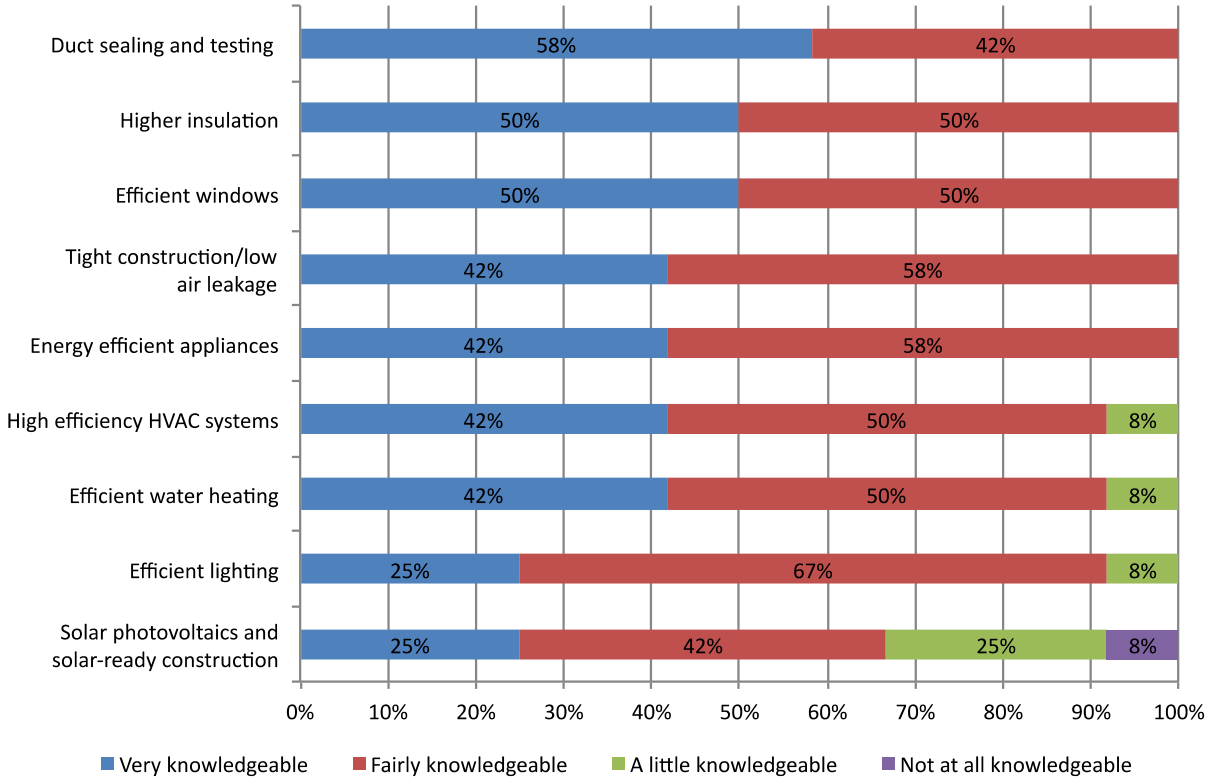
As shown in Figure 5, all of the realtors said they were at least *a little knowledgeable* about the benefits of EPS homes for homebuyers, common energy efficiency measures, and the EPS scoring scale after attending the Real Estate Ally training. Half of the realtors felt that they are *very knowledgeable* about the benefits of EPS for homebuyers, while only 17 percent are *very knowledgeable* about the EPS scoring scale.

Figure 5: Realtor Knowledge of EPS Training Topics (n=12)



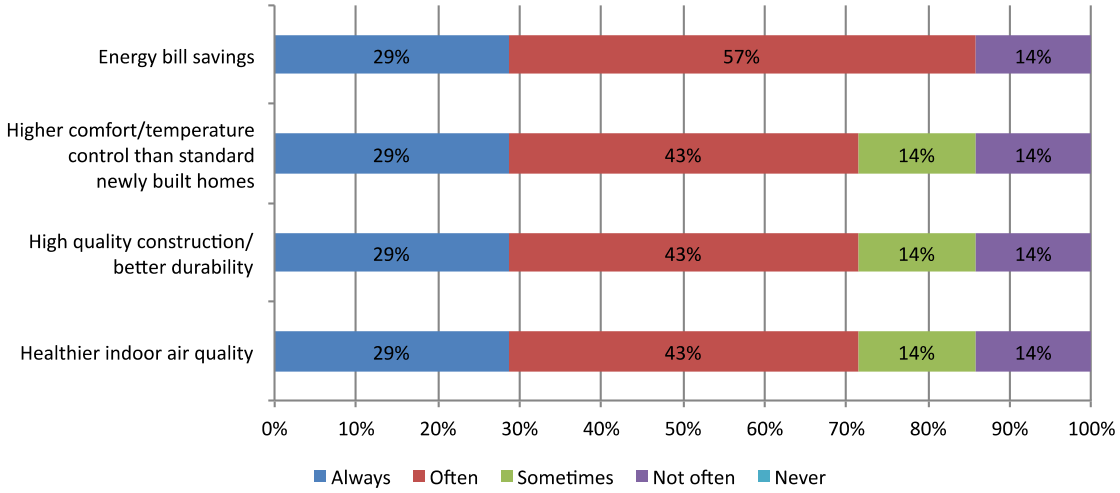
While only 33 percent of the realtors said they were very knowledgeable about *common energy efficiency measures*, 50 percent said they were very knowledgeable about five or more of the specific measure types shown in Figure **6**. The measure with the highest knowledge rating overall is duct sealing and testing, followed by windows and insulation. The measure with the lowest knowledge ratings is solar, including both photovoltaic and solar-ready construction.

Figure 6: Realtor Knowledge about Specific Energy Efficiency Measures (n=12)



Among the seven realtors who have worked with at least one EPS home, two said they always discuss all four of the benefits shown in Figure 7 with the homebuyers or sellers. Overall, the realtors are slightly more likely to discuss the energy bill savings than other benefits of EPS with their customers, but this difference is not statistically significant.

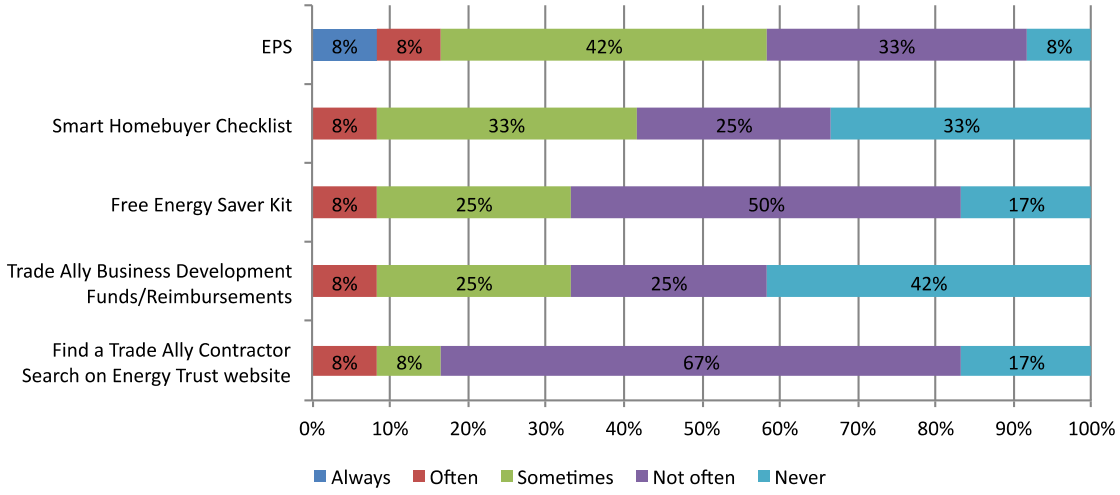
Figure 7: Benefits of EPS Discussed with Homebuyers or Sellers, for EPS homes they have worked with (n=7)



NOTE: Question was only asked of realtors who sold at least one EPS home since July 2014.

When thinking about their real estate practice in general, most of the realtors do not regularly use many of the Energy Trust resources shown in Figure **8**. Unsurprisingly, the most commonly used Energy Trust resource is EPS, with two realtors (16%) saying that they use it *often* or *always* and only one (8%) saying that they *never* use it. The two resources they were the least likely to report using are the trade ally business development funds/reimbursements and Smart Homebuyer Checklist.

Figure 8: Frequency Energy Trust Resources Are Used in Real Estate Practice (n=12)



9.4 Market for Efficient Homes

In order to get a better understanding of the value of the EPS label in the market, we asked realtors to describe the impact an EPS label has on the sale of a home – whether they sell faster or for a higher price than other homes (Table 36). Over half of the realtors (n=7) said it has a positive sales impact, and none said that it has a negative sales impact.

Table 36: Value of EPS Label in the Market (n=12)

Value of EPS in the Market	Responses (n)	Percent (%)
EPS has very positive sales impacts	2	17%
EPS has somewhat positive impacts	5	42%
EPS has no sales impact	3	25%
EPS has slightly negative sales impacts	0	0%
EPS has large negative sales impacts	0	0%
Not sure	2	17%
Total	**12**	**100%**

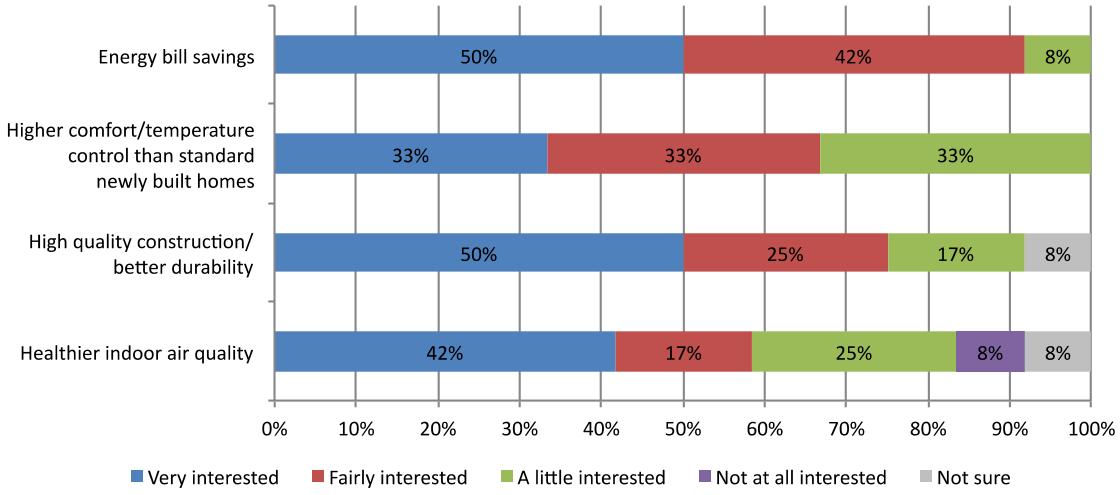
More generally, we asked realtors whether homebuyer customers' interest in energy efficiency is changing. As shown in Table 37, half said interest is increasing and the other half said it is *not changing much*.

Table 37: Trajectory of Homebuyer Interest in Energy Efficiency (n=12)

Interest in Energy Efficiency	Responses (n)	Percent (%)
Increasing a lot	1	8%
Increasing somewhat	5	42%
Not changing much	6	50%
Decreasing somewhat	0	0%
Decreasing a lot	0	0%
Total	**12**	**100%**

Half of the realtors believed their homebuyer customers are *very* or *fairly* interested in all four of the benefits of energy efficient homes shown in Figure 9. Overall, they indicated customers are most interested in energy bill savings benefits and least interested in healthier indoor air quality.

Figure 9: Homebuyer Interest in Benefits of Energy Efficient Homes (n=12)



All of the realtors indicated their homebuyer customers are at least a little interested in general energy efficiency, including 33 percent who said they are *very interested*. When given the list of specific measures shown in Figure **10**, three realtors (25%) said their customers were *very interested* in at least four of these measures, but another three realtors said their homebuyer customers were *not very interested* in any of these measures. The measure with the highest customer interest ratings overall is efficient windows, followed by high efficiency HVAC systems and insulation. The measure with one of the lowest customer interest ratings is duct sealing and testing.

Figure 10: Homebuyer Interest in Specific Energy Efficiency Measures (n=12)

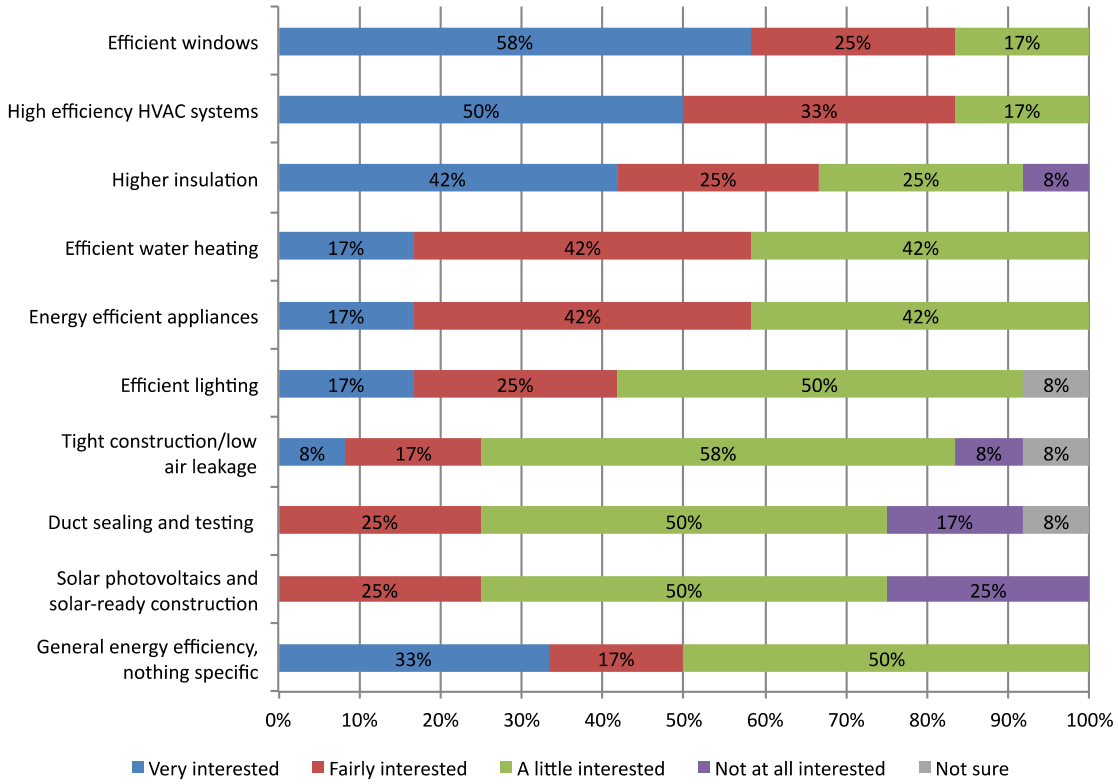
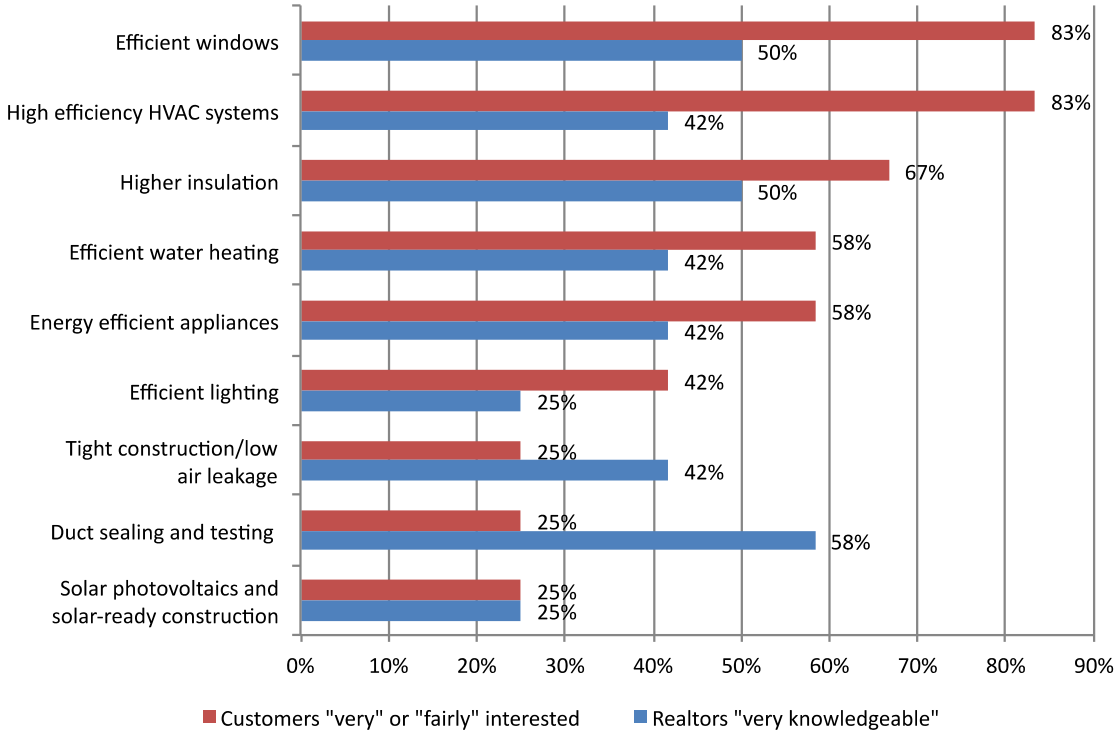


Figure **11** compares the percentage of realtors who believe they are *very knowledgeable* about a specific measure to the percentage that believe customers are *very* or *fairly* interested in that measure. Ideally, realtors will be knowledgeable about all of the measures customers are interested in, because these are the measures they are most likely to want to discuss with the realtor. Most of the realtors (83%) believe their customers are particularly interested in efficient windows and HVAC systems, but only around half report being very knowledgeable about these measures. Notably, duct sealing and testing was one of the measures with the lowest customer interest (25%) of those we asked about, yet it had the highest proportion of "very knowledgeable" realtors (58%).

Figure 11: Comparison of Realtor Knowledge and Customer Interest, by Measure (n=12)



9.5 Communications with Energy Trust

One realtor said they did not receive any information or updates about Energy Trust's programs and services for residential homes. All 11 other realtors (91%) said they receive emails from Energy Trust. Some of these people also get updates by visiting the Energy Trust website (17%, n=2) or participating in webinars (8%, n=1), but none mentioned using standard mail or phone calls with program staff to get information.

The realtors indicated that the information they receive from Energy Trust is useful, but has room for improvement. We asked them to rate the usefulness of the information on a scale of 1 to 5, with 1 being not at all useful and 5 being very useful (Table 38). Over a third of the realtors (42%) rated its usefulness as a 4 or 5 – indicating it is quite useful, while another 17 percent rated as a 2 – indicating that it is only a little useful.

Table 38: Usefulness of Information Received from Energy Trust (n=12)

Usefulness of Information	Responses (n)	Percent (%)
1 - Not at all useful	0	0%
2	2	17%
3	3	25%
4	3	25%
5 - Very useful	2	17%
Not sure	2	17%
Total	**12**	**100%**

Some specific information that the realtors would like to know about Energy Trust's work with energy efficient homes (Table 39) is additional detail on specific efficiency measures (n=3), an overview of Energy Trust's programs and their recommendations for homebuyers (n=2), and how EPS is actually calculated (n=1).

Table 39: Desired Information about Energy Trust's work with Efficient Homes (n=12)

Topics of Interest	Responses (n)	Percent (%)
More info about whatever clients are currently interested in	2	17%
Solar	2	17%
More info on energy efficiency (e.g., air sealing, mini split systems)	1	8%
Program pamphlets or info sheets to provide buyers	1	8%
Info on how EPS is calculated	1	8%
Cost effective retrofits for older homes	1	8%
Breakdown of energy efficiency's impact on costs and the environment, but also how much buyers actually want to know	1	8%
No response	5	42%

NOTE: Multiple responses allowed, percentages might not add up to 100.

As shown in Table 40, overall, half of the realtors (n=6) said they were very satisfied with their experience working with Energy Trust, and none indicated they were not satisfied.

Table 40: Overall Satisfaction with Energy Trust (n=12)

Satisfaction with Energy Trust	Responses (n)	Percent (%)
1 - Not at all satisfied	0	0%
2	0	0%
3	3	25%
4	2	17%
5 - Very satisfied	6	50%
Not sure	1	8%
Total	**12**	**100%**

10 Key Findings and Recommendations

Overall, Energy Trust's New Homes program is continuing to perform well and make progress towards market transformation. Importantly, EPS market share continued to increase in 2014 and 2015, and the program attained its gas the electric savings goals in both years. In this section we present some of the key findings from the evaluation activities and recommendations for program refinements.

10.1 Key Findings

Builders:

1. The program has continued to add new builder trade allies. Almost 250 program builders constructed EPS homes in 2014 and 2015, compared to 220 program builders in 2012 and 2013.
2. EPS market share has increased robustly— from almost 21 percent in 2013 to 36 percent in 2015—in part due to the recruitment of new large volume builders (i.e., 50+ homes per year).
3. The 2014 - 2015 incentive structure for builders and verifiers increased the overall efficiency of EPS homes since 2013. The typical EPS home followed Path 2 under the previous incentives scheme, and now the majority of homes *are equivalent to* Path 3. Most builders follow the performance path and not any specific prescriptive path.
4. The vast majority of standalone projects are air sealing measures. Builders have installed very few heat pump water heaters, ductless heat pumps and high efficiency tanked water heaters in non-EPS homes.
5. Program staff reported that builders are generally satisfied with their program experience and generally offer positive feedback, primarily due to the "ease of participation." This is consistent with findings from interviews Evergreen conducted with participant builders for separate research on gas fireplace installations.
6. Builders in the less urban areas of Eastern Oregon are only just starting to adopt EPS and require more intensive marketing efforts and program support to get participation.
7. Primary reasons for builder non-participation (in all areas) include: higher equipment costs, perceived low customer demand for EPS, perceptions of "onerous" paperwork, lack of educated local subcontractors, and objections to the program's relatively high insurance requirements. In addition, the current "hot" housing market reduces the need for builders to differentiate themselves from competitors.
8. Marketing staff report that non-participant builders are most inclined to sign up after direct, personalized outreach by a program representative - either a trade ally coordinator or verifier.

Verification:

1. Verifiers liked the 2014 - 2015 incentive structure as they are directly rewarded for pushing builders to construct more efficient homes.
2. Interviewed verifiers had high satisfaction with the program trainings. Verifiers are also very satisfied with technical guidance provided in the program Field Guide and from communications with program staff.
3. Verifiers have high satisfaction using the Axis database now, as the initial software "bugs" have been fixed and their hands-on experience has increased.
4. More verification companies are serving the Northwest Oregon region now (8) compared to the previous evaluation period (2).
5. For this evaluation period only one verifier company was active in Southern Oregon, however relatively few homes were constructed in this submarket (66).
6. The program recently enrolled one new verifier in Eastern Oregon and one new verifier in Southern Oregon.
7. Seven of 10 interviewed verifiers plan to grow their verification business over the next year, with three verifiers planning for aggressive expansions by targeting new builders.
8. Some verifiers would like additional training on how to best leverage Energy Trust program materials to recruit new builders.
9. Some verifiers believe that more aggressive promotion of EPS by realtors is required to increase consumer demand.

Subcontractors:

Subcontractors were not a primary focus of this evaluation effort, but there were a few key findings.

1. Staff noted that subcontractors are satisfied generally with their program experiences, however they sometimes get confused (and frustrated) by different participation requirements between the New and Existing Homes programs.
2. It remains challenging for the program to recruit and train subcontractors in rural parts of Eastern Oregon, due to low population densities and long distances subcontractors must travel for training opportunities and to work with EPS builders.
3. The quality of a subcontractor's work is typically directly related to the contracts with their builders. Subcontractors often do not know if they are working on EPS homes.

Quality Assurance:

1. Verifiers are generally satisfied with the QA process for home inspections, and make their schedules work to accommodate site visits. Verifiers have also been working with QA staff to collect more data on leakage from ducts inside conditioned spaces, to potentially adjust the program's default values.
2. According to staff, the highest volume verification firms have the most Axis data entry errors (e.g., inputting duplicate addresses or data), which delays the certification process.

Real Estate Professionals:

1. Real estate ally enrollment increased in 2015 with 39 new real estate allies trained by the end of July, for a 12 percent increase over *all of* 2014. Contributing to this trend were: free presentations followed by tuition-based training, revised content with detailed energy efficiency messaging, and broader recruitment.
2. Real estate agents have generally provided positive course evaluation feedback. Training elements that they value most are: site visits to actual EPS homes, information/tools that can be directly applied to their business, and peer-to-peer role playing activities that help trainees become comfortable talking about EPS homes.
3. Almost all of the surveyed real estate allies concurred that Energy Trust's EPS training gave them effective tools and information to present and promote EPS homes to their clients.
4. Over half of the surveyed realtors said that they have changed the way they promote and sell EPS homes and/or energy efficiency to their clients as a result of Energy Trust's training.
5. Over half of the realtors said that an EPS has a positive sales impact (faster sale or higher price), and none said that it has a negative sales impact. Overall, customer demand for energy efficiency is increasing slowly.
6. Realtors suggest that EPS could be more realtor- and consumer-friendly by providing clearer connections between specific home features and benefits.
7. All of the surveyed realtors believed that having EPS scores automatically uploaded into the Multiple Listing Service that they use would be useful. This would motivate all realtors to become more educated in case their clients start asking more questions about EPS.

EPS Brand and Marketing:

1. In the current hot real estate market, new homes are often sold before construction is finished, and thus EPS is not used in the home marketing.
2. Some builders perceive that realtors are not promoting EPS sufficiently when it is available for a home, which is impeding consumer awareness and demand.
3. Currently, the market value of the EPS brand is effectively hidden, since EPS is rarely included in the RMLS, the primary regional real estate database from which the majority of all real estate market data is sourced.[27]

[27] *A Study on the Residential Market Valuation of EPS and Solar PV in the Greater Portland and Bend, Oregon Markets*. Prepared by Watkins & Associates for Energy Trust of Oregon. November 2014. According to this report, EPS information can be attached to a listing in separate documents, or realtors can enter data in the "Amenities, Energy Score" or "Amenities, Energy Type" field.

Program Design and Delivery:

1. Program staff roles are well defined. Program staff generally described communications and coordination among Energy Trust, CLEAResult, subcontractors and other organizations as excellent. The one area where communications could be improved pertains to new measure development. PMC staff were not always sure if they or Energy Trust staff were responsible for certain technical/research activities, and when activities were to be completed.
2. CLEAResult's acquisition of PECI (the prior PMC) has benefited the New Homes program. In particular, CLEAResult Existing Homes program account managers have enhanced field coverage for the New Homes program in rural parts of the state. The same staff that managed the program for PECI (and CSG) now do so for CLEAResult, bringing valuable continuity and market knowledge.
3. Builder participation in EDA charrettes has increased as more charrettes have been conducted outside of the Portland Metro area. Most of the interviewed verifiers said some of their builder clients are participating in the charrettes. Importantly, the charrettes are helping builders and subcontractors to better understand the actual costs to build EPS homes, which can help them to add more measures.
4. The online Axis database has made the home verification and incentive delivery process much more efficient and eliminated most of the manual data entry that was required. The online system "gives power back to the verifier to print the EPS quickly" since program staff does QA on Axis input data in 24 hours or less.
5. According to CLEAResult staff, uploading trade ally enrollment documentation and obtaining approval is a challenge for some builders.

10.2Recommendations

Market Actor Recruitment and Training:

1. The program should try to recruit more builders in the Bend and southern coast regions, where homebuyers may be particularly inclined to seek out energy efficient homes based on their demographics and environmental values.
2. Conduct more EDA charrettes in Eastern and Southern Oregon to build upon the lunch-and-learns that the program has already been offering.
3. Continue to educate newer larger volume participant builders on energy efficient measures and practices, so they can increase the efficiency of their program homes over time.

Verification:

1. Continue looking for ways to reduce Axis data entry errors by the highest volume verification firms. For instance, the program could provide new financial incentives for verifiers with higher first time pass rates. Alternatively, the program could limit the

ability of builders to redirect their incentives to the verifiers. While this could place additional burden on the builders to pay their verifiers, it could also increase the pressure they place on verifiers to get homes through the process quickly, so the builders obtain their own incentives quickly.

Quality Assurance:

1. Analyze program data in Q1 2016 to see if the majority of Balanced Energy Solutions homes were inspected in November or December 2015, since a program goal is to have QA activities spread out during the year, and potentially reduce QA responsibilities for the PMC.
2. Conduct interviews with builders and verifiers to gauge their satisfaction working with the QA contractor, BES.
3. Consider reducing the amount of QA performed on some of the most reliable verifiers' energy models (e.g., Do the data match the correct homes? Do the data make sense?). Currently the program conducts QA on 100 percent of the verifiers' energy models.

Real Estate Professionals:

1. Future trainings could focus more on high efficiency windows and HVAC systems, since these are measures where the gap between customer interest and realtor self-reported knowledge is greatest.
2. Give more attention on how to interpret EPS in the trainings, so realtors can accurately convey this information to their customers and enhance EPS credibility.

Marketing:

1. Critically, the program needs to develop a system for automatically uploading EPS scores to a central repository where real estate agents have access to all EPS homes (new and existing). Ideally these would be the same listing services that realtors already use. Currently, real estate agents are not inclined to upload EPS information themselves (provided they get it from a builder or verifier), which is hindering public awareness of EPS.
2. In EPS marketing materials look for ways to make connections between specific home features and benefits more explicit to realtors and homebuyers.

Program Design and Delivery:

1. Continue to advocate that EPS scoring be included in the updated residential building code as a performance-scoring pathway to code compliance. This would likely be the most efficient way to rapidly increase builder and consumer acceptance of EPS.
2. The program should formalize roles and communication protocols for new measure development and reviews to expedite the process.

3. Consult with Energy Trust's legal department to see if builder insurance requirements can be reduced, since they are higher than state requirements.
4. Collaborate with affordable housing builders to see if the program can better serve them, with or without program design changes.
5. See if there are ways to make subcontractor participation in the Existing and New Homes programs more consistent to reduce confusion.

Appendix A: Interview Guides

Verifiers Interview Guide

Target Audience:

10 verifiers throughout all parts of Oregon that have verified at least 1 home, with a focus on "key" company staff (1 per company).

Recruitment:

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 homes verifiers 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 60 minutes and all your answers will be kept confidentially; we never link any information to a particular person or company.

SCHEDULE CALL AS NEEDED _____

I. Business Scope

Let's start with some 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. Which of the following best describes your role at your company? 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)

3. 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)

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

5. Approximately what percent of your company's revenues are from EPS home verifications?

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

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

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

9. Do you plan on expanding your verification services over the next 12 months?

   If YES: How do you plan on expanding your services? To more builders in your region, or to new geographic regions? Why is that?

   If NO: Do you expect your verification services to stay about the same or decrease? Why is that?

II. Training

Now I'd like to ask you some questions about your training experiences with Energy Trust's New Homes program.

10. First, can you briefly describe how you received your training on the current New Homes program design and EPS requirements for builders and verifiers?? We'll talk about REM/Rate energy modeling and the Axis database later.

11. For each of the following training topics, 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 – the program requirements and construction techniques
    b. Program procedures and forms
    c. Marketing to builders and subcontractors

12. Regarding the program training you received, how well did it prepare you to verify 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 could the training have been done differently so that you would have been better prepared?

13. Have you had any challenges getting or maintaining the RESNET certification to become an Energy Trust EPS Homes verifier? (If YES, get details)

III. Verification Process

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

14. First, what percentage of the homes that you have verified in the past 12 months have required remediation after your first or second visits? What are the most common reasons for remediation?

15. How is the energy modeling with the REM/Rate software going for you?
    a. (If not mentioned) Do you have any challenges using REM/Rate?

16. And what has been your experience working with the Axis database? (Probe to see if database is easy or cumbersome to use, if it's difficult to enter or transfer data correctly, track homes progress, if they have high/low error rates)

17. How long does it take for you or your staff to get all the required information for each home into Axis, on average (Probe to see if they use the XLS template for 640s, input direct into Axis, or batch similar inputs via an XLS file. Note: uploading the REM/Rate files is pretty easy)?

18. How often do you go into Axis, either to input homes information, check on the QA status, or see if a final EPS has been issued?

19. In Axis, how much time does it take for the program to issue a final EPS for each home after you have asked the program to certify homes with no outstanding QA issues?

20. After you receive the final EPS for a home or group of homes, how long does it usually take you to provide them to the builder, and how do you do this (e.g., email PDF, or print and mail)?

21. Do you see any opportunities to change the way you have to use the REM/Rate software or Axis database for EPS homes, which might improve your participation experience or create operational efficiencies?

IV. Quality Assurance (QA) Process

Let's talk about the quality assurance, or QA process a bit.

22. Who does the QA inspections on your program homes? (Get staff names or company names – should be CLEAResult or third-party Energy Solutions)

23. How does the program schedule its QA inspections with you and your builders? (ACCEPT MULTIPLES)

24. How well does this process work for you?

25. 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)

26. (IF they receive info) On a scale from 1 to 5, where 5 is very useful and 1 is not at all useful, how useful is the inspection information you receive? (IF 1 or 2) Why do you say that?

27. If not mentioned: Has it helped your builders or subs to improve their practices?

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

V. Marketing and Builder Assistance

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

29. How does your company market its EPS home verification services to builders? DO NOT READ, Probe on list below as needed - ACCEPT MULTIPLE ANSWERS
    - In-person visits to builders to see if they need verification services
    - Phone calls to builders to see if they need verification services
    - Mailing or emailing verification information to builders
    - Have information on company website
    - Have information on the Energy Trust website
    - Attend builder meetings or workshops
    - Have information in building trade publications
    - Other methods - specify

30. What program benefits do you emphasize to builders? DO NOT READ, but probe with list if needed:
    - Marketing/ Product differentiation benefits
    - Higher home prices/profits
    - Faster home sales
    - Program cash incentives
    - Promotion assistance available

- Reduced callbacks from homebuyers
- Are guaranteed to meet state energy code
- Help meet corporate sustainability goals
- Other benefits - specify

31. What are the main obstacles to getting builders enrolled in the program? (Probe for list below; record all that apply; ask "which is the greatest obstacle?")
    - Cost of installing EPS measures, compliance costs
    - Cost of participation (insurance requirements, verification fees, etc.)
    - Technical difficulty of meeting requirements
    - Incentives too low
    - Too much paperwork
    - No demand from customers
    - Not enough marketing support
    - Subcontractors cannot meet requirements
    - Participation disrupts building schedule
    - Prefer other certifications (e.g. Earth Advantage, ENERGY STAR)

32. Are those obstacles different for large and small builders?

33. Have any builders asked you for technical guidance to meet the program requirements?

    If YES: What are the most common issues have you assisted them with?

34. 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

35. Do you and your builders use the EPS Field Guide provided by the program?

    If NO: Why not?
    If YES: How useful is the guide? Is there anything that can be improved?

36. Have any of your builders utilized the program's Early Design Assistance?
    If YES: How effective was that?

37. How frequently are you able to affect builders' decisions about efficiency measures and building practices?
    a. For which measures or practices are you most often able to influence a builder?

38. Do you have any goals for getting builders to install solar PV or to make homes ready for future solar systems? (Get details)

    a. If YES: How are you doing meeting these goals, and what the primary challenges for your builders?

39. Are you seeing any new trends for solar PV or solar-ready homes?

VI. Overall Program Interaction/Conclusions

Let's conclude with a few questions about the overall program.

40. Where do you turn if you need more information about different options your builders can use to meet the EPS requirements? (READ and ACCEPT MULTIPLES)
    a. Personal communications or emails with Energy Trust's trainers
    b. Personal communications or emails with other Energy Trust New Homes program staff
    c. Energy Trust program materials and website content (Get details)
    d. Anything else? (Specify)

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

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

43. And finally, overall, how would you rate your satisfaction working with the Energy Trust New Homes program, on a scale from 1 to 5, where 5 is very satisfied and 1 is not at all satisfied?

    (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!

Interview Guide for Earth Advantage Staff

Target Audience:

Staff with Earth Advantage that deliver real estate ally trainings on EPS and/or advise Energy Trust on program design changes.

Real Estate Allies Training

Let's start by discussing your role training Energy Trust's real estate allies on EPS Homes.

1. First, how do you recruit real estate allies to the trainings that describe EPS homes specifically?

2. What recruitment strategies seem to be most effective?

3. What do realtors have to do in order to attend trainings that cover EPS material (Get details on modes offered – web v. class, costs, pre-requisites)?

4. What are the most common reasons realtors give for not wanting to attend trainings that include EPS?

5. What trends are you observing regarding realtors participation? Are more or fewer realtors becoming interested in EPS, or energy efficiency in general?
    1. Why is that?
    2. Does this vary by the type of realtor?

6. Do you get any feedback from realtors immediately after the trainings on EPS?

    1. If YES: What kinds of feedback are you getting?
    2. What aspects of the training do they seem to value most?

7. How well do you think the trained realtors understand the EPS scoring system (probe to see if they know homes are compared to similar, code-based homes)?

8. Is EPS helping realtors to sell the energy efficient features of homes – what do you hear from the realtors?

9. How do you support real estate allies <u>after</u> they have received training on EPS?

10. We are going to conduct a short Internet survey of realtors that have received EPS training in Q4 2014 or later. Are there any specific questions we should ask them?

11. How do you work with New Homes program staff to develop the EPS training content?

12. How well is this process working?

13. What aspects of the realtor trainings have gone particularly well in the past year from your perspective?

14. What new training activities are you planning for EPS in the next year?

15. Do you recommend any changes to how the realtor trainings are developed or delivered, which might lead to greater participation or reduced program costs?

Homes Databases

16. How do you work with Energy Trust to get EPS scores into homes databases like the Oregon RMLS system, Zillow or other systems?

17. How well is this process working? Are you able to get EPS scores uploaded soon after they are available? Are homebuyers able to easily access or search on EPS scores?

18. What are the biggest challenges getting EPS or energy efficiency information into homes databases, and do you see a way to overcome these challenges?

Energy Modeling and EPS Scoring

Since Earth Advantage helped Energy Trust develop the program's energy modeling and scoring approaches we have a few questions on those topics.

19. First, as a key homes verifier for the program, how is it going using REM/Rate to model energy use in EPS homes?

20. Are there tools that are better at modeling energy that the program should consider?

21. Does Earth Advantage think that the verification and scoring process creates accurate results?

22. Overall, does the energy modeling and EPS scoring methodology still work? Could it be improved in any way?

Program Design Advising

Now let's discuss your role advising program staff on upcoming code changes and the program design.

23. How do you work with Energy Trust to advocate or plan for upcoming state code changes?

24. What are likely to be the biggest code changes?

25. What changes do you think the program will need to make to adapt to the next code change?

26. What impacts do you think likely program changes will have on participating builders?

Wrap Up

We have just a few more questions – we're almost done.

27. How do you stay informed about Energy Trust's New Homes program?

28. How satisfied have you been with communications between you and Energy Trust (or its contractors)? Why do you say that?

29. How well do you think Energy Trust's program is operating overall?

30. Do you recommend any process improvements?

Those are all of our questions. Thanks for your time and good information!

Interview Guide for Home Builder Associations

Target Audience:

Staff with the Home Builders Association of Metropolitan Portland and Oregon Home Builders Association.

Respondent Role

1. First, can you briefly summarize your role in promoting Energy Trust's New Homes program to builders and their subcontractors?

2. How long have you been in this role?

3. Which program implementation staff do you work with most?

Builder Services and Participation

4. What program or technical training do you offer to builders about EPS?
   - Does the training cover "EPS homes" explicitly, or do you just cover specific measures that would help builders to get EPS scores?
   - Who provides the training?
   - How frequently?
   - Via what modes – in person v. web based?
   - What is the cost?
   - How are trainings publicized?

5. How do you promote EPS to builders? For instance, what benefits do you describe to them?

6. What trends are you observing regarding builder participation? Are more or fewer builders becoming interested in EPS?
   - Why is that?
   - Does this vary by the type of builder (e.g., production v. custom, starter homes, infill builders, etc.)?

7. What are your biggest challenges promoting EPS to builders?

8. How do you think could these challenges be addressed?

9. How could Energy Trust better support your efforts to promote EPS to your member builders?

10. What do builders think about the program participation requirements? For instance, do they think it is easy to participate, difficult but worth participating in, or a big hassle with few benefits?
    - Does this vary by the type of builder?

11. What are the most common reasons for builders not participating in the program (Probe on paperwork, time to absorb program details, added costs, etc.)?

12. How do you think these participation barriers could be overcome?

13. Do builders think that EPS can be a marketing differentiator for their homes?
    - Does this vary by the type of builder?

14. Based on your trainings, are there any specific program elements that builders have difficulty understanding (probe on incentive levels, how EPS is calculated, specific EPS measures, verification requirements)?

Builder Practices and Program Impacts

Now let's talk a little bit about builders' construction practices.

15. What specific EPS measures are builders most receptive to? Least?

16. What could the program do to get participating builders to build even more efficient homes?

17. Do you have any suggestions to get code-home builders to install more standalone measures (e.g., heat pump water heaters, ductless heat pumps, gas tankless water heaters)?

18. How about accessory dwelling units – is there anything the program could be doing to get builders to construct more ADUs with EPS scores?

19. What trends are you seeing for new homes with solar PV installed, or homes built to accommodate solar later?

20. Is there anything Energy Trust's New Homes program could do to increase builder understanding or installation of solar?

21. How much has Energy Trust's program shifted the overall market to higher efficiency homes?

22. In your opinion, what else should Energy Trust be doing to increase the efficiency of all new homes in Oregon?

Market Conditions

23. What is the outlook for new single-family construction in [Portland/Oregon] in the next year?

24. In which submarkets do you think Energy Trust has the greatest opportunity to increase EPS market share (probe on locations, specific builders, buyer demographics)? Why is that?

25. How do you work with Energy Trust to advocate or plan for upcoming state code changes?

26. What are likely to be the biggest code changes?

27. What changes do you think the program will need to make to adapt to the next code change?

28. What impacts do you think likely program changes will have on participating builders?

Wrap Up

We just have a few more questions then we'll be done.

29. How do you stay informed about Energy Trust's New Homes program?

30. Overall, how satisfied have you been with communications between you and Energy Trust (or its contractors)? Why do you say that?

31. What aspects of Energy Trust's program have gone particularly well in the past year from your perspective?

32. What new activities or initiatives are you planning for EPS homes in the next year?

33. Do you recommend any program changes to increase builder participation or improve program processes?

34. How about any changes that would facilitate your partnering with Energy Trust?

Those are all of our questions. Thanks for your time and good information!

Appendix B: Real Estate Trade Allies Survey Instrument

Realtors Web Survey

Target Audience: Earth Advantage brokers that received EPS training in Q4 2014 through Q2 2015 to become Energy Trust real estate allies.

Introduction

Thank you for participating in this important survey!

We are surveying real estate professionals and would like to learn about your experiences working with homes that have received Energy Trust of Oregon's Energy Performance Score (EPS) and get feedback to improve Energy Trust's programs and trainings.

Even if you have not listed or sold any EPS homes, we would still like your feedback on the training you received, interactions you may have had with Energy Trust, and how your customers value energy efficiency.

Please know that all your answers will be kept confidential and the survey findings will only be reported in summary format - we never link any information to a particular person or company.

Your feedback will help Energy Trust to assess how well its New Homes Program is working, and make its programs as successful as possible for realtors like you.

Let's start with some general background information.

1. How many years have you been a licensed realtor?

   (RECORD: ExpYears allowing up to 2 decimals, e.g., 0.75)

2. Since July 2014, about how many newly constructed, detached single-family homes have you helped customers sell or purchase in Oregon? Please give your best estimate.

   RECORD: NewHomesTot # _____ (*Programmer: If none, skip to Q4*)

3. How many of these newly constructed homes that you helped customers sell or purchase had received an EPS – an Energy Performance Score – through Energy Trust of Oregon's program?

   RECORD: NewHomesEPS # _____ (*Programmer: NewHomesEPS# cannot exceed NewHomesTot#*)

4. And how many **existing** detached, single-family homes have you helped customers buy or sell since July 2014? Please give your best estimate.

   RECORD: ExstHomesTot # _____ (*Programmer: If none, skip to Q5)*

5. How many of these existing homes that you helped customers buy or sell had received an EPS?

RECORD: ExstHomesEPS #(*Programmer: ExstHomesEPS# cannot exceed ExstHomesTot#*)

6. In which Oregon counties do you buy or sell most of your residential homes?

Programmer: Insert list of counties grouped by region. Each county should have a box they can check.

7. Please check any specific types of homes that you specialize in: (Please check all that apply)

    1. No focus areas – work with all home types (*Programmer: this is a single punch; all other responses in this question are multiple punch)*
    2. Newly constructed homes
    3. Existing homes
    4. Urban homes
    5. Suburban homes
    6. Rural/exurban homes
    7. Custom built homes
    8. Production homes
    9. Luxury homes
    10. Energy efficient or "green" homes (e.g., EPS, Earth Advantage, ENERGY STAR)
    11. Other: _____

The following questions are about the training you received on homes that receive an EPS. These questions pertain to Real Estate Ally (REA) training offered by Energy Trust – and NOT the Earth Advantage Broker training offered by Earth Advantage, which may have provided only a brief overview of EPS scores.

8. How aware were you of EPS prior to attending the Real Estate Ally training?
    1. Very aware
    2. Somewhat aware
    3. Not very aware
    4. Never heard of it

9. (*Programmer: response is non-mandatory to advance*) Why did you decide to take Energy Trust's training and become a Real Estate Ally?

10. Please rate your understanding of the following topics after you attended the Real Estate Ally training.

(Programmer: Arrange below as a grid to complete)

Topics:

1. EPS scoring scale
2. Common energy efficiency measures

3. Benefits of EPS homes for homebuyers

Ratings:
1. Very knowledgeable
2. Fairly knowledgeable
3. A little knowledgeable
4. Not at all knowledgeable
5. Topic was not covered in training

11. Please rate your understanding of the following energy efficient features.

Features:
1. Tight construction/low air leakage
2. Higher insulation
3. Efficient windows
4. High efficiency heating and cooling systems (HVAC)
5. Efficient water heating
6. Efficient lighting
7. Duct sealing and testing
8. Energy efficient appliances
9. Solar photovoltaics and solar-ready construction

Ratings:
1. Very knowledgeable
2. Fairly knowledgeable
3. A little knowledgeable
4. Not at all knowledgeable
5. Topic was not covered

12. How often do you use the following Energy Trust resources in your real estate practice?

Resources:
1. EPS
2. Smart Homebuyer Checklist
3. Free Energy Saver Kit
4. Trade Ally Business Development Funds/Reimbursements
5. Find a Trade Ally Contractor Search on Energy Trust website

Ratings:
1. Always
2. Often
3. Sometimes
4. Not often
5. Never

13. (IF NewHomesEPS# or ExstHomesEPS# > 0) For the EPS homes you have worked with, how often do you discuss the following benefits with the homebuyers or sellers:

Benefits:

1. Healthier indoor air quality
2. High quality construction/better durability
3. Higher comfort/temperature control than standard newly built homes
4. Energy bill savings

Ratings:

1. Always
2. Often
3. Sometimes
4. Not often
5. Never

14. Please rate your agreement with the following statement: "Energy Trust's EPS training gave me effective tools and information to present and promote EPS homes to my clients."

1. Strongly agree
2. Somewhat agree
3. Somewhat disagree
4. Strongly disagree
5. No opinion

15. (*Programmer: response is non-mandatory*) What have you changed about the way you promote and sell EPS homes (and energy efficiency) to your clients as a result of Energy Trust's training?

(*Programmer: If Q3 & Q5 = 0, skip to Q17)*

16. Have you increased your sales of EPS homes as a result of Energy Trust's training?

1. Yes, definitely
2. Yes, somewhat
3. No, not really
4. No, not at all
5. No opinion

17. (*Programmer: response is non-mandatory*) What would help you better promote and sell EPS homes?

The next questions are about the market for energy efficient homes.

18. Among your homebuyer clients, would you say interest in energy efficiency is:

    1. Increasing a lot
    2. Increasing somewhat
    3. Not changing much
    4. Decreasing somewhat
    5. Decreasing a lot
    6. Not sure

19. How interested are your homebuyer customers in the following energy efficient features?

    Features:
    1. Tight construction/low air leakage
    2. Higher insulation
    3. Efficient windows
    4. High efficiency heating and cooling systems (HVAC)
    5. Efficient water heating
    6. Efficient lighting
    7. Duct sealing and testing
    8. Energy efficient appliances
        1. Solar photovoltaics or solar-ready construction
        2. General energy efficiency – nothing specific

    Ratings:
    1. Very interested
    2. Fairly interested
    3. Not sure
    4. A little interested
    5. Not at all interested

20. How interested are your homebuyer customers in the following benefits of energy efficient homes?

    Benefits:
    1. Healthier indoor air quality
    2. High quality construction/better durability
    3. Higher comfort/temperature control than standard newly built homes
    4. Energy bill savings

    Ratings:
    1. Very interested
    2. Fairly interested
    3. A little interested
    4. Not at all interested

5. Not sure

21. How valuable is the EPS label in the market – do EPS homes sell faster or for a higher price than other homes?

1. EPS has very positive sales impacts
2. EPS has somewhat positive sales impacts
3. EPS has no sales impact
4. EPS has slightly negative sales impacts
5. EPS has very negative sales impacts
6. Not sure

22. How valuable would it be to your sellers and buyers to have EPS scores automatically uploaded into the Multiple Listing Service that you use?

1. Very valuable
2. Somewhat valuable
3. Not very valuable
4. Not at all valuable
5. Not sure

These last questions are about your interactions with Energy Trust.

23. Which of the following are ways you currently receive information and updates about Energy Trust's programs and services for residential homes? Please check all that apply.

1. Emails
2. Standard mail
3. Energy Trust website
4. Webinars
5. Call program staff
6. Other, Specify_____

24. How would you rate the usefulness of the information that you receive?

not at all useful				very useful	not sure
1	2	3	4	5	9

25. Overall, how would you rate your experience working with Energy Trust?

not at all satisfied				very satisfied	not sure
1	2	3	4	5	9

26. (IF Q25 = 1 or 2) Why are you not satisfied working with Energy Trust?

27. (*Programmer: response is non-mandatory*) What about Energy Trust's work with energy efficient homes would you like to know more about?

28. (*Programmer: response is non-mandatory*) Do you have any recommendations for improving the EPS training or Energy Trust's communications with realtors?

Those are all of our questions. Thank you very much for your time and good information!

Appendix C: 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 D: 2014 - 2015 Builder Paths

EPS INCENTIVE OVERVIEW

2015 CASH INCENTIVES FOR ENERGY-EFFICIENT NEW HOMES

EPS Energy Performance Score

EPS,® brought to you by Energy Trust of Oregon, is an energy performance scoring tool 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-efficiency improvements installed during construction. Review the chart below for guidance on specifications that improve a home's energy performance and related incentives.

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 are available for building homes based on one of five prescriptive pathways, or based on a sliding scale of performance above code, starting at 10 percent improvement. Incentives will vary depending on energy-efficiency improvements.

	Path 1 or 10% Improvement	Path 2 or 20% Improvement*	Path 3 or 25% Improvement	Path 4 or 35% Improvement	Path 5 or 40% Improvement	Your Efficient Home Path
Potential Incentive†	$600	$1,200	$2,000	$4,000	$5,000	
Ceiling	R-49	R-49	R-49	R-60	R-60	
Wall	R-23	R-23	R-23	R-25	R-40	
Floor	R-30	R-30	R-30	R-38	R-38	
Window	U-0.30	U-0.30	U-0.30	U-0.25	U-0.20	
Gas Furnace	92 AFUE	94 AFUE	94 AFUE	94 AFUE	85 AFUE Non Ducted	
Heat Pump	8.5 HSPF‡	8.5 HSPF‡	8.5 HSPF‡	8.5 HSPF‡	9.0 HSPF Ductless Heat Pump	
Ducts	Mastic Sealed and Tested	Mastic Sealed and Tested	Ducts Inside and Sealed§	Ducts Inside and Sealed§	No Ducts	
High-Efficiency Lighting %	80%	80%	80%	100%	100%	
Gas Water Heater	0.61EF	0.82 EF	0.82 EF	0.82 EF	0.82 EF	
Electric Water Heater	0.93 EF	2.0 EF	2.0 EF	0.93 EF	0.93 EF	
Air Sealing ACH50	4.0	4.0	4.0	2.5	2.5	
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 service territory. Incentives are based on improvements in the home's annual energy use over minimum code requirements, as demonstrated by energy modeling. Incentives are subject to funding availability and may change. Incentive examples are based on the 2011 Oregon Residential Specialty Code.

*Achieving Northwest ENERGY STAR certification will qualify homes for Path 2 and will help guide you towards higher performance paths.
†Homes can qualify for an additional incentive of up to $200, if built to be solar ready. For more information, contact a program-approved verifier.
‡9.0 HSPF for Climate Zone 5.
§All HVAC equipment and ducting must be located inside a conditioned space to qualify for this path.

EnergyTrust of Oregon

EPS REQUIREMENTS AT A GLANCE

To receive an EPS and related Energy Trust cash incentives for a newly built home, the following items are required, if applicable to the project.

- ☐ **Compliance with Northwest ENERGY STAR Thermal Enclosure Checklist, TEC**
  - Some experienced EPS builders may fulfill this **requirement by:**
    - Meeting TEC Section 3 – Fully Aligned Air Barriers **and achieving final infiltration rates ≤4.0 ACH50**
    - Work with your verifier to determine your **eligibility**
- ☐ **A Blower Door test**
  - A Blower Door infiltration test must be performed by an Energy Trust approved verifier, HERS Rater, BPI **professional or other approved technician**
- ☐ **Insulation and framing inspections**
  - Intermediate framing: wall studs framed at **16" on-center; fully insulated headers, interior to exterior wall intersections and corners (two-stud or California Corners)**
  - Grade 1 insulation is required (no gaps, voids, **compression or misalignment)**
  - Spray-applied or loose-fill insulation is required in open web floor assemblies when ductwork is **installed within the floor system**
- ☐ **Duct sealing and testing**
  - Ducts must be sealed with mastic paste and **tested following Performance Tested Comfort Systems® PTCS, specifications**
- ☐ **Installation of zonal pressure relief**
  - Bedrooms with multiple supplies require either **a jumper duct, transfer grill, dedicated return or heat/energy recovery ventilator ducts**
  - Rooms with one supply, and without a return, require **a minimum 1" door undercut**
- ☐ **Heat pump commissioning**
  - Heat pump installation must meet PTCS or CheckMe!® **standards**
- ☐ **Non-ducted gas heating equipment requirements for primary space heat**
  - Sealed combustion or direct vent, located in the **main living area and controlled by a programmable thermostat**
  - Gas fireplaces must appear on the eligible models **list found here: *www.energytrust.org/epsfieldguide***
- ☐ **Combustion Appliance Zone, CAZ, testing**
  - Forced air operation must not depressurize the CAZ by more than -3 Pascals, Pa
  - Testing will align with PTCS protocol
- ☐ **Installation and verification of whole-house mechanical ventilation system**
  - Ventilation system must provide fresh air to the home **based on ASHRAE 62.2 calculations: ventilation cfm = (bedrooms +1)*7.5 + (0.01* conditioned area)**
  - Work with your verifier to determine specific **verification requirements for your ventilation strategy**
- ☐ **Heat pump water heaters**
  - Heat pump water heaters must appear on **Northwest Energy Efficiency Alliance's, NEEA,** Northern Climate Qualified HPWH list found here: ***www.energytrust.org/epsfieldguide***
- ☐ **Proper installation of solar ready equipment**
  - Projects must meet Energy Trust Solar Ready **Residential Installation Requirements and be labeled for verifier inspection**

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

Energy Trust of Oregon 421 SW Oak St., Suite 300, Portland, OR 97204 1.866.368.7878 503.546.6862 fax energytrust.org

Appendix E: 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.

EPS EnergyPerformanceScore
Brought to you by Energy Trust of Oregon

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.	0.61EF 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**.

EnergyTrust 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 2013