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MEMO

Date: January 22, 2009
To: Board of Directors
From: Sarah Castor, Market Research and Evaluation Analyst
Brooke Graham, Residential Marketing Manager
Subject: Staff Response to the 2008 Oregon Residential Awareness and Perceptions Study

The 2008 Oregon Residential Awareness and Perceptions Study was a joint effort between Energy Trust's Marketing and Communications group and our Evaluation group. The purpose of the study was two-fold: 1) to gather information about the level of awareness Oregonians have of Energy Trust and 2) to better understand attitudes and behaviors surrounding the topics of energy efficiency, renewable energy and climate change. In the past, staff has attempted to obtain some of this information through the survey portion of the Home Energy Solutions (HES) program evaluations and through an online Web site survey on our main residential page. However, these surveys were limited in that they were less comprehensive, only accommodated limited questions, and were not fully representative of the general population.

The 2008 Oregon Residential Awareness and Perceptions Study provides results based on a representative sample of both homeowners and renters from Energy Trust service territories throughout the state. We plan to repeat the survey on an annual basis to track changes in responses over time.

Of the population surveyed (approximately 1200), 28% were aware of Energy Trust and about 6% have participated in one of our programs. These figures are a few percentage points higher when the sample is limited to homeowners in our service territory. The highest awareness is concentrated mostly in the Portland Metro area, particularly among PGE customers. Awareness of Oregon Department of Energy Tax Credits, which have been in existence for approximately 30 years, was more than double the awareness of Energy Trust in our roughly 7 years.

From survey results, it is clear that Oregonians are concerned about their home's energy bills and believe that global warming is real. However, it does not appear that consumers currently associate energy efficiency as a high priority action to be taken in response to global warming. Energy Trust's challenge is to leverage concerns expressed about global warming and link them to awareness of energy efficiency and renewable energy as ways of reducing carbon emissions. Such connections in messaging could help leverage increased program participation among certain consumers.

To further focus on different consumer types, the survey responses identified five customer segments, three of which were recommended for targeting. Energy Trust marketing staff will develop marketing messages for the target segments and test them through focus groups or an additional survey. As part of the current survey, respondents were asked about willingness to participate in future surveys or focus groups and contact information was collected from those who were willing. This information has been paired with each respondent's customer type, enabling Energy Trust to quickly put together an interview or sample survey group.

The study also revealed that many Oregonians are unfamiliar with the term "CFL", even when they had installed such light bulbs in their home. This was equally true for all customer

segments. Through the same focus groups or an additional focus group, staff would like to further explore consumers' knowledge and use of energy terminology. This information would aid future survey development as well as communications with customers.

In the next survey, we plan to reduce the number of questions on past Energy Trust participation and develop more questions about factors which influence customer decision making about home upgrades and purchases. This will assist us in understanding and potentially helping remove barriers toward taking action.

research/into/action inc

Final Report

2008 Oregon Residential Awareness and Perception Study

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We would like to thank the Energy Trust of Oregon, Inc. for conceiving of this project and giving us the support needed to conduct it. Abt SRBI, Inc. conducted the interviews, which were ably managed by Carla Jackson, Laurie Lago of Business Service Bureau edited and produced the report; we are very grateful for their efforts on this project. Finally, we wish to acknowledge the many citizens of Oregon who agreed to participate in the survey and provided their responses to our questions; we appreciate their willingness to participate.

ACKNOWLEDGEMENTS

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ES EXECUTIVE SUMMARY

This report provides the results from the analysis of the 2008 Oregon Residential Awareness and Perception Study. In April 2008, Energy Trust of Oregon, Inc. (Energy Trust) commissioned a team of researchers, led by Research Into Action, Inc., to conduct the first residential research to gauge general awareness and perceptions of energy efficiency and renewable energy among Oregon residential households. A total of 1,205 interviews were completed by Research Into Action's subcontractor Abt SRBI, Inc. during July through September 2008. The goal of this report is to provide findings and recommendations useful to improving Energy Trust's marketing activities and energy-saving goals in the residential sector.

SUMMARY OF FINDINGS

Based on response to the survey, we estimate that about 6% of Oregonians have participated in Energy Trust programs and about 28% of Oregonians are aware of Energy Trust, with 71% aware of the Oregon State Energy Tax Credit program. Participants expressed satisfaction with the program and over 60% have recommended participation to people outside of their household.

A variety of differences were found between participants in Energy Trust programs and those who have yet to participate. The following highlights some of the important findings:

Energy Trust Awareness and Participation

- Households that are aware of Energy Trust are more highly concentrated in the Portland metropolitan region. Energy Trust awareness was significantly higher among PGE customers and lower among other utility customers, particularly those of EWEB.
- The most frequently cited medium through which households first learned about Energy Trust was from utility inserts and other direct mail.
- Households with electric providers other than PGE have significantly lower participation rates in Energy Trust programs.
- Characteristics associated with homeownership are common among participants: they are more likely to be single-family home dwellers, middle-aged primary householders, more educated, and have higher household income.
- Nonparticipants are more likely to live in non-single family dwellings, have less household income and education, to be either older or younger than average, and to use electricity for heating.

- Households that use natural gas as their primary energy source for heating are more likely to participate in Energy Trust programs.
- Participants seem to be highly satisfied with Energy Trust services.

Attitudes, Belief, and Behaviors

- Participants are more motivated to reduce their energy bill by installing efficient measures compared with nonparticipants, but their conservation attitudes and behaviors are the same as or worse than nonparticipants'.
- Nonparticipants appear to be trying to reduce energy use by conservation actions, but not able to employ efficiency measures, primarily because of a cost barrier.
- Nonparticipants hold more skeptical views than participants do toward "energy-efficient" products in cost, availability, and comfort.
- More households in the Portland metropolitan and Willamette regions are convinced that Global Climate Change is real, compared to those that reside in the Southern or Eastern parts of the state. Oregon households, on average, hold about the same level of conviction as the national average. There appears to be no difference in the conviction that Global Warming is real between participants and nonparticipants.

Green Power and Renewable Energy Option Programs

- Participation in Green Power programs ranges from 7% to 17%. Among EWEB customers, awareness of such a program is significantly lower than for other electric utilities.
- Participation and awareness among NW Natural customers of the renewable energy option program is very low.

Market

- More than half of the nonparticipants' primary news source is television. Participants rely more on paper media and public radio.
- Half of the participants express the intention to participate in Energy Trust programs in the near future by doing more efficiency improvements to their homes, whereas less than a quarter of nonparticipants have the intention to do so.

Energy Consumption

- Owner-occupied households have significantly more high energy consumers compared with renter-occupied households. Renter-occupied households use considerably less energy and this is consistent regardless of housing type.

- ➡ Regional differences in energy consumption of owner-occupied households are significant. The Portland metropolitan area and Willamette/North Coast regions have the highest concentration of high consumption owner-occupied households, and the Southern and Eastern regions have low concentrations of high consumption households.
- ➡ High consumption owner-occupied households are significantly more highly educated, with higher incomes.
- ➡ Very few differences in Energy Trust awareness and participation, energy use attitudes, perceptions, and behaviors were observed between low and high energy consumption households.

CONCLUSIONS AND RECOMMENDATIONS

The main findings from the analysis suggest that Energy Trust has significant challenges, as well as opportunities for marketing and energy saving. The results suggest that the public is concerned about their energy use and the problem of Global Warming is becoming a more pressing issue to them. This signifies the importance of future efforts to inform the issue of energy efficiency and promote changes in their behaviors. In this light, we offer the following conclusions and recommendations:

Conclusion 1: **Five distinct market segments have emerged, which may have important implications to Energy Trust marketing strategies.**

- ***Strugglers*** **(renter-occupied households) – have low to moderate market attractiveness**
- ***Progressive Savers*** **(low energy consumption lifestyle) – have low to moderate market attractiveness**
- ***Main Street Oregonians*** **– are one of the most attractive market segments**
- ***Willing and Able*** **– are one of the most attractive market segments**
- ***Comfortably Established*** **– are the most attractive market segment**

➡ ***Recommendation 1:*** **Give the highest priority to reach the *Comfortably Established*, and then *Main Street Oregonians* and *Willing and Able*. If resources allow, provide CFLs particularly to *Strugglers* to enhance knowledge and gain savings.**

Conclusion 2: **The public is confused by terminologies commonly used in the energy efficiency industry.**

➡ ***Recommendation 2:*** **Prior to implementing future surveys, efforts should be made to test the terms used in the instruments that consumers use to describe energy efficiency, and energy conservation actions and behaviors. Brainstorm industry assumptions with focus groups to enhance survey effectiveness.**

Conclusion 3: **The increasing use of cell phones as primary household phone lines challenges obtaining representative samples.**

- ➡ ***Recommendation 3:*** **Employ more rigorous sampling techniques by including sample quotas for demographic variables that are available in census data, such as for householder's age and housing structure. Use of other advanced data collection technologies – such as web surveys or purchasing cell phone numbers – that allow for reaching cell phone-only households could be used in conjunction with traditional RDD techniques.**

Conclusion 4: **A short survey is good for respondents, but not necessarily good for addressing every question.**

- ➡ ***Recommendation 4:*** **Continue to use respectful, short surveys, but limit questions on participation and focus on behavior, awareness, decision-making, and market barriers.**

1 INTRODUCTION

In April 2008, Energy Trust of Oregon, Inc. (Energy Trust) commissioned Research Into Action, Inc. and a team of researchers: Dethman & Associates, Abt SRBI, Inc., and Loren Lutzenhiser to conduct its first general residential research to gauge general awareness and perceptions of energy efficiency and renewable energy among residential customers within Energy Trust's service territory in Oregon.

PURPOSE OF THIS STUDY

In the past, Energy Trust has generated market-specific data during evaluation efforts that surveyed program participants, as well as nonparticipants. It has also previously commissioned market research examining residential consumers in specific markets. These efforts have provided sporadic and piecemeal results; past surveys generally could not accommodate many questions other than those needed for the specific evaluation. This is the first study Energy Trust has commissioned that was aimed at resolving these deficiencies and producing research that will help Energy Trust understand its customers' general level of interest and awareness regarding energy efficiency, renewable energy, climate change, and related topics. Study results will be used to help design and support marketing and implementation of current and future Energy Trust programs and campaigns. The results will also serve as a benchmark for future tracking surveys.

From these study goals, a number of research areas with associated questions emerged through discussions with Energy Trust staff and the Research Into Action team. Specific study areas and research focus include:

- Awareness of Energy Trust
- Energy efficiency program participation, motivation, and barriers for participation
- Energy use behaviors and attitudes toward energy
- Awareness of and perception toward energy-using household equipment and items
- Awareness of and perception toward renewable energy
- Belief toward global warming/ecology
- Customer demographics

In addition, this study aims for development of meaningful market segmentation. The results are used to identify patterns of differences that can be captured to create homogeneous subgroups that can be leveraged for Energy Trust's marketing and public relations effort.

ORGANIZATION OF THIS REPORT

This report is organized into the five sections. Following this introductory chapter, we discuss the methodology of the study, including the sampling plan. The third and fourth chapters present the findings – Chapter 3 focusing on a question-by-question analysis and Chapter 4 focusing on the integration of the energy consumption and segmentation analyses. Chapter 5 presents our conclusions and recommendations. The appendices include the questionnaire, banners, and additional analysis of consumption data.

2 METHODOLOGY

This chapter describes detailed procedures that governed data collection and analysis to ensure the research produced a representative sample, reliable data, and sound analyses.

SURVEY INSTRUMENTS

The process of developing survey questions began by identifying the high level inquiries and assumptions about energy efficiency and renewable energy that are of interest to Energy Trust. During the initial kick-off meeting, a long list of ideas was offered by Energy Trust's program staff as to the issues Energy Trust would like addressed. The Research Into Action team then refined those ideas by identifying common themes and associated research questions (Appendix A). The resulting document guided our survey development effort.

As a next step, we reviewed existing residential studies and survey instruments that have been used in the past or are currently in use by Energy Trust to extract any questions that have been refined and might address the research issues. These questions largely provided a basis for the draft survey; appropriate modifications were made to address issues specific to this research and several newly developed questions were added to cover previously unexplored areas. The past studies that served as references included:

- *Residential Segmentation Questionnaire, Puget Sound Energy, 2008*
- *Residential Website Survey, Energy Trust of Oregon, 2007*
- *2006 Energy Conservation, Efficiency, and Demand Response, Schulman, Ronca and Bucuvalas, Inc., 2006*
- *Measuring Endorsement of the New Ecological Paradigm: A Revised NEP Scale, Dunlap, 2000*
- *2001 Residential Energy Consumption Survey, U.S. Department of Energy, Energy Information Administration, 2001*
- *2004 California Statewide Residential Appliance Saturation Study*
- *The Polls—Trends: Twenty Years of Public Opinion About Global Warming, Public Opinion Quarterly, Fall 2007, Volume 71*

Energy Trust and several utility stakeholders reviewed the preliminary research instruments and discussed priorities (trade-offs, deletions, and additions) with the Research Into Action team to ensure that the survey, with a constraint of an average length of 15 minutes, would best address

Energy Trust's research goals. Based on these discussions, Research Into Action then finalized the research instrument.

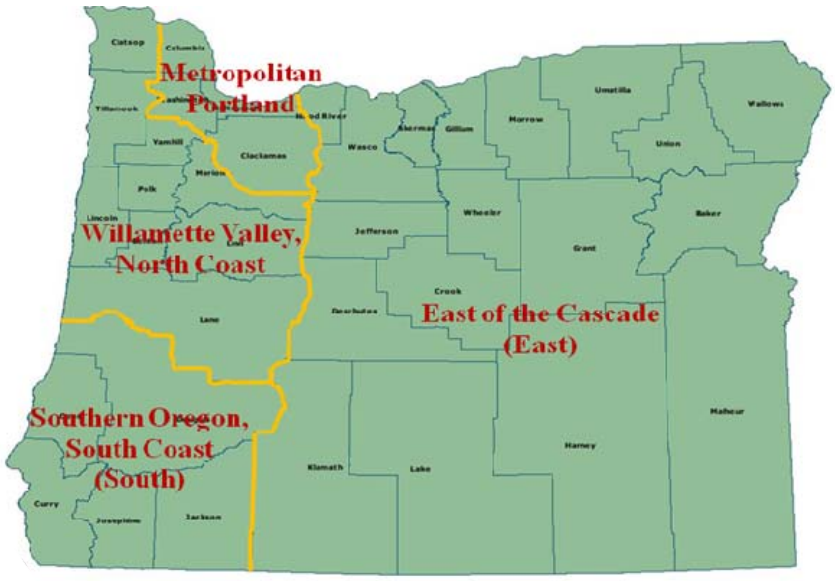
The survey primarily asked questions in a closed-ended format, with a few opportunities for verbatim responses. Questions were included to screen respondents to ensure that they were the decision-makers about energy use in the household and that the households were primarily used as residences, not for business. In addition, a Spanish version of the survey was administered to Spanish-speaking households to accommodate this growing portion of the Oregon population. (The survey instrument can be found in Appendix B.)

SAMPLING

A strict sampling method was employed to ensure the sample population was representative of Energy Trust's target population in its residential market.

Energy Trust covers the service territories of five of Oregon's private investor-owned electric and gas utilities – Portland General Electric (PGE), PacifiCorp, NW Natural, Cascade Natural Gas, and Avista. Though scattered throughout the State of Oregon, Energy Trust serves most of the metropolitan areas in the state. Using ZIP codes, four geographic areas were identified as useful categories, those in: Metropolitan Portland, Willamette Valley/North Coast, Southern Oregon/South Coast, and East of the Cascades (see Figure 2.1; detailed county and ZIP code information is attached in Appendix C).

Figure 2.1: Four Regions for Sampling



Another issue that was deemed important to consider for sampling was to ensure a representative ratio of homeowners and renters. In recent surveys, reaching renters has become increasingly

difficult, with fewer renters having traditional telephone services and being less well represented in purchased lists.

With these two quota variables in mind, SRBI,[1] the contractor who performed the surveys, attempted to reach potential household respondents using a list produced by the RDD (Random Digit Dialing) method. The RDD list provided ZIP codes that were used to manage the geographic quota. The rental unit quota was tracked by a screening question.

After the originally intended sample size (n=1,000) was reached, the proportion of rental unit samples deviated greatly from the census. Therefore, SRBI purchased an additional set of lists specifically containing residents of rental housing to collect an additional 200 renter samples to correct the imbalance. Meeting renter quotas for each region resulted in 1,205 completes. However, once the sample was analyzed, we observed significant differences in some demographic characteristics within the renter samples between the RDD samples and list samples, specifically in the primary householders' age and the housing structure of the households. By employing a post-stratification weighting method, we calculated weights of known strata of the population to adjust the sample data to conform more to the population's parameters. (A detailed procedure and calculation of post-stratification is attached in Appendix D.)

A final sample size of 1,205 was proportional to the population in each region and by homeowner/renter, and these were matched as closely as possible with the proportions provided in the U.S. Census Bureau's Decennial Census 2000. Table 2.1 shows the census, samples, and weighted samples. This sample size is adequate to ensure an overall confidence level of 95%, with ±3% precision and ±5% precision within each geographic region.

Table 2.1: Sample Quota

SEGMENT	METROPOLITAN PORTLAND	WILLAMETTE VALLEY / NORTH COAST	SOUTHERN OREGON / SOUTH COAST	EAST OF THE CASCADES	TOTAL
CENSUS 2000					
Percent of State Population	44%	30%	13%	13%	100%
Average Percent of Rental Units Per County	38%	36%	31%	31%	36%

Continued

[1] Abt SRBI, Inc. is a full-service national survey research organization, with its headquarters in New York City and operations in nine other U.S. cities.

SEGMENT	METROPOLITAN PORTLAND	WILLAMETTE VALLEY / NORTH COAST	SOUTHERN OREGON / SOUTH COAST	EAST OF THE CASCADES	TOTAL
SAMPLE					
Sample Population	493	383	169	160	1,205
	41%	32%	14%	13%	100%
Renter Sample	119	152	58	44	373
	24%	40%	35%	28%	31%
WEIGHTED SAMPLE					
Weighted Population	530	361	160	153	1,204
	44%	30%	13%	13%	100%
Renter Sample	202	129	50	48	429
	39%	36%	31%	31%	36%

DATA COLLECTION AND ANALYSIS

The telephone interviews were conducted from Abt SRBI's call center using trained, professional survey managers and interviewers, who use a computer-assisted telephone interview system (CATI). In order to maximize meaningful participation in the survey, all staff were thoroughly trained as to the nature of the study, the importance of the information being collected, and management of the sample.

Prior to the full-scale fielding, 20 pretest surveys were conducted to identify any problems with respondents' (and interviewers') understanding of questions or issues with the survey length. Some modifications were made to questions, based on the results of the pretest, but these were insignificant and the total number of pretests was included in the final dataset.

The fielding was conducted from July 7 to September 10, 2008, during the day, evening, and weekend hours to reach as many targets as possible. To counteract non-response bias, a minimum of five attempts per telephone number was made to complete the surveys with the least amount of samples necessary. The average length of the survey was 19 minutes, including the screening questions. The participation rate[2] was 58.3%. (Detailed final dispositions are given in Appendix E.)

[2] The participation rate was calculated by treating the numerator as all respondents who completed required survey questions, while treating the denominator as those who completed required questions, those who began but terminated before completing all required questions, and those who refused entirely. This is a standard response rate calculation method set by the Council of Applied Statistical Research Organizations (CASRO).

The completed survey data was analyzed using statistical software, *SPSS Version 16*. All procedures employed for the step-by-step data cleaning and data transformation, and statistical analyses were documented in its syntax file. The analytic approaches are explained in more detail in Section 3.

3 QUESTION-BY-QUESTION FINDINGS

This chapter describes the results of the survey with a question-by-question analysis. Whenever possible, we make comparisons of the variables by demographics, participants and nonparticipants, census, and other available statistics, and then conduct a statistical analysis of the differences between given assumptions about awareness and participation, energy use, behavior, and perception.

QUESTION-BY-QUESTION ANALYSIS

Though each question was treated independently most of the time, we needed to combine some questions or further transform data by recoding or computing variables in order that responses to some questions provide meaningful information. The analysis includes the following subsections:

- *Analysis of Energy Trust Participants*
- *Energy Trust Awareness and Program Participation*
- *Use of Energy*
- *Perception and Attitude Toward Energy Efficiency and Renewable Energy*
- *Belief in Global Warming*
- *Market Conditions*

Analysis of Energy Trust Participants

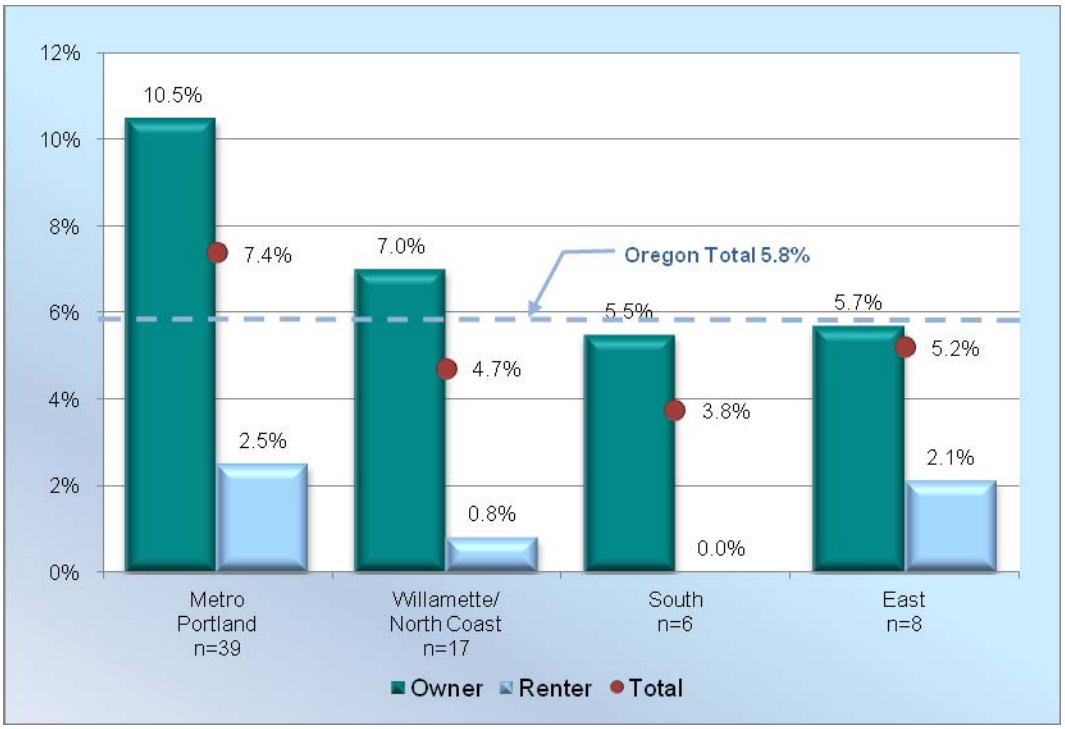
The respondents who reported they have participated in Energy Trust programs or received an incentive check from Energy Trust were considered participants in Energy Trust programs.[3] Of all respondents, the Energy Trust participation rate in the entire state of Oregon was 6%. Of those who have heard of Energy Trust, 21% were participants.

Figure 3.1 shows the Energy Trust program participation rate of all household respondents by region and homeownership. Though Metro Portland households seem to have a much higher

[3] This estimation method of participation does not take into account that oil-heated homes and households outside of Energy Trust territory are not eligible for participation. Also, the respondents who said they had only participated in Energy Trust programs before 2004 (over five years ago) were not counted as participants because they could only have participated in their utility's programs, not in any sponsored by Energy Trust.

participation rate than the other three regions, these differences were not statistically significant. However, in all four regions, owner-occupied households have significantly higher participation rates than renter-occupied households ($p<.05$). Given the difficulty for renters to make investments in their homes, this difference is to be expected.

Figure 3.1: Energy Trust Program Participation Rate by Region



We also looked at the participation rates within each electric utility (Figure 3.2). Respondents whose electric provider is PGE have a significantly higher participation rate (8%). Customers with electric utilities other than PGE have lower than the state total participation rate – PacifiCorp customers were at 5% and no Eugene Water and Electric Board (EWEB) customers reported participation in Energy Trust programs. "Other" electric providers constitute all other coops or public utilities in the state; just 3% of these utilities' customers reported they have participated in Energy Trust programs.[4] Significantly higher participation among owner-occupied households was consistent in all electric providers.

Participation rate by each natural gas provider was also examined (Figure 3.3).

[4] Energy Trust does not provide electric energy reduction services to EWEB or public electric utilities or coops in Oregon. However, some customers of EWEB or public electric utilities and coops qualify for gas energy efficiency services if they purchase natural gas from NW Natural, Avista, or Cascade Natural Gas.

Figure 3.2: Energy Trust Program Participation Rate by Electric Utility

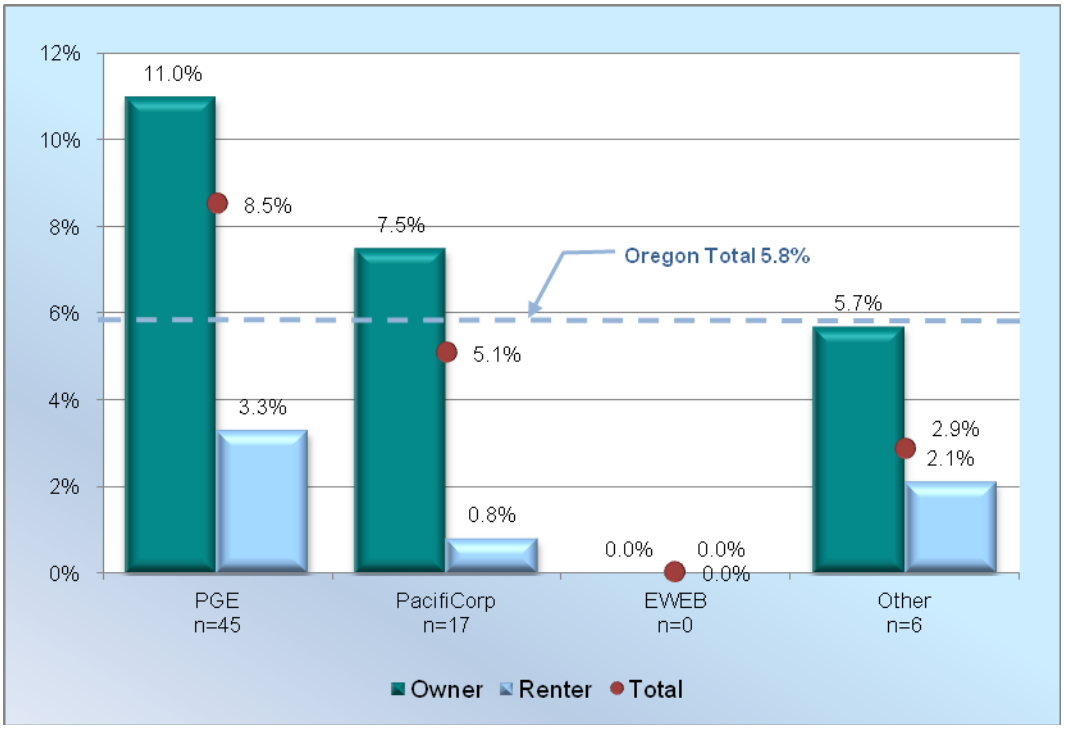
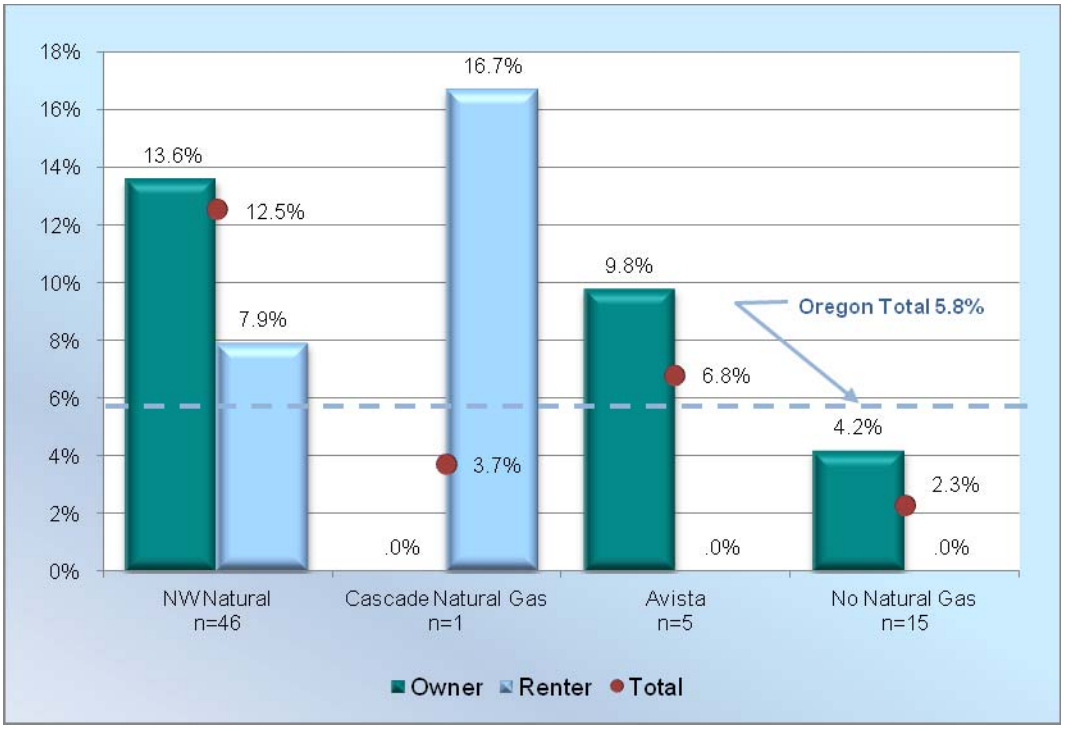


Figure 3.3: Energy Trust Program Participation Rate by Natural Gas Utility

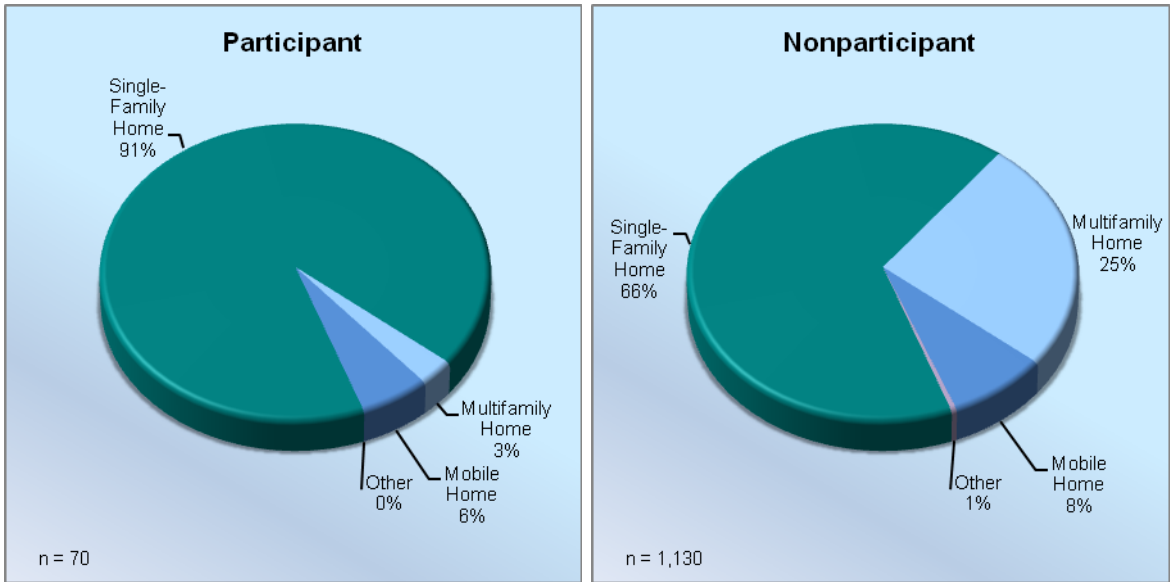


Among customers of NW Natural and Avista, participation rates in Energy Trust programs were higher than the state total. Though the renter bar seems high, only one responding customer of Cascade Natural Gas (n=27) reported participation.[5] Overall, the differences in participation among natural gas utility providers were not significant. However, significant differences in participation between owner-occupied and renter-occupied households were again consistent findings.

To examine the characteristics of participants further, several demographic variables were compared between participants and nonparticipants.

First, as shown in Figure 3.4, housing structures in which participants live are significantly different from those in which nonparticipants live ($p<.05$). More than 90% of participants' homes are single-family homes; only a fraction of them live in multifamily homes (3%). For nonparticipants, single-family homes are still the dominant structural type (66%) and a quarter (25%) live in multifamily dwellings. Whether participants or nonparticipants, mobile homes constitute a relatively small percent in the state (6% and 8%, respectively).

Figure 3.4: Housing Structure by Energy Trust Participation

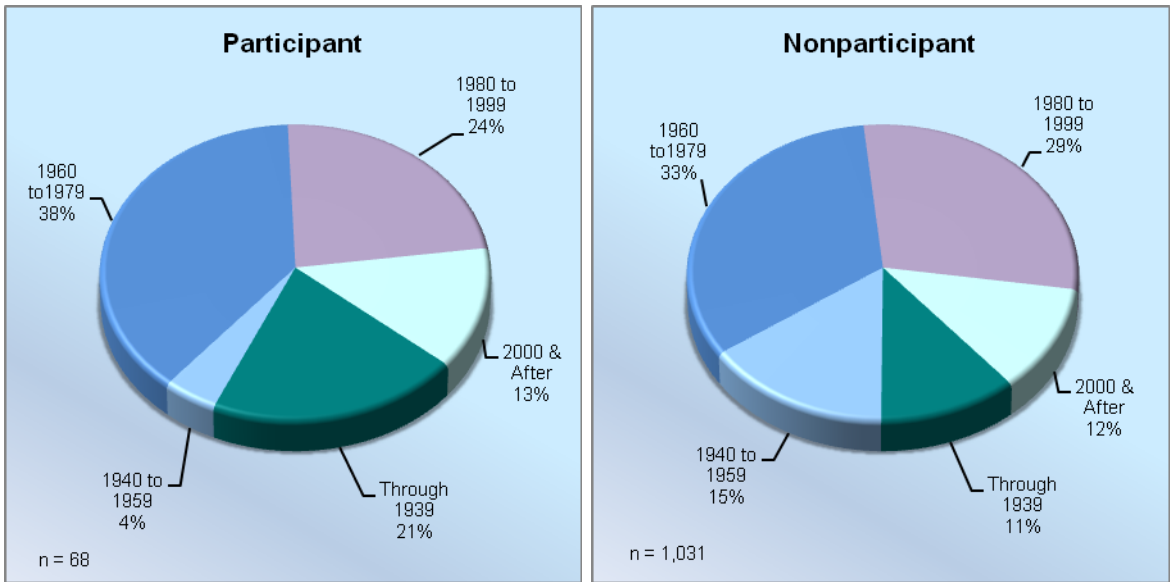


Second, ages of homes were compared between participants and nonparticipants (Figure 3.5). Though homes built between 1940 and 1959 are less prevalent among participants and this appears to cause the significant result ($p<.05$), overall ages of homes seem very similar between participants and nonparticipants. It is likely that the proportion of homes built after 1960 is high

[5] Energy Trust recently started serving Cascade Natural Gas in mid-2006.

due to the greater percent of sample households located in the Portland area, where a substantial percent of housing stocks was added after 1960.

Figure 3.5: Year Home Built by Energy Trust Participation



Third, participant householders' age distribution was not different from nonparticipant households (Figure 3.6). Yet, householders aged 50 to 69 seem to be slightly more actively engaged in efficiency measure installations.

Figure 3.6: Primary Householder's Age by Energy Trust Participation

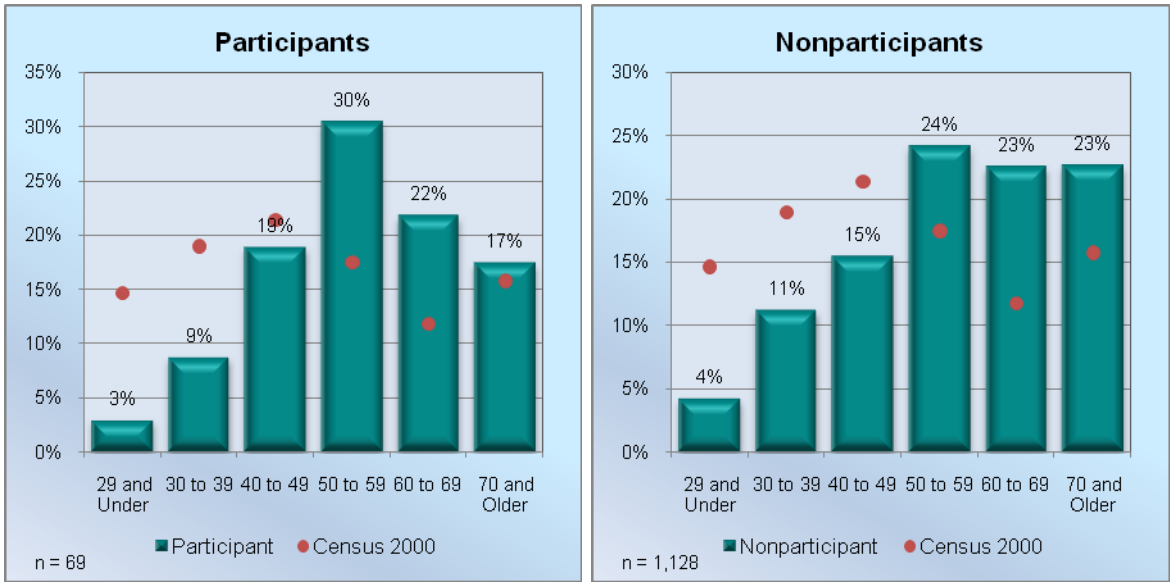
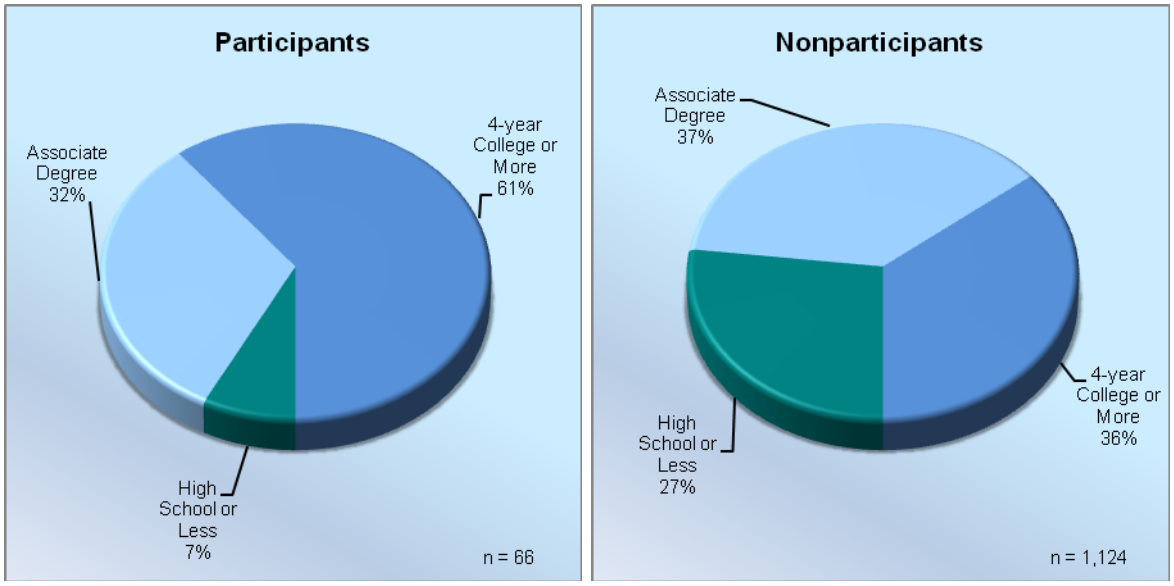


Figure 3.6 also illustrates a comparison with 2000 census data, where the sample householders seem to be older in age than the census population. This is most likely caused by the sampling challenge posed by a growing cell phone usage among young people. With the RDD sampling method, older households have disproportionately higher chances of selection. This sampling issue will be discussed at greater length in Chapter 5.

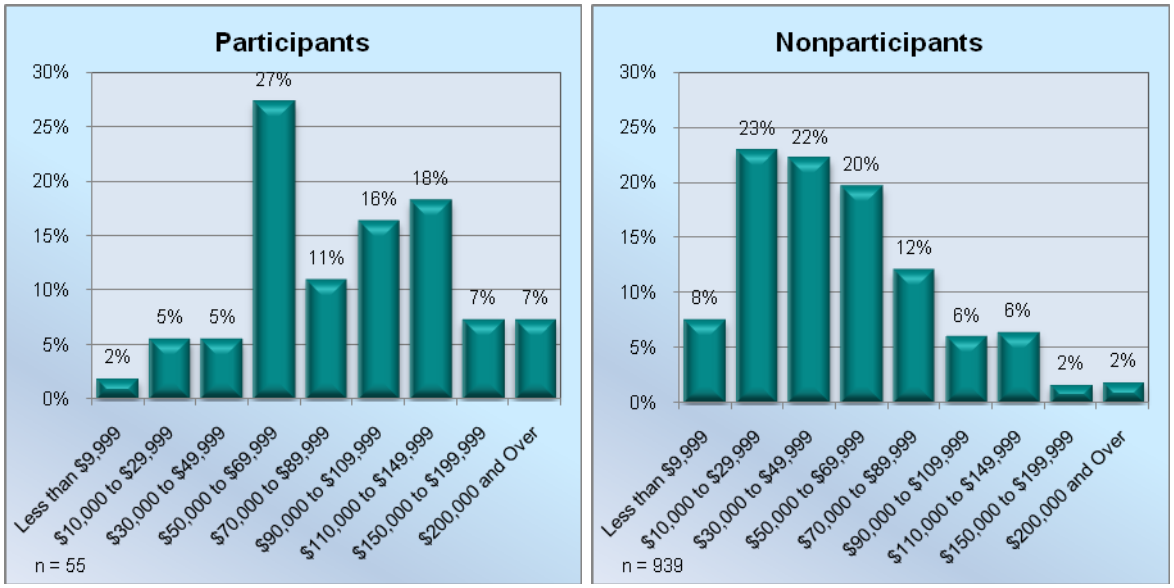
Fourth, Figure 3.7 shows that participants have significantly higher education compared with nonparticipant householders ($p<.05$). Few participants have high school or less education (7%) and more than 60% of the participants have at least a four-year college degree. A much higher percentage of nonparticipants have only high school or less education (27%) and a much smaller percentage of nonparticipant householders have graduated a 4-year college (36%) compared with participants.

Figure 3.7: Education Level of Primary Householder by Energy Trust Participation



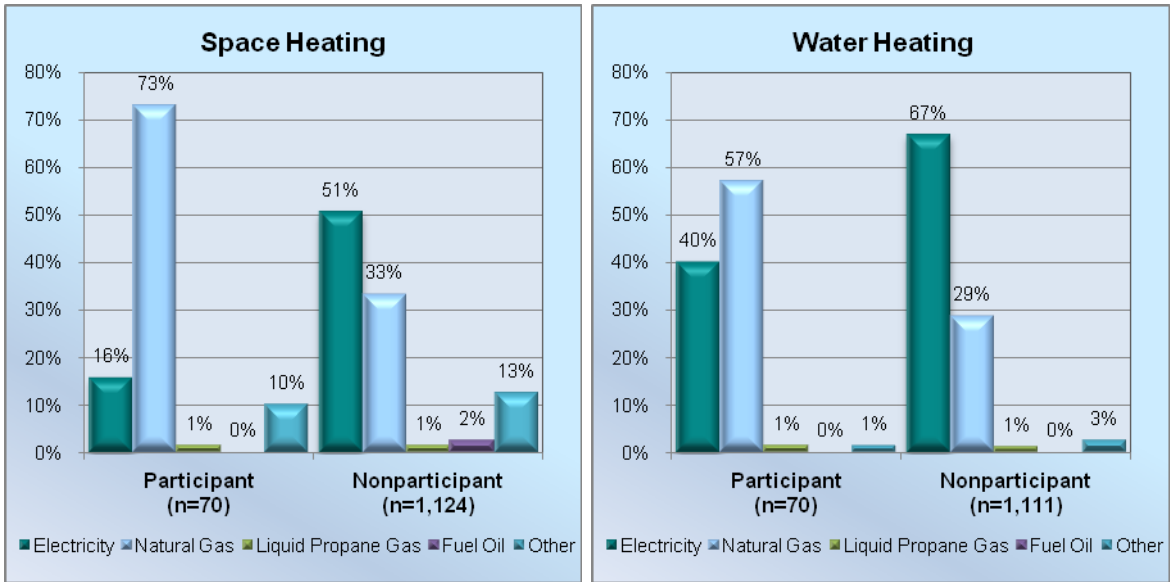
Fifth, household incomes were compared between participant and nonparticipant households (Figure 3.8). Participants' household income is significantly higher than that of nonparticipants ($p<.05$). Most participants' household income exceeds $50,000, whereas the most prevalent income range for nonparticipant households was $10,000 to $70,000.

Figure 3.8: Household Income by Energy Trust Participation



Finally, differences in fuel types used for heating between participant and nonparticipant households were examined. As shown in Figure 3.9, for both space and water heating, households with natural gas reported a significantly higher likelihood of participation in Energy Trust programs ($p<.05$). Specifically, for space heating, 73% of participants reported they use natural gas, while 33% of the nonparticipants reported use of natural gas for space heating. Further, only 16% of participants, versus 51% of nonparticipants, reported heating their homes with electricity.

Figure 3.9: Primary Energy Source for Heating by Participation

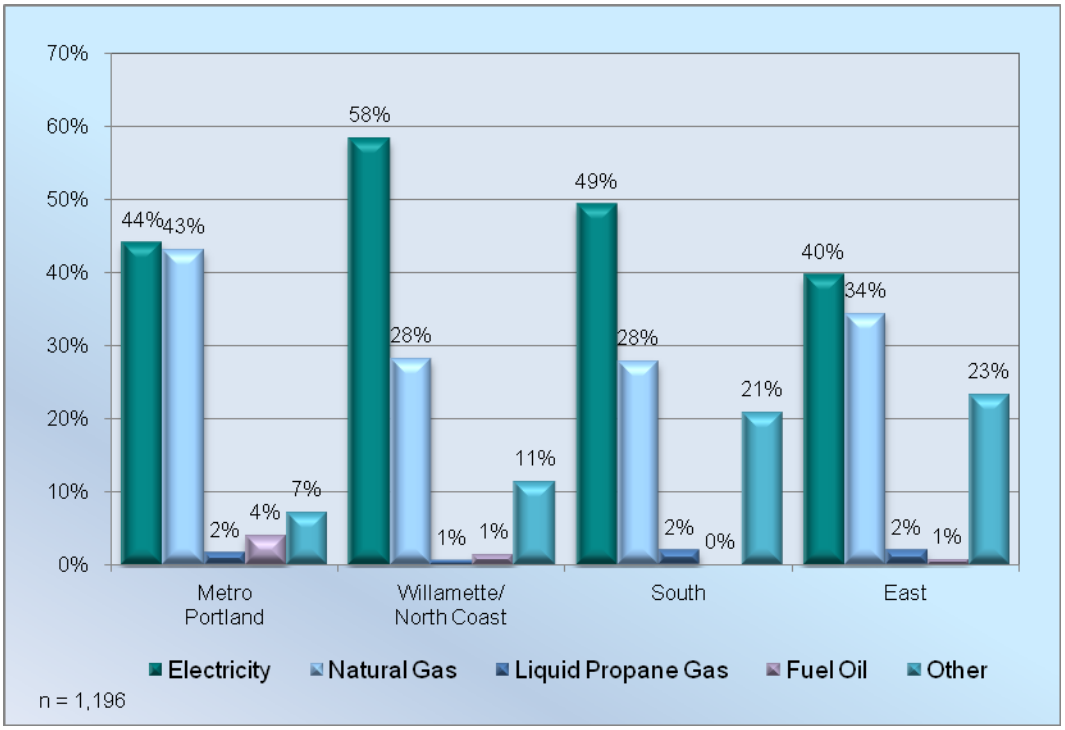


Similarly, for water heating, high usage of natural gas among participants (57%) and high usage of electricity among nonparticipants (67%) were reported.

In addition, Figure 3.10 and Figure 3.11 examine prevalent heating sources in each of the four geographic regions.

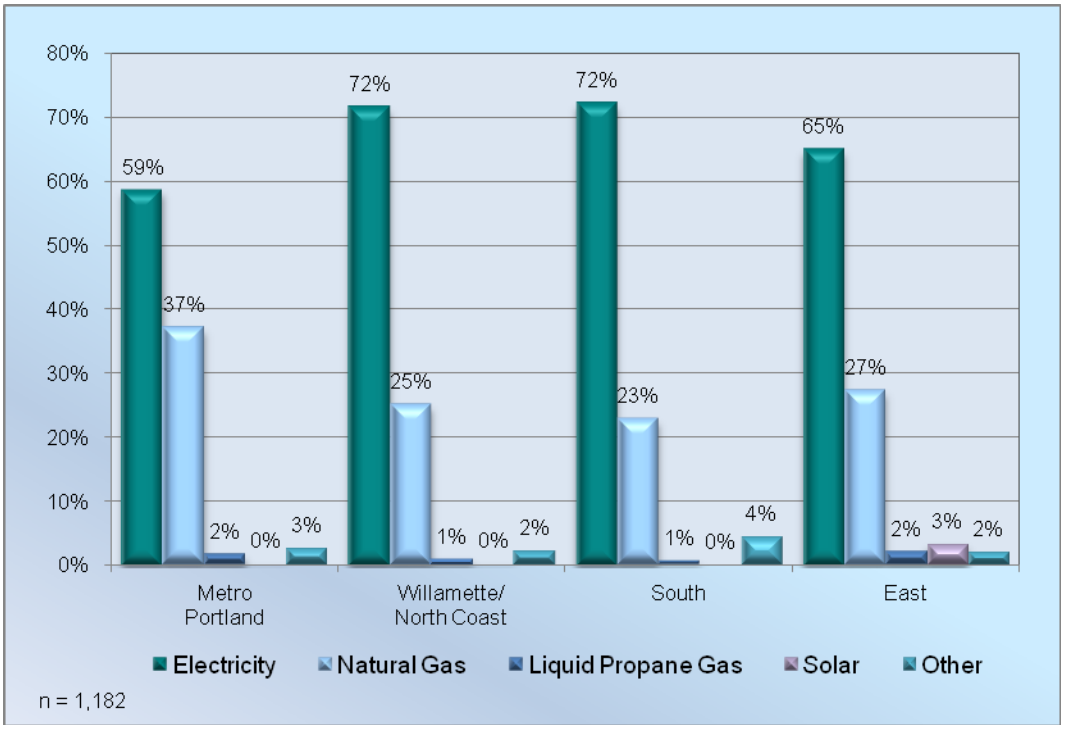
For space heating (Figure 3.10), electricity is the most common source of energy in all areas of Oregon. In Metropolitan Portland and the East, electricity and natural gas are equally important fuel types for space heating. In Willamette/North Coast and the South, percentages of electrically-heated homes far exceed other fuel types (58% with electricity and 28% with natural gas in Willamette/North Coast, and 49% with electricity and 28% with natural gas in the South). In South and East Oregon, in particular, a significant portion of homes are heated with "other" fuel, which is most likely wood (21% in the South and 23% in the East). These regional differences in prevalent fuel types for space heating were significant ($p<.05$).

Figure 3.10: Primary Energy Source for Space Heating



For water heating (Figure 3.11), use of electricity far exceeds the use of natural gas and other fuels in all four regions. Though the Metropolitan area has more homes with natural gas water heating than other areas (37%), electricity is still the most prevalent fuel type (59%). In the other three regions, this trend is more dramatic – 65% to 72% of homes have electric water heaters, and 23% to 37% have a natural gas water heater. Another thing worth noting is that in Eastern Oregon, 3% of homes utilize solar for water heating, while this is nonexistent in other regions. Overall differences in fuels used for water heating in each region were significant ($p<.05$).

Figure 3.11: Primary Energy Source for Water Heating



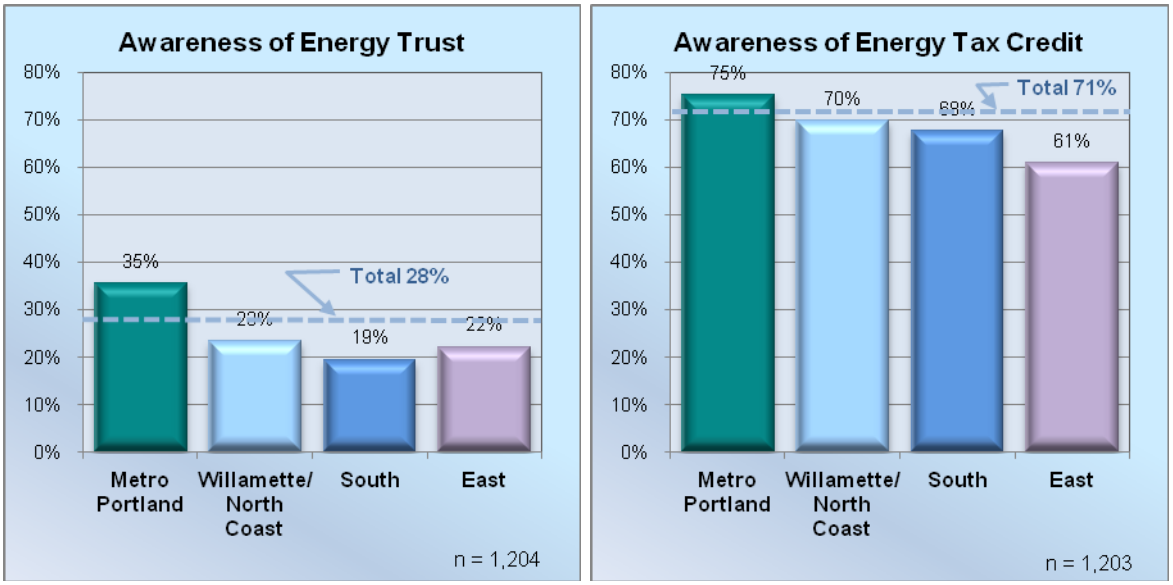
Awareness of Energy Trust and Program Participation

This section discusses responses that relate to respondent's awareness of Energy Trust and their experiences of program participation.

Awareness of Energy Trust

Figure 3.12 shows respondents' awareness level of Energy Trust and the Energy Tax Credit in each geographic region. The Portland metropolitan area has by far the highest awareness of Energy Trust (35%). In other regions, 19% to 23% of the households reported an awareness of Energy Trust. The regional differences in awareness level were found to be significant ($p<.05$). Overall, 28% of total Oregon households were aware of Energy Trust. In contrast, 71% of total Oregon households were aware of the State Residential Energy Tax Credit Program.

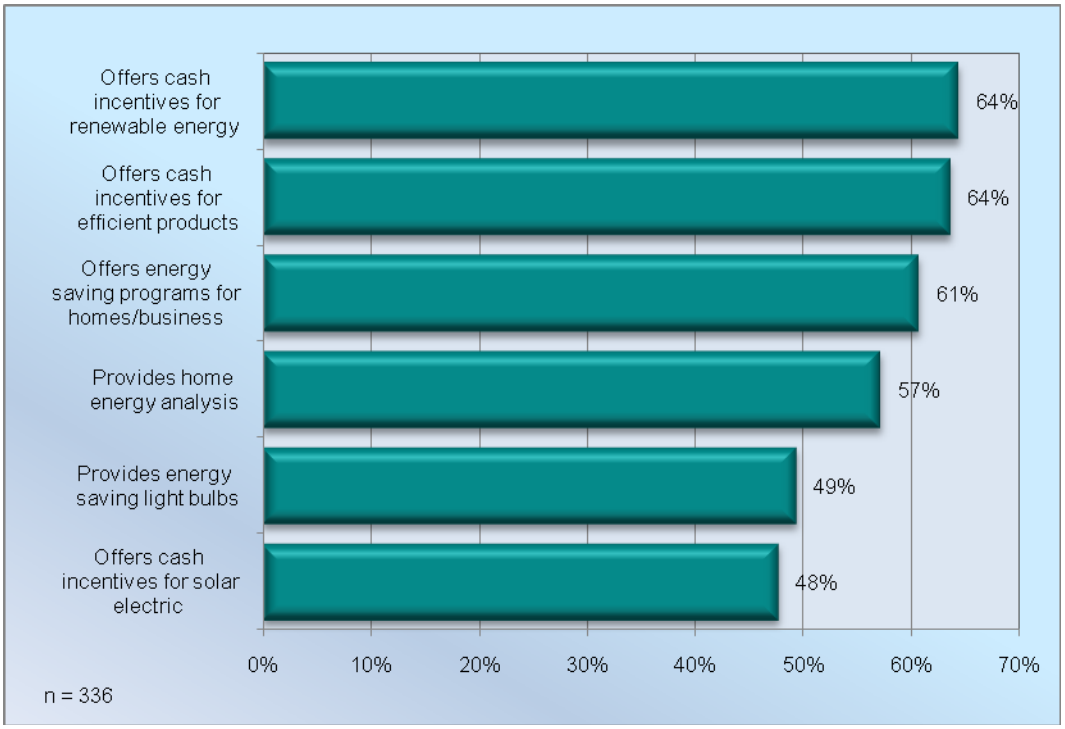
Figure 3.12: Awareness of Energy Trust and State Energy Tax Credit by Region



Those who reported they were aware of Energy Trust were further asked whether they had heard about specific facts about Energy Trust provided by the interviewer.[6] Figure 3.13 shows each statement asked of respondents and the percentages of those who said "yes." Sixty-one percent reported their general awareness of what Energy Trust does – "offering energy saving programs for homes and businesses." In more specific areas, 64% reported their awareness of Energy Trust offering cash incentives and promoting renewable energy, and providing cash incentives for installing energy-saving products. Fifty-seven percent said they know Energy Trust "provides home energy analysis and recommendations." Less than half were aware that Energy Trust provides energy saving light bulbs (49%) and that it offers cash incentives and promotes solar electric (48%).

[6] The order of the statements was randomized.

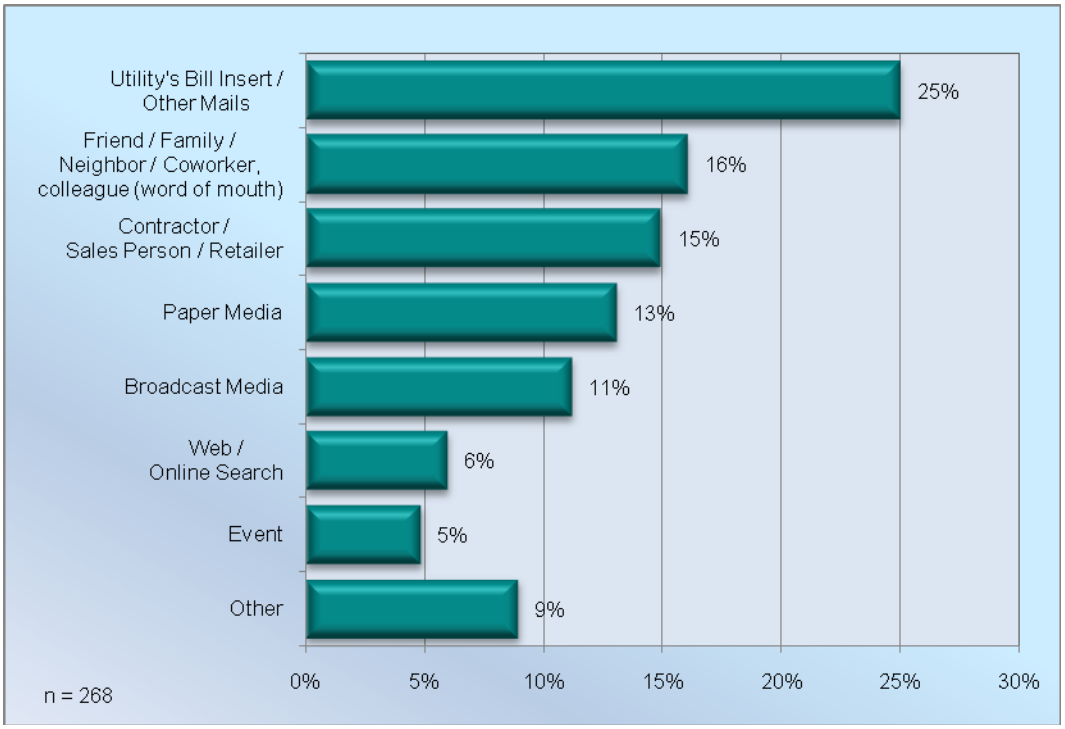
Figure 3.13: What They Know About Energy Trust?



For those aware of Energy Trust, we asked how they first heard about the organization and its programs (Figure 3.14).[7] The most frequently reported medium through which they first learned about Energy Trust was utility inserts and other direct mail (25%). Sixteen percent cited various forms of word-of-mouth – through a friend, family member, neighbor, coworker, or colleague. Fifteen percent said specifically they heard from their contractor, salesperson, or retailer. Thirteen percent cited paper media, which includes magazines and newspapers. Eleven percent became acquainted through broadcast media (TV and radio). Six percent reported they learned from a website or online search engine. Five percent said they learned of Energy Trust at an event.

[7] No options were provided and only one answer was recorded.

Figure 3.14: How They First Heard About Energy Trust



Program Participation

For those who reported their participation in Energy Trust programs, several follow-up questions were asked.

Figure 3.15 shows the responses to the question: "How important are the following reasons why you participated in the Energy Trust program?" Since the respondents were asked to provide their answers using a 0-10 scale, where 0 is "not at all important" and 10 is "very important," the bars represent a mean score of each reason. "Saving money on the energy bill" was perceived the most important reason (mean=8.39). "Protecting the environment" and "receiving incentives to buy a product" were reported to be less important than saving money on bills (mean=6.24 for protecting the environment, and mean=6.08 for wanting incentives to buy products).

Participants were also asked who the influential people were in deciding to participate in Energy Trust programs, using the same 0-10 scale (Figure 3.16). Though none of the categories were rated very highly, salespersons at retailers or a contractor were rated the most important people in decision-making (mean=4.87). All other people were reported to be of fairly low importance to making decisions on Energy Trust participation.

Figure 3.15: Reasons for Participation

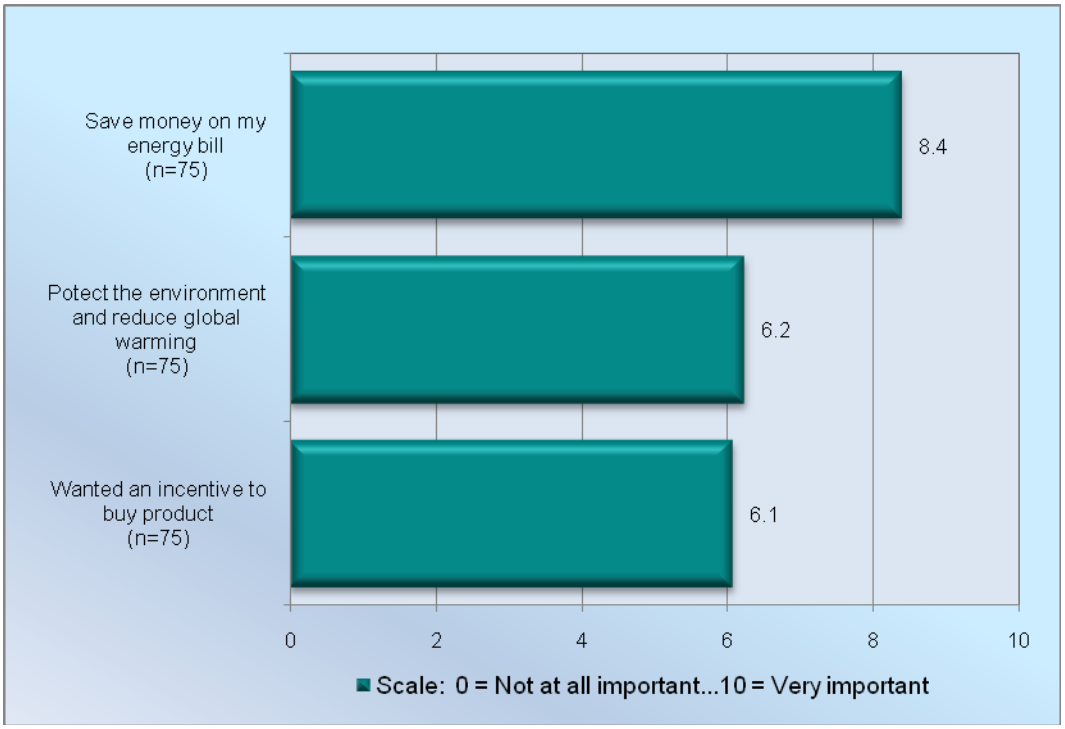
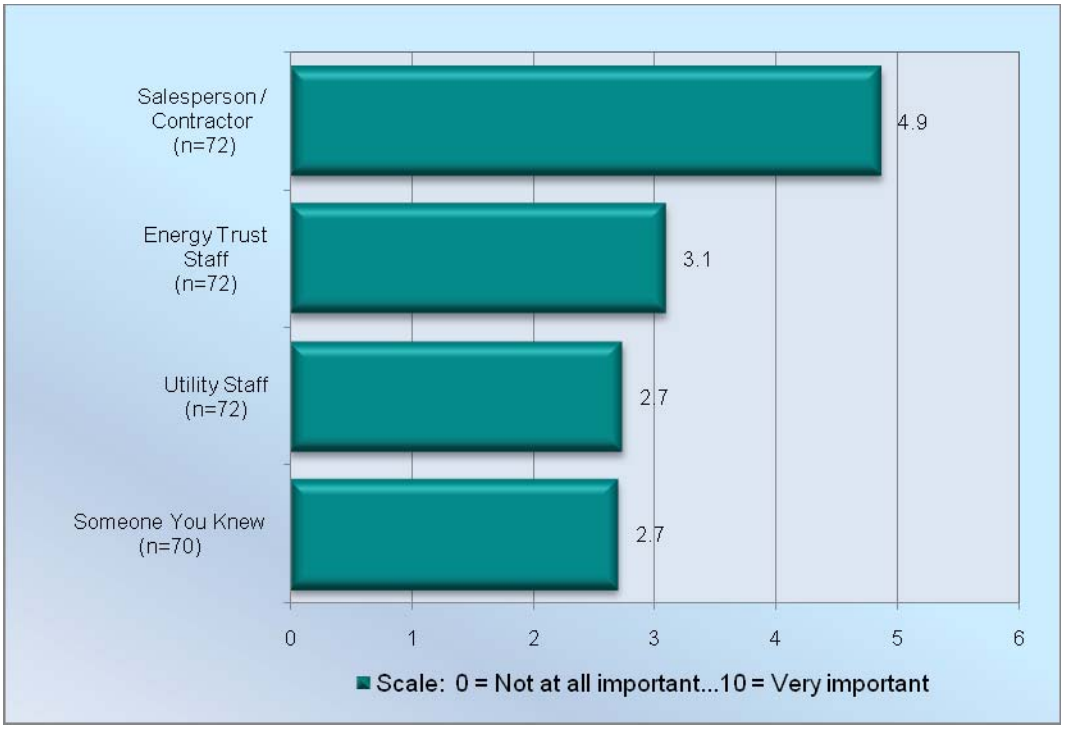
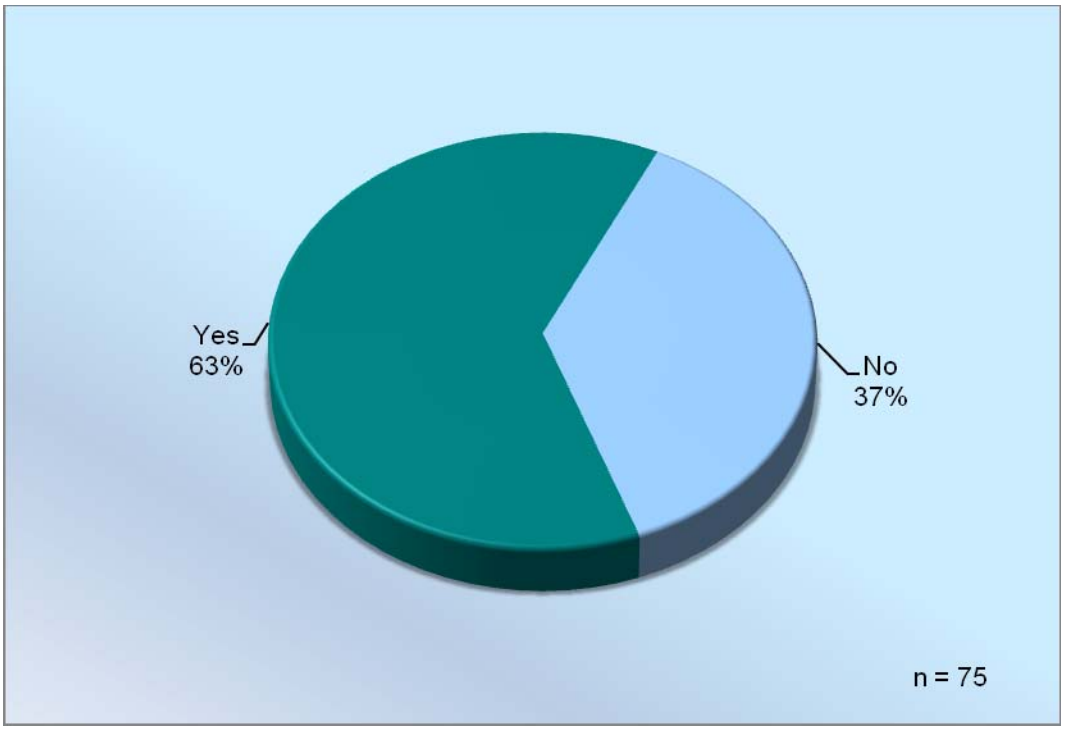


Figure 3.16: Influential People in Participation Decision



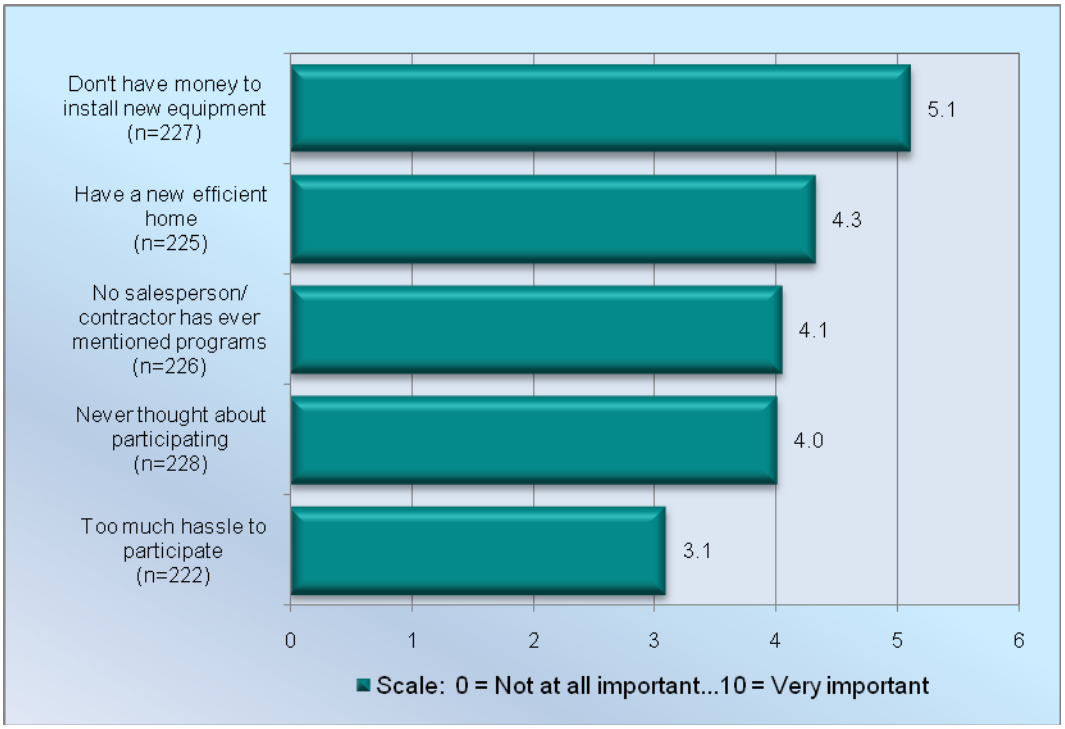
Overall, it seems participants found their experience with an Energy Trust program to be positive – 63% reported they have recommended Energy Trust to someone outside of their household (Figure 3.17).

Figure 3.17: Recommended Energy Trust to Others



If the respondents were aware of Energy Trust, but had not participated in any of its programs, we asked them why they had not yet done so, using the same 0-10 importance scale (Figure 3.18). Among all the reasons listed, "don't have money to install new equipment" was rated as the most important (mean=5.11). Other reasons rated with moderate importance were they think they already "have a new efficient home" (mean=4.32), "salesperson or contractor did not mention programs" (4.05), and they had "never thought about participating" (mean=4.01).

Figure 3.18: Reason for Nonparticipation



Knowledge of Energy Labels

There are a variety of energy-related labels and programs that have been implemented locally in Oregon. Respondents' knowledge of these was assessed in the survey by asking whether they had heard of each program. Table 3.1 shows the result for participants and nonparticipants.

As the bold-highlighted percentages show, participants consistently demonstrated that they have a higher level of knowledge about energy efficiency programs as compared with nonparticipants. Except for Super GOOD CENTS® and Power Smart, the differences between these two groups was found to be statistically significant ($p<.05$). Among these programs, ENERGY STAR® received the highest level of recognition (80% among participants and 55% among nonparticipants). Awareness of Super Good Cents®, ENERGY guide®, Earth Advantage, and LEED were moderate among participants (42% to 55%); however, a considerably lower percentage of nonparticipants were aware of some of these programs, in particular Earth Advantage and LEED (18% to 22%).

Table 3.1: Awareness of Energy-Related Labels

ENERGY-RELATED LABEL	PARTICIPANT	NON-PARTICIPANT	SIGNIFICANCE (P)
ENERGY STAR®	**80%**	55%	p<.0001
Earth Advantage	**47%**	22%	p<.0001
LEED	**42%**	18%	p<.0001
Home Performance with ENERGY STAR®	**20%**	12%	p<.01
ENERGYguide®	**51%**	38%	p<.01
Super GOOD CENTS®	**55%**	49%	None (p>.05)
Power Smart	**30%**	27%	None (p>.05)

NOTES:

ENERGY STAR® is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy that certifies energy efficient products and practices.

Earth Advantage® is a nonprofit organization that provides certification programs for ENERGY STAR® Homes (Home Performance with ENERGY STAR®) and Leadership for Energy and Environmental Design (LEED). The label was developed for Portland General Electric.

Leadership in Energy and Environmental Design (LEED), developed by the U.S. Green Building Council (USGBC), provides a suite of standards for environmentally sustainably construction.

ENERGYguide® is a yellow label that manufacturers are required to display on many appliances to show estimates of how much energy the appliance uses, as well as the annual operating cost compared with other similar products. All ENERGY STAR®-qualified appliances must carry the ENERGYguide® label.

In partnership with electric utilities in the region, the Super GOOD CENTS® label offers homebuyers a guarantee of energy efficiency and quality construction. Qualifying homes are certified under the program, manufacturer inspections are conducted, and dealer training is provided.

Power Smart is label developed by BC Hydro and, for a period of time in the 1990s, was offered by Portland General Electric.

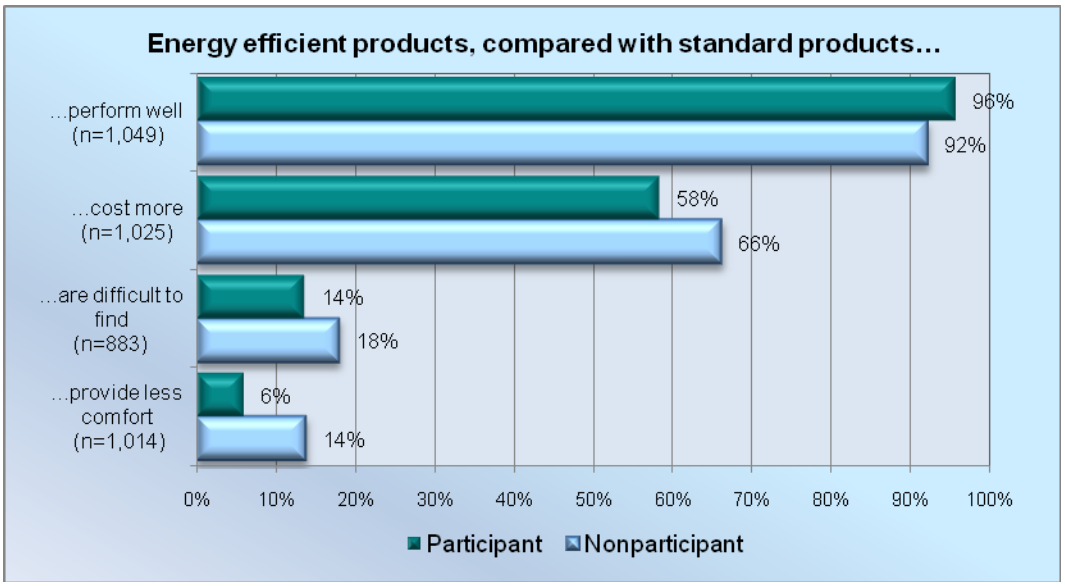
Perceptions and Attitudes toward Energy Efficiency and Renewable Energy

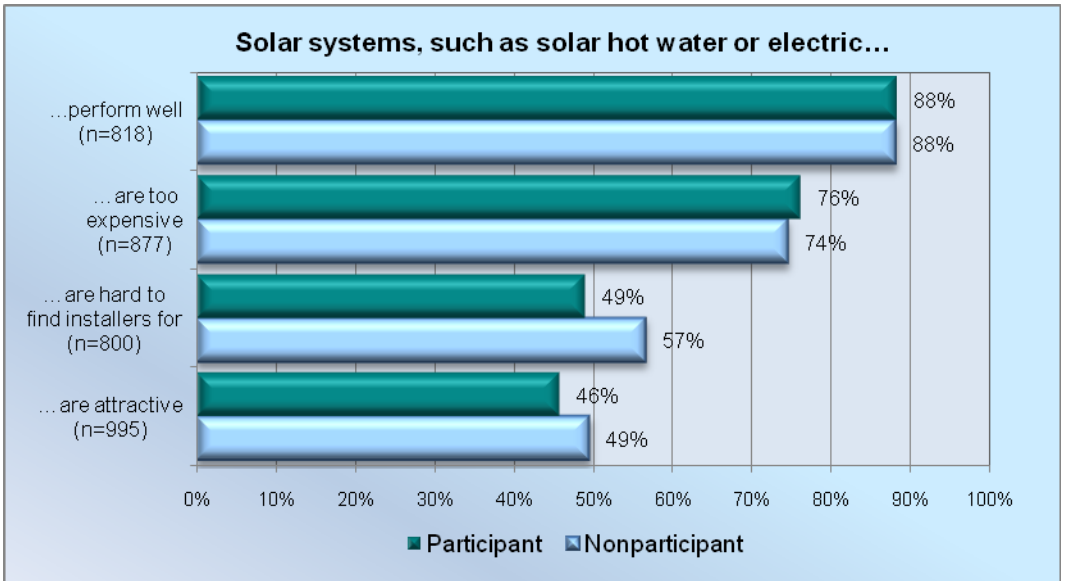
The survey also attempted to investigate respondents' perceptions and attitudes toward energy efficiency and renewable energy in order to understand how important these issues are to people and to understand where they might be in the process of making decisions to consider energy efficiency and renewable choices.

Figure 3.19 shows responses to questions that asked about the respondents' impressions of energy efficiency products and renewable energy systems. The graphs present the percentage of respondents who answered "yes" by Energy Trust participation. First, they were asked about several specific aspects of energy-efficient products (phrased as "products that are specifically designed to use less energy") compared to standard products. More than 90% of the respondents reported they think energy-efficient products perform well. However, 58% of participants and 66% of nonparticipants think energy-efficient products cost more than standard products ($p<.05$). Similarly, fewer participants hold views that energy-efficient products are difficult to find (14%) or that they provide less comfort (6%) as compared to views of nonparticipants (18% and 14%,

respectively), with significant differences found between the two groups for both opinions ($p<.05$).

Figure 3.19: Energy Efficiency/Renewable Impressions





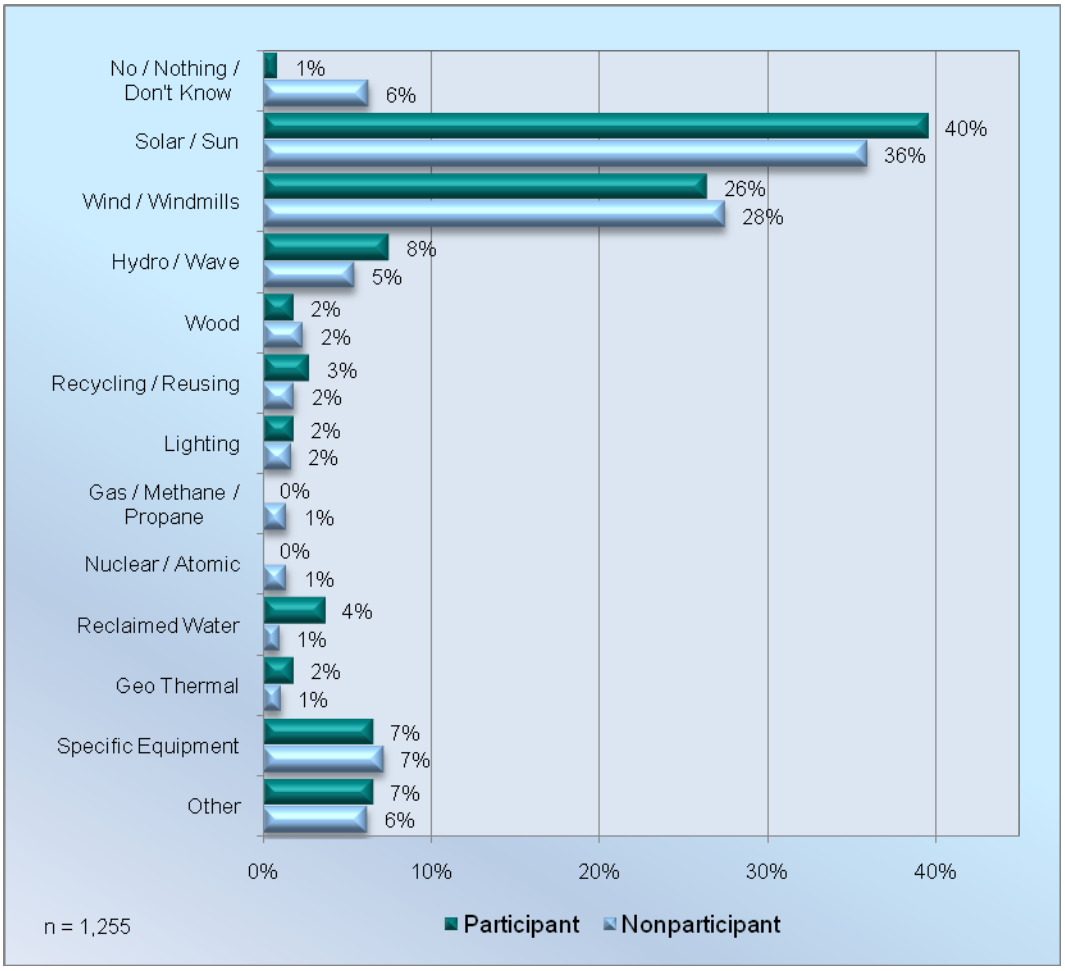
A similar set of questions was asked concerning respondents' impressions about renewable energy systems, specifically about solar systems "such as solar hot water or electric." Almost 90% of the respondents reported they think solar systems perform well. Approximately 75% said solar systems are "too expensive" for them. Less than half of the participants thought it is difficult to find someone who knows how to install solar systems (49%) versus 57% of the

nonparticipants ($p<.05$). Finally, slightly less than half of the respondents said solar systems are "attractive" options.

Overall, it appears that nonparticipants hold more skeptical views than participants toward energy-efficient products and renewable energy systems, especially in matters of cost, availability, and comfort.

The survey also asked what respondents thought of as "renewable energy options suitable for homes" in an open-ended format. Figure 3.20 shows the responses by Energy Trust participation. The most commonly cited options, both among participants and nonparticipants, were solar systems and wind. Hydro power generation was also a popular response. It is reasonable to conclude that nonparticipants are less knowledgeable about renewable options compared with participants (6% of nonparticipants and 1% of participants reported "no" or "don't know").

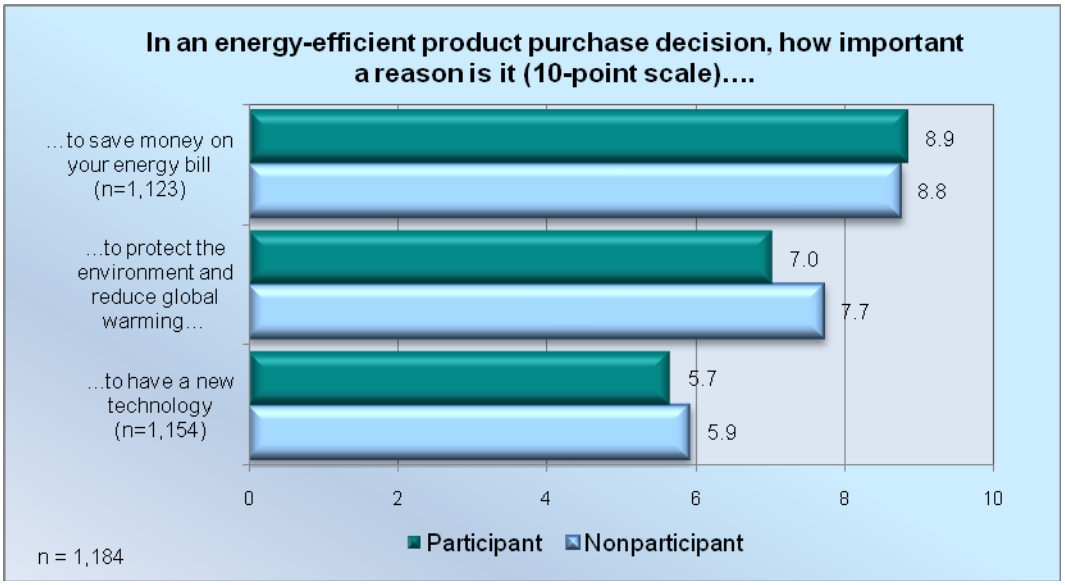
Figure 3.20: What Comes to Your Mind As Renewable Energy Options Suitable for Homes?

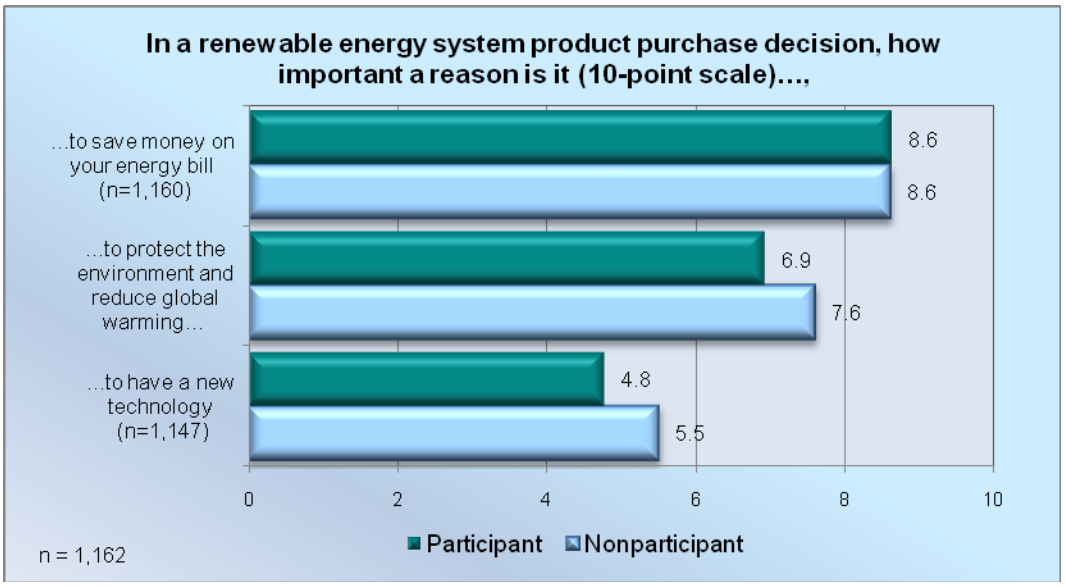


Note: The total number of responses (not number of respondents) was used (number of responses=1,255).

In addition, three possible driving factors in purchase decisions of energy-efficient products and renewable energy systems were explored. Figure 3.21 illustrates mean scores of each reason by Energy Trust participation using a 0-10 scale, where 0 means "not at all important" and 10 means "very important." Responses were very similar between energy-efficient products and renewable energy systems. "Saving money on energy bill" was rated as by far the most important reason among all the responses provided. Environmental protection was rated moderately high and having new technology was the lowest rated reason of importance in purchase decision-making.

Figure 3.21: Reasons for Energy Efficiency/Renewable Purchase Decisions

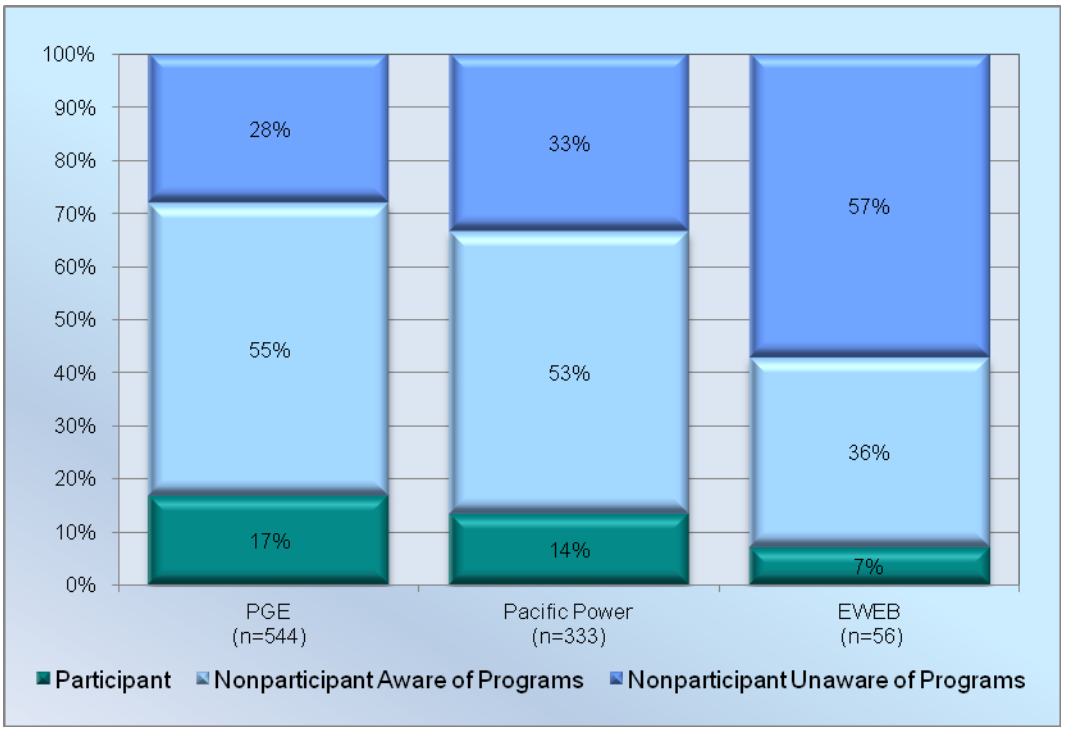




Green Power Option

Most of the major utility providers in Oregon offer green power option programs, which allow their customers to purchase electricity or natural gas (depending on the utility) from renewable energy sources at a marginally higher rate than basic services.[8] The survey assessed whether the respondents were correctly aware of the existence of such a program offered by their utilities and whether they participate in these programs. Figure 3.22 shows the result by Oregon's major electric utilities that offer green power option programs.

Figure 3.22: Green Power Option Program Participation



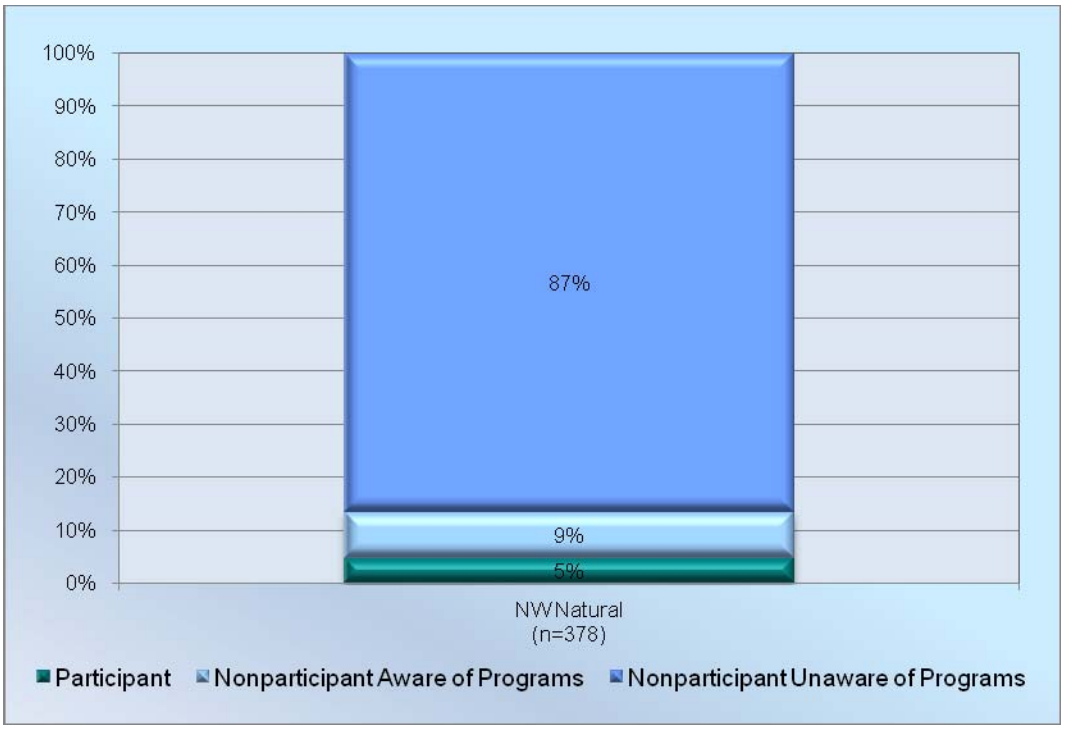
Among PGE customers: 17% of the households reported their participation in the Green Source Program; 55% reported they were aware of the program, but not participating in it; and 28% reported they were not aware that PGE offers such a program. Pacific Power customers' participation in its Blue Sky Program was reported to be slightly lower than participation of PGE customers in its program, but at a moderate rate (14%); 53% were aware, but not participating,

[8] PGE offers the *Green Source Program*, Pacific Power offers the *Blue Sky Program*, and EWEB offers its *EWEB Green Power Program*. Under these programs, an additional $0.0078 to $0.01 per kWh over the basic service rates is put towards the purchase of electricity from renewable sources, such as wind and biomass. NW Natural offers the *Smart Energy Program*, which allows customers, for an additional $6.00 per month (as well as a pay-per-therm option), to support environmental projects that prevent the release of greenhouse gases.

and 33% reported they were unaware of the program. Among EWEB customers, participation in its EWEB Green Power Program was reported at a relatively lower rate (7%) and more than half of the customers were not aware that their utility provides such a program (57%). These differences in the participation and awareness were significantly different between the three electric providers ($p<.05$).

Among NW Natural customers, as Figure 3.23 illustrates, the rate of participation in its Smart Energy Program was reported to be very low (5%) and most households reported they are not aware of this program (87%). However, at the time the survey was fielded, the Smart Energy Program was only a few months old.

Figure 3.23: Renewable Energy Option Program Participation

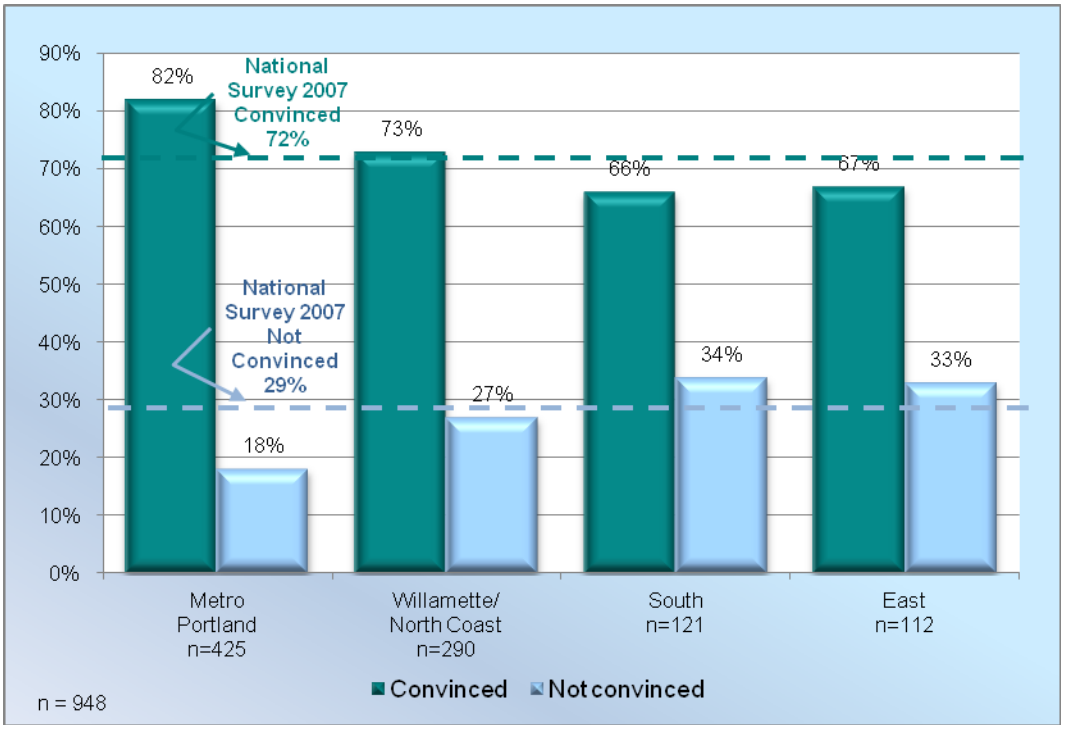


Belief in Global Warming

All the respondents were asked about their belief in Global Climate Change, using a question frequently asked in national polls regarding how convinced they are that Global Warming is actually happening. Figure 3.24 shows the responses by the four regions. Overall, a large majority of Oregonians is personally convinced that Global Warming is happening – 75% said

they are convinced and 25% reported they are not convinced that Global warming is real.[9] Residents in Metropolitan Portland and the Willamette Valley/North Coast regions are significantly more likely to be convinced that Global Warming is happening (81% and 72%, respectively), compared to those who reside in Southern and Eastern Oregon (65% and 63%, respectively; $p<.05$). The level of conviction that Global Warming is happening among Oregonians is about the same as the national level – 72% are convinced and 29% are not convinced.[10]

Figure 3.24: Belief in Global Warming or Climate Change



These responses were further analyzed to see whether participants and nonparticipants exhibit different beliefs in Global Warming by employing Chi-Square. The result found that participation in Energy Trust programs is not associated with whether or not they are convinced that Global Warming is real (*p,* ns).

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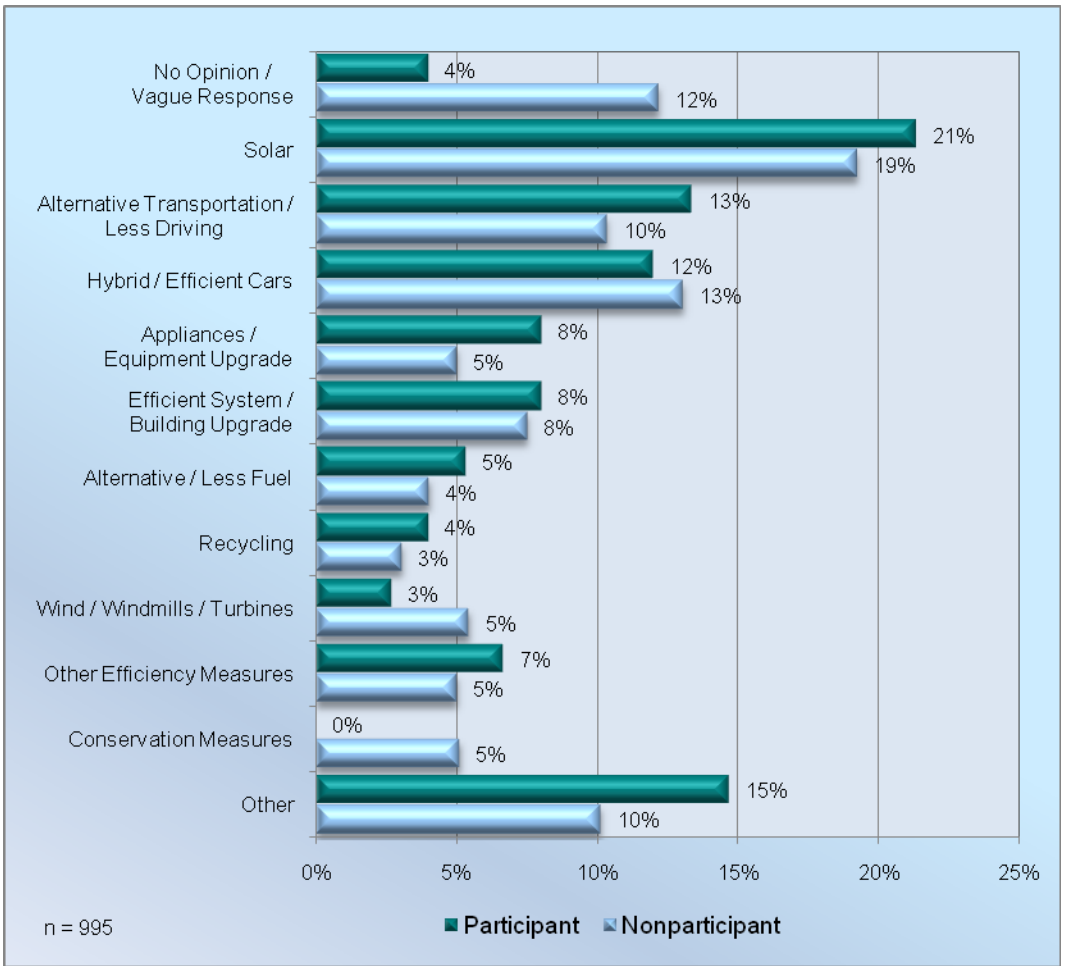
9 In order to rescale this survey data to the scale used in the national survey, "somewhat convinced" (middle point) in this survey was treated as missing (n=235). "Completely convinced" and "mostly convinced" were combined in "convinced" bins, and "not so convinced" and "not at all convinced" were combined in "not convinced" bins.

10 *American Opinions on Global Warming*, *http://www.populationmedia.org/wp-content/uploads/2008/01/americansglobalwarmingreport.pdf.*

In addition, the survey inquired what the respondents would advise their friends to do in order to reduce their contribution to Global Warming (Figure 3.25).

Figure 3.25: Advise to Reduce Contribution to Global Warming



Note: The total number of responses (not number of respondents) were used (number of responses=995).

Taking advantage of solar power was the most commonly cited response from both participants and nonparticipants. Methods of reducing the use of vehicle fuels – such as use of alternative transportation, less driving, use of fuel-efficient vehicles – were also common responses. Responses that relate to upgrading homes with efficient systems and equipment were often mentioned, especially by participants. Another finding is that nonparticipants held the majority of "no opinion" responses and no participants offered "conservation measures." This apparent tendency of nonparticipants to focus on conservation and participants to focus on efficiency is discussed further in the next section.

Energy Use Behavior

For all the respondents, a series of questions was asked to assess how households use energy in their homes. Table 3.2 summarizes the results of these questions by making a comparison between participants and nonparticipants. Bolded figures for each question represent the group (participants or nonparticipants) that expressed overall greater pro-conservation/energy efficiency behavior.

Table 3.2: Use of Energy by Energy Trust Participation

CHARACTERISTIC	PARTICIPANT	NON-PARTICIPANT	SIGNIFICANCE (P)
GENERAL LEVEL OF CONCERN			
How concerned about your home's energy bill? (10-point)	**8.2**	6.8	p<.0001
CONSERVATION FOCUSED MEASURES			
Percent of the time you turn the lights off when leaving a room?	80%	**85%**	None (p>.05)
Percent of the time you do laundry with washer fully loaded?	84%	**86%**	None (p>.05)
Percent of the time you leave your computer on/sleep mode? (reverse scale)	49%	**38%**	p>.05
EFFICIENCY FOCUSED MEASURES			
Percent of the time you try to buy energy-efficient appliances/ electronics?	**88%**	75%	p<.001
Ever had a home energy audit/review? (yes)	**34%**	14%	p<.0001
Has filter for heating system been changed since January? (yes)	**70%**	54%	p<.001
Have purchased ENERGY STAR® appliances/electronics? (yes)	**96%**	68%	p<.0001
Have a plasma TV larger than 42"? (yes)	13%	**3%**	p<.0001
Have CFL or twisty/swirly bulbs in your home? (yes)	**91%**	79%	p<.001

First, we asked how concerned they were in general terms about their home's electric and natural gas bill, using a 0-10 scale where 0 equals "not at all concerned" and 10 equals "very concerned." Overall, participants (mean=8.2) showed a significantly higher level of concern about their energy bill as compared with nonparticipants (mean=6.8; $p<.05$).

The second set of questions focused on conservation behaviors. In each question, the respondents were asked to estimate what percent of the time they conduct specific behaviors, as stated by the interviewers. A difference between participants and nonparticipants was found, which seems to reflect a difference in focus, or perhaps knowledge and capacity; nonparticipants claim to

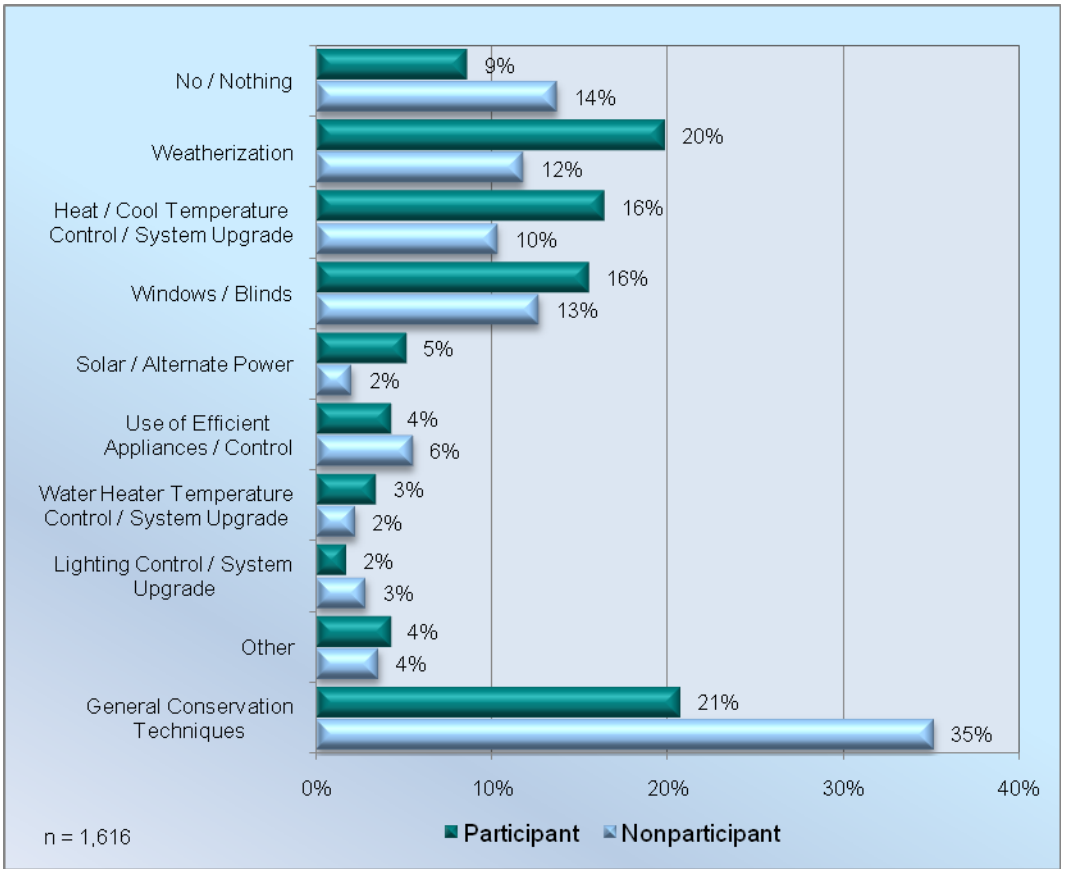
implement conservation behaviors more and participants claim to implement efficiency behaviors more.

In all three questions, nonparticipants showed greater pro-conservation behaviors overall, and two of these were statistically significantly higher than participants ($p<.05$). Nonparticipants reported, on average, 85% of the time they "turn the lights off when they leave a room and it's no longer occupied," as compared with 80% of the time among participants ($p<.05$). Further, nonparticipants reported 38% of the time that they "leave their computer on or in sleep mode all night," as compared with 49% of participants ($p<.05$).

By contrast, for almost all questions that focused on energy efficiency, participants showed significantly greater pro-energy efficiency behaviors, with an exception of having a large screen plasma TV. Participants reported, on average, 88% of the time they "try to buy a low energy-using model when they are buying appliances or electronics," while 75% of the time nonparticipants do so ($p<.05$). Thirty-four percent of the participants reported they have had a home energy audit (versus 14% of nonparticipants), 70% of the participants said they had recently changed a filter for their heating system (versus 54% of nonparticipants), 96% of the participants reported they have purchased an ENERGY STAR® appliance or electronics (versus 68% of nonparticipants), and 91% of the participants reported they have CFLs in their homes (versus 79% of nonparticipants) – all of which show significantly greater claimed energy efficiency behaviors among participants ($p<.05$).

Other energy-saving activities reported are shown by Energy Trust participation in Figure 3.26. The most commonly cited were energy efficiency measures such as weatherization (insulation, weather stripping, caulking, envelop upgrade, etc.), temperature control system upgrades, and upgrading and installing windows and blinds. These efficiency-focused activities were more commonly reported by participants. On the other hand, nonparticipants more often reported their conservation-focused activities. These findings are consistent with the data presented above in Table 3.2.

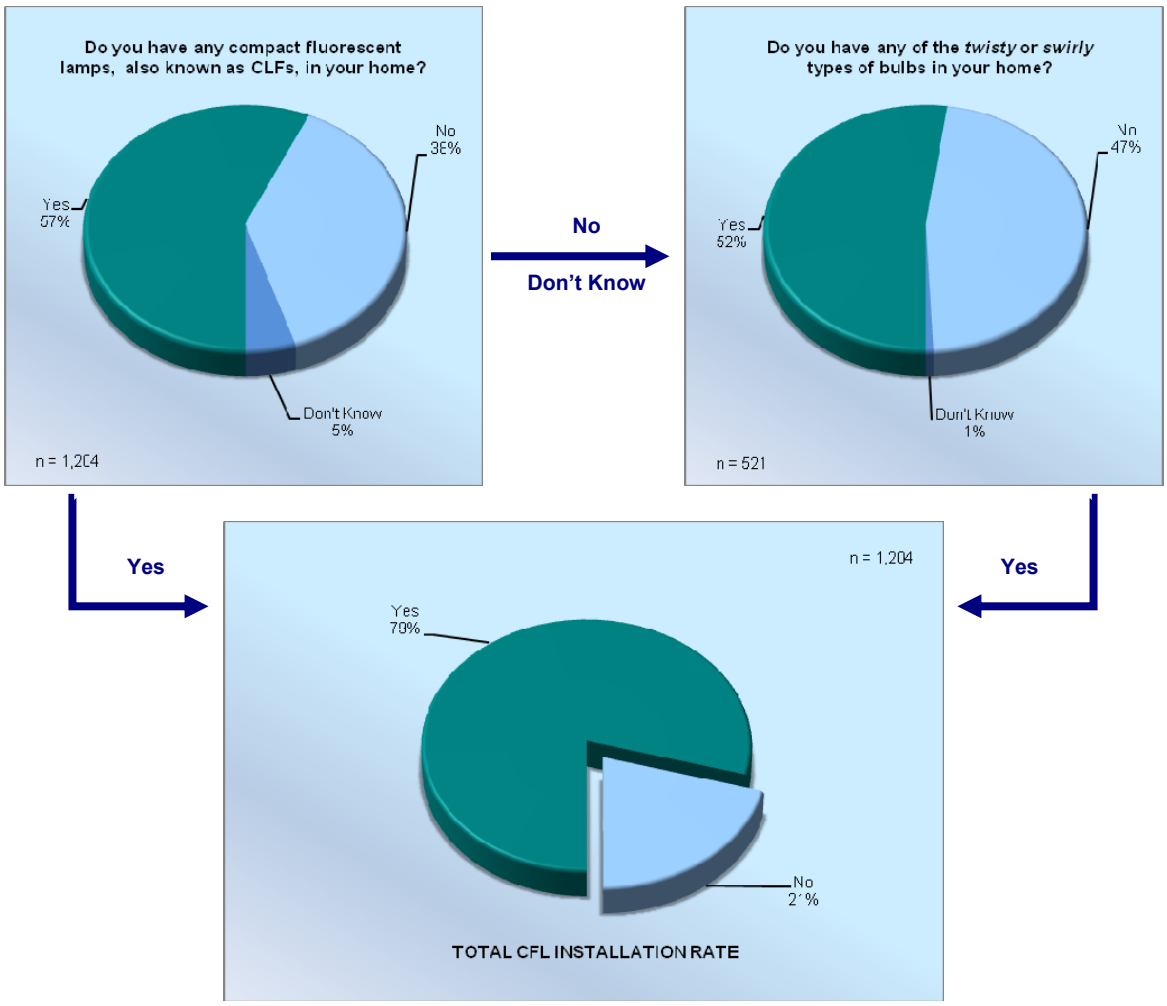
Figure 3.26: Other Activities to Reduce Energy Use



Note: The total number of responses (not number of respondents) were used (number of responses=1,616).

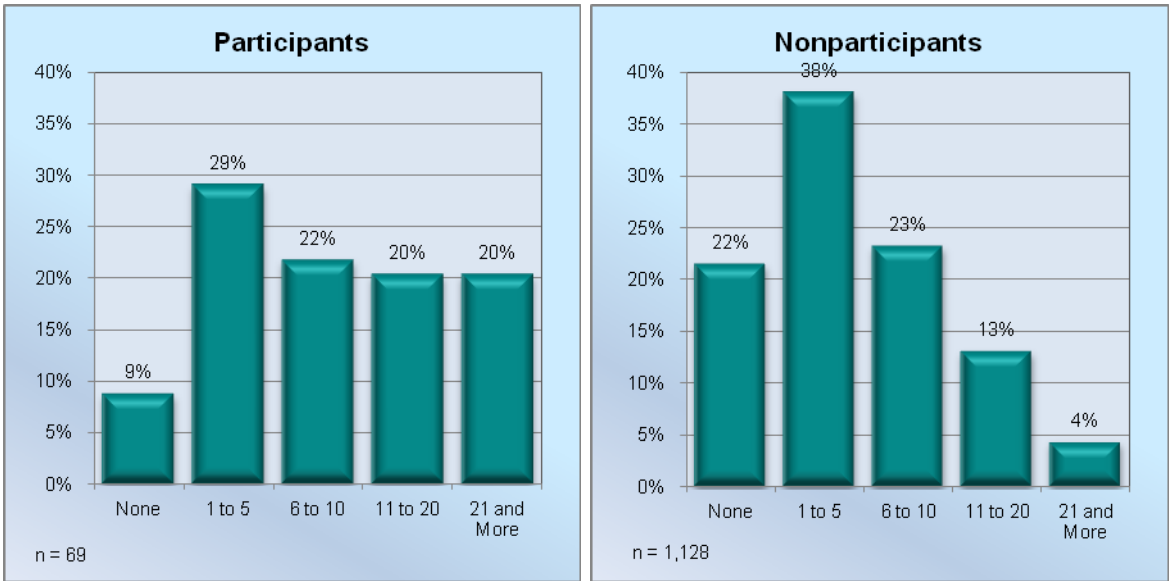
We also examined the residential CFL installation rate with a previously unexplored method (Figure 3.27). First, we asked whether they have "any compact fluorescent lamps, also known as CFLs, in their homes. If they did not say "yes" to this question, we further prompted whether they have "twisty or swirly" types of bulbs. We found that more than half (52%) of the respondents who did not report they have CFLs in fact have them in their homes and may simply be unaware of the term "compact fluorescent lamps" or "CFLs." By combining those who reported they have CFLs and those have *twisty* or *swirly* bulbs, we found that 80% of Oregon households report having CFLs installed at home.

Figure 3.27: Self-Reported CFL Installation Rate



In addition, we found that not only are participants more likely to report having CFLs, but the number of CFLs installed in their homes is significantly greater than nonparticipants' ($p<.05$). As Figure 3.28 illustrates, the percentage of households that install more than 11 CFLs are markedly higher among participants than with nonparticipants.

Figure 3.28: Number of CFLs Installed

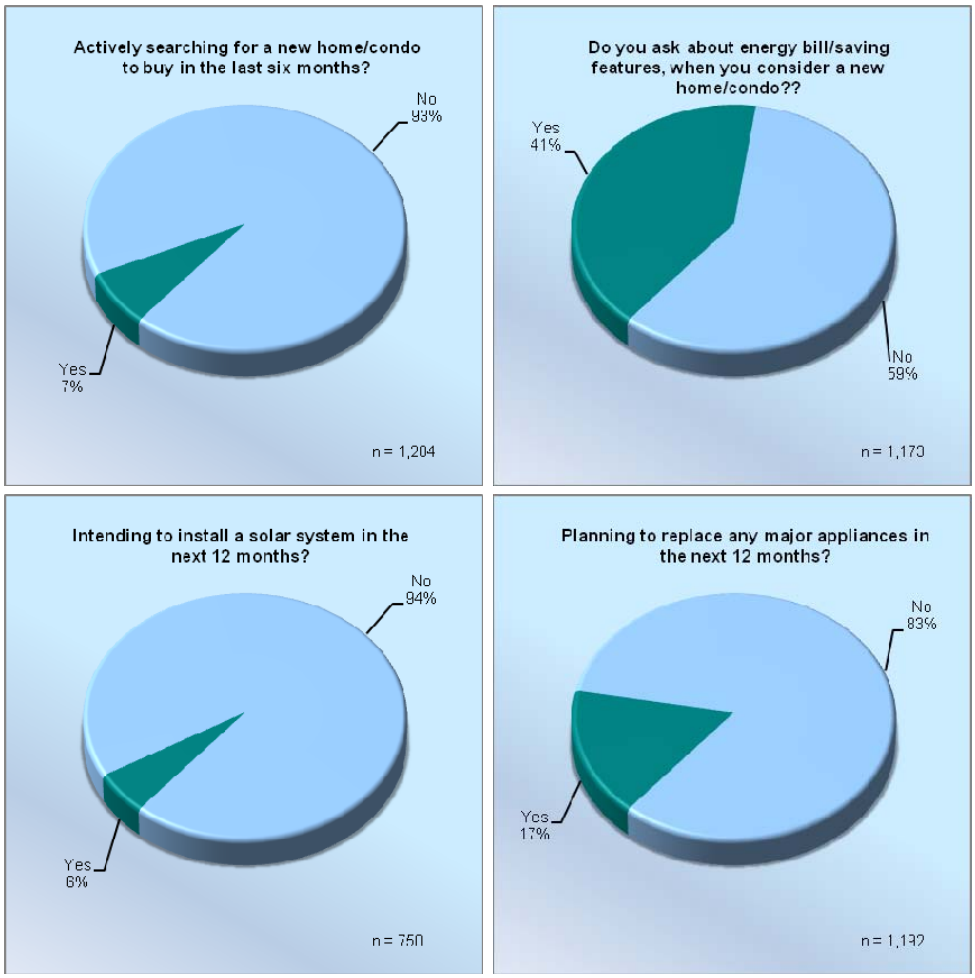


Market Conditions

We asked several questions that may be useful to understand the conditions of the energy efficiency market. However, interpretation of these data requires a caution, since a large U.S. financial crisis and dramatic downturn of U.S. stock prices were reported immediately after the close of the data collection phase.

Seven percent of respondents reported they had actively searched for a new home to buy in the last six months. Forty-one percent of all respondents said they asked about the energy bill or energy-saving features when they considered a new home (56% of respondents who are actively searching). Six percent said they are intending to install a solar system in the next 12 months, and 17% reported they are planning to replace a major appliance in the next 12 months (Figure 3.29).

Figure 3.29: Market Conditions

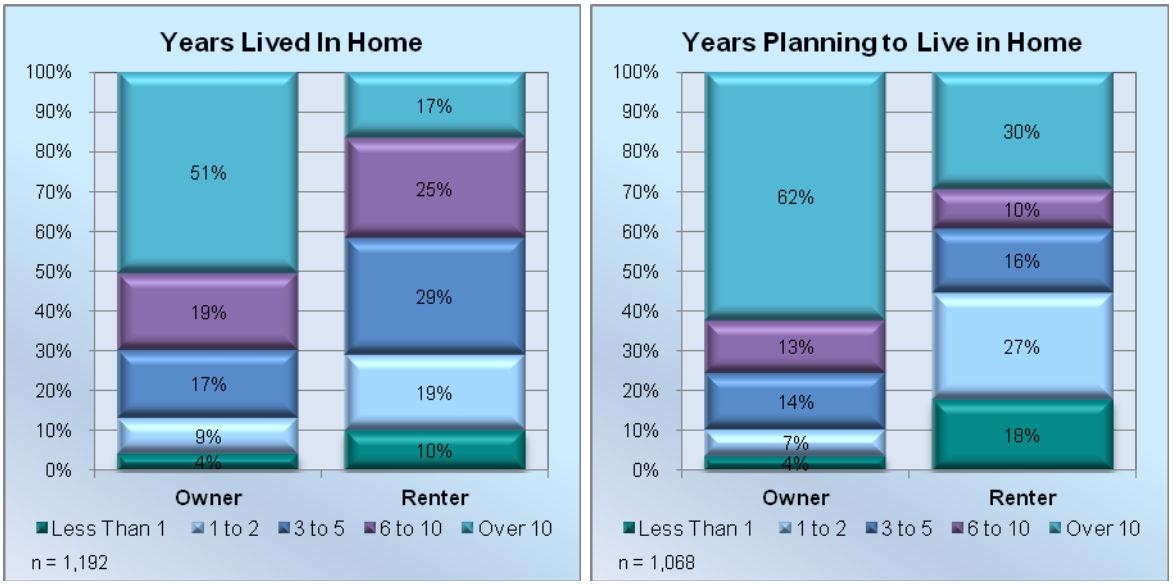


Note: Responses other than "yes" or "no" were treated as missing.

Figure 3.30 shows the number of years the respondents reported they have lived and plan to live in their current homes. Overall, renter residents are more mobile, fluid, and unsettled as compared with owner residents. Among the owner-occupied households, more than half have lived in their homes for more than eleven years, 19% have lived in their homes for six to ten years, and 30% have lived in their home for less than five years. Among renters, on the other hand, only 42% have lived in their current home for more than six years, and 58% have lived in it for five years or less. The difference is significant ($p<.05$).

These differences are more vivid in respondents' future plans: 62% of owners plan to stay in their current homes for eleven years or longer, 13% plan to stay for six to ten years, and 25% plan to live there for five years or less. On the other hand, a majority of renters (61%) plan to live in their homes for less than five years and 10% plan to live in it for six to ten years. Yet, 30% of renters see themselves living in their current homes for eleven years or longer. These differences between owners and renters were found to be statistically significant ($p<.05$).

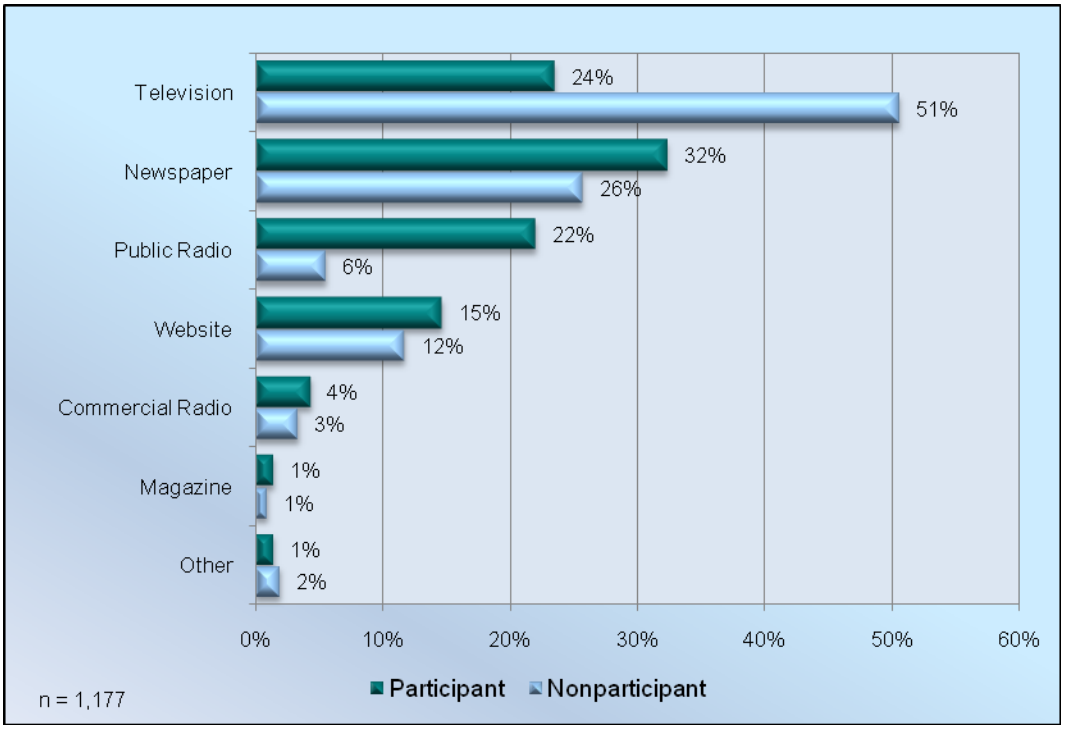
Figure 3.30: Years Lived and Planning to Live in This Home



Note: No significant differences were found between participants and nonparticipants.

As part of assessing marketing outlets that would reach Oregonians, the respondents were asked about their primary source for getting news (Figure 3.31).

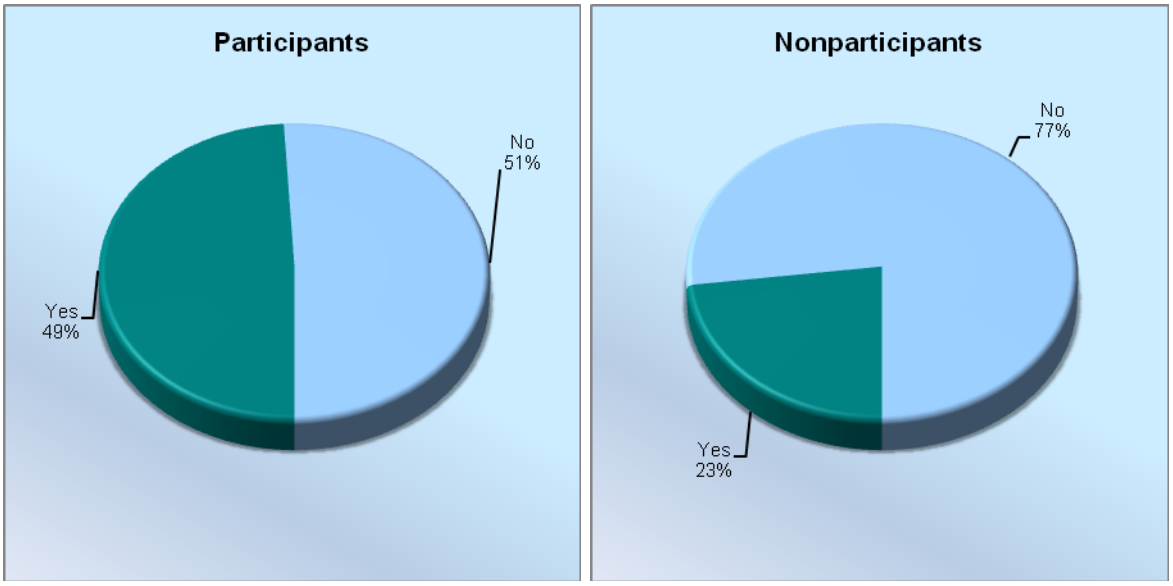
Figure 3.31: Primary News Sources



The news sources participants and nonparticipants rely on were found to be significantly different ($p<.05$). Television was by far the most common news source for nonparticipants (51%), while newspapers were the most frequently used medium among participants (32%). Newspapers and websites are also common sources among nonparticipants (26% and 12%, respectively), and television, public radio, and websites are the most often used media by participants (24%, 22%, and 15% respectively).

Finally, respondents were asked about their intention to participate in an Energy Trust program within the next 12 months (Figure 3.32). Half of the participants reported their intention to participate by doing more improvements to their homes (49%), whereas less than a quarter of nonparticipants (23%) reported they intend to participate in an Energy Trust program in the near future.

Figure 3.32: Intention of Future Energy Trust Participation



Note: Responses other than "yes" or "no" were treated as missing.

4 SEGMENTATION

This chapter presents an analysis of energy consumption data along with some notable findings from multivariate analyses. Finally, findings from the segmentation analysis are presented that identify distinct market segments of interest to Energy Trust programs.

ENERGY CONSUMPTION DATA

This section discusses the procedures and findings of the energy consumption data analysis.

Method

Abt SRBI used Telematch® to identify addresses of the sample households based on their telephone number. Energy Trust then matched monthly energy consumption data (February 2002 through July 2008) for the residential accounts that belonged to these addresses. Energy usage data was available only for the households of PGE, Pacific Power, and NW Natural customers.

Of the 764 known addresses, 614 unique sample households' billing data were obtained. Of those, 48 had natural gas data only, 309 had electric data only, and 257 had both natural gas and electric data.

Since practically all households use electricity, households with only natural gas data were considered as missing their data for electricity usage and thus were excluded from the analysis. Electric data-only households were included only if they reported in the survey that their primary source of energy for space heating was electricity, with the assumption that natural gas data did not exist for these households because of their sole use of electricity.

Further, households that reported in the survey that they had lived in their home for less than a year were excluded. This is because the most recent twelve-month period from which we could obtain the most number of the sample households' energy consumption without missing data was determined to be from May 2007 through April 2008. Though this period provided the most consistent data without missing a large number of cases, there were some that did not have 12-month records. Therefore, only those cases with more than a 10-month record were retained for analysis. The number of days for the available number of months was calculated (using 30.42 days a month, on average), which was then used to compute the average energy consumption per day. Finally, daily consumption was multiplied by 365 days to realize the annual energy consumption. To get the total energy consumption, electric and natural gas consumptions were combined after converting kWh and therms to a BTU term.[11]

[11] 1 kWh=3,412.3 BTU; 1 therm=100,067 BTU.

This resulted in 356 viable sample households with total annual energy consumption data in BTUs, 501 sample households with annual electric consumption data in kWh, and 235 sample households with annual natural gas consumption data in therms. Table 4.1 shows the change in the sample size during this procedure.

Table 4.1: Sample Size of Energy Consumption Data

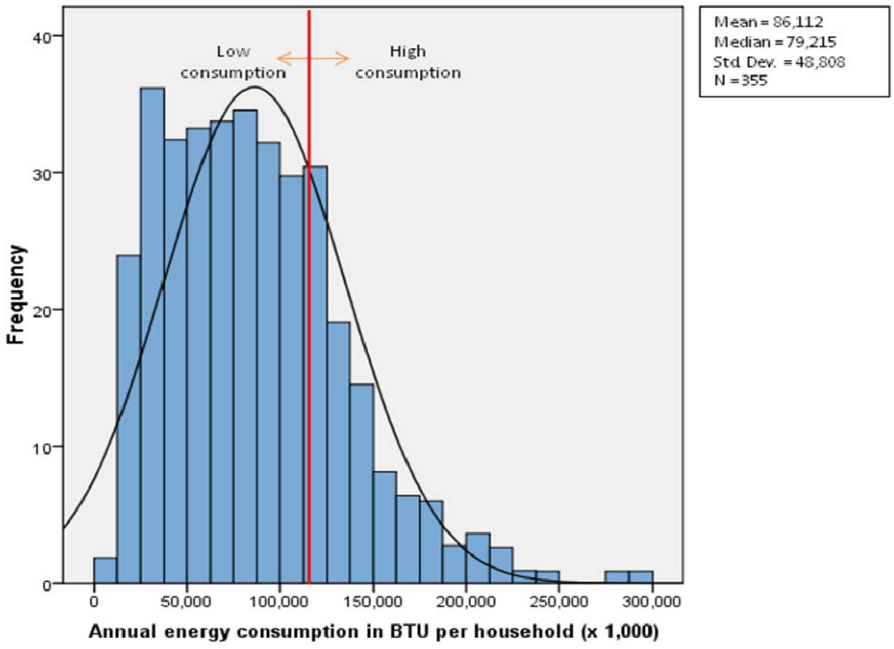
CHARACTERISTIC	SAMPLE SIZE	PERCENT OF TOTAL SAMPLE POPULATION
Sample Household Population	1,205	100%
Address Matched Households	764	63%
Households With Unique Billing Account	614	51%
• **Natural Gas Data Only**	*48*	*8%*
• **Electric Data Only**	*309*	*50%*
• **Both Natural Gas and Electric Data**	*257*	*42%*
Total Energy Consumption In BTUs	356	30%
• **Electric Consumption in kWh**	*501*	*42%*
• **Natural Gas Consumption in Therms**	*235*	*20%*

The following is a discussion of the in-depth analysis of this total energy consumption data in BTUs. The same set of analyses was done for electric consumption data in kWh and natural gas consumption data in therms (which can be found in Appendix F).

Total Energy Consumption in BTU

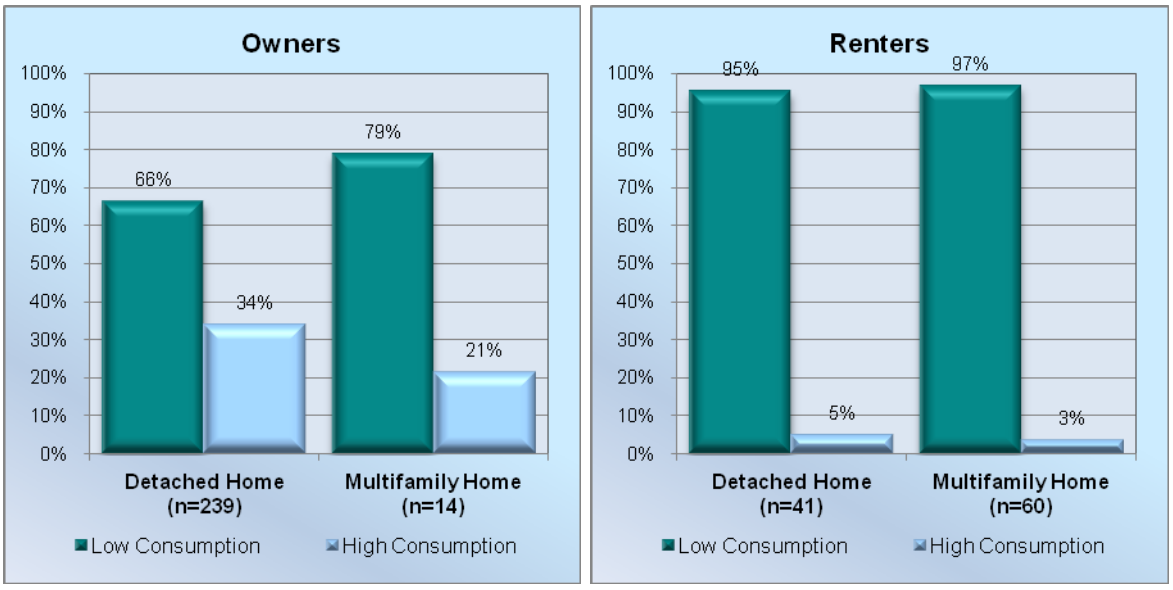
The histogram in Figure 4.1 shows the tabulated frequencies of total annual household energy consumption. The 75 percentile point was chosen to divide the samples into low and high consumption groups to analyze the data further. Thus, the "low" consumption group is only lower than the high users, rather than truly "low" users who are more difficult to discern due the effects of housing and family structure.

Figure 4.1: Total Energy Consumption Histogram



Using these consumption categories, Figure 4.2 compares energy usage in detached homes and multifamily homes within owner-occupied households, and within renter-occupied households, respectively.

Figure 4.2: Total Energy Consumption by Homeownership by Housing Structure

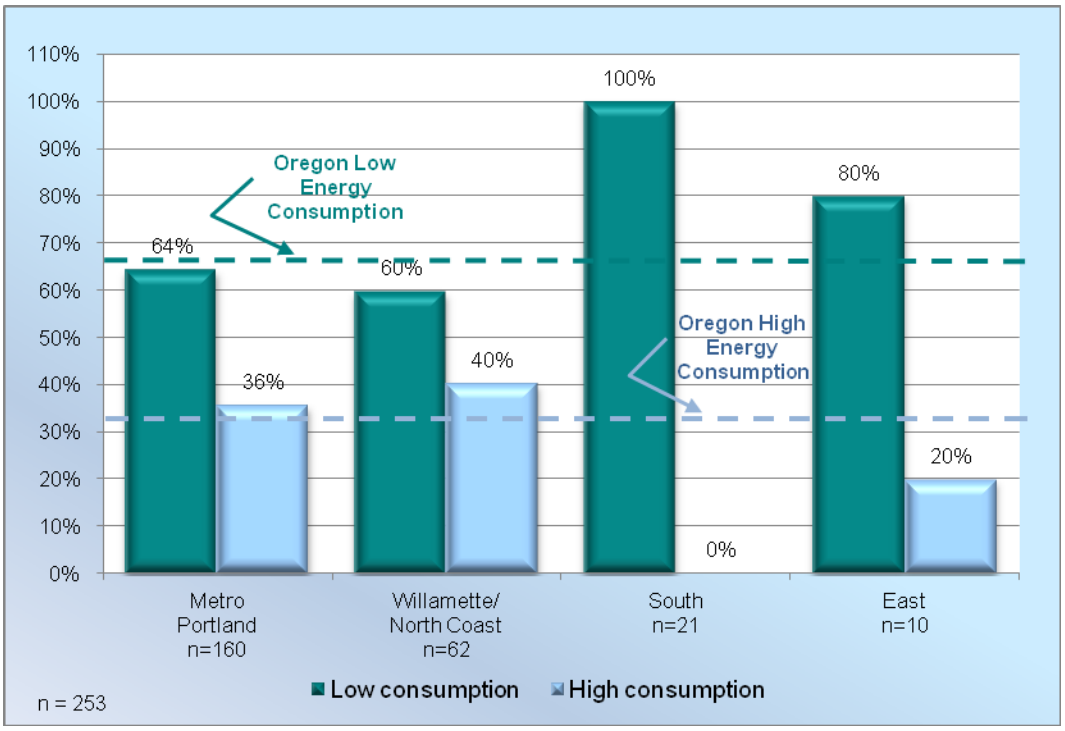


Within owner-occupied households, 34% of the detached homes and 21% of the multifamily homes have high energy consumption. Among renter-occupied households, 5% of the detached homes and 3% of the multifamily homes recorded high energy consumption.

The main finding from this analysis is that owner-occupied households have significantly more high energy consumers compared with renter-occupied households ($p<.05$). Renter-occupied households use considerably less energy, and this is consistent regardless of the housing type.

Next, we examined, among homeowners, how total energy consumption compares between different regions (Figure 4.3), as well as against the total percent of low and high energy consumption households.

Figure 4.3: Total Energy Consumption of Homeowners by Region



We found that regional differences in energy consumption of owner-occupied households are significant ($p<.05$). The Metropolitan Portland and Willamette/North Coast regions have a high concentration of high energy consumption owner-occupied households (36% to 40% of households, slightly above the state total), and Southern and Eastern Oregon (the South in particular) have a significantly lower concentration of high consumption owner-occupied households (0% to 20% of households).

Further, the low and high total energy consumption households were compared in terms of their attitudes and behaviors toward energy efficiency. Table 4.2 shows responses to a list of questions

focused on attitudes and behaviors, as well as some demographics, and illustrates how these two groups compare for each item (only within owner-occupied households).

Table 4.2: Low vs. High Energy Consumption Owner-Occupied Households

CHARACTERISTIC	LOW CONSUMPTION HOUSEHOLDS	HIGH CONSUMPTION HOUSEHOLDS	SIGNIFICANCE (P)
Heard of Energy Trust	46%	49%	None (p>.05)
Have Participated in Energy Trust Programs	13%	13%	None (p>.05)
Level of Concern About Home's Energy Bill (10-Point)	7.37	7.23	None (p>.05)
Percent of Time Lights Are Turned Off When Leaving a Room	72%	75%	None (p>.05)
Percent of Time Laundry Is Done with Washer Fully Loaded	69%	73%	None (p>.05)
Had a Home Energy Audit/Review	24%	25%	None (p>.05)
Have a Plasma TV Larger than 42"	2%	6%	None (p>.05)
Have CFL or Twisty/Swirly Bulbs In Home	83%	86%	None (p>.05)
Have Purchased ENERGY STAR® Appliance/Electronics	82%	87%	None (p>.05)
Convinced of Global Warming	73%	77%	None (p>.05)
Home Built Before 1969	36%	41%	None (p>.05)
Primary Householder's Age is 39 Years or Younger	12%	10%	None (p>.05)
Primary Householder is Without a Four-Year College Degree	50%	33%	p<.01
Household Income is Below $50,000	36%	13%	p<.001

Overall, very few differences in energy use behaviors and attitudes were observed between low and high energy consumption households. Demographically, high energy consumption owner-occupied households seem to be more educated and well off ($p<.05$).

SEGMENTATION

Method

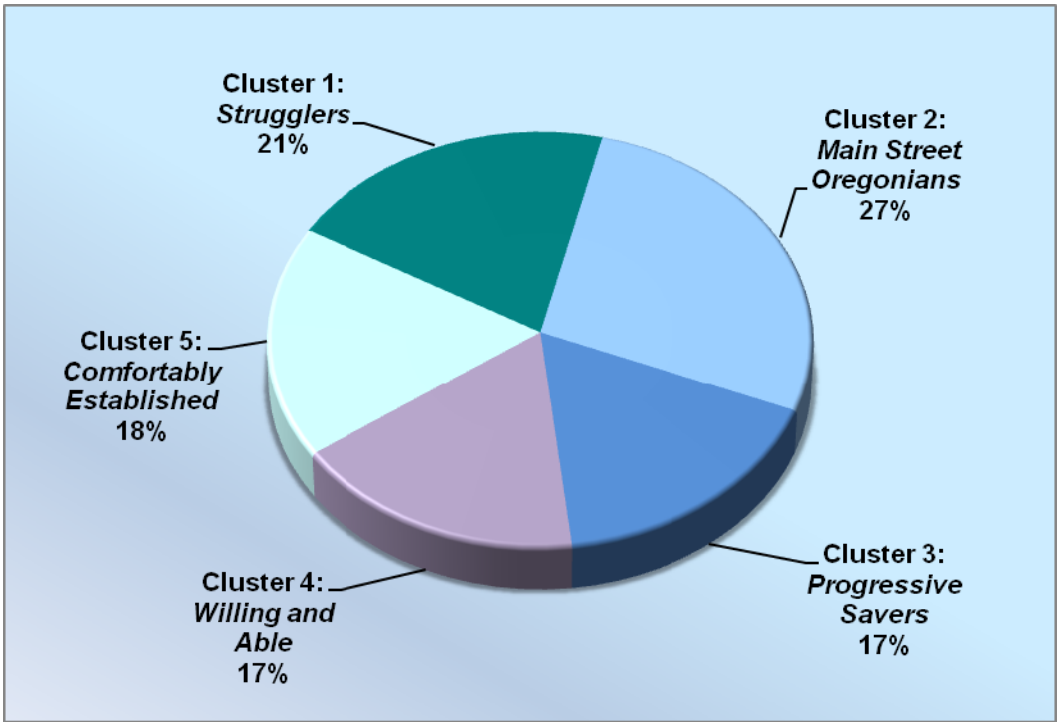
We used factor analysis, regression, and clustering techniques to segment the sample population. Factor analysis was used to explore the structure of the dataset by grouping the variables into factors, and regression analysis was chosen to test if the derived factors and the demographic variables were significant predictors of household energy consumption behavior. We input all significant variables and factors in the regression model into the two-step clustering algorithm. We further explored the derived segments through crosstab chi square procedures. We used SPSS algorithms for all of these analyses, and discuss the procedure and interpretation of each technique in greater detail in Appendix G.

Five Segments

The final two-step cluster analysis identified five distinct segments, each of which has distinct demographic and behavioral characteristics. Based on these attributes, we named each segment in a manner that characterizes the group so that it will make sense to the readers (Figure 4.4):

- ***Strugglers*** (21%)
- ***Main Street Oregonians*** (27%)
- ***Progressive Savers*** (17%)
- ***Willing and Able*** (17%)
- ***Comfortably Established*** (18%)

Figure 4.4: Five Clusters



The following describes the behavioral and demographic variables that characterize the five segmented groups.

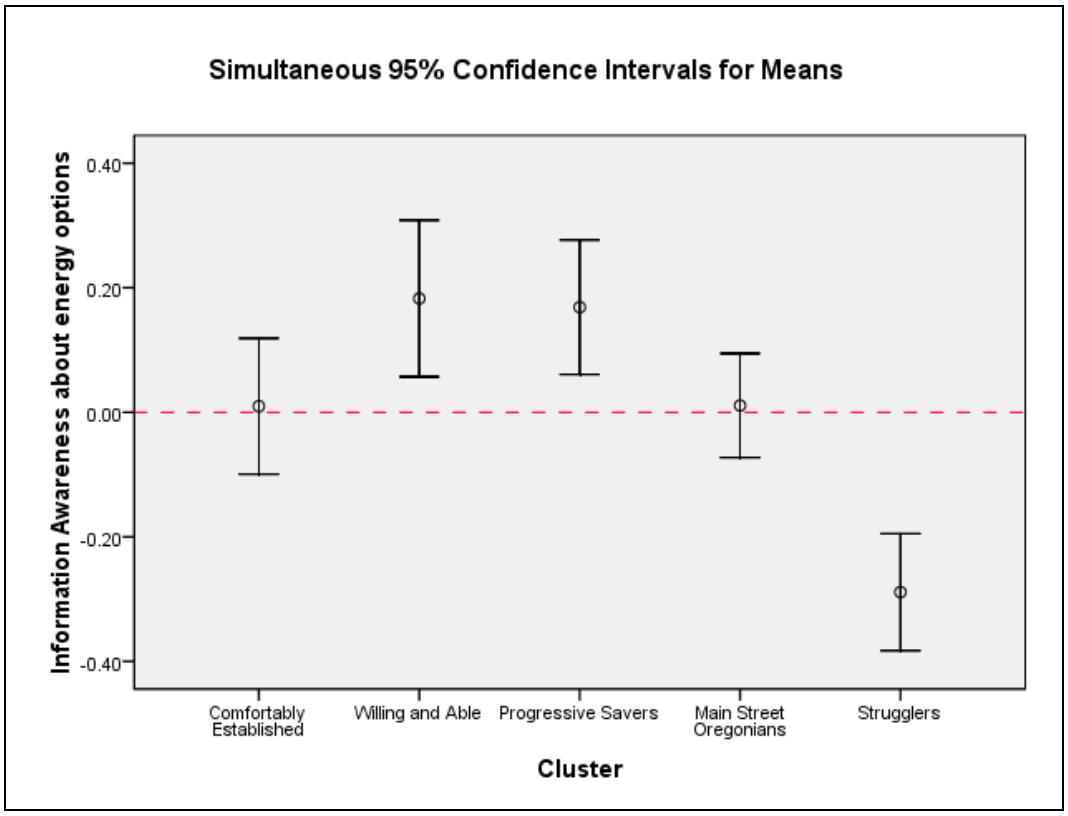
Behavioral Variables

Figure 4.5 illustrates each segment's score and a range of distribution regarding general awareness of information that relates to energy efficiency. This variable is a composite score that

was created during the factor analysis (refer to Appendix G). In general, higher scores exemplify higher awareness of energy efficiency and participation in Energy Trust programs and the State Residential Tax Credit Program, higher likelihood of past ENERGY STAR® purchases, and a higher likelihood of CFL installations in the home.

Strugglers scored the lowest. Although there are some overlaps, *Comfortably Established* and *Main Street Oregonians* were about average, and *Willing and Able* and *Progressive Savers* scored the highest. *Strugglers* thus are the least aware of energy efficiency information, and *Willing and Able* and *Progressive Savers* are the most aware of such information.

Figure 4.5: Information Awareness About Energy-Saving Products, Programs, or Measures



The information awareness score is a composite score of general energy efficiency awareness that also factors in Energy Trust participation. Figure 4.6 specifically examines the Energy Trust participation by each segment. *Willing and Able* and *Comfortably Established* have significantly higher participation in Energy Trust programs (11% and 15% respectively). Some *Main Street Oregonians* and *Progressive Savers* have participated, but their participation is below the state total. No *Strugglers* have participated in Energy Trust programs.

Figure 4.6: Energy Trust Participation by Clusters

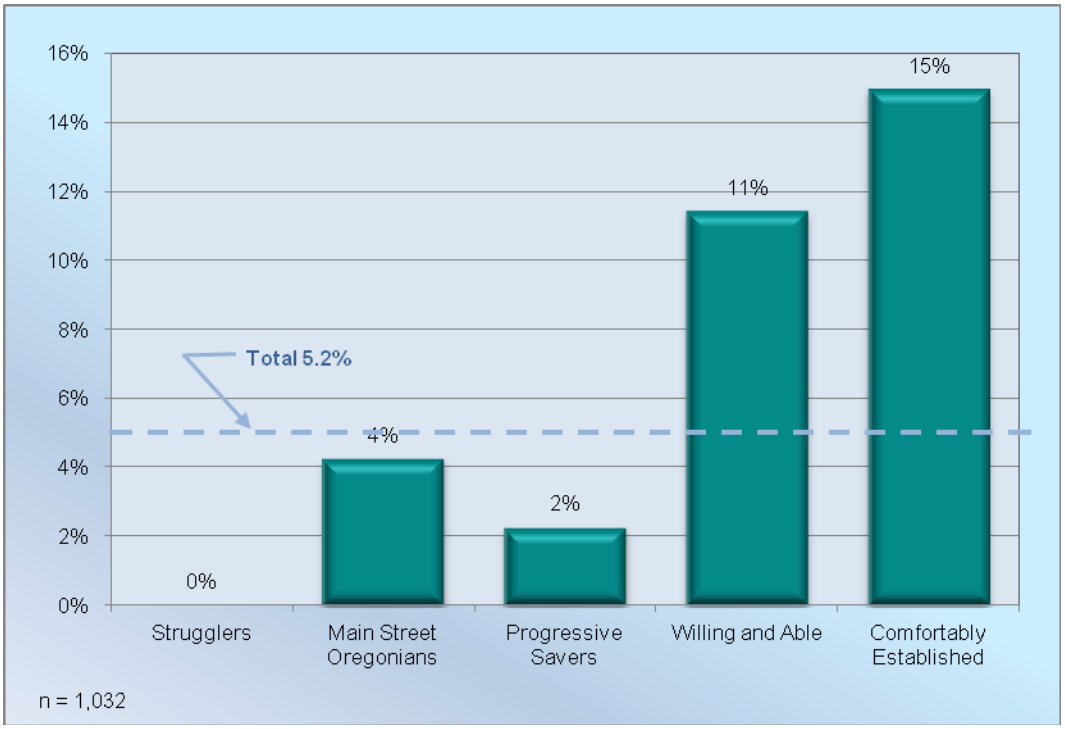


Figure 4.7 shows the distributions of the five segments within low-medium (below 75 percentile) and high (above 75 percentile) energy consumption groups, measured by annual BTU consumption. A large proportion of high energy consuming households is *Comfortably Established* (62%). On the other hand, very small proportions of high energy consumers are *Progressive Savers* and *Strugglers* (3% and 5% respectively; $p<.05$).

Figure 4.8 shows the distributions for the number of CFLs installed in homes. *Strugglers* appear to have the least number of CFLs, but other segments are almost evenly distributed from low to high numbers of CFL installations.

Figure 4.7: Clusters by Energy Consumption

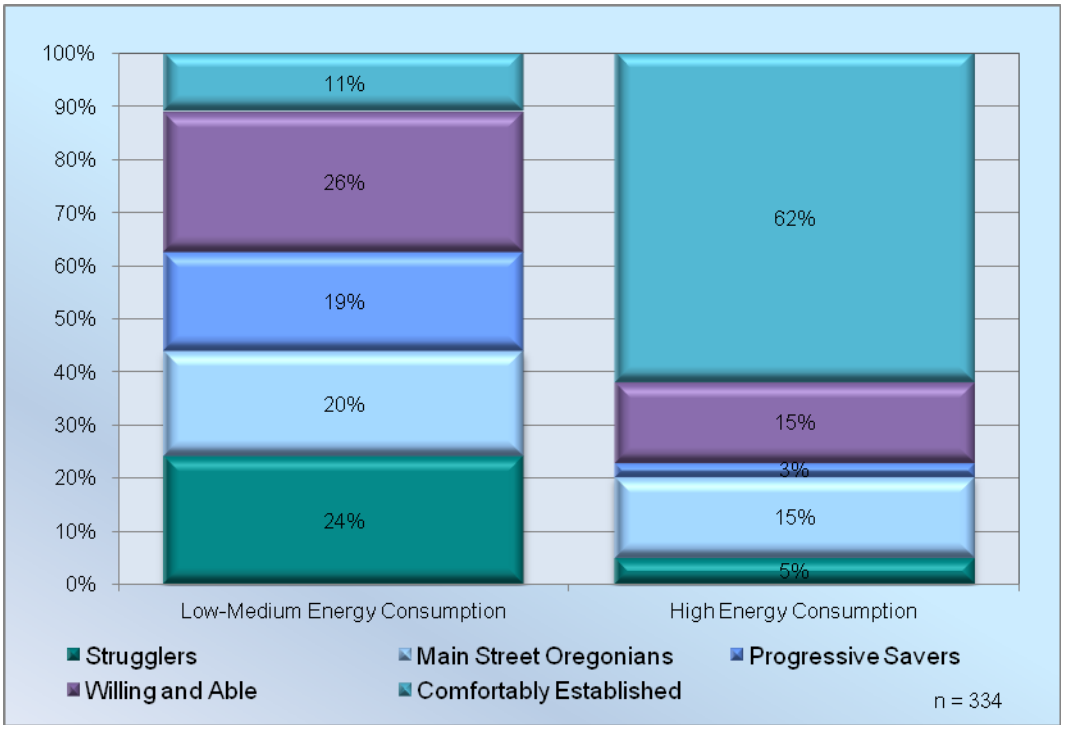
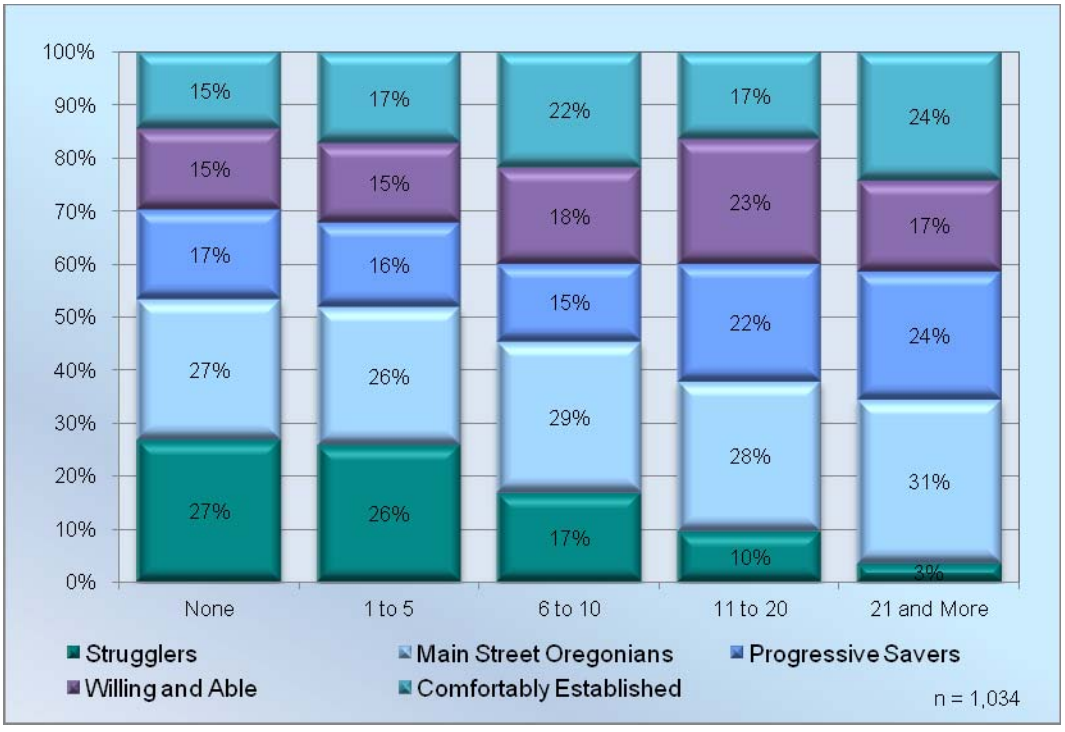


Figure 4.8: Clusters by the Number of CFLs Installed



Demographic Variables

As shown in Figure 4.9, the five segments were distributed across the four regions with a significant difference ($p<.05$). The most notable segment by geographic area is *Main Street Oregonians*, which are predominantly located in less-urban regions, in particular in the South and secondly in the Willamette Valley/North Coast. The other two segments are more evenly distributed across the state.

Figure 4.9: Clusters by Region

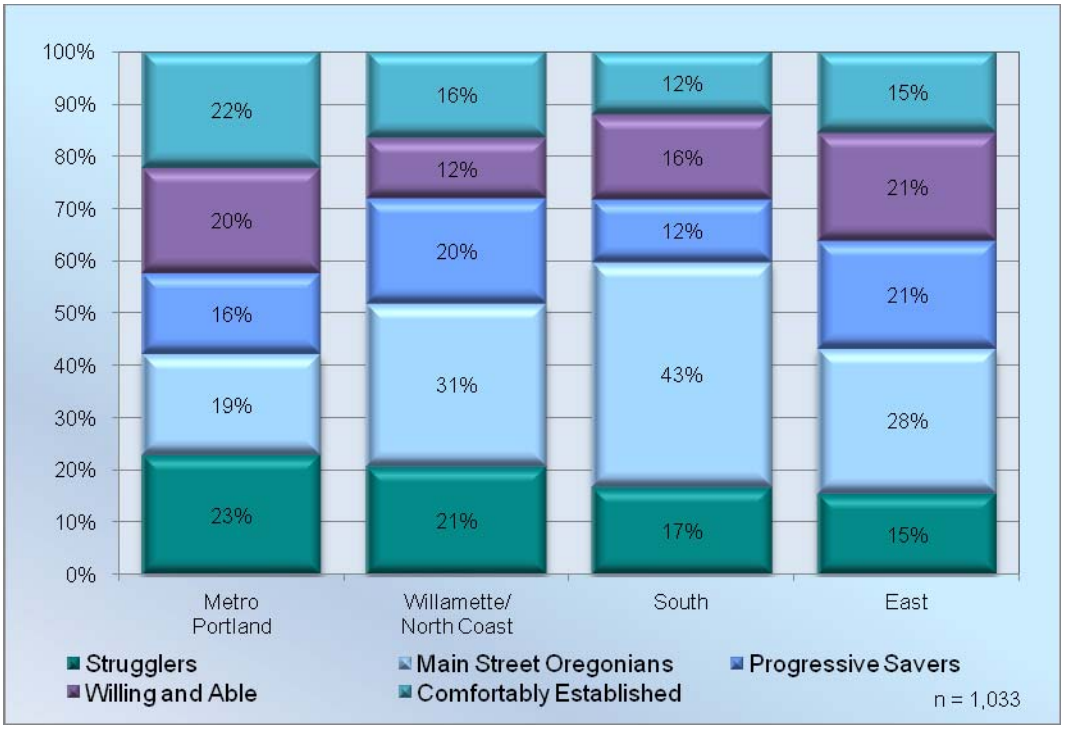


Figure 4.10 describes homeownership within each segment. *Strugglers* are all renters, and *Main Street Oregonians* and *Comfortably Established* are all homeowners. *Willing and Able* and *Progressive Savers* consist of both renters and owners. These differences are significant ($p<.05$).

The type of space heating fuel used by each segment is shown in Figure 4.11. Electricity is the dominant fuel type used by *Strugglers*, *Main Street Oregonians*, and *Progressive Savers*. Other fuel types, such as propane and oil, are also used by some of these groups. *Willing and Able* and *Comfortably Established* use natural gas as their primary heating fuel.

Figure 4.10: Clusters by Homeownership

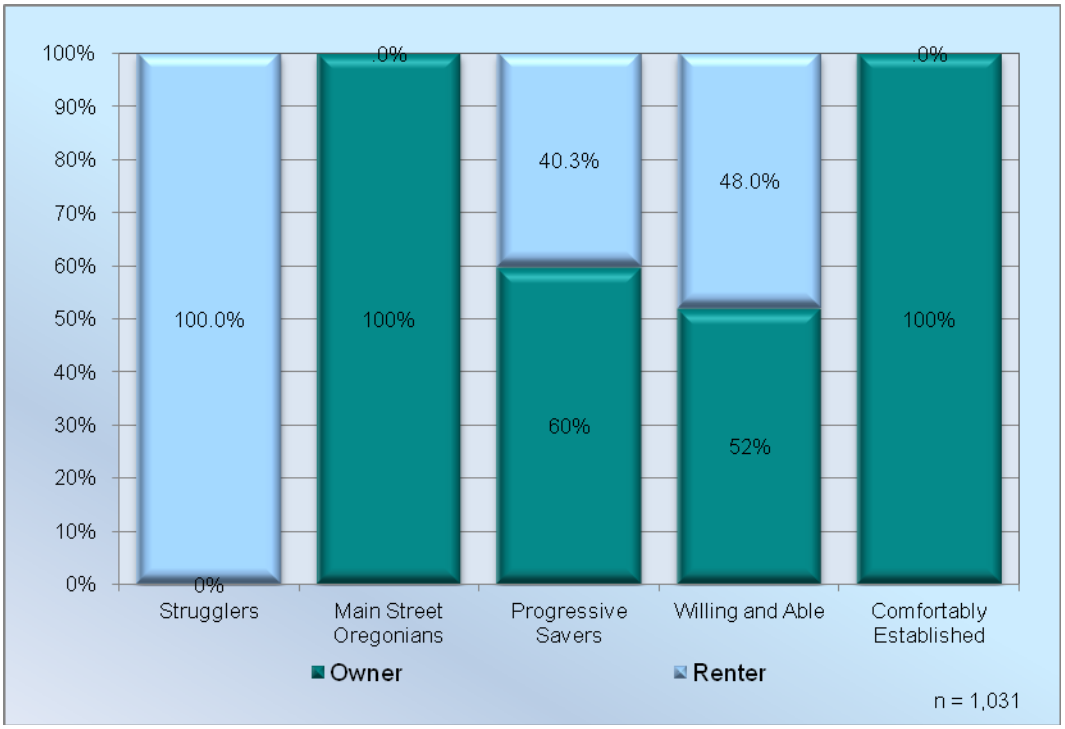


Figure 4.11: Clusters by Space Heating Fuel

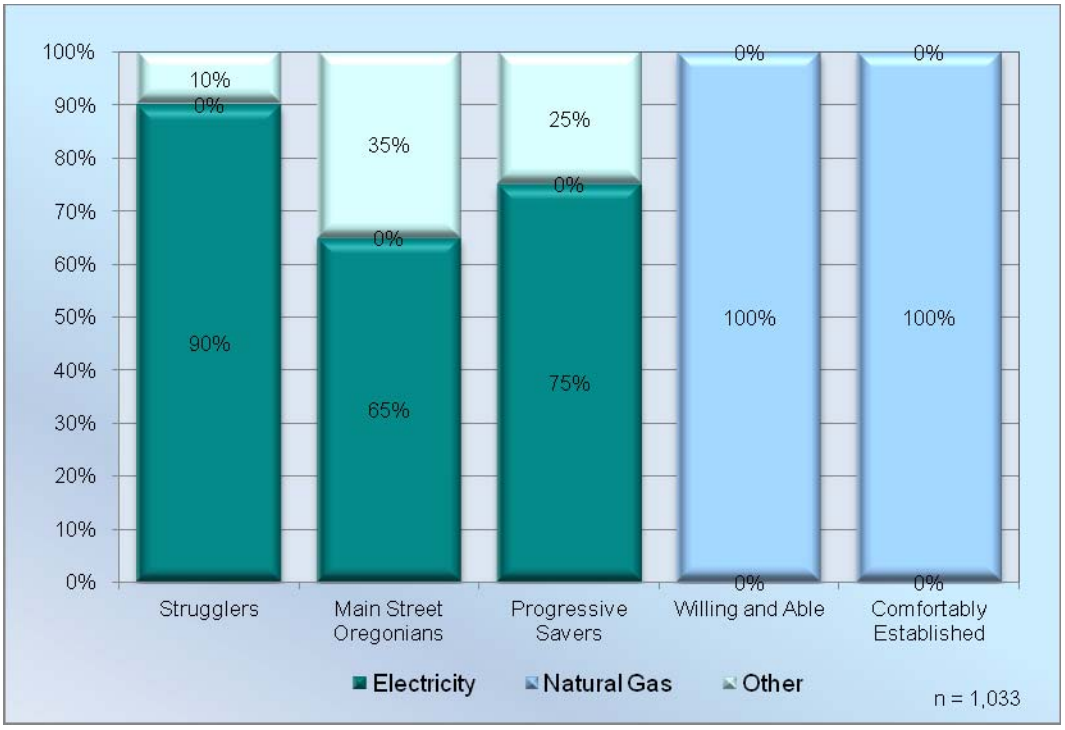
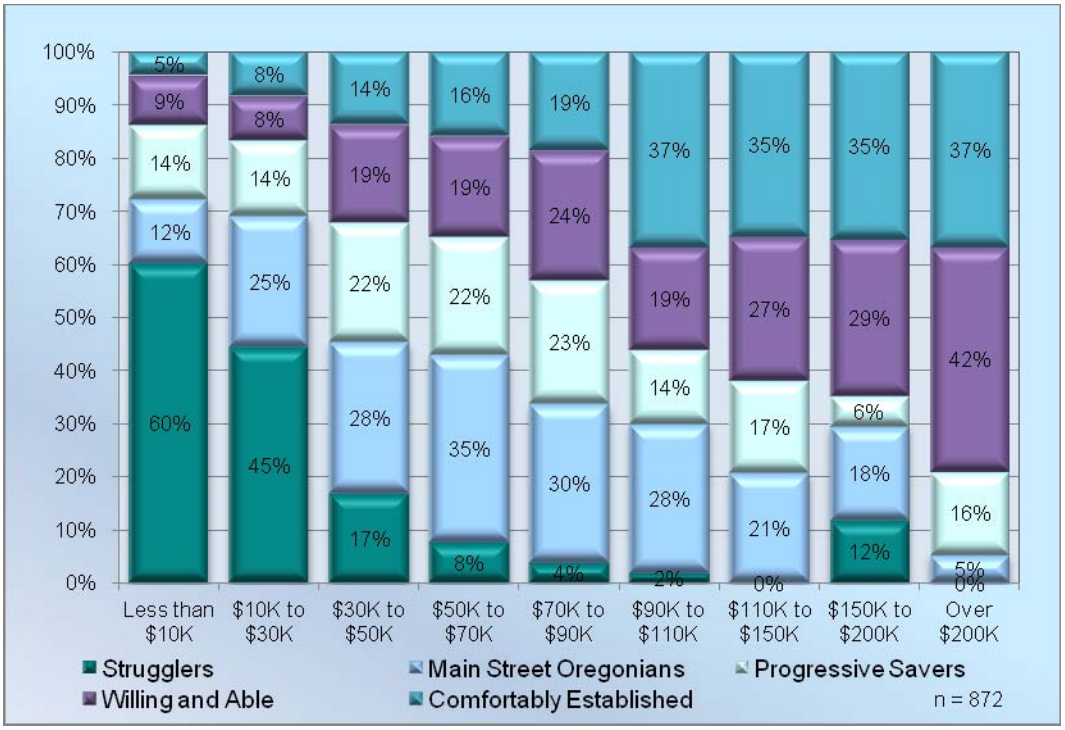


Figure 4.12 shows household income ranges. Strugglers are dominant in the below $30K income ranges. *Main Street Oregonians* and *Progressive Savers* are fairly evenly distributed, but mostly in the middle income ranges. The portions of *Willing and Able* and *Comfortably Established* increase as household income increases, indicating they are in higher income brackets. These findings are significant ($p<.05$).

Figure 4.12: Clusters by Household Income



The distribution of segments by primary householder's age is shown in Figure 4.13. *Progressive Savers* and *Willing and Able* are more likely below 49 years-old. On the other hand, *Comfortably Established* and *Main Street Oregonians* are more likely older households (above 50 years-old). *Strugglers* are most commonly either older households or younger households.

Finally, Figure 4.14 shows the educational achievement by primary householders. *Strugglers* have the lowest education level, whereas *Comfortably Established* have the highest educational achievement of the five segments. Other segments are by and large evenly distributed across all education levels.

Figure 4.13: Clusters by Primary Householder's Age

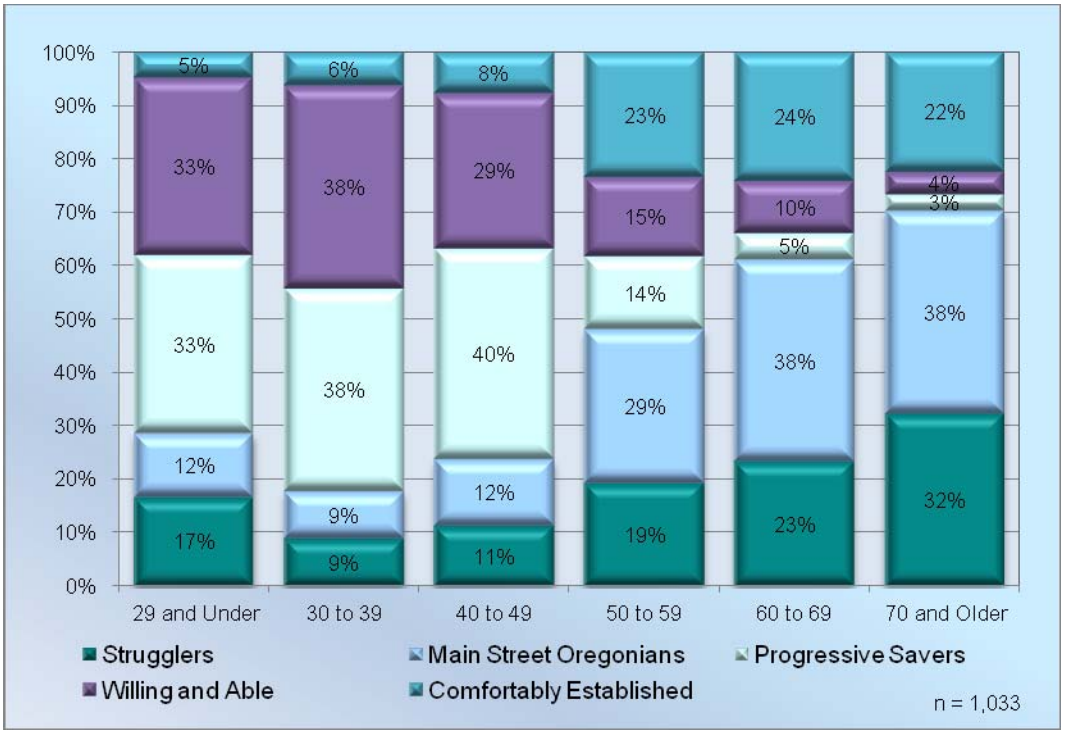
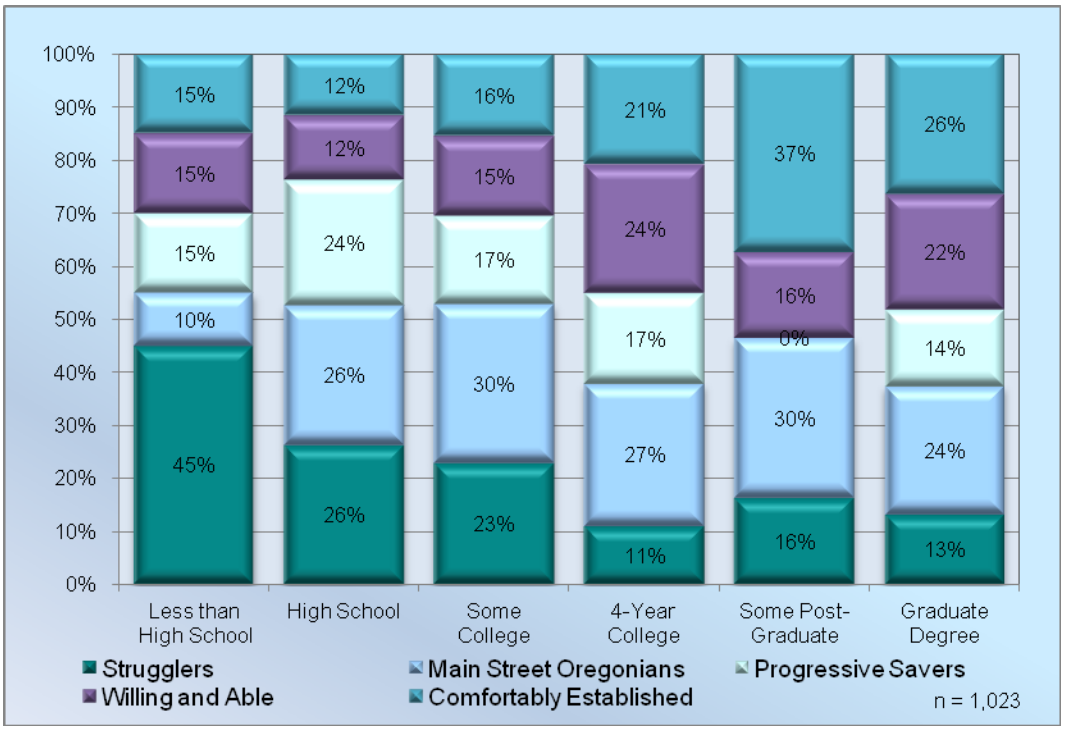


Figure 4.14: Clusters by Primary Householder's Education Level



Segmentation Summary

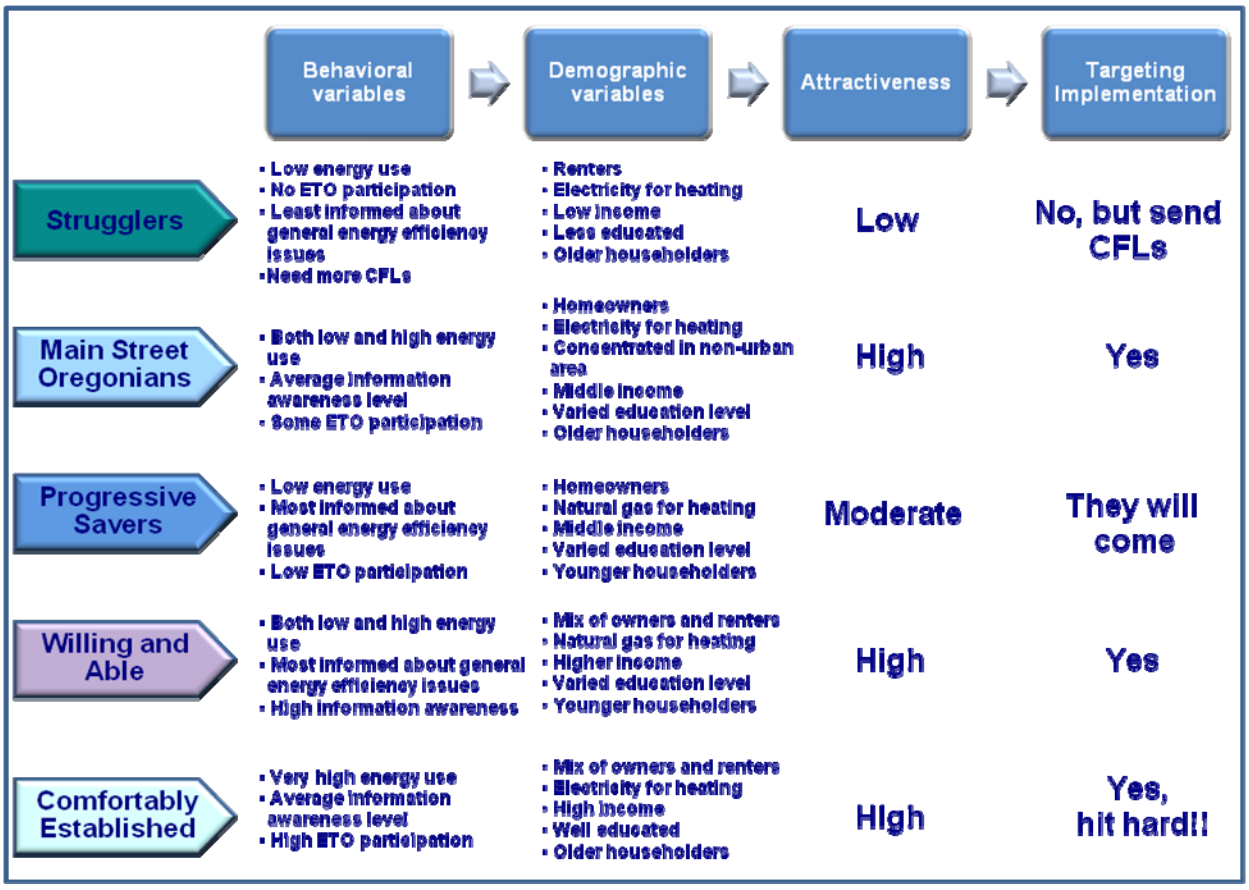
The five segments we identified based on behavioral, energy awareness, and energy consumption patterns also have distinct behavioral and demographic characteristics. The following summarizes each segment:

- **Strugglers** are renters who live in mostly electrically-heated homes. They are a transitional, young population or older people who are in a survival mode. Energy consumption in these homes is low. Due to renting circumstances and financial constraints, their capability for efficiency measure installation are limited, with even CFL installation rates quite low. They are also the least informed on the issue of energy efficiency.
- **Main Street Oregonians** are homeowners who most commonly live in non-urban areas. They are older in age and financially tend to be middle-income. Electric heating is the most dominant method of space heating in these homes. Some of these homes use relatively low energy, but more than half have high energy consumption. They are moderately informed about energy efficiency issues and some of these households have participated in Energy Trust programs.
- **Progressive Savers** are younger households with middle incomes that are highly aware of energy efficiency issues, with energy conservation as part of their lifestyle, even without participation in Energy Trust programs. They are a mix of renters and homeowners whose homes use mostly electricity for heating.
- **Willing and Able** are a mix of homeowners and renters that use natural gas to heat their homes. They are younger in age, but financially successful. Energy consumption is relatively low, but some consume high amounts of energy. They tend to be highly aware of energy efficiency issues and their Energy Trust program participation is high.
- **Comfortably Established** are homeowners who live in natural gas heated homes and tend to be high consumers of energy. They are older and financially successful, with a high level of education. Though energy efficiency awareness is somewhat average, they have been more likely to participate in Energy Trust programs than any other segments. They are slightly concentrated in urban areas, but present across the state.

Target Segment Selection

Figure 4.15 summarizes the characteristics of each of the five segments and selects the most attractive segments in the markets that are of interest to Energy Trust.

Figure 4.15: Segmentation Summary and Target Segments



We identified *Main Street Oregonians*, *Willing and Able*, and *Comfortably Established* as the most attractive market segments for Energy Trust to target. These segments, *Comfortably Established* in particular, include most of the high energy consumption households, and most of these households are owner-occupied households that have ability to take efficiency actions. Also, they are already more likely to take advantage of programs Energy Trust offers and thus offer a likely willing opportunity.

On the other hand, *Strugglers* seems to have low market attractiveness. They are renters and financially constrained; therefore, their ability to take efficiency measures seems lower. Moreover, most of these households' energy consumption is low and they are the least likely candidate for future Energy Trust participation. However, Energy Trust can help their efficiency by improving CFL installation and other low-cost measure installations in these homes.

Finally, *Progressive Savers* have moderate market attractiveness; yet for efficient use of Energy Trust's limited resources, this segment would be a secondary target. These households appear to already have greater efficiency and conservation systems imbedded in their lifestyle; therefore, we believe they will continue to find ways to save energy and come to Energy Trust programs as they need them.

5 SAMPLING CHALLENGE

One of the important assumptions for accurate estimation using survey data is that samples are representative of the population. The most prevalent method of market data collection is still through telephone surveys, but there is now a greater chance of violation in the assumption of representativeness due to the rapid growth in use of cell phones.

Because inclusion of cell phone numbers in the sampling list is difficult due to various logistical and legal obstacles, cell phone-only households have a zero chance of selection in most RDD samples. Yet, cell phone usage is significantly more prevalent among younger people. Further, younger and less affluent households are more likely to be cell-only households, without a landline. Thus, RDD samples can deviate from a representative sample by missing an important segment of the population.

In this survey, a question was added to investigate Oregonians' use of cell phones for the benefit of future surveys (Table 5.1). Sixty-six percent of respondents reported they use a landline predominantly, 23% reported their use of a cell phone as their primary phone, and 11% said they use both a landline and cell phone equally. Considering that the sampling list of this survey consisted of only landline numbers (cell phone-only households were not included), it is reasonable to assume that the households that use primarily cell phones are much greater than 23%.[12]

Table 5.1: Primary Phone

PRIMARY PHONE TYPE	PERCENT OF TOTAL
Landline Phone	66%
Cell Phone	23%
Both Landline and Cell Phone Equally	11%

Note: Only within RDD sample (N=1,000). *Don't know* responses and refusals were treated as missing (N=15).

Further, when the renter samples are compared with census data, the deviance of the sample from the population is even more apparent (Table 5.2). Overall, renters consisted of 17% of the sample, but according to the 2000 census, 36% of Oregon households are renters. Moreover, the RDD renter sample was much younger than the census as a whole, and more of the list renters lived in single-family homes than the census reports.

[12] Previous research by others (need citation) has found that the population of cell phone with landline but preferring cell phone users are the most similar to cell phone only population.

Table 5.2: Comparison of Renter Sample (RDD) vs. the 2000 Census

CHARACTERISTIC	RDD SAMPLE	2000 CENSUS
Renter as a Percent of the Total Population	17%	36%
AGE OF RENTERS (N=167)		
29 Years of Age and Under	15%	29%
30 to 39 Years of Age	19%	25%
40 to 49 Years of Age	20%	18%
50 to 59 Years of Age	20%	11%
60 to 69 Years of Age	11%	6%
70 Years of Age and Older	14%	11%
TYPE OF RENTAL HOUSING (N=165)		
Single-Family	44%	35%
Multifamily	51%	60%
Mobile Home	5%	5%

When the renter samples are compared between those who reported using cell phones as their primary phone and those who reported using a landline or both a cell phone and landline, there were significant differences in important demographic characteristics between these two groups (Table 5.3). Primarily, cell phone renters are significantly younger, more educated, and their household income is higher compared with renter households that primarily use a landline or both ($p<.05$).

Table 5.3: Primarily Cell Phone vs. Landline Rental Households

CHARACTERISTIC	RENTERS WHO PRIMARILY USE A CELL PHONE	RENTERS WHO PRIMARILY USE A LANDLINE OR BOTH A LANDLINE AND CELL PHONE	SIGNIFICANCE (*P*)
Age of Primary Householder	39 years or younger	50 years or older	p<.0001
Education of Head of Household	4-year college or more	High school or less	p<.0001
Household Income	$50K or more	Less than $50K	p = .05

Though no differences were observed in awareness of energy efficiency issues, participation in Energy Trust programs, energy use behaviors, and other environmental attitudes, there were statistically significant differences in important demographic variables between primarily cell households and landline households. These findings manifest the emerging problems of RDD sampling techniques due to the increasingly prevalence of cell phones as a replacement for traditional landline phones. According to the Center for Disease Control's national Center for

Health Statistics, this trend is growing at a rapid pace – with a 22% to 23% increase every six weeks.[13]

The fact that there is little indication of difference in variables of concern for this study is heartening; however, future surveys that will use a similar RDD sampling approach need to include plans to deal with these sampling challenges. Some of the options are to employ statistical data manipulation techniques – such as were done here – or to use sampling and surveying strategies that explicitly allow inclusion of cell phone-only households, likely at a greater cost than using a strict RDD approach or purchase-list approach.

[13] *How Serious is Polling's Cell-only Problem?*, Pew Research Center, Keeter, 2007. *http://pewresearch.org/pubs/515/polling-cell-only-problem.*

6 CONCLUSIONS AND RECOMMENDATIONS

FINDINGS

The main findings from the analysis suggest that Energy Trust has significant challenges, as well as opportunities, for its marketing and energy-saving goals. The questionnaire covered a broad range of residential energy efficiency issues and primarily assessed household levels of awareness. The degree to which this translates to actual behavioral change was not deeply examined, yet the findings do suggest that the public is concerned about their energy use and the subject of Global Warming is becoming a more pressing issue to them.

Across the Oregon households surveyed, Energy Trust participation was estimated at about 6%, and 21% of those indicating awareness of Energy Trust services, with 28% of the households reporting they have heard of Energy Trust (Portland metropolitan area has the highest at 35%). In contrast, awareness of Energy Trust is low compared with the Oregon State Energy Tax Credit Program at 71% statewide. Energy Trust program participation, however, has been positive – over 60% of those who have participated reported they have recommended Energy Trust to people outside of their households.

The analyses also found that households that have participated in Energy Trust programs are significantly different from nonparticipants in important demographic, as well as some behavioral, characteristics. Participant households are more likely to be single-family home dwellers, middle-aged, with higher incomes and education, and to use natural gas for heating. Participants are also more knowledgeable about energy efficiency products and services, and they are better able to distinguish between efficiency and conservation. Nonparticipants, on the other hand, are more skeptical about energy efficiency and renewable products in cost, availability, and comfort.

The following highlights some of the important findings:

Energy Trust Awareness and Participation

- Households that are aware of Energy Trust are more highly concentrated in the Portland metropolitan region. Energy Trust awareness was significantly higher among PGE customers and lower among other utility customers, particularly those of EWEB.
- The most frequently cited medium through which households first learned about Energy Trust was from utility inserts and other direct mail.
- Households with electric providers other than PGE have significantly lower participation rates in Energy Trust programs.

- Characteristics associated with homeownership are common among participants: they are more likely to be single-family home dwellers, middle-aged primary householders, more educated, and have higher household income.
- Nonparticipants are more likely to live in non-single family dwellings, have less household income and education, to be either older or younger than average, and to use electricity for heating.
- Households that use natural gas as their primary energy source for heating are more likely to have participated in Energy Trust programs.
- Participants seem to be highly satisfied with Energy Trust services.

Attitudes, Belief, and Behaviors

- Participants are more motivated to reduce their energy bill by installing efficient measures compared with nonparticipants, but their conservation attitudes and behaviors are the same as or worse than nonparticipants'.
- Nonparticipants appear to be trying to reduce energy use by conservation actions, but not able to employ efficiency measures, primarily because of a cost barrier.
- Nonparticipants hold more skeptical views than participants do toward "energy-efficient" products in cost, availability, and comfort.
- More households in the Portland metropolitan and Willamette regions are convinced that Global Climate Change is real, compared to those that reside in the Southern or Eastern parts of the state. Oregon households, on average, hold about the same level of conviction as the national average. There appears to be no difference in the conviction that Global Warming is real between participants and nonparticipants.

Green Power and Renewable Energy Option Programs

- Participation in Green Power programs ranges from 7% to 17%. Among EWEB customers, awareness of such a program is significantly lower than for other electric utilities.
- Participation and awareness among NW Natural customers of the renewable energy option program is very low.

Market

- More than half of the nonparticipants' primary news source is television. Participants rely more on paper media and public radio.

➡ Half of the participants express the intention to participate in Energy Trust programs in the near future by doing more efficiency improvements to their homes, whereas less than a quarter of nonparticipants have the intention to do so.

Energy Consumption

➡ Owner-occupied households have significantly more high energy consumers compared with renter-occupied households. Renter-occupied households use considerably less energy, and this is consistent regardless of housing type.

➡ Regional differences in energy consumption of owner-occupied households are significant. The Portland metropolitan area and Willamette/North Coast regions have the highest concentration of high consumption owner-occupied households, and the Southern and Eastern regions have low concentrations of high consumption households.

➡ High consumption owner-occupied households are significantly more highly educated, with higher incomes.

➡ Very few differences in Energy Trust awareness and participation, energy use attitudes, perceptions, and behaviors were observed between low and high energy consumption households.

CONCLUSIONS AND RECOMMENDATIONS

We offer the following conclusions and recommendations:

Conclusion 1: **Five distinct market segments have emerged, which may have important implications to Energy Trust marketing strategies.**

- ***Strugglers*** **(renter-occupied households) – have low to moderate market attractiveness**
- ***Progressive Savers*** **(low energy consumption lifestyle) – have low to moderate market attractiveness**
- ***Main Street Oregonians*** **– are one of the most attractive market segments**
- ***Willing and Able*** **– are one of the most attractive market segments**
- ***Comfortably Established*** **– are the most attractive market segment**

The latter three are the most attractive market segments to Energy Trust because these segments include the most number of high energy consumers, they are mostly owner-occupied households with the ability to take efficiency actions, and they are the most likely Energy Trust participants.

➡ ***Recommendation 1:*** **Give the highest priority to reach the *Comfortably Established*, and then *Main Street Oregonians* and *Willing and Able*. If resources allow, provide CFLs particularly to *Strugglers* to enhance knowledge and gain savings.**

Conclusion 2: **The public is confused by terminologies commonly used in the energy efficiency industry.** We found that most respondents (52%) who initially said they don't have "CFLs or compact fluorescent lamps" reported they did have them after we clarified the question by describing them as "twisty or swirly" types of bulbs.

➡ ***Recommendation 2:*** **Prior to implementing future surveys, efforts should be made to test the terms used in the instruments that consumers use to describe energy efficiency, and energy conservation actions and behaviors. Brainstorm industry assumptions with focus groups to enhance survey effectiveness.**

Conclusion 3: **The increasing use of cell phones as primary household phone lines challenges obtaining representative samples.** The survey data shows that, with a traditional RDD sampling technique, we are not including particular segments of the population, which are most likely renter-occupied younger households (likely *Strugglers* and *Willing and Able*). As a result, accurate population estimation is difficult, particularly for important demographic variables.

➡ ***Recommendation 3:*** **Employ more rigorous sampling techniques by including sample quotas for demographic variables that are available in census data, such as for householder's age and housing structure. Use of other advanced data collection technologies – such as web surveys or purchasing cell phone numbers – that allow for reaching cell phone-only households could be used in conjunction with traditional RDD techniques.**

Conclusion 4: **A short survey is good for respondents, but not necessarily good for addressing every question.** The questionnaire included questions about participation that could only be answered by 7% of the sample, questions that would be more optimally included in program evaluation efforts. The participation questions reduced the potential to ask additional questions on behavior, awareness, decision-making, and market barriers that could be very fruitful for marketing efforts.

➡ ***Recommendation 4:*** **Continue to use respectful, short surveys, but limit questions on participation and focus on behavior, awareness, decision-making, and market barriers.** This will improve the quality of the market segmentation efforts and knowledge generally of Oregonian attitudes and concerns about energy. Also, make sure that the instrument permits opportunities to use assess both aided and unaided awareness of Energy Trust, the State Energy Tax Credit, and other important market issues.

APPENDICES

APPENDICES

A RESEARCH THEMES, QUESTIONS, AND ISSUES

The following are the key themes, questions, and issues, that informed the research survey.

Table A.1: Research Themes, Questions, and Issues Explored

RESEARCH AREA	RESEARCH QUESTIONS	RESEARCH ISSUES
Awareness of Organizations	Want to know if people are aware of Energy Trust and what they think of ETO	Aware of Energy Trust, Oregon State Energy Tax Credit, of Energy Trust programs (aided, unaided), perception of Energy Trust, perception of their utility, do they think ETO is part of their utility, when would they call ETO
Program Participation	Want to know perceptions of Energy Trust programs	Reasons for participation or nonparticipation, satisfaction with participation, suggestions for improving
Awareness of Energy Efficiency	Want to know awareness of energy efficiency	How they define EE and energy conservation; do they understand difference between EE and energy conservation, renewables; ENERGY STAR® awareness (aided, unaided), assessment of EE of home and what they base assessment on
Assessment of Energy Efficiency's Importance	Want to understand how important Energy Efficiency is to people	Concern for energy savings, energy cost, environment, sustainability, national energy security, and economic security; what they don't like about EE options
Awareness of Renewable Energy	Want to know awareness of different forms of renewable energy	Solar hot water, solar PV, wind – do they know someone with, opinion of whether it works; purchase green energy (why, why not), what would make it easier
Use of Energy	What choices are people making in energy use today; does low-cost/no-cost still need promotion	Thermal setting choice; low-cost no-cost behaviors taken; EE/conservation/renewable actions taken; secondary refrigeration, plasma TV, number of PCs on 24/7, #CFLs; recently purchased or shopped
Decision-Making	Where are people in the process of making decisions to consider energy efficiency and renewables	Plans for future EE or renewable actions, what info have they gathered, what deliberations; plans for next big purchase: appliance, entertainment/PC, house; how does EE, renewable rank; how do they know if EE; likely influence of incentives, vendor, POS info, energy/$ savings
Global Climate Change	How does Oregon compare to national population on Global Climate Change awareness; what is the perception of GC-EE connections	Beliefs, connection to EE, perception of sources of CO_2, given beliefs' effects on actions

Continued

RESEARCH AREA	RESEARCH QUESTIONS	RESEARCH ISSUES
Market	Preferred information sources for energy efficiency, for renewables, for products	Sources of information on EE, renewables, products to buy; what makes a source credible; accessed ETO website
Structure	House characteristics	Home type (MF/SF), home size, home age, fuel type heat, fuel type water, secondary fuels
Demographics	Household characteristics	Tenancy, number of occupants, income, geographical location, age, gender, for owners how long in home, renters how soon till buy
Follow-Up	Willingness to participate in a focus group or receive emails from Energy Trust	Obtain name, address, email

B SURVEY INSTRUMENT

Energy Trust of Oregon
Residential Awareness Study

Hello, my name is _____ with _____, I'm calling on behalf of Energy Trust of Oregon. I'd like to speak with a person responsible for making decisions about energy use in your household such as paying your electric or gas bill or buying new appliances? Would that be you? [IF NEEDED Energy Trust of Oregon is a nonprofit organization dedicated to changing how Oregonians use energy]

() Yes
() No, respondent available
() No, respondent currently not available [THANK AND TERMINATE, SCHEDULE A CALLBACK]
() No, refused [THANK AND TERMINATE]

[WHEN POTENTIAL RESPONDENT REACHED] [REINTRODUCE] Today, I am speaking to Oregon residents on behalf of Energy Trust of Oregon about how households use energy. This is not a sales call. All responses will be kept confidential and used strictly for research purposes. First, I have a few questions to see if you qualify for this important study.

S1. Is your location used primarily as a residence or as a business?
1 Residence
2 Business [THANK AND TERMINATE]
8 DK [THANK AND TERMINATE]
9 REF [THANK AND TERMINATE]

S2. RECORD GENDER [CHECK QUOTA]
1 MALE
2 FEMALE

S3. What is the name of your natural gas utility, if you use one? [IF NEEDED: Natural gas comes in a pipe to the house] [DO NOT READ LIST]
1 Northwest Natural
2 Cascade Natural Gas
3 Avista
4 NO NATURAL GAS COMPANY
5 Other, Specify

8 DON'T KNOW
9 REFUSED

S4. What is the name of your electric utility? [DO NOT READ LIST]
1 PGE, Portland General Electric
2 Pacific Power [Pacific Power and Light, PP&L, PacifiCorp]
3 EWEB [Eugene Water and Electric Board]
4 Other (SPECIFY) _____
8 DK
9 REF

S5. Do you own or rent your home? [CHECK QUOTA]
1 Own
2 Rent
8 DK
9 REF

S6. Please stop me when I get to the type of house you live in? Is it… [READ LIST]
1 A single-family detached home
2 A duplex, townhouse, row house or small apartment with 2-4 total units
3 An apartment, condominium, or townhouse with 5 or more total units
4 A mobile or manufactured home
5 Other (specify) _____
8 DK
9 Refused

ENERGY TRUST AWARENESS

1. Prior to today, have you heard of Energy Trust of Oregon?
1 Yes
2 No [SKIP TO Q10]
8 DK [SKIP TO Q10]
9 REF [SKIP TP Q10]

2. (IF Q1 = 1) Please tell me if you have heard the following about Energy Trust? [READ LIST – RANDOMIZE. RECORD YES OR NO FOR EACH.]
a. Energy Trust offers energy saving programs for homes and businesses
b. Energy Trust offers cash incentives for installing energy saving products
c. Energy Trust provides energy saving light bulbs
d. Energy Trust provides home energy analysis and recommendations
e. Energy Trust offers cash incentives and promotes solar electric (PV)
f. Energy Trust offers cash incentives and promotes renewable energy (wind, biopower, etc.)

3. (IF Q1 = 1) From whom or how did you first hear about Energy Trust and its programs? [DO NOT READ. SINGLE RECORD]
1 Friend, family member, neighbor, coworker, colleague (word of mouth)
2 Contractor
3 Energy Trust/ETO
4 Retailer, salesperson
5 Gas or Electric utility
6 Bill insert/Utility Newsletter/Brochure/ Letter or mail
7 Email
8 Event
9 Website or online search
10 Sign – billboard
11 Mass transit ads
12 Magazine story or ad
13 Newspaper story or ad
14 Radio story or ad
15 Television story or ad
16 Other, specify _____
98 Don't know
99 Refused

PROGRAM PARTICIPATION

4. (IF Q1 = 1) Have you ever participated in any Energy Trust program or received an incentive check from Energy Trust?
1 Yes [SKIP TO Q6]
2 No
8 DK [SKIP TO Q10]
9 REF [SKIP TO Q10]

5. (IF Q4 = 2) Using a scale of 0 to 10, where 0 means "not at all important" and 10 means "very important", how important are each of the following in why you have not participated in an Energy Trust program? –[RANDOMIZE] 11 = DK 12 = REF
a. Never thought about participating
b. Too much hassle to participate
c. Don't have money to install new equipment
d. Have a new efficient home
e. No salesperson or contractor has ever mentioned any programs

6. (IF Q4=YES) You mentioned that you have participated in Energy Trust program. Which of the following best describes when you participated. Was it …[READ LIST. MULTIPLE RECORD]
   1 Sometime in the past year, 2007 or 2008
   2 Sometime between 2004 and 2006
   3 5 or more years ago, before 2004
   8 DK
   9 REF

7. (IF Q4 = 1)Using a scale of 0 to10 where 0 means "not at all important" and 10 means "very important",, how important were the following people in your decision to participate in Energy Trust program? [RANDOMIZE] 11 = DK 12 = REF
   a. Someone you knew had participated
   b. Salesperson or contractor recommended it
   c. Energy Trust program person recommended it
   d. A Utility person recommended it

8. (IF Q4 =1) Using a scale from 0 to10, where 0 means for "not at all important" and 10 means "very important", how important are the following reasons for why you participated in an Energy Trust program? [RANDOMIZE] 11 = DK 12 = REF
   a. Wanted an incentive to buy product
   b. Wanted to save money on my energy bill
   c. Wanted to protect the environment and reduce global warming

9. (IF Q4 = 1) Have you recommended using Energy Trust to anyone outside of your household?
   1 Yes
   2 No
   8 DK
   9 REF

10. (ASK ALL) Are you aware that the State of Oregon offers taxpayers Energy Tax Credits for installing certain energy saving equipment?
   1 Yes
   2 No
   8 DON'T KNOW
   9 REFUSED

USE OF ENERGY

Now I have some questions about how you use energy in your home.

11. Using a scale of 0 to 10 where 0 means "not at all concerned" and 10 means "very concerned", how concerned are you about your home's electric or natural gas bill?
0 1 2 3 4 5 6 7 8 9 10 11 = DK 12 = REF

12. About what percent of the time would you say that you turn the lights off when you leave a room and it's no longer occupied?
_____%
102 DK
103 REF

13. About what percent of the time would you say that you wash your clothes with the washer fully loaded?
_____%
101 DO NOT HAVE ONE
102 DK
103 REF

14. About what percent of the time do you leave your computer on or in sleep mode all night?
_____%
101 DO NOT HAVE ONE
102 DK
103 REF

15. Have you ever had a home energy audit or review?
1 Yes
2 No
8 DK
9 REF

16. How drafty would you say this house is? Would you say it is….?
1 Very drafty
2 Somewhat drafty
3 Not too drafty
4 Not drafty at all
8 DON'T KNOW
9 REF

17. Has the filter for your heating system been changed since January [2008]?
1 Yes
2 No
8 DK
9 REF

18. Do you have a flat screen TV that is larger than 42 inches?
1 Yes
2 No [SKIP TO Q21]
8 DK [SKIP TO Q21]
9 REF [SKIP TO Q21]

19. (IF Q18 = 1) Is it plasma, LCD, LED, or a regular flat screen TV? [IF NEEDED: LCD=Liquid Crystal]
1 Plasma
2 LCD
3 LED
4 Regular flat screen
8 DK
9 REF

20. Do you have any compact fluorescent lamps, also known as CFLs, in your home?
1 Yes [SKIP TO Q22]
2 No
8 DK
9 REF

21. (IF Q 20 = 2, 8, or 9) Do you have any of the twisty or swirly types of bulbs in your home?
1 Yes
2 No [SKIP to Q23]
8 DK [SKIP to Q23]
9 REF [SKIP to Q23]

22. (IF Q21 = 1) Approximately, how many of these bulbs do you have installed in your home? Would you say…?
1 1-5
2 6-10
3 11-20
4 More than 20
8 DK
9 REF

ENERGY STAR®

23. Tell me if you have ever heard of any of the following …[READ LIST, RANDOMIZE, BUT ALWAYS ASK ENERGY STAR IMMEDIATELY FOLLOWED BY HOME PERFORMANCE WITH ENERGY STAR]?
a ENERGY STAR®
b Home Performance with ENERGY STAR®
c Energy Guide
d Power Smart
e Earth Advantage
f Super Good Cents
g LEED

24. (IF YES TO ENERGY STAR IN Q23a) Have you ever purchased any ENERGY STAR® appliances or electronics?
1 Yes
2 No
8 DK
9 REF

25. About what percent of the time do you try to buy the low energy using models when you are buying appliances or electronics?
_____%
101 Never buy appliances or electronics
102 DK
103 REF

ENERGY EFFICIENCY IMPORTANCE

26. I'd like to hear your impressions about products that are specifically designed to use less energy compared to standard products. Please say yes or no, as to whether or not you agree that compared to standard products, products that use significantly less energy… [RANDOMIZE]
a. Provide less comfort Y N
b. Cost more Y N
c. Perform well Y N
d. Are difficult to find Y N

27. Using a scale of 0-10, where 0 means "not at all important" and 10 means "very important" , how important would each of the following reasons be in your decision to purchase an energy efficient product?
    a. To save money on your energy bill
    b. To protect the environment and reduce global warming
    c. To have a new technology

28. Other than the things you have mentioned so far, are you doing or have you done anything else to reduce your home's energy usage? (RECORD)

    _____
    _____
    _____

RENEWABLE ENERGY AWARENESS

My next questions concern renewable energy options.

29. What things come to your mind as renewable energy options suitable for homes? RECORD

    _____
    _____
    _____

30. (IF SC4 = 1, 2, OR 3) Does [INSERT: ELECTRIC UTILITY (S4)] offer a "green power" option, where you pay a little extra for electricity from a renewable source like wind or solar]
    1 Yes
    2 No [SKIP TO Q32]
    8 DK [SKIP TO Q32]
    9 REF [SKIP TO Q32]

31. (IF Q30 = 1) Is your household participating in this "green power" program?
    1 Yes
    2 No
    8 DK
    9 REF

32. (IF SC3 = 1, 2, or 3) Does [INSERT: GAS UTILITY (S3)] offer a renewable energy option, where you pay a little extra on your gas bill to bring biogas to our region, making it a viable renewable energy source?
1 Yes
2 No [SKIP TO Q34]
8 DK [SKIP TO Q34]
9 REF [SKIP TO Q34]

33. (IF Q32 = 1) Is your household participating in this renewable energy option?
1 Yes
2 No
8 DK
9 REF

34. I'd like to hear your impression about solar hot water or electric systems. Please tell me yes or no, as to whether or not you agree with each of the following statements. [RANDOMIZE]
a. It's hard to find someone who knows how to install solar systems Y N
b. Solar systems perform well Y N
c. Solar system are attractive Y N
d. Solar systems are too expensive Y N

35. Using a scale of 0 to 10, where 0 is "not at all important" and 10 is "Very important", how important would each of the following reasons be in your decision to purchase a renewable energy system?
a. To save money on my energy bill
b. To protect the environment and reduce global warming
c. To have a new technology

36. Would you say that you do or do not know where to obtain information about different types of renewable energy for your home?
1 Yes
2 No
8 DK
9 REF

GLOBAL WARMING/ECOLOGICAL BELIEF

My next questions concern your thoughts on some current social issues.

37. How convinced are you that global warming or climate change is happening—would you say you are completely convinced, mostly convinced, somewhat convinced, not too convinced, or not at all convinced?
1 Completely convinced
2 Mostly convinced
3 Somewhat convinced
4 Not too convinced [SKIP TO Q39]
5 Not at all convinced [SKIP TO Q39]
8 DK [SKIP TO Q39]
9 REFUSED [SKIP TO Q39]

38. (IF Q37 = 1, 2, OR 3)There is a lot of talk about things people can do to reduce their contribution to global warming. If a friend of yours wanted to do the most effective thing, and had the money to do anything, what would you advise your friend to do?
_____
_____
_____

MARKET

My next few questions concern plans you may have.

39. In the last 6 months, have you been actively searching for a new home or condominium to buy?
1 Yes
2 No
8 DON'T KNOW
9 REF

40. Whenever you have considered a new home, apartment, or condominium, did you ask about the energy bills and energy saving features?
1 Yes
2 No
8 DON'T KNOW
9 REF

41. (IF S5 = 1) Are you intending to install a solar system at your home in the next 12 months?
1 Yes
2 No
8 DK
9 REF

42. Are you planning to replace any major appliances in your home in the next 12 months?
1 Yes
2 No
8 DK
9 REF

43. Do you think you will participate in any Energy Trust programs in the next 12 months?
1 Yes
2 No
3 (VOL) Already participate
8 DK
9 REF

DEMOGRAPHICS

These next questions are just to help us understand characteristics of your household.

44. What is your primary source for getting news? Is it…[READ LIST, ONE RESPONSE]
1 Newspaper
2 Commercial radio [*confirm if just say radio – is that commercial radio or public radio?*]
3 Public radio
4 Magazines
5 TV
6 Websites
7 Blogs
8 Friends
9 Don't follow the news
98 (VOL) DON'T KNOW
99 (VOL) REFUSED

45. About when was your home built? [DO NOT READ LIST]
1 Before 1930
2 1930 to 1939
3 1940 to 1949
4 1950 to 1959
5 1960 to 1969
6 1970 to 1979
7 1980 to 1989
8 1990 to 1994
9 1995 to 1999
10 2000 to 2008

98 DK
99 Refused

46. Do you heat your home primarily with electricity, natural gas, or something else? [DO NOT READ LIST, BUT PROBE TO CODE]
1 Electricity
2 Natural gas
3 Liquid propane gas (LPG)
4 Fuel oil
5 Other
8 DK
9 Refused

47. Do you heat your water primarily with electricity, natural gas, or something else? [DO NOT READ LIST, BUT PROBE TO CODE]
1 Electricity
2 Natural gas
3 Liquid propane gas (LPG)
4 Fuel oil
5 Solar
8 DK
9 Refused

47a (IF Q47 = 5) What energy source do you use as a back-up to your solar water heating system?
1 Electricity
2 Natural gas
3 Liquid propane gas (LPG)
4 Fuel oil
8 DK
9 Refused

48. How many people, including yourself, live in your home now?
_____ # OF PEOPLE
98 DK
99 REF

49. How many school-aged children 18 years or younger, live in your household?
1-15_____#
0 None
98 DK
99 REF

50. Please stop me when I get to your age group. Is it… [READ LIST]:
1 29 yrs or younger
2 30-39 yrs
3 40-49 yrs
4 50-59 yrs
5 60-69 yrs
6 70 yrs or older
8 DK
9 Refused

51. How long have you lived in this home? Has it been…
1 Less than a year
2 1-2 yrs
3 3-5 yrs
4 6-10 yrs
5 More than 10 years
8 DK
9 Refused

52. How much longer do you see your household living in this home? Would you say…?
1 Less than a year
2 1 to 2 yrs
3 3 to 5 yrs
4 6 to 10 yrs
5 More than 10 years
8 DK
9 Refused

53. What is the highest level of education you have achieved so far? [DO NOT READ LIST]
1 Some high school or less
2 High school diploma
3 Some college/associate degree/trade school
4 Four year college degree
5 Some post-graduate studies
6 Post graduate degree/Masters, PhD, professional degree
8 DK
9 Refused

54. Please stop me when I get the range of your household's total before tax annual income:
1 Less than $50,000
2 $50,000 up to $110,000 [SKIP TO Q56]
3 $110,000 or more? [SKIP TO Q57]
8 DK [SKIP TO Q58]
9 REF [SKIP TO Q58]

55. (IF Q54 = 1) Is it…
1 Less than $10,000 [SKIP TO Q58]
2 $10,000 up to $30,000 [SKIP TO Q58]
3 $30,000 up to $50,000 [SKIP TO Q58]
8 DK [SKIP TO Q58]
9 REF [SKIP TO Q58]

56. (IF Q54 = 2) Is it…
1 $50,000 up to $70,000 [SKIP TO Q58]
2 $70,000 up tp $90,000 [SKIP TO Q58]
3 $90,000 up to $110,000 [SKIP TO Q58]
8 DK [SKIP TO Q58]
9 REF [SKIP TO Q58]

57. (IF Q54 = 3) Is it…
1 $110,000 up to $150,000
2 $150,000 up to $200,000
3 $200,000 or more
8 DK [SKIP TO Q58]
9 REF [SKIP TO Q58]

58. Do you have a cell phone?
1 Yes
2 No SKIP TO Q60
8 DK SKIP TO Q60
9 REF SKIP TO Q60

59. (IF Q58 = YES) Which do you use most often, …? [READ LIST]
1 Your Cell phone, or
2 Your Land phone line at home
3 (VOL) Both equally
8 DK
9 REF

60. Do you belong to an online community such as a blog, Facebook, etc.?
1 Yes
2 No
8 DK
9 REF

61. Energy Trust is planning on conducting more research in the future, would you be willing to participate in…
a. A phone Survey Yes No
b. An email survey Yes No
c. A focus group with payment Yes No

62. (IF YES TO ANY IN Q61)
a. What is your name? _____
Phone number? _____ (from sample read-in)
b. Email address? _____
c. Address? _____

THAN YOU VERY MUCH FOR YOUR TIME!!

\END OF SURVEY

C ZIP CODE BREAKOUT BY TOWN, COUNTY, AND REGION

ZIP CODE	TOWN	COUNTY	REGION
97001	Antelope	Wasco	Eastern Oregon
97002	Aurora	Marion	Willamette / North Coast
97004	Beaver Creek	Clackamas	Portland Metro
97005	Beaverton	Washington	Portland Metro
97006	Beaverton	Washington	Portland Metro
97007	Beaverton	Washington	Portland Metro
97008	Beaverton	Washington	Portland Metro
97009	Boring	Clackamas	Portland Metro
97010	Bridal Veil	Multnomah	Portland Metro
97011	Brightwood	Clackamas	Portland Metro
97012	Canby	Clackamas	Portland Metro
97013	Canby	Clackamas	Portland Metro
97014	Cascade Locks	Hood River	Eastern Oregon
97015	Clackamas	Clackamas	Portland Metro
97016	Clatskanie	Columbia	Portland Metro
97017	Colton	Clackamas	Portland Metro
97018	Columbia City	Columbia	Portland Metro
97019	Corbett	Multnomah	Portland Metro
97020	Donald	Marion	Willamette / North Coast
97021	Dufur	Wasco	Eastern Oregon
97022	Eagle Creek	Clackamas	Portland Metro
97023	Estacada	Clackamas	Portland Metro
97024	Fairview	Coos	Southern Oregon
97025	Lake Oswego	Clackamas	Portland Metro
97026	Gervais	Marion	Willamette / North Coast
97027	Gladstone	Clackamas	Portland Metro
97028	Government Camp	Clackamas	Portland Metro
97029	Grass Valley	Sherman	Eastern Oregon

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ZIP CODE	TOWN	COUNTY	REGION
97030	Gresham	Multnomah	Portland Metro
97031	Hood River	Hood River	Eastern Oregon
97032	Hubbard	Marion	Willamette / North Coast
97033	Kent	Sherman	Eastern Oregon
97034	Lake Oswego	Clackamas	Portland Metro
97035	Lake Oswego	Clackamas	Portland Metro
97036	Marylhurst	Clackamas	Portland Metro
97037	Maupin	Wasco	Eastern Oregon
97038	Molalla	Clackamas	Portland Metro
97039	Moro	Sherman	Eastern Oregon
97040	Mosier	Wasco	Eastern Oregon
97041	Mount Hood Parkdale	Hood River	Eastern Oregon
97042	Mulino	Clackamas	Portland Metro
97044	Odell	Hood River	Eastern Oregon
97045	Oregon City	Clackamas	Portland Metro
97047	Parkdale	Hood River	Eastern Oregon
97048	Rainier	Columbia	Portland Metro
97049	Rhododendron	Clackamas	Portland Metro
97050	Rufus	Sherman	Eastern Oregon
97051	Saint Helens	Columbia	Portland Metro
97053	Warren	Columbia	Portland Metro
97054	Deer Island	Columbia	Portland Metro
97055	Sandy	Clackamas	Portland Metro
97056	Scappoose	Columbia	Portland Metro
97057	Shaniko	Wasco	Eastern Oregon
97058	The Dalles	Wasco	Eastern Oregon
97060	Troutdale	Multnomah	Portland Metro
97061	Clatskanie	Columbia	Portland Metro
97062	Tualatin	Washington	Portland Metro
97063	Tygh Valley	Wasco	Eastern Oregon
97064	Vernonia	Columbia	Portland Metro
97065	Wasco	Sherman	Eastern Oregon
97066	Scappoose	Columbia	Portland Metro

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ZIP CODE	TOWN	COUNTY	REGION
97067	Welches	Clackamas	Portland Metro
97068	West Linn	Clackamas	Portland Metro
97069	West Linn	Clackamas	Portland Metro
97070	Wilsonville	Clackamas	Portland Metro
97071	Woodburn	Marion	Willamette / North Coast
97072	Hubbard	Marion	Willamette / North Coast
97073	Faubion	Clackamas	Portland Metro
97074	South Junction	Wasco	Eastern Oregon
97075	Beaverton	Washington	Portland Metro
97076	Beaverton	Washington	Portland Metro
97077	Beaverton	Washington	Portland Metro
97078	Beaverton	Washington	Portland Metro
97080	Gresham	Multnomah	Portland Metro
97086	Columbia County	Columbia	Portland Metro
97088	Gresham	Multnomah	Portland Metro
97100	Indeterminate (Washington)	Washington	Portland Metro
97101	Amity	Yamhill	Willamette / North Coast
97102	Arch Cape	Clatsop	Willamette / North Coast
97103	Astoria	Clatsop	Willamette / North Coast
97106	Banks	Washington	Portland Metro
97107	Bay City	Tillamook	Willamette / North Coast
97108	Beaver	Tillamook	Willamette / North Coast
97109	Buxton	Washington	Portland Metro
97110	Cannon Beach	Clatsop	Willamette / North Coast
97111	Carlton	Yamhill	Willamette / North Coast
97112	Cloverdale	Deschutes	Eastern Oregon
97113	Cornelius	Washington	Portland Metro
97114	Dayton	Yamhill	Willamette / North Coast
97115	Dundee	Yamhill	Willamette / North Coast
97116	Forest Grove	Washington	Portland Metro
97117	Gales Creek	Washington	Portland Metro
97118	Garibaldi	Tillamook	Willamette / North Coast
97119	Gaston	Washington	Portland Metro

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ZIP CODE	TOWN	COUNTY	REGION
97121	Hammond	Clatsop	Willamette / North Coast
97122	Hebo	Tillamook	Willamette / North Coast
97123	Hillsboro	Washington	Portland Metro
97124	Hillsboro	Washington	Portland Metro
97125	Manning	Washington	Portland Metro
97126	McMinville	Yamhill	Willamette / North Coast
97127	Lafayette	Yamhill	Willamette / North Coast
97128	Mcminnville	Yamhill	Willamette / North Coast
97130	Manzanita	Tillamook	Willamette / North Coast
97131	Nehalem	Tillamook	Willamette / North Coast
97132	Newberg	Yamhill	Willamette / North Coast
97133	North Plains	Washington	Portland Metro
97134	Oceanside	Tillamook	Willamette / North Coast
97135	Pacific City	Tillamook	Willamette / North Coast
97136	Rockaway Beach	Tillamook	Willamette / North Coast
97137	Saint Paul	Marion	Willamette / North Coast
97138	Seaside	Clatsop	Willamette / North Coast
97140	Sherwood	Washington	Portland Metro
97141	Tillamook	Tillamook	Willamette / North Coast
97142	Indeterminate (Washington)	Washington	Portland Metro
97143	Netarts	Tillamook	Willamette / North Coast
97144	Timber	Washington	Portland Metro
97145	Tolovana Park	Clatsop	Willamette / North Coast
97146	Warrenton	Clatsop	Willamette / North Coast
97147	Wheeler	Tillamook	Willamette / North Coast
97148	Yamhill	Yamhill	Willamette / North Coast
97149	Neskowin	Tillamook	Willamette / North Coast
97173	Washington County	Washington	Portland Metro
97200	Portland	Multnomah	Portland Metro
97201	Portland	Multnomah	Portland Metro
97202	Portland	Multnomah	Portland Metro
97203	Portland	Multnomah	Portland Metro
97204	Portland	Multnomah	Portland Metro

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ZIP CODE	TOWN	COUNTY	REGION
97205	Portland	Multnomah	Portland Metro
97206	Portland	Multnomah	Portland Metro
97207	Portland	Multnomah	Portland Metro
97208	Portland	Multnomah	Portland Metro
97209	Portland	Multnomah	Portland Metro
97210	Portland	Multnomah	Portland Metro
97211	Portland	Multnomah	Portland Metro
97212	Portland	Multnomah	Portland Metro
97213	Portland	Multnomah	Portland Metro
97214	Portland	Multnomah	Portland Metro
97215	Portland	Multnomah	Portland Metro
97216	Portland	Multnomah	Portland Metro
97217	Portland	Multnomah	Portland Metro
97218	Portland	Multnomah	Portland Metro
97219	Portland	Multnomah	Portland Metro
97220	Portland	Multnomah	Portland Metro
97221	Portland	Multnomah	Portland Metro
97222	Milwaukie	Clackamas	Portland Metro
97223	Tigard	Washington	Portland Metro
97224	Tigard	Washington	Portland Metro
97225	Cedar Mill	Washington	Portland Metro
97226	Portland	Multnomah	Portland Metro
97227	Portland	Multnomah	Portland Metro
97228	Portland	Multnomah	Portland Metro
97229	Cedar Mill	Washington	Portland Metro
97230	Portland	Multnomah	Portland Metro
97231	Portland	Multnomah	Portland Metro
97232	Portland	Multnomah	Portland Metro
97233	Portland	Multnomah	Portland Metro
97235	Lake Oswego	Clackamas	Portland Metro
97236	Portland	Multnomah	Portland Metro
97237	Portland	Multnomah	Portland Metro
97238	Portland	Multnomah	Portland Metro

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ZIP CODE	TOWN	COUNTY	REGION
97239	Portland	Multnomah	Portland Metro
97240	Portland	Multnomah	Portland Metro
97242	Portland	Multnomah	Portland Metro
97246	Portland	Multnomah	Portland Metro
97250	Portland	Multnomah	Portland Metro
97251	Portland	Multnomah	Portland Metro
97253	Portland	Multnomah	Portland Metro
97254	Portland	Multnomah	Portland Metro
97255	Portland	Multnomah	Portland Metro
97256	Portland	Multnomah	Portland Metro
97258	Portland	Multnomah	Portland Metro
97259	Portland	Multnomah	Portland Metro
97262	Indeterminate (Multnomah)	Multnomah	Portland Metro
97264	Portland	Multnomah	Portland Metro
97265	Portland	Multnomah	Portland Metro
97266	Town Center	Clackamas	Portland Metro
97267	Oak Lodge	Clackamas	Portland Metro
97268	Portland	Multnomah	Portland Metro
97269	Portland	Multnomah	Portland Metro
97271	Portland	Multnomah	Portland Metro
97272	Portland	Multnomah	Portland Metro
97276	Portland	Multnomah	Portland Metro
97280	Portland	Multnomah	Portland Metro
97281	Portland (Wash. Co.)	Washington	Portland Metro
97282	Portland	Multnomah	Portland Metro
97283	Portland	Multnomah	Portland Metro
97286	Portland	Multnomah	Portland Metro
97289	Portland	Multnomah	Portland Metro
97290	Portland	Multnomah	Portland Metro
97291	Portland (Wash. Co.)	Washington	Portland Metro
97292	Portland	Multnomah	Portland Metro
97293	Portland	Multnomah	Portland Metro
97294	Portland	Multnomah	Portland Metro

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ZIP CODE	TOWN	COUNTY	REGION
97296	Portland	Multnomah	Portland Metro
97298	West Slope	Washington	Portland Metro
97299	Portland	Multnomah	Portland Metro
97301	Salem	Marion	Willamette / North Coast
97302	Salem	Marion	Willamette / North Coast
97303	Salem	Marion	Willamette / North Coast
97304	Salem	Marion	Willamette / North Coast
97305	Salem	Marion	Willamette / North Coast
97306	Salem	Marion	Willamette / North Coast
97307	Keizer	Marion	Willamette / North Coast
97308	Salem	Marion	Willamette / North Coast
97309	Salem	Marion	Willamette / North Coast
97310	Salem	Marion	Willamette / North Coast
97311	Salem	Marion	Willamette / North Coast
97312	Salem	Marion	Willamette / North Coast
97313	Salem	Marion	Willamette / North Coast
97314	Salem	Marion	Willamette / North Coast
97318	Seaside	Clatsop	Willamette / North Coast
97320	Albany	Linn	Willamette / North Coast
97321	Albany	Linn	Willamette / North Coast
97322	Albany	Linn	Willamette / North Coast
97324	Alsea	Benton	Willamette / North Coast
97325	Aumsville	Marion	Willamette / North Coast
97326	Blodgett	Benton	Willamette / North Coast
97327	Brownsville	Linn	Willamette / North Coast
97328	Monmouth	Polk	Willamette / North Coast
97329	Cascadia	Linn	Willamette / North Coast
97330	Corvallis	Benton	Willamette / North Coast
97331	Corvallis	Benton	Willamette / North Coast
97332	Corvallis	Benton	Willamette / North Coast
97333	Corvallis	Benton	Willamette / North Coast
97335	Crabtree	Linn	Willamette / North Coast
97336	Crawfordsville	Linn	Willamette / North Coast

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ZIP CODE	TOWN	COUNTY	REGION
97338	Dallas	Polk	Willamette / North Coast
97339	Corvallis	Benton	Willamette / North Coast
97341	Depoe Bay	Lincoln	Willamette / North Coast
97342	Detroit	Marion	Willamette / North Coast
97343	Eddyville	Lincoln	Willamette / North Coast
97344	Falls City	Polk	Willamette / North Coast
97345	Foster	Linn	Willamette / North Coast
97346	Gates	Linn	Willamette / North Coast
97347	Grand Ronde	Polk	Willamette / North Coast
97348	Halsey	Linn	Willamette / North Coast
97350	Idanha	Linn	Willamette / North Coast
97351	Independence	Polk	Willamette / North Coast
97352	Jefferson	Marion	Willamette / North Coast
97355	Lebanon	Linn	Willamette / North Coast
97356	Newport	Lincoln	Willamette / North Coast
97357	Logsden	Lincoln	Willamette / North Coast
97358	Lyons	Linn	Willamette / North Coast
97359	Marion	Marion	Willamette / North Coast
97360	Mill City	Linn	Willamette / North Coast
97361	Monmouth	Polk	Willamette / North Coast
97362	Mount Angel	Marion	Willamette / North Coast
97364	Neotsu	Lincoln	Willamette / North Coast
97365	Newport	Lincoln	Willamette / North Coast
97366	South Beach	Lincoln	Willamette / North Coast
97367	Lincoln City	Lincoln	Willamette / North Coast
97368	Otis	Lincoln	Willamette / North Coast
97369	Otter Rock	Lincoln	Willamette / North Coast
97370	Philomath	Benton	Willamette / North Coast
97371	Rickreall	Polk	Willamette / North Coast
97372	Rose Lodge	Lincoln	Willamette / North Coast
97373	Saint Benedict	Marion	Willamette / North Coast
97374	Scio	Linn	Willamette / North Coast
97375	Scotts Mills	Marion	Willamette / North Coast

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ZIP CODE	TOWN	COUNTY	REGION
97376	Seal Rock	Lincoln	Willamette / North Coast
97377	Shedd	Linn	Willamette / North Coast
97378	Sheridan	Yamhill	Willamette / North Coast
97380	Siletz	Lincoln	Willamette / North Coast
97381	Silverton	Marion	Willamette / North Coast
97383	Stayton	Marion	Willamette / North Coast
97384	Mehama	Marion	Willamette / North Coast
97385	Sublimity	Marion	Willamette / North Coast
97386	Sweet Home	Linn	Willamette / North Coast
97388	Gleneden Beach	Lincoln	Willamette / North Coast
97389	Tangent	Linn	Willamette / North Coast
97390	Tidewater	Lincoln	Willamette / North Coast
97391	Toledo	Lincoln	Willamette / North Coast
97392	Turner	Marion	Willamette / North Coast
97394	Waldport	Lincoln	Willamette / North Coast
97396	Willamina	Polk	Willamette / North Coast
97400	Indeterminate (Lane)	Lane	Willamette / North Coast
97401	Eugene	Lane	Willamette / North Coast
97402	Eugene	Lane	Willamette / North Coast
97403	Eugene	Lane	Willamette / North Coast
97404	Eugene	Lane	Willamette / North Coast
97405	Eugene	Lane	Willamette / North Coast
97406	Agness	Curry	Southern Oregon
97407	Allegany	Coos	Southern Oregon
97408	Eugene	Lane	Willamette / North Coast
97409	Alvadore	Lane	Willamette / North Coast
97410	Azalea	Douglas	Southern Oregon
97411	Bandon	Coos	Southern Oregon
97412	Blachly	Lane	Willamette / North Coast
97413	Blue River	Lane	Willamette / North Coast
97414	Broadbent	Coos	Southern Oregon
97415	Brookings	Curry	Southern Oregon
97416	Camas Valley	Douglas	Southern Oregon

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ZIP CODE	TOWN	COUNTY	REGION
97417	Canyonville	Douglas	Southern Oregon
97418	Junction City	Lane	Willamette / North Coast
97419	Cheshire	Lane	Willamette / North Coast
97420	Coos Bay	Coos	Southern Oregon
97421	Coos Bay	Coos	Southern Oregon
97422	Douglas County	Douglas	Southern Oregon
97423	Coquille	Coos	Southern Oregon
97424	Cottage Grove	Lane	Willamette / North Coast
97425	Crescent Lake	Klamath	Eastern Oregon
97426	Creswell	Lane	Willamette / North Coast
97427	Culp Creek	Lane	Willamette / North Coast
97428	Curtin	Douglas	Southern Oregon
97429	Days Creek	Douglas	Southern Oregon
97430	Deadwood	Lane	Willamette / North Coast
97431	Dexter	Lane	Willamette / North Coast
97432	Dillard	Douglas	Southern Oregon
97434	Dorena	Lane	Willamette / North Coast
97435	Drain	Douglas	Southern Oregon
97436	Elkton	Douglas	Southern Oregon
97437	Elmira	Lane	Willamette / North Coast
97438	Fall Creek	Lane	Willamette / North Coast
97439	Florence	Lane	Willamette / North Coast
97440	Eugene	Lane	Willamette / North Coast
97441	Gardiner	Douglas	Southern Oregon
97442	Glendale	Douglas	Southern Oregon
97443	Glide	Douglas	Southern Oregon
97444	Gold Beach	Curry	Southern Oregon
97446	Harrisburg	Linn	Willamette / North Coast
97447	Idleyld Park	Douglas	Southern Oregon
97448	Junction City	Lane	Willamette / North Coast
97449	Lakeside	Coos	Southern Oregon
97450	Langlois	Curry	Southern Oregon
97451	Lorane	Lane	Willamette / North Coast

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ZIP CODE	TOWN	COUNTY	REGION
97452	Lowell	Lane	Willamette / North Coast
97453	Mapleton	Lane	Willamette / North Coast
97454	Marcola	Lane	Willamette / North Coast
97455	Pleasant Hill	Lane	Willamette / North Coast
97456	Monroe	Benton	Willamette / North Coast
97457	Myrtle Creek	Douglas	Southern Oregon
97458	Myrtle Point	Coos	Southern Oregon
97459	North Bend	Coos	Southern Oregon
97460	Norway	Coos	Southern Oregon
97461	Noti	Lane	Willamette / North Coast
97462	Oakland	Douglas	Southern Oregon
97463	Oakridge	Lane	Willamette / North Coast
97464	Ophir	Curry	Southern Oregon
97465	Port Orford	Curry	Southern Oregon
97466	Powers	Coos	Southern Oregon
97467	Reedsport	Douglas	Southern Oregon
97468	Remote	Coos	Southern Oregon
97469	Riddle	Douglas	Southern Oregon
97470	Roseburg	Douglas	Southern Oregon
97472	Saginaw	Lane	Willamette / North Coast
97473	Scottsburg	Douglas	Southern Oregon
97476	Sixes	Curry	Southern Oregon
97477	Springfield	Lane	Willamette / North Coast
97478	Springfield	Lane	Willamette / North Coast
97479	Sutherlin	Douglas	Southern Oregon
97480	Swisshome	Lane	Willamette / North Coast
97481	Tenmile	Douglas	Southern Oregon
97482	Thurston	Lane	Willamette / North Coast
97484	Tiller	Douglas	Southern Oregon
97486	Umpqua	Douglas	Southern Oregon
97487	Veneta	Lane	Willamette / North Coast
97488	Vida	Lane	Willamette / North Coast
97489	Walterville	Lane	Willamette / North Coast

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ZIP CODE	TOWN	COUNTY	REGION
97490	Walton	Lane	Willamette / North Coast
97491	Wedderburn	Curry	Southern Oregon
97492	Westfir	Lane	Willamette / North Coast
97493	Westlake	Lane	Willamette / North Coast
97494	Wilbur	Douglas	Southern Oregon
97495	Winchester	Douglas	Southern Oregon
97496	Winston	Douglas	Southern Oregon
97497	Wolf Creek	Josephine	Southern Oregon
97498	Yachats	Lincoln	Willamette / North Coast
97499	Yoncalla	Douglas	Southern Oregon
97500	Indeterminate (Jackson)	Jackson	Eastern Oregon
97501	Medford	Jackson	Eastern Oregon
97502	Central Point	Jackson	Eastern Oregon
97503	White City	Jackson	Eastern Oregon
97504	Medford	Jackson	Eastern Oregon
97505	Indeterminate (Jackson)	Jackson	Eastern Oregon
97520	Ashland	Jackson	Eastern Oregon
97521	Ashland	Jackson	Eastern Oregon
97522	Butte Falls	Jackson	Eastern Oregon
97523	Cave Junction	Josephine	Southern Oregon
97524	Eagle Point	Jackson	Eastern Oregon
97525	Gold Hill	Jackson	Eastern Oregon
97526	Grants Pass	Josephine	Southern Oregon
97527	Grants Pass	Josephine	Southern Oregon
97528	Grants Pass	Josephine	Southern Oregon
97529	Central Point	Jackson	Eastern Oregon
97530	Jacksonville	Jackson	Eastern Oregon
97531	Kerby	Josephine	Southern Oregon
97532	Merlin	Josephine	Southern Oregon
97533	Murphy	Josephine	Southern Oregon
97534	O'Brien	Josephine	Southern Oregon
97535	Phoenix	Jackson	Eastern Oregon
97536	Prospect	Jackson	Eastern Oregon

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ZIP CODE	TOWN	COUNTY	REGION
97537	Rogue River	Jackson	Eastern Oregon
97538	Selma	Josephine	Southern Oregon
97539	Shady Cove	Jackson	Eastern Oregon
97540	Talent	Jackson	Eastern Oregon
97541	Trail	Jackson	Eastern Oregon
97543	Wilderville	Josephine	Southern Oregon
97544	Williams	Josephine	Southern Oregon
97545	Josephine County	Josephine	Southern Oregon
97555	Prineville	Crook	Eastern Oregon
97558	Crater Lake	Klamath	Eastern Oregon
97562	Grants Pass	Josephine	Southern Oregon
97565	Port Orford	Curry	Southern Oregon
97586	Grants Pass	Josephine	Southern Oregon
97601	Klamath Falls	Klamath	Eastern Oregon
97602	Klamath Falls	Klamath	Eastern Oregon
97603	Klamath Falls	Klamath	Eastern Oregon
97604	Crater Lake	Klamath	Eastern Oregon
97607	Klamath Falls	Klamath	Eastern Oregon
97620	Adel	Lake	Eastern Oregon
97621	Beatty	Klamath	Eastern Oregon
97622	Bly	Klamath	Eastern Oregon
97623	Bonanza	Klamath	Eastern Oregon
97624	Chiloquin	Klamath	Eastern Oregon
97625	Dairy	Klamath	Eastern Oregon
97626	Fort Klamath	Klamath	Eastern Oregon
97627	Keno	Klamath	Eastern Oregon
97630	Lakeview	Lake	Eastern Oregon
97632	Malin	Klamath	Eastern Oregon
97633	Merrill	Klamath	Eastern Oregon
97634	Midland	Klamath	Eastern Oregon
97635	New Pine Creek	Lake	Eastern Oregon
97636	Paisley	Lake	Eastern Oregon
97637	Plush	Lake	Eastern Oregon

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ZIP CODE	TOWN	COUNTY	REGION
97638	Silver Lake	Lake	Eastern Oregon
97639	Sprague River	Klamath	Eastern Oregon
97640	Summer Lake	Lake	Eastern Oregon
97641	Christmas Valley	Lake	Eastern Oregon
97642	Rice Hill	Douglas	Southern Oregon
97654	Deer Island	Columbia	Portland Metro
97701	Bend	Deschutes	Eastern Oregon
97702	Bend	Deschutes	Eastern Oregon
97705	Bend	Deschutes	Eastern Oregon
97706	Beaverton	Washington	Portland Metro
97707	Bend	Deschutes	Eastern Oregon
97708	Bend	Deschutes	Eastern Oregon
97709	Bend	Deschutes	Eastern Oregon
97710	Fields	Harney	Eastern Oregon
97711	Ashwood	Jefferson	Eastern Oregon
97712	Brothers	Deschutes	Eastern Oregon
97720	Burns	Harney	Eastern Oregon
97721	Princeton	Harney	Eastern Oregon
97722	Diamond	Harney	Eastern Oregon
97730	Camp Sherman	Jefferson	Eastern Oregon
97731	Chemult	Klamath	Eastern Oregon
97732	Crane	Harney	Eastern Oregon
97733	Crescent	Klamath	Eastern Oregon
97734	Culver	Jefferson	Eastern Oregon
97735	Fort Rock	Lake	Eastern Oregon
97736	Frenchglen	Harney	Eastern Oregon
97737	Gilchrist	Klamath	Eastern Oregon
97738	Hines	Harney	Eastern Oregon
97739	La Pine	Deschutes	Eastern Oregon
97740	Lawen	Harney	Eastern Oregon
97741	Madras	Jefferson	Eastern Oregon
97750	Mitchell	Wheeler	Eastern Oregon
97751	Paulina	Crook	Eastern Oregon

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ZIP CODE	TOWN	COUNTY	REGION
97752	Post	Crook	Eastern Oregon
97753	Powell Butte	Crook	Eastern Oregon
97754	Prineville	Crook	Eastern Oregon
97756	Redmond	Deschutes	Eastern Oregon
97758	Riley	Harney	Eastern Oregon
97759	Sisters	Deschutes	Eastern Oregon
97760	Terrebonne	Deschutes	Eastern Oregon
97761	Warm Springs	Jefferson	Eastern Oregon
97764	Indeterminate (Jefferson)	Jefferson	Eastern Oregon
97782	Umatilla	Umatilla	Eastern Oregon
97801	Pendleton	Umatilla	Eastern Oregon
97810	Adams	Benton	Willamette / North Coast
97812	Arlington	Gilliam	Eastern Oregon
97813	Athena	Umatilla	Eastern Oregon
97814	Baker City	Baker	Eastern Oregon
97817	Bates	Grant	Eastern Oregon
97818	Boardman	Morrow	Eastern Oregon
97819	Bridgeport	Baker	Eastern Oregon
97820	Canyon City	Grant	Eastern Oregon
97821	Cayuse	Umatilla	Eastern Oregon
97823	Condon	Gilliam	Eastern Oregon
97824	Cove	Union	Eastern Oregon
97825	Dayville	Grant	Eastern Oregon
97826	Echo	Umatilla	Eastern Oregon
97827	Elgin	Union	Eastern Oregon
97828	Enterprise	Wallowa	Eastern Oregon
97830	Fossil	Wheeler	Eastern Oregon
97831	Fox	Grant	Eastern Oregon
97832	Condon	Gilliam	Eastern Oregon
97833	Haines	Baker	Eastern Oregon
97834	Halfway	Baker	Eastern Oregon
97835	Helix	Umatilla	Eastern Oregon
97836	Heppner	Morrow	Eastern Oregon

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ZIP CODE	TOWN	COUNTY	REGION
97837	Hereford	Baker	Eastern Oregon
97838	Hermiston	Umatilla	Eastern Oregon
97839	Lexington	Morrow	Eastern Oregon
97840	Oxbow	Baker	Eastern Oregon
97841	Imbler	Union	Eastern Oregon
97842	Imnaha	Wallowa	Eastern Oregon
97843	Ione	Morrow	Eastern Oregon
97844	Irrigon	Morrow	Eastern Oregon
97845	John Day	Grant	Eastern Oregon
97846	Joseph	Wallowa	Eastern Oregon
97848	Kimberly	Grant	Eastern Oregon
97850	La Grande	Union	Eastern Oregon
97852	Milton-Freewater	Umatilla	Eastern Oregon
97856	Long Creek	Grant	Eastern Oregon
97857	Lostine	Wallowa	Eastern Oregon
97858	Enterprise	Wallowa	Eastern Oregon
97859	Meacham	Umatilla	Eastern Oregon
97860	Indeterminate (Gilliam)	Gilliam	Eastern Oregon
97861	Mikkalo	Gilliam	Eastern Oregon
97862	Milton-Freewater	Umatilla	Eastern Oregon
97864	Monument	Grant	Eastern Oregon
97865	Mount Vernon	Grant	Eastern Oregon
97866	Prairie City	Grant	Eastern Oregon
97867	North Powder	Union	Eastern Oregon
97868	Pilot Rock	Umatilla	Eastern Oregon
97869	Prairie City	Grant	Eastern Oregon
97870	Richland	Baker	Eastern Oregon
97872	Ritter	Grant	Eastern Oregon
97873	Seneca	Grant	Eastern Oregon
97874	Spray	Wheeler	Eastern Oregon
97875	Stanfield	Umatilla	Eastern Oregon
97876	Summerville	Union	Eastern Oregon
97877	Sumpter	Baker	Eastern Oregon

Continued

ZIP CODE	TOWN	COUNTY	REGION
97878	Hermiston	Umatilla	Eastern Oregon
97880	Ukiah	Umatilla	Eastern Oregon
97882	Umatilla	Umatilla	Eastern Oregon
97883	Union	Union	Eastern Oregon
97884	Unity	Baker	Eastern Oregon
97885	Wallowa	Wallowa	Eastern Oregon
97886	Weston	Umatilla	Eastern Oregon
97890	Indeterminate (Malheur)	Malheur	Eastern Oregon
97901	Adrian	Malheur	Eastern Oregon
97902	Arock	Malheur	Eastern Oregon
97903	Brogan	Malheur	Eastern Oregon
97904	Drewsey	Harney	Eastern Oregon
97905	Durkee	Baker	Eastern Oregon
97906	Harper	Malheur	Eastern Oregon
97907	Huntington	Baker	Eastern Oregon
97908	Ironside	Malheur	Eastern Oregon
97909	Jamieson	Malheur	Eastern Oregon
97910	Jordan Valley	Malheur	Eastern Oregon
97911	Juntura	Malheur	Eastern Oregon
97913	Nyssa	Malheur	Eastern Oregon
97914	Ontario	Malheur	Eastern Oregon
97917	Riverside	Linn	Willamette / North Coast
97918	Vale	Malheur	Eastern Oregon
97920	Westfall	Malheur	Eastern Oregon

D POST-STRATIFICATION WEIGHTING METHOD

The distribution of the sample across home ownership (own vs. rent) and the region of residence deviated somewhat from the distribution in census data. As Table D.1 shows, homeowners were somewhat overrepresented relative to the census (Row 1, Column D vs. G), while renters were underrepresented (Row 2, Column D vs. G). The situation regarding the region of residence was complicated by the fact that the size and direction of the deviation between the sample and the census differed for owners and renters, as well as for the renters reached through RDD versus those sampled from a list of likely renters. This is seen in Table D.1.

Table D.1: Comparison of Sample and Census

SAMPLE	SAMPLE PERCENTAGE				CENSUS PERCENTAGE		
	(A) OWNER	(B) RENTER-RDD	(C) RENTER-LIST	(D) COMBINED	(E) OWNER	(F) RENTER	(G) COMBINED
HOME OWNERSHIP							
(1) Owner	100.0	0.0	0.0	68.8	—	—	64.2
(2) Renter	0.0	100.0	100.0	31.2	—	—	35.8
(3) Total	100.0	100.0	100.0	100.0	—	—	100.0
REGION							
(4) Metropolitan Portland	45.0	35.7	28.8	40.9	42.1	47.2	—
(5) Willamette Valley / North Coast	27.6	44.6	37.6	31.8	29.7	30.0	—
(6) South	13.4	10.1	20.0	14.0	14.3	11.6	—
(7) East	14.1	9.5	13.7	13.3	13.9	11.1	—
(8) Total	100.10	100.0	100.0	100.00	100.00	100.00	—

As this table shows, residence in the Portland Metro area was overrepresented in the sample of owners (Row 4, Column A vs. E), but underrepresented in both groups of renters (Row 4, Columns B and C vs. F), particularly for the renters sampled from the list. In the owner sample, residence in the Willamette Valley/ North Coast was very close to the census (Row 5, Column A vs. E), but residence in Willamette was overrepresented in both groups of renters (Row 5, Columns B and C vs. F), particularly among those reached by RDD. We see different patterns of deviation between the sample and census for residence in the South and East regions.

To deal with the complex pattern of deviations between the sample and census percentages, we constructed two sets of weights: one set for ownership and one set for region of residence. The first set of weights adjusted the percentage of owners and renters in the entire sample. The second set of weights adjusted the percentage of residents within each of the four regions, separately for owners, renters reached through RDD, and renters sampled from the list.

Note that it was necessary to have a separate *ownership* weight even though the *residence* weight was calculated separately for owners and the two groups of renters. This is because the latter adjusts the residency across the four regions within each ownership group, but it does not adjust the percentage of owner and renters.

The principle behind both sets of weights was the same. The weight for any given group was calculated as the ratio of the census percentage to the sample percentage:[14]

$$W = \text{Percent}_{\text{census}} / \text{Percent}_{\text{sample}}$$

So, for example, the *ownership* weight for all owners is 64.2 / 68.8 = 0.93.[15] The *residence* weight applied to renters reached by RDD who live in the Portland Metro area is 47.2 / 35.7 = 1.32. The entire set of weights is shown in Table D.2.

Table D.2: Weights

CATEGORY	CENSUS	SAMPLE	WEIGHT
Owner	64.2	68.8	0.93
Renter	35.8	31.2	1.15
OWNER			
Metropolitan Portland	42.1	45.0	0.94
Willamette Valley / North Coast	29.7	27.6	1.08
South	14.3	13.4	1.07
East	13.9	14.1	0.98

Continued

[14] A description of this method is provided by Applied Technologies for Learning in the Arts & Sciences, College of Liberal Arts & Sciences, University of Illinois Urbana-Champaign. URL: https://www.atlas.uiuc.edu/data_stats/resources/spss. Last accessed: November 11, 2008.

[15] Percentages are shown to only one significant digit. However, weights were calculated based on data carried to several significant digits. Therefore, the percentages shown would not necessarily produce exactly the weights shown.

CATEGORY	CENSUS	SAMPLE	WEIGHT
RENTER-RDD			
Metropolitan Portland	47.2	35.7	1.32
Willamette Valley / North Coast	30.0	44.6	0.67
South	11.6	10.1	1.15
East	11.1	9.5	1.17
RENTER-LIST			
Metropolitan Portland	47.2	28.8	1.64
Willamette Valley / North Coast	30.0	37.6	0.80
South	11.6	20.0	0.58
East	11.1	13.7	0.81

We assigned both an *ownership* weight and a *residence* weight to each survey respondent. We then calculated a combined weight for each respondent as the product of the *ownership* and *residence* weights:

$$W_{combined} = W_{ownership} * W_{residence}$$

Thus, for example, the combined weight for an owner who lives in the Portland Metro region would be calculated as 0.93 * 0.94 = 0.87. The combined weight for a renter who was reached through RDD and who lives in the East region would be 1.15 * 1.17 = 1.34. Thus, in computing summary data, the first person would be counted as 0.87 respondents and the second would be counted as 1.34 respondents.

E FINAL DISPOSITION SUMMARY

SRBI	TOTAL	DIALED %
TOTAL NUMBERS DIALED	**18678**	**100.0%**
BAD NUMBERS (OUT OF FRAME)	**10487**	**56.1%**
BUSINESS/GOVERNMENT NUMBER/NON-RESIDENT	**1140**	**6.1%**
Cell Phone	17	0.1%
Fax/Modem Number/Computer Tone	710	3.8%
Incomplete Call/Line Problems (Temporary)	11	0.1%
Not In Service / Disconnected	1035	5.5%
Dialer - bad number syntax	4892	26.2%
Dialer - incomplete	59	0.3%
Dialer - modem tone	2	0.0%
Dialer - new number dropped	160	0.9%
Dialer - Rejected number	113	0.6%
Dialer - site out of service	1830	9.8%
Dialer - unknown error	36	0.2%
Possible Unassigned Number/No Answer All Attempts	482	2.6%
TOTAL GOOD NUMBERS (TOTAL SAMPLE FRAME)	**8191**	**43.9%**
NO CONTACT	**1216**	**6.5%**
Live Non-Contacts	1216	6.5%
Busy	2	0.0%
Fax/Modem/Computer tone (live)	69	0.4%
No answer	97	0.5%
Dialer - busy	45	0.2%
Dialer - no answer	737	3.9%
Live Non Contacts - OVER MAX (max set to 5)	266	1.4%
TOTAL CONTACTS	**6975**	**37.3%**

Continued

SRBI	TOTAL	DIALED %
CONTACTS - NOT SCREENED	**5339**	**28.6%**
Dead - Not Screened	267	1.4%
Away for duration	76	0.4%
CHILD/TEEN PHONE	7	0.0%
Foreign Language - NON-SPANISH	35	0.2%
Health Problems - LONG TERM	92	0.5%
Hearing Problems	57	0.3%
LIVE - NOT SCREENED	**1968**	**10.5%**
Answering Machine/Voice Mail	1323	7.1%
CallBack - CALL BLOCKING	0	0.0%
Live Not Screened - OVER MAX (max set to 5)	645	3.5%
CALLBACK - NOT SCREENED	**2287**	**12.2%**
Callback - APPOINTMENTS	35	0.2%
Callback - UNSPECIFIED	530	2.8%
Hung-up -	736	3.9%
Health Problems - SHORT TERM	9	0.0%
Foreign Language - SPANISH	22	0.1%
Dialer - nuisance hang-up	12	0.1%
Callback - CALL BLOCKING (over max)	0	0.0%
Hung-up CB - OVER MAX	105	0.6%
Callbacks Not Screened - OVER MAX (max set to 5)	838	4.5%
REFUSALS - NOT SCREENED	**817**	**4.4%**
Refusal - CALL BLOCKING	7	0.0%
Refusal - SOFT	383	2.1%
Second Soft Refusal	24	0.1%
Refusal - HARD (Do Not Callback)	294	1.6%
Hung-up REF - OVER MAX	14	0.1%
Refusals Not Screened- OVER MAX (max set to 5)	95	0.5%

Continued

SRBI	TOTAL	DIALED %
CONTACTS - SCREENED	**1636**	**8.8%**
SCREEN-OUTS	**122**	**0.7%**
SCREEN-OUT NO/DK/REF S1	75	0.4%
SCREEN-OUT 17 S/O S5 NON-RENTER	47	0.3%
QUOTA-OUTS	**0**	**0.0%**
Q/O (OVER QUOTA TERMINATE)	0	0.0%
QUALIFIED REFUSALS	**134**	**0.7%**
Mid-Interview Term	0	0.0%
Qualified Soft Refusal - 1 PASSED S1	72	0.4%
Qualified Second Soft Refusal - 1	14	0.1%
Qualified Hard Refusal - 1 PASSED S1	29	0.2%
Qualified Refusals - OVER MAX (max set to 5)	19	0.1%
QUALIFIED CALLBACKS	**175**	**0.9%**
Abandoned Interview	11	0.1%
Qualified Callback - 1 PASSED S1	88	0.5%
Qualified Spanish Callback - 1	10	0.1%
Qualified Callbacks - OVER MAX (max set to 5)	66	0.4%
TOTAL COMPLETES	**1205**	**6.5%**
Proceed with interview/Completed Interview	1205	6.5%

Survey Incidence (Screening Incidence)	92.5%
List Incidence (Dialing Incidence)	8.1%
Cooperation Rate 1	58.3%
Cooperation Rate 2	54.1%
Totals Refusals	11.6%
Response Rate 1	16.2%
Response Rate 2	19.8%

F ELECTRIC AND THERM CONSUMPTION DATA & ANALYSIS

Figure F.1: Electric Consumption – Electric Heating Households

- Billing data matched for households of PGE or PAC customers,
- Cases were included if their primary space heating source is electricity,
- Households that lived in their house for less than a year are excluded,
- Below 75 percentile=low consumption households,
- Above 75 percentile=high consumption households.

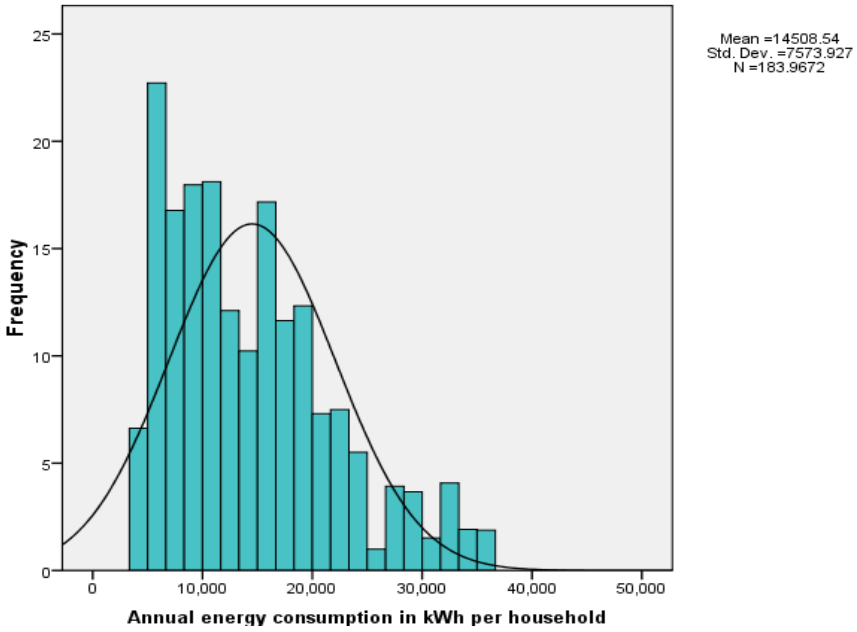


Figure F.2: KWH Consumption by Homeownership by Housing Structure (Within Electric Households)

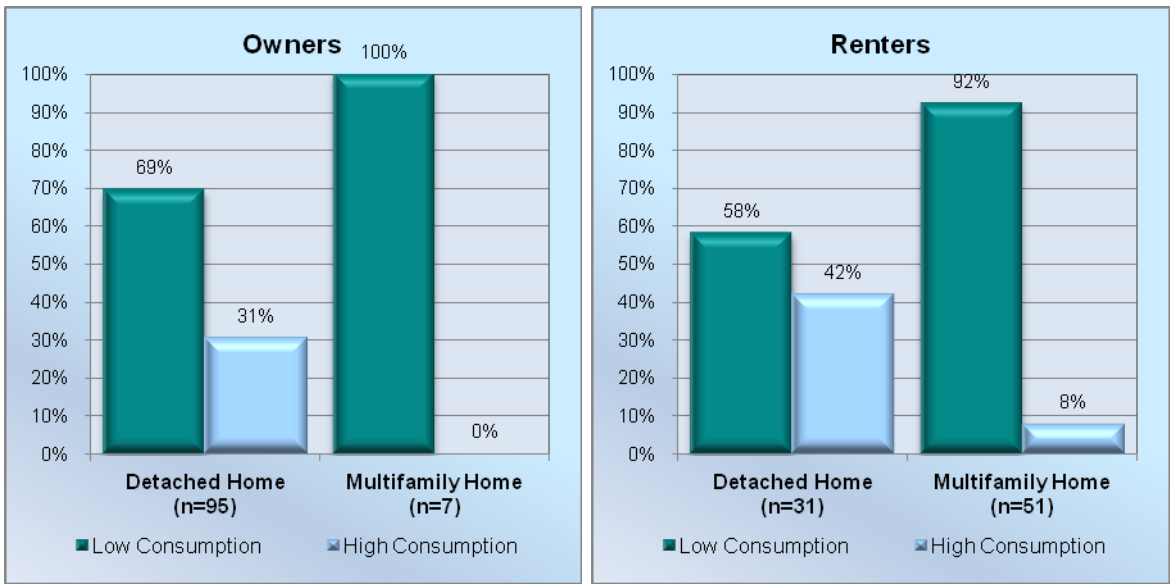


Figure F.3: KWH Consumption of Homeowners by Region (Within Electric-Heating Households)

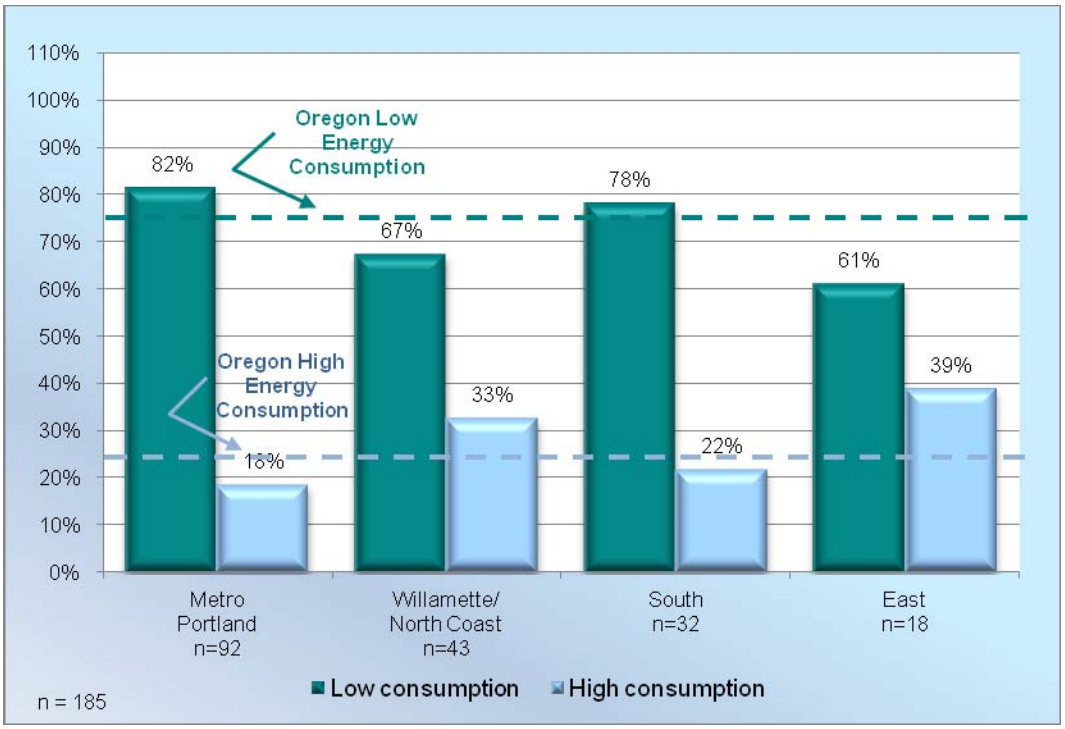


Figure F.4: Electric Consumption – Natural Gas Heating Households

- Billing data matched for households of PGE or PAC customers,
- Cases were included if their primary space heating source is natural gas,
- Households that lived in their house for less than a year are excluded,
- Below 75 percentile=low consumption households,
- Above 75 percentile=high consumption households.

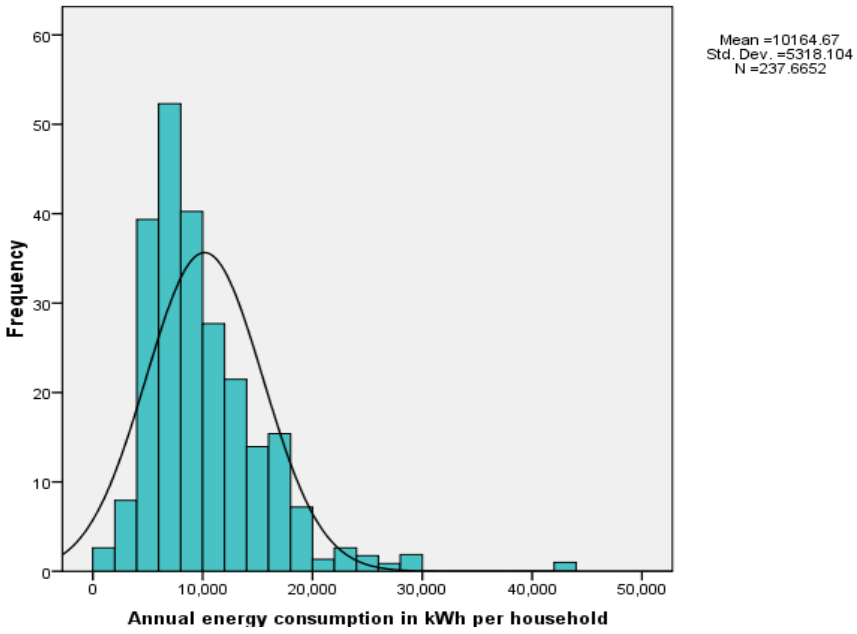


Figure F.5: KWH Consumption by Homeownership by Housing Structure (Within Natural Gas Households)

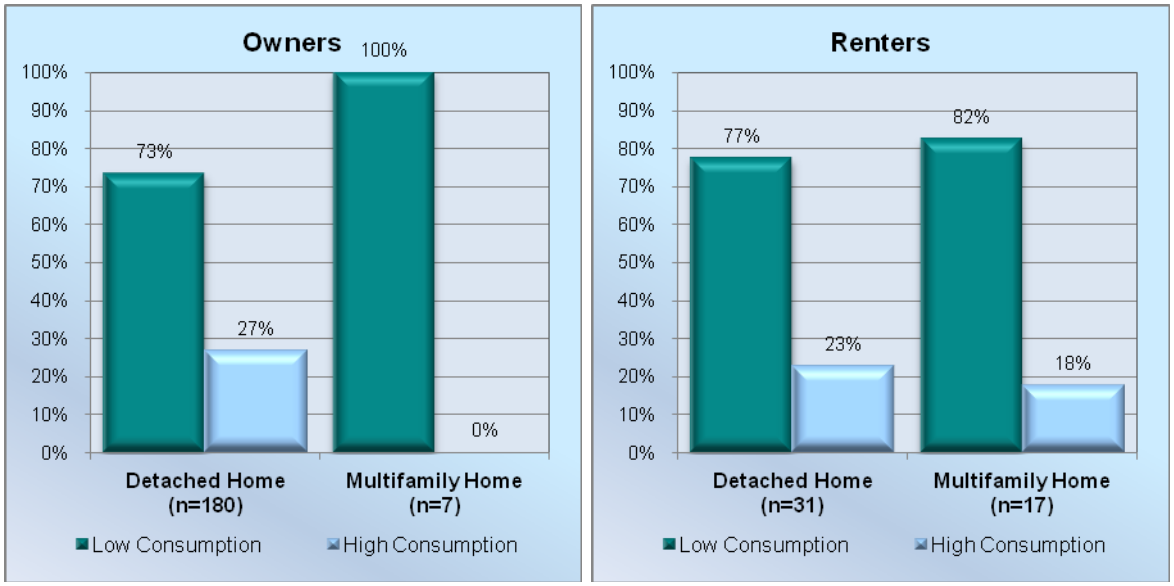


Figure F.6: KWH Consumption of Homeowners by Region (Within Natural Gas-Heating Households)

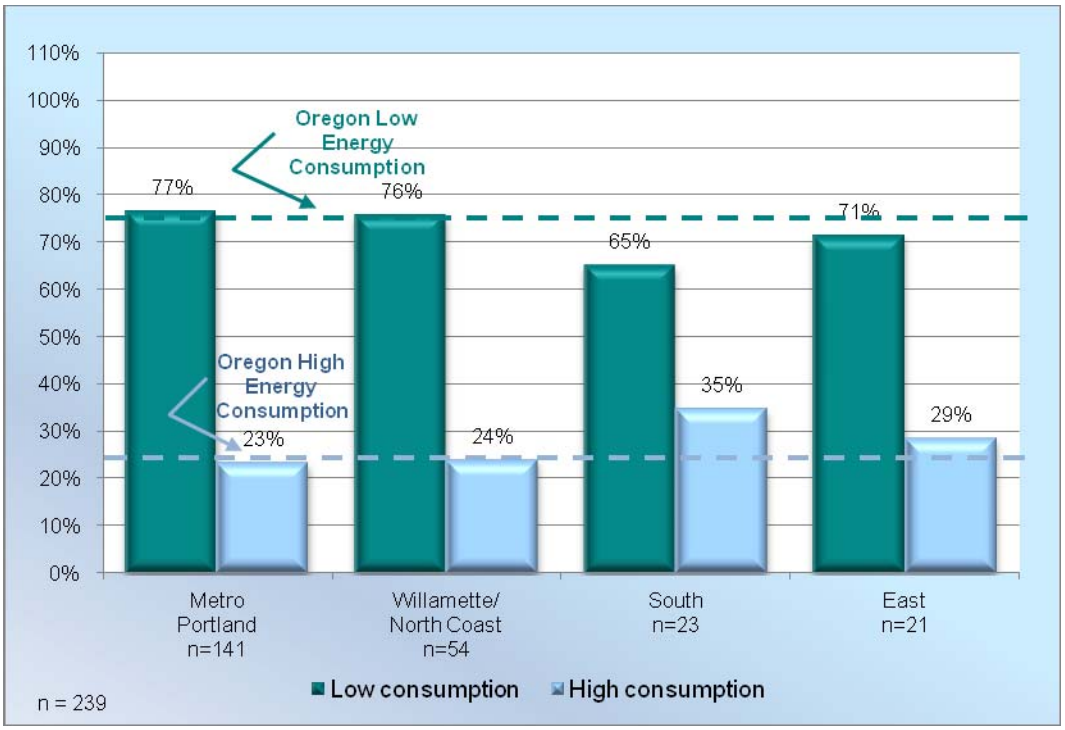


Figure F.7: Natural Gas Consumption

- Billing data matched for households of NWN customers,
- Cases included if their primary space heating source is natural gas,
- Households that lived in their house for less than a year are excluded,
- 1 outlier case (36,545 therm) was excluded,
- Below 75 percentile=low consumption households,
- Above 75 percentile=high consumption households.

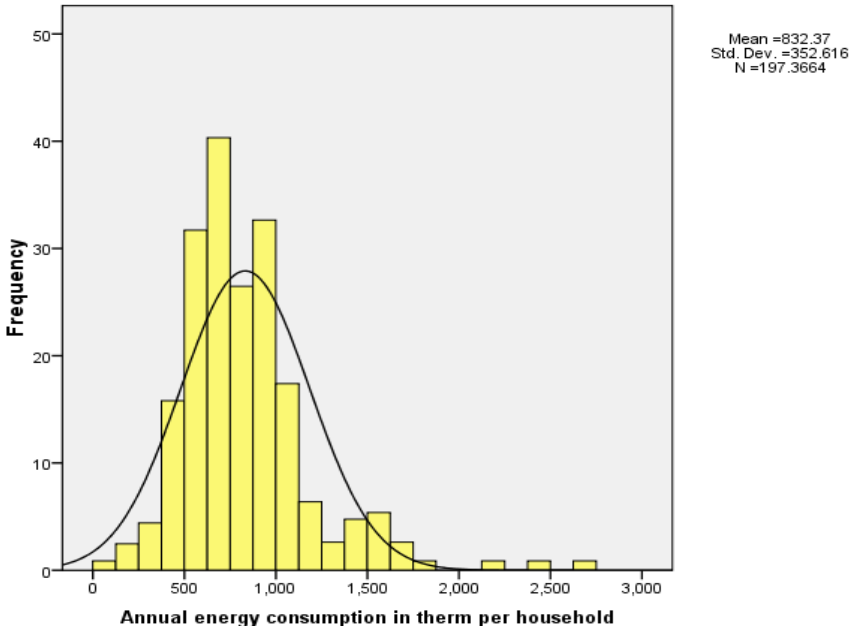


Figure F.8: Therm Consumption by Homeownership by Housing Structure (Within Natural Gas Households)

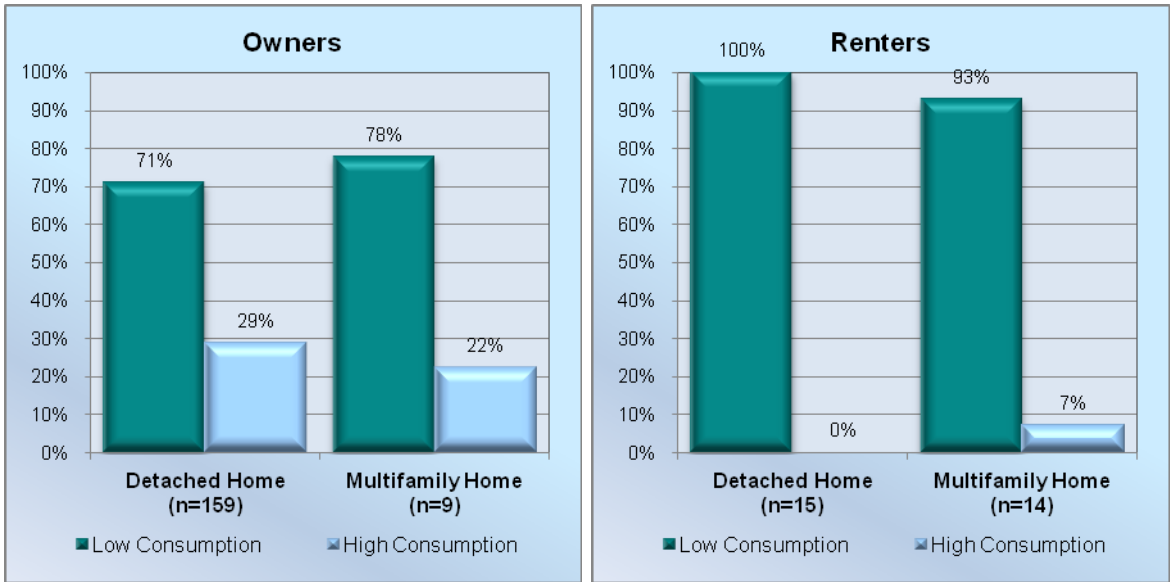
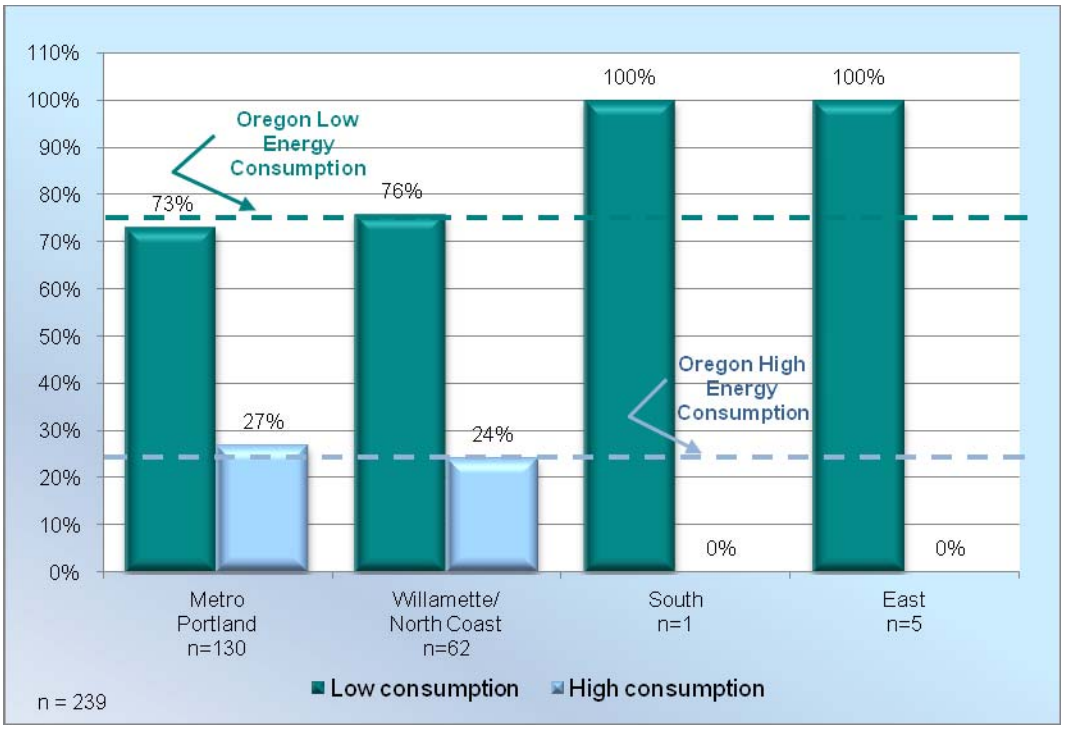


Figure F.9: Therm Consumption of Homeowners by Region (Within Natural Gas-Heating Households)



G FACTOR, REGRESSION, AND CLUSTER ANALYSIS

FACTOR ANALYSIS

By using factor analysis, the number of variables in the dataset was reduced to a smaller set of factors. In particular, the most dominant set of relationships among variables was uncovered through factor analysis. The uncovered dominant relationships generally had high loading scores, meaning the correlations between specific variables and particular factors were high. The correlations were calculated based on the shared variance among all the variables, not the total variance. The shared variance is the observed variance (what is measured), whereas the total variance consists of the observed and the unobserved variance. The unobserved variance is the error term in factor analysis. Hence, examining the shared variance among all the variables allowed one to explore the observed relationships while separating the error term. Furthermore, the factor structure estimation was based on multiple regression logic and commonly accepted rules of estimation.

Specifically, certain choices were made in order to specify the appropriate factor-based structure in the dataset. The scree plot and the map test for optimal number of factors were the chosen rationales for the number of factors in the dataset (Costello and Osborne, 2005). Additionally, the specification structure was refined using the varimax rotation because it did not differ from the oblique rotation. The varimax rotation assumes that factors are uncorrelated, which is often not realistic, whereas oblique rotation assumes that factors are correlated. Intriguingly, in respect to our dataset, factor analysis results based on varimax rotation did not differ from the oblique rotation results. Hence, oblique rotation factor structure specification indicated that factors in the dataset were actually uncorrelated. Therefore, using varimax rotation was justifiable, since it specified that factors were uncorrelated. Finally, the loading factor scores less than 0.32 were suppressed (not considered) since those loadings were too small to provide any meaningful information (Costello and Osborne, 2005; Tabachnick and Fidell, 2001). Ultimately, the above mentioned choices determined the final structure of the factor model for the dataset.

REGRESSION

Regression analysis was utilized mainly to identify the significant predictors of energy consumption behavior. This was done because it was important to identify the most important variables for the clustering analysis in respect to energy consumption behavior. Specifically, the dependent variable was the annual energy use per household (sum of gas and electricity in BTU units), and the independent variables were all the demographic variables and the three derived factors from the factor analysis. The regression model was based on Ordinary Least Squares (OLS) estimation, and it was refined due to a few problems with the dataset.

The first problem was related to the factor variance. Initially, the three derived factors were represented by the factor scores, meaning the raw data of multiple variables that loaded into factors was used to estimate the variance of the three derived factors. However, for the regression model, it was better to utilize the variance of the raw data because the factor derived variance was not quite representative of the original variance due to the varimax rotation specification. Thus, the multiple variables that comprised each factor were scaled and averaged to represent the three factor constructs. The z-scores of all the variables in a factor per household were computed, and then those scores were averaged. The standardized Cronbach alpha values for all the variables that defined a factor were above 0.7 (Table G.1), justifying taking an average of standardized variables. Essentially, an average of multiple items that loaded in each factor reliably measured the constructs that the factors represented. Thus, the regression model estimated the influence of the factor constructs appropriately, because those standardized and averaged factor values preserved the original household level differences present in the raw data.

The second problem was related to missing data. The listwise deletion was used for the regression model to remedy this concern. The listwise deletion excluded any cases that had missing data. There were many cases with missing data (Ntotal=1,205, Nregression=224), but sufficient cases were present in the regression model.

SEGMENTATION

Factor analysis and the regression procedure were necessary to identify an optimal set of variables and factors for the final two-step cluster analysis, because the choice of variables when clustering determines the cluster solution.

The two-step cluster approach was the most appropriate choice over the other segmentation algorithms because it properly treats the binary/categorical data and a large number of cases. All other segmentation approaches generally cannot assess the binary data or large datasets appropriately. Hence, using an approach that accurately estimates the type of data that was present in the dataset ensured the most accurate estimation of the segments.

Specifically, the optimal segmentation solution was based on a two-step clustering procedure. The first optimal solution was a result of the Schwarz Bayesian Criterion (BIC) and the Ratio of Distance Measures (RDM). Essentially, these criteria determine the optimal fit of the model by analyzing the amount of additional variation explained at each step of the iterative process (going from cluster 1 solution to cluster 2 solution, and so on). The optimal fit was at the BIC level that had the highest RDM. Hence, the optimal solution resulted in a seven clusters. However, after reviewing the seven clusters, it was observed that the two clusters belonging to renter households were small and did not represent an appropriate percentage for cluster segments. Thus, a modification was made, meaning the two small clusters were deleted from the segmentation model by specifying a fixed cluster solution of five. The five cluster solution combined the two small renter clusters into one main renter cluster. Moreover, the five cluster solution fit well with the criteria of comprehensibility (deriving upon understandable segments) and stability (deriving upon segments that have an appropriate amount of cases that represent each segment). Thus, this solution was chosen as the final segmentation solution for the dataset.

After choosing the final segmentation solution, the crosstabs of the derived segments and other variables (typically demographic variables) were analyzed in order to further clarify the characteristics of the segments.

INTERPRETATION

Factor Analysis

Table G.1 shows the result of the factor analysis. The factor analysis identified three main factors or dimensions – information awareness, environmental beliefs, and cost-technology impressions – as reasons for investing in energy efficiency or renewable energy products. Though loading scores of each variable differ, the reliability statistics confirmed that all the uncovered variables that loaded onto a factor reliably measured that factor (Standardized Cronbach alpha values were above 0.7). The overall factor model accounted for 23.83% of variance.

In respect to each factor, two or more variables were generally more dominant. For the information awareness factor, the number of programs that respondents were aware of and the ENERGY STAR® purchase variable had the highest loading scores. For the environmental beliefs factor, all three variables had high loading scores, with the global warming variable least present among the three. Lastly, in the cost-technology factor, the highest loadings were the variables on importance of a new technology for both energy efficiency and renewable energy products. In fact, based on the loading scores, one can see which variables correlate more with the specific factors in the dataset.

Ultimately, three factors were uncovered with reliability statistics that confirmed that the items reliably measured the uncovered factors.

Table G.1: Result of the Factor Analysis

MAXIMUM LIKELIHOOD VARIANCE ACCOUNTED FOR AFTER VARIMAX ROTATION: 23.83%					
FACTORS	**ITEM LOADINGS**	**LOADING SCORES**	**MEAN**	**CRONBACH A**	**STANDARD CRONBACH A**
Factor 1: Information Awareness	ENERGY STAR® purchase – yes/no	0.620	0.51	0.63	0.73
	Number of energy programs that respondent is aware of – count (0 to 7)	0.585	2.51		
	Knowing where to obtain information about renewable energy – yes/no	0.488	0.67		
	Aware of Energy Tax Credit from State of Oregon – yes/no	0.454	0.77		
	Number of CFL bulbs installed – scale (0=0; 1=1-5; 2=6-10; 3=11-20; 4= 20+)	0.451	1.60		
	ETO awareness – yes/no	0.434	0.35		
	CFL presence in home – yes/no	0.373	0.84		
	ETO participation – yes/no	0.337	0.08		
Factor 2: Environmental Beliefs	Importance of buying EE products to protect the environment and reduce global warming – scale (0 to 10)	0.844	7.71	0.81	0.84
	Importance of buying RE systems to protect the environment and reduce global warming – scale (0 to 10)	0.828	7.58		
	How convinced are you that global warming or climate change is happening – scale (0 to 4, 0 being not at all convinced and 5 being completely convinced)	0.662	2.73		
Factor 3: Cost-Technology Impressions When Buying EE or RE Products	Importance of new technology on purchasing EE products – scale (0 to 10)	0.891	6.01	0.73	0.73
	Importance of new technology on purchasing RE systems – scale (0 to 10)	0.786	5.51		
	Importance of saving money on the energy bill for purchasing EE products – scale (0 to 10)	0.464	8.77		
	Importance of saving money on the energy bill for purchasing RE systems – scale (0 to 10)	0.336	8.61		

Note: Scales 0 to ten indicate 0 being least important and 10 being most important.

Regression

Table G.2 shows the results of the regression analysis. The overall regression model was significant and it explained 36.6% of household energy consumption variance. Moreover, the regression results indicated that there were three significant predictors of energy consumption (homeownership, energy source for space heating, and presence of children), and one predictor (information awareness factor) that is approaching significance ($p<.05$).

In particular, the regression coefficients suggested the following. The information awareness predictor indicated that increased levels of information awareness decreased energy consumption ($\beta= -0.0926$, $p=0.058$), whereas owning a residence compared to renting increased energy consumption ($\beta= 0.258$, $p<0.05$). Energy consumption in the regression model was represented by the BTU average per month per household member. Interestingly, if a home was heated by natural gas, primarily, rather than electricity, then more energy was used ($\beta= 0.292$, $p<0.05$). This was strange because, generally, the natural gas heating system is more efficient than the electric system. However, other potentially important variables were missing in this regression model, such as the house size, meaning the house size may have explained this effect if natural gas households lived in larger houses. Unfortunately, house size was not captured in the survey, so it cannot be evaluated in regards to the home heating source. Lastly, households with children appeared to use less energy compared to households without children (β -.0385, $p<0.05$). This is not surprising because households with children may have more people living in a house and the dependent variable in this regression model was energy per household member. Essentially, if a household has more members, then the energy consumed per household member deceases, since the total household energy is divided by the number of household members. In other words, this relationship between household with children and energy consumption may be an artifact of the dependent variable or the way the dependent variable was constructed.

In summation, only four variables were significant predictors of energy consumption behavior, and among those four, one was significant at a $p<0.01$ level. Additionally, the environmental beliefs factor and the cost-technology factor were not significant in this regression model.

Table G.2: Result of Regression Analysis

OVERALL MODEL	N	R	R^2	F	SIG.
	224	0.605	0.366	4.782	0.000
PREDICTORS	**B**	**SE**	**β**	**T**	**SIG.**
Constant	1964296	620805.6		3.164107	0.002
Environmental Beliefs Factor	-233850	171498	-0.09259	-1.36357	0.174
Cost-Technology Factor	183121.4	181365.9	0.064042	1.009679	0.314
Information Awareness Factor	**-423735**	**222144.6**	**-0.12898**	**-1.90747**	**0.058**
Male or Female	-26834.7	275972.9	-0.00628	-0.09724	0.923
Gas Service or No Gas Service	685891.5	516265.4	0.159037	1.328564	0.186
PGE versus Other	717747.1	1083481	0.03856	0.662446	0.508
Own or Rent	**1230471**	**400221.6**	**0.258426**	**3.074473**	**0.002**
Single-Family Residence vs. Multifamily Residence	284734.7	429875.1	0.053571	0.662366	0.509
Single-Family Residence vs. Mobile Family Residence	327266.6	675634.3	0.032277	0.484384	0.629
News Source (TV vs. Other)	-31445.6	267604.2	-0.00739	-0.11751	0.907
House Age (Up to 1959 vs. 1960-1989)	286986.9	323037.5	0.068098	0.888401	0.375
House Age (Up to 1959 vs. 1990-2005)	-215294	355539.7	-0.04449	-0.60554	0.546
Home Heat Source (Electricity vs. Natural Gas)	**1229744**	**468891.2**	**0.292099**	**2.622664**	**0.009**
Home Heat Source (Electricity vs. Other Gas)	-248061	1059052	-0.015	-0.23423	0.815
Water Heat Source (Electricity vs. Natural Gas)	-294305	369480	-0.06993	-0.79654	0.427
Water Heat Source (Electricity vs. Other Gas)	-2607519	1961261	-0.07749	-1.32951	0.185
Respondent's Age (39 or Younger vs. 40-59 Years Old)	-373261	416798	-0.08884	-0.89554	0.372
Respondent's Age (39 or Younger vs. 60 or Older)	-11317.8	491858.9	-0.00257	-0.02301	0.982
How Much Longer Do You Plan to Live in Your Home (Less than 3 Years vs. 3-10 Years)	41811.1	372118.3	0.009066	0.11236	0.911
How Much Longer Do You Plan to Live in Your Home (Less than 3 Year vs. 10 Years or More)	-140818	369881.8	-0.03354	-0.38071	0.704
Education (Some College/Trade School vs. High School or Less)	278257.3	366422.3	0.061319	0.759389	0.449
Education (Some College/Trade School vs. 4-Year College or More)	332751.2	385404.3	0.079209	0.863382	0.389
Households (With Children vs. Without Children)	**-1750392**	**315538.4**	**-0.38505**	**-5.54732**	**0.000**
Household Income	28460.05	87508.76	0.025944	0.325225	0.745

a. Dependent Variable: average BTU consumption per month per household member

Cluster Analysis

Discussed in the body of the report.