Energy Star Homes Northwest

Market Progress Evaluation Report, No. 1

prepared by

ECONorthwest

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ENERGY STAR Homes Northwest Program

First Market Progress Evaluation Report

A Report to the Northwest Energy Efficiency Alliance

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

INTRODUCTION

This report is the first of three market progress evaluation reports (MPERs) for the Northwest Energy Efficiency Alliance's ENERGY STAR Homes Northwest program. This project represents one of two major projects within the Alliance's Residential Sector Initiative and works in close coordination with the Alliance's ENERGY STAR Home Products program – the other project included in the Initiative.

The ENERGY STAR Homes Northwest program promotes the construction and sale of new homes built to an ENERGY STAR standard designed specifically for the states of Washington, Oregon, Idaho, and Montana. Homes built to this standard are at least 15 percent more energy efficient than Washington and Oregon State energy codes. These ENERGY STAR homes also include high efficiency lighting, windows, appliances, water heaters, insulation, and heating and cooling equipment. As a result, these new homes are designed to save an average of 1,000 to 1,500 kWh per year for gas-heated homes and 3,700 kWh annually for electrically heated homes.

The primary purpose of this first evaluation report is to provide a baseline for the market progress indicators that will be used to evaluate the Alliance's ENERGY STAR HOMES Northwest program.[1] It includes baseline analysis on the new home market in the Northwest as well as information on current builder practices and builder and homebuyer perceptions of the ENERGY STAR label and its meaning for homes. Future MPERs will focus on process evaluation issues and measuring market progress indicators. The final MPER is scheduled for early 2006 and will compare program progress on these key indicators with the baseline levels established in this report.

NOTE: The builder survey conducted for this report was designed to provide baseline data on the key market progress indicators for the Alliance program. The data on builder practices related to specific materials/equipment being installed in new homes cannot be used as the basis for an impact evaluation because it measures the proportion of builders engaging in certain practices rather than the penetration of specific equipment types as a proportion of total new residential building stock. The Alliance plans to conduct market research to update characteristics of new residential building stock in 2006.

PROJECT BACKGROUND AND APPROACH

The ENERGY STAR Homes Northwest program is focused on marketing the potential benefits of building homes to the ENERGY STAR standard directly to builders and other market actors. ENERGY STAR serves as the mechanism to differentiate both builders and the homes they build and provides consumers with an easy way to identify the home as efficient. Certification, labeling, and marketing efforts in the project are designed to increase the market share of ENERGY STAR new homes while simultaneously protecting the ENERGY STAR brand.

[1] A list of the key market progress indicators is provided in Table 3 on page 12 of this report.

In order to make the ENERGY STAR Homes Northwest project work in the Northwest, the EPA worked with the Alliance and its stakeholders to develop an energy efficiency specification tailored specifically for this region. This process is designed to be fuel-neutral and centers on a package of prescribed measures that define the level of performance for an ENERGY STAR Northwest Home.

The table below provides a summary of the two prescriptive Builder Options Packages (BOPs) for single-family, site-built homes. The ENERGY STAR Northwest Home package was designed to include efficiency measures that would result in a level of performance that was a minimum of 15 percent better than that required by codes around the region. It was also designed to include efficiency improvements in all major end-uses including space heating and cooling, water heating, lighting, and appliances. Testing the HVAC and duct systems for leaks is also required using the Performance Tested Comfort System (PTCS) specifications. Finally, the requirements were designed to maximize the marketing impact through linkages to as many ENERGY STAR branded components as possible, from the heating and cooling system to lighting and appliances.

ENERGY STAR Homes Northwest Technical Specifications

Component	BOP 1 (Heat Pump/Gas Furnace)	BOP 2 (Zonal Electric/Propane)
Ceiling	R-38 Std	R-38 Std
Wall	R-21 Std.	R-21 Std. + 2.5
Floor Insulation	R-30	R-30
Unheated Slab Below Grade	R-10	R-10
Windows	U-0.35	U-0.30
Heating System	8.0 HSPF 0.90 AFUE	N/A / 0.80 AFUE
Ventilation System	Central Exhaust	HRV 70%
Air Conditioning System	SEER 13	SEER 13
Duct Tightness	PTCS	Electric N/A Propane PTCS
Envelope Tightness	7.0 ACH @ 50 Pa	2.5 ACH @ 50 Pa
Water Heating	Electric 0.93 EF / Gas 0.60 EF (> 60 gal.)	Electric 0.93 EF / Gas 0.60 EF (> 60 gal.)
Appliances	All built-ins are ENERGY STAR	
Lighting	> 50% of sockets either ENERGY STAR lamps or fixtures	

To further increase the flexibility of these requirements, several Technical Compliance Options (TCO) are allowed within each of the two BOPs:

- TCO #1 substitutes perimeter insulation for floor insulation in homes with crawlspaces.
- TCO #2 replaces the SEER 13 air conditioning unit with a SEER 12 unit in exchange for additional upgrades in the building shell or equipment.
- TCO #3 utilizes the U.S. EPA's Advanced Lighting Package in place of the current BOP standard.[2]
- TCO #4 allows for a gas hydronic heating system for use with BOP #1 and includes several modifications to the efficiency requirements for water heating and insulation depending on the type of system.
- TCO #5 allows for an electric hydronic heating system for use with BOP #2 and includes several modifications to the efficiency requirements for water heating and insulation depending on the type of system.
- TCO #6 allows for U-value trade-offs within BOP #1
- TCO #7 allows for U-value trade-offs within BOP #2

These TCOs help the program include a greater range of equipment options, many of which are driven by the varying climate considerations in the states covered by the program.

EVALUATION APPROACH

This MPER employed four primary data collection components to evaluate the program's progress:

- **Market Assessment**. Building permit data from the US Census and the Construction Monitor[3] is used to characterize the new home and builder markets within the program territory.
- **Builder Surveys**. In May 2004, 100 builders were interviewed by phone to gather information on current building practices and attitudes and perceptions regarding energy efficiency and ENERGY STAR. In addition, we conducted 20 interviews with some of the larger builders in the region to collect more in-depth information on these issues.
- **Homebuyer Surveys.** In August 2004, we surveyed more than 300 homebuyers that had purchased a newly constructed home within the last two years. These surveys were designed to collect information on awareness and perception of energy efficiency home

[2] The U.S. EPA Advanced Lighting Package requires that 50 percent of high-use rooms and outdoor lights must have ENERGY STAR fixtures. In addition, all ceiling fans must be ENERGY STAR and 25 percent of medium-use and low-use rooms must have ENERGY STAR fixtures.

[3] The Construction Monitor is a weekly publication that includes all of the new building permits that have been issued in the city and counties of select market areas across the Western US.

components and to gauge the potential demand for ENERGY STAR-qualified homes in the region.

- **Market Actor Interviews**. In depth interviews were conducted with 11 realtors, 8 HVAC contractors, and 4 lighting distributors to gather additional information on specific ENERGY STAR homes program requirements.

The analysis methods and results for each of these tasks are summarized below.

SUMMARY FINDINGS: MARKET ASSESSMENT

One of the key purposes of this study was to characterize the current new home construction market in the region and to provide updated information on the baseline conditions in the residential new construction market. In particular, the objectives of the market characterization undertaken in this study are to:

- Characterize the overall market for new homes in the region and the number of homebuilders so that the potential within the ENERGY STAR homes market can be assessed.

- Show what, if any, market conditions have changed since the previous market baseline study conducted by the Alliance.[4]

The following table shows the trend in construction for new single-family homes from 1998 to 2004. With respect to the region, Washington is about half of the total number of new homes, Oregon makes up just over a quarter, and Montana and Idaho comprise 19 percent and 3 percent of new homes, respectively. Compared to the previous Baseline Report, the major difference is that the share of new homes in Idaho has increased by 4 percent while the share of new homes in Montana has declined by the same amount.

The year over year growth rates from the territory show growth of 11-16 percent in Idaho and closer to 9 percent in Washington. Oregon had been adding new homes at modest rates of 3-7 percent between 2001 and 2003 but appears to have experienced a boom in 2004 with a reported 16 percent increase in new homes over the prior year. Montana had stronger growth rates of up to 14 percent between 2001 and 2003, but these rates slowed in 2004.

[4] *Market Research Report: Baseline Characteristics of the Residential Sector; Idaho, Montana, Oregon, and Washington.* Prepared by Ecotope for NEEA, 2001.

Single Family New Construction by State (1998-2004)

Year	Washington Homes	Washington % CHG	Oregon Homes	Oregon % CHG	Idaho Homes	Idaho % CHG	Montana Homes	Montana % CHG	Total Homes	Total % CHG
1998	28,644		16,936		10,277		1,485		57,342	
1999	28,111	-1.9%	16,595	-2.0%	10,497	2.1%	1,607	8.2%	56,810	-0.9%
2000	25,471	-9.4	15,619	-5.9	9,681	-7.8	1,565	-2.6	52,336	-7.9
2001	26,736	5.0	16,323	4.5	9,738	0.6	1,790	14.4	54,587	4.3
2002	30,239	13.1	17,413	6.7	10,845	11.4	2,050	14.5	60,547	10.9
2003	33,091	9.4	17,875	2.7	12,601	16.2	2,340	14.1	65,907	8.9
2004	36,328	9.8	20,877	16.8	14,167	12.4	2,179	-6.9	73,551	11.6
% of 2004	49%		28%		19%		3%		100%	

Note: 2004 numbers are estimated by ECONorthwest using reported Census numbers through November 2004 (December 2004 were not available at the time of this report). To get the full year estimate, December 2003 Census numbers were used as an estimate for December 2004.
Source: US Census, Housing Units Authorized by Building Permit Report

The next table shows the total number of builders distributed by construction volume and illustrates the fragmented nature of the residential construction industry. As shown in this table, the vast majority of builders (78 percent) build four homes or less each year and only 56 builders (less than 1 percent) are considered "volume" builders (constructing 100 homes or more each year). Washington has the vast majority of volume builders in the program territory, and these builders also comprise a greater share of the total builder population within the state.

Builders by State and Volume, 2003

State	Number of Units Built (Annually)					
	1-4	**5-9**	**10-24**	**25-99**	**> 100**	**Total**
WA	1,843	254	182	102	42	2,423
OR	895	132	78	28	5	1,138
ID	971	151	87	36	8	1,253
MT	1,027	139	60	17	1	1,244
Total	4,736	676	407	183	56	6,058

Source: Construction Monitor.

The following table shows the current level of awareness of the ENERGY STAR home label and the change in awareness from the earlier Baseline Study. In 1999, awareness was generally low with only 17 percent of the builders in the region aware of the ENERGY STAR label for homes. By 2004, general awareness has grown considerably with over half of the builders aware that there is an ENERGY STAR label for homes.

Builders Aware of the ENERGY STAR Label for Homes

Aware	Percent (1999)	Percent (2004)
Yes	17	56
No	83	44
Total	100	100

Source: *Market Research Report: Baseline Characteristics of the Residential Sector; Idaho, Montana, Oregon, and Washington.* Prepared by Ecotope for NEEA, 2001.

The following table shows the distribution of current ENERGY STAR Homes Northwest participating builders by state and building volume. The 2004 builder participation goals for the program are also included. The program has surpassed its overall goal of 72 non-volume builders, with 91 participating builders as of November. The program also met its overall recruitment goal for volume builders of 7 with 9 recruited as of November 2004.

On a state-by-state basis, Idaho and Montana have met their builder recruitment goals, with just under half of the total of builder participation coming from Idaho. This is due primarily to the "Quick Start" phase of the ENERGY STAR Homes Northwest program that leveraged Idaho Energy Division's (IED's) pre-existing ENERGY STAR Homes Program and Idaho Power's marketing efforts..

Number of Participating Builders

State	Non-Volume Builders (<100 homes / year)	2004 Goal Non-Volume Builders	Volume Builders (100+ homes / year)	2004 Goals	Total Participants
WA	15	36	7	3	21
OR	22	15	1	3	23
ID	45	15	2	2	46
MT	10	7	0	0	10
Total	91	72	9	7	100

Source: PECI, data as of November 2004.
Note: For this table, 2004 goals for builders in the Spokane / Northern Idaho region is split evenly between ID and WA. The large volume builder goal of one builder for this region was assigned to WA.

The table below shows the construction activity achieved through the ENERGY STAR Homes program as of November 2004. "Certified" homes refer to those that have been constructed and certified as ENERGY STAR-compliant by the program. "Initiated" homes are those that are planned as ENERGY STAR homes, with construction underway but not yet completed. Homes that are "committed" are those that the builder has said will be ENERGY STAR but construction has not yet begun.

ENERGY STAR Home Construction Status

State	Committed		Initiated	Certified		Total 2004 New Homes	% Committed and Certified Relative to Total New Homes
	Actual	2004 Goal	Actual	Actual	2004 Goal		
WA	1,200	638	16	3	308	36,328	3.3%
OR	795	420	92	0	455	20,877	3.8
ID	329	288	93	48	155	14,167	2.7
MT	30	50	7	0	20	2,179	1.4
Total	2,354	1,396	207	51	938	73,551	3.3

Source: PECI, data as of November 2004.
Note: For this table, 2004 goals for certifications and commitments in the Spokane / Northern Idaho region are split evenly between ID and WA.

The previous table shows how ENERGY STAR home construction is comparing with program goals for 2004. At the time of this report, certified ENERGY STAR homes are lagging behind goals. The high number of committed and initiated ENERGY STAR homes combined with the number of builders signed on to the program, however, indicate that this deficit will likely be made up in the coming year if present trends continue.

The far right column of the last table shows the share of committed and certified ENERGY STAR homes as a share of new home construction within the state. As a share of total construction, ENERGY STAR homes are on track to comprise anywhere from 1.4 percent (Montana) to 3.8 percent (Oregon) of new homes built in 2004. Both the number of ENERGY STAR homes and total new home construction in 2004 are estimates, however, and the results presented below will likely change. This market share measure will be tracked on an ongoing basis and will be used as one of the key metrics for evaluating the ENERGY STAR Homes program accomplishments over time.

SUMMARY FINDINGS: BUILDER SURVEY, HOMEBUYER SURVEY, AND MARKET ACTOR INTERVIEWS

Much of this phase of the evaluation focused on obtaining detailed baseline information from builders and new homebuyers, including:

- Current building practices related to efficiency
- ENERGY STAR awareness among builders and homebuyers
- Perceptions of the ENERGY STAR label and what it means for homes
- Experience with the ENERGY STAR Homes Northwest program

Questions in both surveys are linked to specific market progress indicators set for the ENERGY STAR Homes Northwest program and will be used to evaluate program progress on key progress metrics over the life of the program.

The market actor interviews were designed to provide an additional perspective on key ENERGY STAR home components and to help corroborate findings from the builder and homebuyer survey. These interviews were conducted by phone and involved extended conversations with realtors, HVAC contractors, and lighting distributors.

The results of the builder survey indicate significant awareness of the ENERGY STAR label, with 56 percent of builders already aware of the ENERGY STAR label for homes. The primary benefit of the ENERGY STAR label for builders is considered to be the potential advantage it may offer in terms of marketing and gaining a competitive edge. Most builders also agreed that the ENERGY STAR label will make a home more marketable to prospective homebuyers. Builders also emphasize that demand must come first from the consumer before ENERGY STAR homes can hope to make substantial inroads into the market.

The builder survey indicates a general improvement in efficiency levels for the individual building components since the 1999 results included in the Baseline Report. In particular, high efficiency windows and ENERGY STAR appliances now appear to be regular features in new homes and definitely have increased in efficiency since 1999. Builders now are more aware of the ENERGY STAR label for homes than they were in 1999 and also have more experience with CFL lamps and fixtures. The increase in awareness and efficiency levels is likely due to two factors. First, building codes – particularly in Washington and Idaho – have been improved since 1999 and require builders to adopt high efficiency options in many building components. Second, since 1999 the region has had multiple programs promoting specific conservation measures – both by the Alliance and by individual utilities. In particular, the Alliance has implemented its Residential Lighting Program, the ENERGY STAR Home Products Program, and the Performance Testing Comfort System Program (duct testing) during this period, and these programs have increased awareness and adoption for these measures throughout the region.

Among builders and HVAC contractors, it appears that widespread acceptance of duct testing may prove to be a challenge for the program. While slightly more than half of the builders are aware of duct testing, only 17 percent said that they used duct tests in at least some of the homes they built. In addition, almost one third of the builders aware of duct testing felt that there was no benefit to having ducts tests performed and half of the participating builders disagreed with the notion that homebuyers understood the value of duct testing and duct sealing. These opinions were echoed by the HVAC contractors we interviewed.

On the consumer side, homebuyers tend to look positively on energy efficiency and responses to multiple questions suggest that they would be willing to pay more for an ENERGY STAR labeled home – a finding that was also confirmed by the realtors we interviewed. While awareness of the ENERGY STAR homes label is lower among recent homebuyers than with builders, homebuyers are aware of the ENERGY STAR label on appliances and many reported that the appliances in their new home were ENERGY STAR. Homebuyers do not believe that the ENERGY STAR components are difficult to understand and a majority believes that more can be done to make new homes energy efficient.

The in-depth interviews conducted with builders and other market actors generally confirmed the results of the phone surveys. Most builders, lighting distributors, and HVAC contractors were familiar with the various energy efficiency measures promoted by the program but were less familiar with the ENERGY STAR homes label itself. Both builders and HVAC contractors in the in-depth interviews expressed some concern regarding the added time and cost involved with

the duct tests. All of the people we interviewed stressed the need for increased consumer awareness of ENERGY STAR home benefits, as increased consumer understanding and acceptance of these benefits will ultimately determine the market demand for these homes.

MARKET PROGRESS INDICATORS

Progress indicators identified at the outset of the program reflect the consumer/retail focus of the current effort. These indicators – along with a brief assessment of program performance for each – include:

1. Builders use the ENERGY STAR label to differentiate themselves in the marketplace;

   Evaluation Finding: As of November 2004, 100 builders had joined the ENERGY STAR Homes Northwest program. These builders have completed construction and certification on 51 ENERGY STAR homes and construction has been initiated on another 207 ENERGY STAR homes. Participating builders also committed to building an additional 2,354 ENERGY STAR homes during this period. The construction activity among early participating builders indicates that these builders view the ENERGY STAR home label as a means to differentiate themselves from their competitors. While construction numbers are below the 2004 goals originally set for the program, the number of builders signed and homes committed surpassed 2004 goals. In the builder survey, 27 percent of builders cited marketing and product differentiation as a primary benefit of the ENERGY STAR homes label.

2. Consumers, builders and other market actors link ENERGY STAR and home quality/value;

   Evaluation Finding: Among builders and homebuyers that are aware of the ENERGY STAR label for homes, there is already a significant association with home quality and value. Of the 56 percent of builders who reported being aware of the ENERGY STAR label for homes, 30 percent strongly agreed and 21 percent somewhat agreed with the statement that "ENERGY STAR certified homes tend to be higher quality overall". While only 19 percent of homebuyers reported awareness of the ENERGY STAR label for homes, 79 percent of those homebuyers agreed that ENERGY STAR homes provide additional quality and 77 percent agreed that ENERGY STAR homes are worth more. Changes in the responses to these survey questions will be tracked over time to measure progress on this indicator.

   The results reported here reflect the very early stages of the ENERGY STAR market and represent only the fraction of the builder and homebuyer population that are already aware of the ENERGY STAR home label. Future measures of progress on this indicator will include the responses to the same survey questions in addition to market data on prices paid for ENERGY STAR homes.

3. Builders are convinced of the long-term cost savings from reductions in call-backs that should result from performance testing and quality assurance practices;

   Evaluation Finding: Among the 24 percent of builders that utilize duct tests, 12 percent said that reducing callbacks was an important benefit of testing and 26 percent mentioned that the tests catch problems before the customer does. Similarly, verifying that the

HVAC installation was done correctly was mentioned as a benefit by 26 percent of builders and verifying that ducts do not leak was mentioned by 20 percent as a benefit.

In general, however, builders are not yet convinced of the benefits of duct testing and 41 percent of the builders surveyed were unaware of duct testing. When builders experienced with duct testing were asked to identify the benefits of duct testing, 28 percent said that duct tests provide no benefits, and this was the most frequent response. When asked why duct tests were not performed, 29 percent of builders said that duct tests were too expensive.

Other quality assurance practices were not included in this report but will be addressed in future evaluation reports once builder participation in the program increases.

4. Increased awareness by builders and subcontractors of key efficiency and quality issues;

   Evaluation Finding: In general, builders and the market actors we talked to seemed aware of the various energy efficiency and quality issues related to the ENERGY STAR homes label. Most builders had at least some experience with installing high efficiency options in non-ENERGY STAR homes, and lack of awareness of the technology or the benefits does not appear to be a significant barrier to adopting the individual measures. The one exception to this is with duct tests, where builder awareness of testing benefits is more limited. Builders also do not consider ducts as a major area for energy conservation, as only 3 percent of the builders mentioned ducts as an important component for reducing energy consumption within a home. Changes in awareness over time will be tracked in the evaluation to determine if the program is having a positive impact in this area.

5. Other market actors and trade allies are spending their own resources marketing ENERGY STAR Homes and matching Alliance investments;

   Evaluation Finding: At this early stage, builders have not yet begun substantial promotion of ENERGY STAR homes. This indicator will be tracked over time based on responses to the builder survey and data on cooperative marketing that is tracked by the program.

6. Builders and their subcontractors have expanded knowledge and skills necessary to treat key energy efficiency and quality issues, particularly performance testing of HVAC ducts and equipment.

   Evaluation Finding: The builder survey suggests that availability of skilled contractors or products is not a major barrier to adopting most of the energy efficiency components required by the program. There are some issues related to duct testing, however. As discussed above, 41 percent of the builders are unaware of duct testing. Similarly, the HVAC contractors we talked to also expressed concern regarding these tests and said the tests were unnecessary when HVAC systems and ducts are installed correctly; therefore, the tests are an unfair burden placed on competent contractors. Lack of testers within the area was also mentioned as a concern by the HVAC contractors we interviewed.

7. Increased recognition of the ENERGY STAR label and understanding what it means for new homes.

   Evaluation Finding: Builder awareness has increased in recent years, with 56 percent of the builders we interviewed saying they were aware of ENERGY STAR homes. This is an increase over the 19 percent builder awareness reported in the previous Baseline Study[5] using 1999 data. The increase in awareness is likely due to the national ENERGY STAR homes campaign and to earlier ENERGY STAR homes efforts by Idaho Power and Puget Sound Energy. Despite this increase in awareness, 42 percent of those who were aware of the label said that they did not know any specific benefits when asked to describe the primary benefits to the builder were of the ENERGY STAR homes label.

   Among homebuyers, 19 percent were aware of ENERGY STAR homes, although none of the recent homebuyers had actively looked for an ENERGY STAR home when making their home purchase.

8. Multiple Listing Services include whether a home is certified ENERGY STAR in their listings.

   Evaluation Finding: Very few ENERGY STAR homes have been built in the region to date, and consequently the ENERGY STAR qualification is not automatically included in the new home Multiple Listing Services. This indicator will be tracked as the program progresses and ENERGY STAR homes begin to appear in the market in greater numbers.

9. The value of efficiency upgrades is automatically included in the appraisal process.

   Evaluation Finding: This longer term progress indicator is not addressed in this first report. This issue will be investigated as the program continues and new ENERGY STAR homes become more available.

EVALUATION CONCLUSIONS AND RECOMMENDATIONS

The following general conclusions are drawn from the data sources and analysis presented in this report:

- **Builders are beginning to believe in the marketing advantages of the ENERGY STAR homes label.** As of November 2004, 100 builders had enrolled in the program and 2,354 ENERGY STAR homes had been committed. These numbers indicate that builders are beginning to see the marketing potential of the ENERGY STAR label for homes. This conclusion is supported by the builder survey results, where marketing and product differentiation were the most common benefits cited among builders that were aware of the ENERGY STAR label for homes. Builders aware of the ENERGY STAR homes label also agreed that the ENERGY STAR label made homes more marketable, with 62 percent of builders strongly or somewhat agreeing with this statement. In a

[5] *Baseline Characteristics of the Residential Sector; Idaho, Montana, Oregon, and Washington*. Prepared by Ecotope for NEEA, 2001

similar question, 51 percent of builders either somewhat or strongly agreed that ENERGY STAR homes have a competitive advantage in the market.

- **Gaining acceptance of the duct testing requirement will likely be a significant challenge for the program**. Of the builders we surveyed, 41 percent were unaware of duct testing. Of builders that are aware, the perceived high cost of duct tests was mentioned by 29 percent as the primary reason for not having duct tests done. An additional 31 percent of the builders said that they did not do duct tests since they are not required by the building code. The most frequent response to the question regarding duct test benefits was "No benefit" (cited by 28 percent of builders) and only 3 percent of builders mentioned ducts as an important component for reducing home energy consumption. Similarly, HVAC contractors indicated that duct tests were expensive and time-consuming and often unnecessary.

  Despite the general lack of perceived duct test benefits, some builders do consider duct testing beneficial. When asked about duct test benefits, 25 percent of builders aware of duct testing said that the tests catch problems before the customers do and 15 percent mentioning reduced callbacks. Builders also mentioned that duct tests help verify that the HVAC and ducts are functioning properly (26 and 20 percent, respectively).

- **Builders are not expressing strong agreement on the potential ENERGY STAR benefits**. Not surprisingly, builders do not yet have strong beliefs on the potential benefits of the ENERGY STAR label. In all of the responses to the ENERGY STAR attitudinal questions, the average response tended to reflect a middle-of-the-road attitude in terms of the perceived value of the ENERGY STAR label. Builders did seem to agree slightly more with the statements "ENERGY STAR homes are marketable" (62 percent at least somewhat agree), "ENERGY STAR homes are higher quality" (51 percent at least somewhat agree), and that "ENERGY STAR homes enjoy a competitive advantage in the market" (51 percent at least somewhat agree).

- **Consumers appear to be receptive to ENERGY STAR homes and their benefits.** When asked if the benefits of the ENERGY STAR home label were difficult to understand, 84 percent of the homebuyers either moderately or strongly disagreed with this statement. This finding is encouraging given that builders and realtors both consider homebuyer education as critical for the future development of the ENERGY STAR homes market.

  Among homebuyers already aware of the ENERGY STAR label for homes, 79 percent either moderately or strongly agreed that ENERGY STAR homes are of higher quality. In addition, 77 percent either moderately or strongly agreed that ENERGY STAR homes are worth more. While these initial numbers are encouraging, they represent only those homebuyers that are aware of ENERGY STAR homes (19 percent of homebuyers) and are therefore only a small share of the overall population.

- **Homebuyers may be willing to pay a premium for an ENERGY STAR home.** When homebuyers were presented with a marketing-oriented statement about the benefits of ENERGY STAR certified homes, they indicated that on average, they would be willing

to pay an additional $5,700 for an ENERGY STAR certified home. While these types of willingness-to-pay stated preference questions are notoriously imprecise, the generally positive response to this question does suggest that homebuyers would be willing to pay at least some premium for an ENERGY STAR home once they understand and believe all the associated benefits. This conclusion is supported by the homebuyer opinions regarding energy efficiency and a home's resale value and overall home quality. Realtors we interviewed also indicated that ENERGY STAR homes may sell for a higher price but only if the added benefits are clearly communicated to homebuyers.

- **Consumers believe that new homes can be made more energy efficient**. The majority of homebuyers we surveyed indicated that new homes could be more energy efficient, with 42 percent strongly agreeing and 33 somewhat agreeing with this statement. Interestingly, there appears to be more agreement on this issue among homebuyers than among builders, where 16 percent of the builders strongly agreed and 28 percent somewhat agreed that homes built to code are energy efficient enough.

- **The ENERGY STAR lighting requirement may also pose a significant challenge for the program.** While most builders we interviewed have some experience with ENERGY STAR lighting, some expressed concern about the lighting requirement for the program. In particular, volume builders are very cost sensitive and the higher costs associated with ENERGY STAR lighting can be prohibitive for this market. These concerns were echoed by lighting distributors who also mentioned the higher cost and both a lack of fixture selection and dimmable CFL lamps as potential problems in the new homes market.

The following recommendations are based on the above findings:

- **The Program should consider how to shift builder attitudes and awareness regarding duct performance testing.** Most builders do not understand that there are issues with duct efficiency and do not perceive the value of duct testing for themselves or their customers. Only 3 percent of builders surveyed mentioned ducts when asked what components of the home they considered most important for reducing home energy consumption. Builder marketing efforts should promote the critical importance of duct efficiency to whole home energy efficiency.

- **Consider how to better educate builders on the costs and availability of CFLs.** Builders expressed some concern about these issues in the builder survey, with some volume builders indicating that the bulbs were too expensive. In addition, lighting distributors mentioned the extra cost and a lack of availability for some applications. Increased education and marketing on product availability and the long-term value of ENERGY STAR lighting should help alleviate some of these issues. Promoting high-quality new products as they become available, particularly in those applications where availability has been an issue (such as dimmable fixtures or smaller fixtures where CFLs currently do not fit), should also benefit the Program.

- **Incorporate findings from the homebuyer survey into Program marketing efforts to builders.** Key results from the homebuyer survey include:

- Homebuyers' high awareness of the ENERGY STAR label (82 percent).
- Homebuyer stated willingness to pay $5,700 more, on average, for an ENERGY STAR home.
- Homebuyer perceptions that new homes can be made more efficient (75 percent agree).

These homebuyer survey results are in contrast to some of the findings from the builder survey, where many builders indicated that homes built to code are efficient enough and lack of consumer demand was commonly given as a reason for not building more energy efficient homes. Using the homebuyer survey results in the marketing of the program to builders should help correct these misperceptions.

- **Approach Multiple Listings Services (MLS) about including ENERGY STAR designation in the listing information.** With several large-scale prominent builders participating in the program and compelling data regarding consumer recognition of the ENERGY STAR label and the potential value placed on an ENERGY STAR home, MLS may be willing to begin including this information in its listings.

1. INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

This report is the first of three market progress evaluation reports (MPERs) of the Northwest Energy Efficiency Alliance's ENERGY STAR Homes Northwest program. This project is one of two major projects within the Alliance's Residential Sector Initiative and works in close coordination with the Alliance's ENERGY STAR Home Products program – the other project included in the Initiative.

The ENERGY STAR Homes Northwest program promotes the construction and sale of new homes built to an ENERGY STAR standard that has been designed specifically for the states of Washington, Oregon, Idaho, and Montana. Homes built to this standard are at least 15 percent more energy efficient than Washington and Oregon State energy codes. These ENERGY STAR homes also include high efficiency lighting, windows, appliances, water heaters, insulation, and heating and cooling equipment. As a result, these new homes are designed to save an average of 1,000 to 1,500 kWh per year for gas-heated homes and 3,700 kWh annually for electrically heated homes.

The primary purpose of this first evaluation report is to provide a baseline for the market progress indicators that will be used to evaluate the Alliance's ENERGY STAR Homes Northwest program.[6] It includes baseline analysis on the new home market in the Northwest as well as information on current builder practices and builder and homebuyer perceptions of the ENERGY STAR label and its meaning for homes. Future MPERs will focus on process evaluation issues and measuring market progress indicators. The final MPER is scheduled for early 2006 and will compare program progress on these key indicators with the baseline levels established in this report.

Table 1 below summarizes the main components of the MPERs planned for the ENERGY STAR Northwest Homes evaluation. Each report will contain a market assessment showing the current conditions in the new home market and tracking changes over time. Phone surveys for both builders and new homebuyers are included in this first baseline report and will be repeated in the final MPER scheduled for 2006. Beginning in 2005, we will also be conducting a post-occupancy survey of homebuyers that recently purchased ENERGY STAR homes to determine satisfaction and retention of individual measures. In-depth interviews with a smaller sample of builders and various market actors including realtors and building contractors will be conducted for all three reports, and the final two interview rounds will include a significant amount of process related discussion. The process evaluation scheduled for the second and third reports will also involve interviews with utilities, state energy offices, and home verifiers involved with program. Finally, a review of the cost effectiveness modeling and underlying model assumptions will also be conducted for the second and final evaluation reports.

[6] A list of the key market progress indicators is provided in Table 3 on page 12 of this report.

Table 1. Evaluation Report Components

Analysis Component	MPER 1 Baseline Report	MPER 2 (2Q 2005)	MPER 3 (1Q 2006)
Market Assessment	λ	λ	λ
Market Actor Interviews	λ	λ	λ
Builder Phone Survey	λ		λ
Builder In-Depth Interviews	λ	λ	λ
Homebuyer Phone Survey	λ		λ
Process Evaluation		λ	λ
Post-Occupancy Homebuyer Survey		λ	λ
Review of Cost Effectiveness Modeling		λ	λ

1.2 PROJECT BACKGROUND

Program Overview

The ENERGY STAR Homes Northwest program markets the potential benefits of building homes to the ENERGY STAR standard directly to builders. ENERGY STAR serves as the mechanism to both differentiate builders and the homes they build and to provide consumers with an easy way to identify the home as efficient. Certification, labeling and marketing efforts in the project are designed to increase the market share of ENERGY STAR new homes while simultaneously protecting the ENERGY STAR brand.

While it has been successful in other parts of the country, the national project model for ENERGY STAR homes has not been a particularly good fit for this region. This can be attributed to a number of factors, but the most significant include the success of robust energy codes in Oregon and Washington, past focus on (electric heat) Super Good Cents branding for new construction, and the lack of an energy-rating infrastructure that has traditionally been used in other parts of the country.

In order to make the ENERGY STAR Homes project work in the Northwest, the EPA worked with the Alliance and its stakeholders to develop a tailored project process. This process is centered on a package of prescribed conservation measures and is designed to be fuel-neutral. Additionally, the current codes in Washington and Oregon already meet the national ENERGY STAR standard, which necessitated a newer, more stringent ENERGY STAR requirement for the region if significant efficiency gains were to be achieved in the new homes market.

Table 2 provides a summary of the two prescriptive Builder Options Packages (BOPs) for single-family, site-built homes. The ENERGY STAR Homes Northwest package was designed to include efficiency measures that would result in a level of performance that was a minimum of

15 percent better than that required by codes in the region. It is also designed to include efficiency improvements in all major end-uses including space heating and cooling, water heating, lighting, and appliances. Testing the HVAC and duct systems for leaks is also required using the Performance Tested Comfort System (PTCS) specifications. Finally, the requirements were designed to maximize the marketing impact by linking to as many ENERGY STAR branded components as possible, from the heating and cooling system to lighting and appliances.

Table 2. ENERGY STAR Homes Northwest Technical Specifications

Component	BOP 1 (Heat Pump/Gas Furnace)	BOP 2 (Zonal Electric/Propane)
Ceiling	R-38 Std	R-38 Std
Wall	R-21 Std.	R-21 Std. + 2.5
Floor Insulation	R-30	R-30
Unheated Slab Below Grade	R-10	R-10
Windows	U-0.35	U-0.30
Heating System	8.0 HSPF 0.90 AFUE	N/A / 0.80 AFUE
Ventilation System	Central Exhaust	HRV 70%
Air Conditioning System	SEER 13	SEER 13
Duct Tightness	PTCS	Electric N/A Propane PTCS
Envelope Tightness	7.0 ACH @ 50 Pa	2.5 ACH @ 50 Pa
Water Heating	Electric 0.93 EF / Gas 0.60 EF / (> 60 gal.)	Electric 0.93 EF / Gas 0.60 EF / (> 60 gal.)
Appliances	All built-ins are ENERGY STAR	
Lighting	> 50% of sockets either ENERGY STAR lamps or fixtures	

To further increase the flexibility of these requirements, there are also several Technical Compliance Options (TCO) that are allowed within each of the two BOPs:

- TCO #1 substitutes perimeter insulation for floor insulation in homes with crawlspaces.
- TCO #2 replaces the SEER 13 air conditioning unit with a SEER 12 unit in exchange for additional upgrades in the building shell or equipment.

- TCO #3 utilizes the U.S. EPA's Advanced Lighting Package[7] in place of the current BOP standard.

- TCO #4 allows for a gas hydronic heating system for use with BOP #1 and includes several modifications to the efficiency requirements for water heating and insulation depending on the type of system.

- TCO #5 allows for an electric hydronic heating system for use with BOP #2 and includes several modifications to the efficiency requirements for water heating and insulation depending on the type of system.

- TCO #6 allows for U-value trade-offs within BOP #1.

- TCO #7 allows for U-value trade-offs within BOP #2.

These TCOs help the program to include a greater range of equipment options, many of which are driven by the varying climate considerations in the states covered by the program.

In addition to the prescriptive component requirements listed above, there are additional program components that are designed to assist builders and contractors with the ENERGY STAR requirements. These program elements include:

- Infrastructure development and market actor training and education, particularly for HVAC contractors and PTCS specifications;

- A quality assurance process requiring that:

    - Every central HVAC system be performance tested;

    - Every home be inspected by a certified verifier for compliance with ENERGY STAR Northwest project specifications; and

    - Every home be certified by a third-party contractor operating under an independent ENERGY STAR Northwest quality assurance process.

- Marketing, outreach, promotion, and consumer education focused on branding and labeling, quality and value, and other co-branding and cross promotion opportunities. This is done through press releases, articles, and newsletters that advertise the program and provide information on the benefits of ENERGY STAR homes. The program has also developed the program website www.northwestenergystar.com as an additional information resource for builders and potential new homebuyers.

[7] The U.S. EPA Advanced Lighting Package requires that 50 percent of high-use rooms and outdoor lights must have ENERGY STAR fixtures. In addition, all ceiling fans must be ENERGY STAR and 25 percent of medium-use and low-use rooms must have ENERGY STAR fixtures.

- Coordination and incorporation of multiple project efforts by utilities and others, specifically including technical standards and financial incentives.

- Promotion and support for "plus" packages that increase energy efficiency or other attributes such as green or healthy buildings (beyond base project requirements) that will further support builder differentiation through efficiency.

Future program activities are anticipated to explore and demonstrate emerging new construction products, services and techniques. These efforts may include support for next generation products as well as comprehensive design approaches such as the Zero Energy Home. In addition, the Alliance will plan and implement codes and standards activities designed to facilitate code improvements and compliance.

Market Transformation Theory

The primary market transformation mechanism for the ENERGY STAR Homes Northwest program seeks to remove the barriers to identification of an energy efficient new home while simultaneously providing builders a means to differentiate themselves in the market. Given sufficient marketing resources, the ENERGY STAR brand has already proven that it can become a credible product differentiator that provides consumers with a readily identifiable means to distinguish a minimum level of efficiency in appliance and lighting markets. Previous experience with Super Good Cents homes within the Alliance territory demonstrated the power of a having a consolidated regional marketing effort focused on a single brand as the differentiation mark for efficiency.

Second, the implementation strategy leverages the ENERGY STAR brand equity to raise awareness of the higher level of efficiency available in the new homes market. Awareness of the ENERGY STAR label is currently over 80 percent among new homebuyers within the Alliance service territory, and increasing numbers of consumers not only recognize the label but are able to describe that it means the labeled product will use less energy and will cost less to operate. The current marketing effort in the ENERGY STAR Homes Northwest program is intended to promote the ENERGY STAR label to the new home buying market in a way that builds on this existing awareness. The theory is that homebuyers will learn that – as with purchasing an appliance – a home with the ENERGY STAR label they will guarantee an energy efficient home.

If the program is successful, the ENERGY STAR brand and label will become firmly established for new homes making identification and differentiation of these homes possible. Consumers will value and demand these homes and builders will provide and promote ENERGY STAR homes to increase their sales and profit. As ENERGY STAR homes become more prevalent, appraisers and real estate agents will acknowledge their value and Multiple Listing Services will include whether a home is ENERGY STAR certified in their listings.

As market share for ENERGY STAR begins to grow, the differentiating ability of the brand will need to be protected. To accomplish this, the ENERGY STAR Homes Northwest program will identify and test the next level of energy efficiency in new homes through a series of demonstration projects. Those measures that are successful in the demonstration efforts will be incorporated into the "next generation" ENERGY STAR specification. Similarly, as measures in the current ENERGY STAR specification become part of current practice, the program will

support the adoption of these elements into minimum code requirements. These last two elements provide the long-term mechanisms to maintain the integrity of the brand while solidifying the energy efficiency gains made through marketing of the ENERGY STAR Northwest home.

Market Barriers and Market Opportunities

There are a number of barriers to increasing the efficiency of energy use in new homes, including:

Lack of Awareness and Information. Builders, consumers, and other market actors are often unaware of the magnitude and potential value of energy savings that can result from improved construction practices. Similarly, there is a lack of awareness and appreciation of the non-energy benefits such as improved indoor air quality and lower maintenance costs that result from more efficient construction.

Inability to Identify Efficiency. Many builders claim to be building efficient homes, but consumers cannot always differentiate between accurate and false efficiency claims. In addition, the presence of multiple individual utility and other local programs promoting energy efficiency and green building practices may add to market confusion regarding what constitutes an energy efficient home.

Split Incentives. For new homes, builders and contractors make energy efficiency design and investment decisions but do not ultimately pay the energy bills. Many builders doubt they will be able to increase the home sales price in order to cover the initial costs of the energy efficiency improvements.

Limited Technical Skill. Many builders and subcontractors have an inadequate understanding of the nature of key efficiency losses in the home – such as through HVAC ducts or building air leakage. These are critical elements for capturing the energy efficiency potential in new homes and yet there are few contractors currently trained and certified to deliver results. Building the infrastructure necessary to support a viable contractor pool that can provide heating and cooling system commissioning and duct testing and sealing is a major challenge for this program.

Economic Benefits Not Recognized by Financial Markets. Appraisers do not value energy efficiency improvements or benefits when making their valuations. As a result, homebuyers who stay in their new home only a few years are unable to recoup the extra cost of efficiency investments through bill savings alone. Similarly, most mortgage lenders do not distinguish between efficient and inefficient homes when deciding whether a consumer can afford a mortgage or when developing mortgage products that reflect

lower risk of default from homes that are more efficient and therefore have lower energy bills.[8]

Despite the market barriers, the current new construction market offers a number of opportunities for market transformation. Market opportunities addressed by the program include:

Builder Differentiation. Given the large number of builders in the market, individual builders must differentiate themselves from their competitors. In addition, the desire to differentiate tends to fluctuate with the market – when demand for housing decreases, builders are more interested in differentiation as a means to capture business.

Consumer Demand for New Home Efficiency. Historically, consumer surveys have shown that efficiency is a key component in what is expected in a new home. However, since the home is brand new many consumers already assume that it will be energy efficient simply because it is new.

Consumer Awareness of ENERGY STAR Brand. Many consumers are already aware of the ENERGY STAR label for products but additional education may be needed to establish awareness of the label for homes. To facilitate this, the ENERGY STAR requirements for homes need to represent a significant improvement over current practice.

Interest in Sustainable Building Practices. There is a small but growing interest in sustainable or "green" construction practices among both builders and homebuyers. However, efficiency is not always part of the package of specified sustainable measures. The program will need to link efficiency to sustainability with those partners that may view efficiency or ENERGY STAR as competitors.

Market Progress Indicators

Progress indicators identified at the outset of the program reflect the focus of the project on all facets of the residential new construction market and are designed to address the key market barriers and opportunities discussed above. Short-term and long-term indicators include:

Short-term Indicators

- Builders use the ENERGY STAR label to differentiate themselves in the marketplace,
- Consumers, builders, and other market actors link ENERGY STAR homes and home quality/value;
- Builders are convinced of the long-term cost savings from reductions in call-backs that should result from performance testing and quality assurance practices;

[8] This barrier primarily impacts those that have trouble qualifying for a mortgage such as some first time home buyers and low income households. The importance of this barrier is lessened somewhat in the current market that is enjoying very low interest rates but will become more of a factor as mortgage interest rates rise.

- Increased awareness by builders and subcontractors of key efficiency and quality issues;
- Other market actors and trade allies are spending their own resources marketing ENERGY STAR Homes and matching Alliance investments;
- Builders and their subcontractors have expanded knowledge and skills necessary to treat key energy efficiency and quality issues, particularly performance testing of HVAC ducts and equipment; and
- Increasing recognition of the ENERGY STAR label and understanding what it means for new homes.

Long-term Indicators

- Multiple Listing Services include whether a home is certified ENERGY STAR in their listings;
- The value of efficiency upgrades is automatically included in the appraisal process;
- Residential energy codes are upgraded to incorporate some or all of the current ENERGY STAR requirements; and
- A new level of efficiency for ENERGY STAR is adopted based on successful demonstration of new and emerging technologies.

1.3 Study Purpose and Previous Baseline

The Residential New Construction Baseline Study (Baseline Study) was conducted by Ecotope for the Alliance and published in 2001. The Baseline Study provided very detailed information on Pacific Northwest housing characteristics and efficiency levels in the residential new construction market and utilized data from a sample of onsite audits that were conducted in 1999. The data from this study, however, are now five years old and do not reflect the most recent changes in building practices or the market progress made for specific ENERGY STAR building components such as windows. The Baseline study also did not address homebuyer and builder attitudes, awareness, and the general preferences and perceptions related to the ENERGY STAR label and energy efficiency within the residential new construction market.

The current evaluation is designed to provide a baseline for the market progress indicators that will be used to evaluate the Alliance's ENERGY STAR Homes Northwest program. In addition to characterizing the current new construction market, most of the evaluation resources were directed toward builder and homebuyer surveys to collect detailed information on builder practices and attitudes and perceptions of energy efficiency, the ENERGY STAR label, and components specific to the ENERGY STAR Homes Northwest program requirements. These data are used in this report to establish a program baseline that will provide a means to measure market progress on key indicators for the duration of the ENERGY STAR Homes Northwest program.

NOTE: The data on builder practices related to specific materials/equipment being installed in new homes cannot be used as the basis for an impact evaluation because it measures the proportion of builders engaging in certain practices rather than the penetration of specific equipment types as a proportion of total new residential building stock. The Alliance plans to conduct market research to update the original Ecotope baseline in 2006.

1.4 Evaluation Overview

This section summarizes the components, methods, and analytical approach for this MPER. Additional detail on the individual evaluation components, analysis methods, and results are provided in the next 4 chapters.

Evaluation Components

The evaluation of the ENERGY STAR Homes Northwest project has several primary components that include:

- **Market characterization**, which includes an assessment of potential market size (homes and builders), market share, market opportunities, price differentiation between ENERGY STAR and non-ENERGY STAR homes, and the number of participating builders that build and promote ENERGY STAR homes.

- **Homebuyer** awareness, knowledge, understanding, attitudes, and purchasing behavior surrounding ENERGY STAR homes. This includes general awareness and understanding of the ENERGY STAR home label and its meaning, and the value placed on the various benefits offered by ENERGY STAR homes.

- **Builder and trade ally** knowledge, attitude, and sales behavior regarding ENERGY STAR Homes as reflected in their attitudes and perceptions of the ENERGY STAR homes label, marketing efforts, and individual efficiency components such as duct testing and sealing. Satisfaction with the ENERGY STAR Homes Northwest program will also be measured.

For each of these areas, metrics of market progress have been established and the evaluation will collect the data needed to track progress on each of these metrics over time. Whenever possible, data for key evaluation issues are collected from multiple sources.

As discussed in the previous section, this first evaluation report focuses on establishing baseline conditions for the ENERGY STAR Homes Northwest project. This includes characterizing the new home market within the program territory, identifying current building and energy efficiency practices for new homes, and builder, homebuyer, and market actor attitudes toward ENERGY STAR and the various energy efficient home components. Future evaluation reports will continue to update progress on the key market indicators presented in this report. In addition, future reports will also contain process evaluation results and reviews of the cost effectiveness modeling performed by the Alliance for this program.

Evaluation Data Sources and Analysis Methods

Market Characterization

One of the key purposes of this study was to characterize the current new home construction market in the region and to provide updated information on the baseline conditions in the residential new construction market. In particular, the objectives of the market characterization undertaken in this study are to:

- Characterize the overall market for new homes in the region and the number of homebuilders so that the potential for the ENERGY STAR homes market can be assessed.

- Show how market conditions have changed since the Baseline Study and update key market indicators related to ENERGY STAR.

These tasks were addressed by utilizing secondary data sources such as the building industry publication *Construction Monitor* for information on new homes and the number of homebuilders in the region.

Builder and Homebuyer Surveys

Much of this evaluation focused on obtaining detailed information from both builders and new homebuyers. These surveys included collecting information on:

- Current building practices relating to the ENERGY STAR home specifications

- ENERGY STAR awareness among builders and homebuyers

- Perceptions of the ENERGY STAR label and what it means for homes

- Experience with the ENERGY STAR Homes Northwest program

Both the builder and homebuyer survey instruments were developed by ECONorthwest and Quantum Consulting and fielded by Quantum Consulting. Questions in both surveys are linked to specific market progress indicators set for the ENERGY STAR Homes Northwest program. Consequently, the survey responses not only serve as measures of the current baseline, but they will be used to evaluate program progress on these key progress metrics over the life of the program.

Market Actor Interviews

The market actor interviews are designed to provide an additional perspective on key ENERGY STAR home components. These interviews were conducted by phone and involved extended conversations with realtors, HVAC contractors, and lighting distributors. As discussed above, in-depth interviews were also conducted with some of the largest builders in the region. These interviews focused on attitudes and perceptions relating to ENERGY STAR and the current practices within the new home construction market. The results of these interviews were used to help corroborate findings from the builder and homebuyer survey. The market actor interview

effort will be expanded later in the evaluation to include additional contractors and trade allies as well as utilities, inspectors, and state energy offices. As the ENERGY STAR Homes Northwest program becomes more established, these interviews will also be used as part of the process evaluation.

Indicators of Program Progress

Table 3 summarizes the key indicators of program progress along with the metrics that have been developed as part of this evaluation to measure them. The table includes only the short-term indicators, as they are the focus of this first report covering the early stage of the ENERGY STAR Homes program. As the program matures, the list of progress indicators will be expanded to include the long-term progress indicators mentioned earlier. The information sources used to measure each progress indicator are also included in the table, and in each case multiple data sources are used for each indicator. The information sources and metrics are the primary sources of data supporting the evaluation conclusions and recommendations presented in this report.

Table 3: Market Progress Indicators and Sources of Measurement

Progress Indicator	Sources	Metric
Builders use ENERGY STAR to differentiate themselves	Builder Survey & In-Depth Interviews (IDI) Builder Participation ENERGY STAR Homes Construction Data	Number of participating builders Number of ENERGY STAR homes built Number of ENERGY STAR homes committed Percent of builders that believe the ENERGY STAR label will help them market homes
ENERGY STAR linked to home value	Builder Survey & IDI Market Actor IDI Homebuyer Survey	Homebuyers mentioning home value / quality as an ENERGY STAR benefit Homebuyers that paid a premium for an ENERGY STAR home Homebuyers that say they would pay a premium for an ENERGY STAR home Builder perception of ENERGY STAR / home value link Market actor perception of ENERGY STAR / home value link
Builders convinced of long-term cost savings from reduced call backs due to performance testing and quality assurance practices	Builder Survey & IDI	Builders doing duct tests Builders mentioning reduced call backs as a benefit Builders mentioning verification that HVAC installed correctly as a benefit
Increased awareness among builders and contractors of key efficiency issues	Builder Survey & IDI Market Actor IDI	Change in awareness among builders of efficiency issues (Duct testing, HVAC, CFLs)
Builders and market actors use own resources to promote ENERGY STAR homes	Co-op advertising data Builder Survey & IDI Market Actor IDI	Number of co-op advertisements Number of builders using own resources to promote ENERGY STAR homes Number of ENERGY STAR promotions funded without program support
Builders and contractors have knowledge and skills needed to address key efficiency issues	Builder Survey & IDI Market Actor IDI	Change in builder practices related to key efficiency components (duct testing, high efficiency heating & cooling, CFLs) Change in number of builders listing duct tightness as a key factor in reducing energy use Availability of qualified contractors
Increased recognition and understanding of ENERGY STAR label for new homes	Homebuyer Survey Market Actor IDI Builder Survey & IDI	Change in awareness of ENERGY STAR Homes label and ENERGY STAR requirements for builders and contractors Change in awareness of ENERGY STAR Homes label for homebuyers Change in understanding of specific ENERGY STAR benefits (i.e., reduced energy bills, indoor air quality, tight ducts) Homebuyers mention value of knowing the home was certified using 3rd party verification

The remainder of this report is organized as follows. Following this introduction, Chapter 2 provides a characterization of the new homes market within the program territory. Following the market characterization, Chapter 3 presents the results of our builder survey, followed by the results of the new homebuyer survey in Chapter 4. Chapter 5 contains the results from our in-depth interviews with realtors, HVAC contractors, and lighting distributors. Additional detail on our in-depth interviews with builders is provided in Appendix A (the key findings from these interviews are also integrated into the builder survey results presented in Chapter 3). Finally, Appendix B contains copies of the survey instruments and interview guides used for this report.

2. MARKET CHARACTERIZATION

This chapter provides an overview of the residential construction market for Washington, Oregon, Idaho and Montana. Results from the previous Baseline Report are also presented when data are available. Builder participation, program goals, and ENERGY STAR home construction data are also presented and provide a context for the survey results presented in the following chapters.

2.1 RESIDENTIAL NEW CONSTRUCTION MARKET OVERVIEW

Table 4 shows the residential population and growth rates for the four states covered by the ENERGY STAR Homes Northwest program. Population in the ENERGY STAR Homes Northwest program area is largely concentrated in Washington and Oregon (primarily in the Western part of these states), with substantially lower population levels in Idaho and Montana. As shown in subsequent tables, the new housing market generally follows these population proportions with the exception of Idaho, which accounts for a disproportionately high share of new residential construction in the region due to the higher growth rate between 1999 and 2004.

Table 4. State Population and Growth Rates

State	Population	Average Annual Growth 1999-2004	Percent of 2004 Total
WA	6,203,788	1.5%	51%
OR	3,594,586	1.6	30
ID	1,393,262	2.2	11
MT	926,865	1.0	8
Total	12,118,501	1.6%	100%

Source: US Census, State Population Estimates

Table 5 shows the trend in construction for new, single-family homes from 1998 to 2004. With respect to the region, Washington is about half of the total number of new homes, Oregon makes up just over a quarter, and Montana and Idaho comprise 19 percent and 3 percent of new homes, respectively. Compared to the previous baseline report, the major difference is that Idaho has increased from 15 percent of new homes while Montana declined from 7 percent.[9]

The year over year growth rates from the territory show growth of 11-16 percent in Idaho and closer to 9 percent in Washington. Oregon had been adding new homes at modest rates of 3-7 percent between 2001 and 2003 but appears to have experienced a boom in 2004 with a reported 16 percent increase in new homes. Montana had stronger growth rates of up to 14 percent between 2001 and 2003 but was down 6.9 percent from 2003 in 2004. The new home growth rates suggest the program should be aware of the additional building activities occurring in Oregon.

[9] The 1998 housing starts data cited in the December 2001 report show Idaho at 15 percent of the region and Montana at 7 percent.

Table 5. Single Family New Construction by State (1998-2004)

Year	Washington Homes	Washington % CHG	Oregon Homes	Oregon % CHG	Idaho Homes	Idaho % CHG	Montana Homes	Montana % CHG	Total Homes	Total % CHG
1998	28,644		16,936		10,277		1,485		57,342	
1999	28,111	-1.9%	16,595	-2.0%	10,497	2.1%	1,607	8.2%	56,810	-0.9%
2000	25,471	-9.4	15,619	-5.9	9,681	-7.8	1,565	-2.6	52,336	-7.9
2001	26,736	5.0	16,323	4.5	9,738	0.6	1,790	14.4	54,587	4.3
2002	30,239	13.1	17,413	6.7	10,845	11.4	2,050	14.5	60,547	10.9
2003	33,091	9.4	17,875	2.7	12,601	16.2	2,340	14.1	65,907	8.9
2004	36,328	9.8	20,877	16.8	14,167	12.4	2,179	-6.9	73,551	11.6
% of 2004	49%		28%		19%		3%		100%	

Note: 2004 numbers are estimated by ECONorthwest using reported Census numbers through November 2004 (December 2004 were not available at the time of this report). To get the full year estimate, December 2003 Census numbers were used as an estimate for December 2004.
Source: US Census, Housing Units Authorized by Building Permit Report

Table 6 shows the distribution of builders by state. With the exception of Washington, which has by far the most builders, the other states have similar numbers of homebuilders despite the differences in population and housing starts in these states. Note that these figures reflect where builder offices are located and do not account for builders who construct homes in multiple states.

Table 6. Builders by State (2003)

State	Number of Builders	Percent
WA	2,423	40%
OR	1,138	19
ID	1,253	21
MT	1,244	21
Total	6,058	100

Source: *Construction Monitor*.

Table 7 shows the total number of builders distributed by construction volume and illustrates the fragmented nature of the builder industry. As shown in this table, the vast majority of builders (78 percent) build four homes or less each year and only 56 builders (less than 1 percent) are considered "volume" builders (constructing 100 homes or more each year). Washington has the vast majority of volume builders in the program territory, and these builders also comprise a greater share of the total builder population within the state. The presence of volume builders is also reflected in the average number of homes built per builder within each state, where the average for Washington is almost twice that of Idaho and Montana and 34 percent higher than Oregon.

Table 7. Builders by State and Volume (2003)

State	Number of Units Built (Annually)						
	1-4	5-9	10-24	25-99	> 100	Total	Average
WA	1,843	254	182	102	42	2,423	9.4
OR	895	132	78	28	5	1,138	5.4
ID	971	151	87	36	8	1,253	7.0
MT	1,027	139	60	17	1	1,244	4.5
Total	4,736	676	407	183	56	6,058	7.1

Source: Construction Monitor.

2.2 BUILDER AWARENESS AND PARTICIPATION

Table 8 shows the current level of builder awareness of the ENERGY STAR home label and the change in awareness from the earlier Baseline Study. In 1999, awareness was generally low with only 17 percent of the builders in the region aware of the ENERGY STAR label for homes. By 2004, general awareness has grown considerably with over half of the builders aware of an ENERGY STAR label for homes. The higher awareness level is likely due to national ENERGY STAR home efforts and earlier ENERGY STAR home programs offered by Idaho Power and Puget Sound Energy (WA).

Table 8. Builders Aware of the ENERGY STAR Label for Homes

Aware	Percent (1999)	Percent (2004)
Yes	17	56
No	83	44
Total	100	100

Q. Have you ever heard of the "Energy Star" program for New Homes? (same question wording 1999 and 2004)

Source: 1999 data from *Market Research Report: Baseline Characteristics of the Residential Sector; Idaho, Montana, Oregon, and Washington.* Prepared by Ecotope for NEEA, 2001.

Table 9 presents the number of builders who have contractually agreed to participate in the ENERGY STAR Homes Northwest program as of the end of November 2004. Results are shown by state and building volume and include the program's 2004 builder participation goals.

Table 9. Number of Participating Builders

State	Non-Volume Builders (<100 homes / year)	2004 Goal Non-Volume Builders	Volume Builders (100+ homes / year)	2004 Volume Goals	Total Participants
WA	15	36	7	3	21
OR	22	15	1	3	23
ID	45	15	2	2	46
MT	10	7	0	0	10
Total	91	72	9	7	100

Source: PECI, data as of September 2004.
Note: For this table, 2004 goal for builders in the Spokane / Northern Idaho region is split evenly between ID and WA. The large volume builder goal of one builder for this region was assigned to WA.

Table 10 shows the construction activity achieved through the ENERGY STAR Homes program as of November 2004. "Certified" homes refer to those that have been constructed and certified as ENERGY STAR-compliant by the program. "Initiated" homes are those that are planned as ENERGY STAR homes, with construction underway but not yet completed. Homes that are "Committed" are those that the builder has said will be ENERGY STAR but construction has not yet begun.

Table 10. ENERGY STAR Home Construction Status

	Committed		Initiated	Certified		Total 2004 New Homes	% Committed and Certified Relative to Total New Homes
State	Actual	2004 Goal	Actual	Actual	2004 Goal		
WA	1,200	638	16	3	308	36,328	3.3%
OR	795	420	92	0	455	20,877	3.8
ID	329	288	93	48	155	14,167	2.7
MT	30	50	7	0	20	2,179	1.4
Total	2,354	1,396	207	51	938	73,551	3.3

Source: PECI, data as of November 2004.
Note: For this table, 2004 goals for certifications and commitments in the Spokane / Northern Idaho region are split evenly between ID and WA.

Table 10 shows how ENERGY STAR home construction is compares with program goals for 2004. At the time of this report, certified ENERGY STAR homes are lagging behind goals for certified homes. The high number of committed and initiated ENERGY STAR homes combined with the number of builders signed on to the program, however, indicate that this deficit will likely be made up in the coming year if present trends continue.

The far right column of the last table shows the share of committed and certified ENERGY STAR homes as a share of new home construction within the state. As a share of total construction, ENERGY STAR homes are on track to comprise anywhere from 1.4 percent (Montana) to 3.8 percent (Oregon) of new homes built in 2004. Both the number of ENERGY

STAR homes and total new home construction in 2004 are estimates, however, and the results presented below will likely change. This market share measure will be tracked on an ongoing basis and will be used as one of the key metrics for evaluating the ENERGY STAR Homes program accomplishments over time.

3. BUILDERS SURVEY

3.1 METHODOLOGY AND SAMPLE COMPOSITION

There were two separate components to the builder survey effort. First, 20 in-depth interviews (IDIs) with builders were conducted in person and over the phone in May 2004. These interviews were conducted primarily with larger builders who were recruited using *Construction Monitor* data and a list of builder contacts provided by PECI. These interviews were used to refine the phone survey instrument and also allowed more in-depth discussion on key evaluation issues. Following the in-depth interviews, Quantum Consulting surveyed 100 builders over the phone in June 2004. Additional detail on the builder in-depth interviews is included in Appendix A and the builder survey instrument is included in Appendix B.

The sample scheme for the builder survey had several stages. For the in-depth interviews, sample quotas were set up by state and construction volume to ensure a representative mix of builders. To fill these quotas, builders were first recruited from a list of builder contacts provided by the implementation contractor PECI. These builders were primarily large builders and included program participants. Once the in-depth interviews were completed, the phone survey sample was drawn from the Construction Monitor list of builders with sample quotas set by state based on new home construction activity. Recruiting was done by state and began with the larger builders to ensure that at least some large builders were included in the phone survey sample before recruiting targeted the smaller volume builders. Table 11 shows the final sample distribution by state for both builder survey efforts.

Table 11. Builder Survey Sample

State	Builder Phone Surveys	Builder In-depth Interviews	Total
WA	44	6	50
OR	22	9	31
ID	22	3	25
MT	12	2	14
Total	100	20	120

The sampling method introduces a few sources of potential bias that need to be considered when interpreting the survey results. By design, we recruited builders that were participating in the program for the in-depth interviews as they can provide important feedback on how the program is performing at this early stage. Because program participants are over-represented in the sample (12 percent in the sample relative to less than 1 percent in the builder population), the survey results are biased more towards builders that have experience with the various energy

efficiency components required by the program and are more likely to have favorable attitudes toward energy efficient building practices in general.[10]

In our sample design, we have also emphasized recruiting larger builders where possible. Getting these builders to participate will be important for the long-term success of the program and therefore they were targeted for this survey to obtain their opinions on important program issues. Although these builders are over-represented in the sample, the sample results are weighted to the builder population, which helps reduce any potential bias these responses may have.

Although builders are generally difficult to recruit for phone surveys, we found no evidence of non-response bias in our sample. In the case of the builder phone survey, the response rate[11] was approximately 18 percent, which is greater than the 10 percent originally anticipated for this survey. Another measure of potential bias is the number of refusals per completed survey. For the builder survey, there were 0.75 refusals for each survey complete. Ratios of less than 1 are a positive sign of sample response and indicate a lack of non-response bias.

The final builder phone survey sample by construction volume is shown in Table 12. By design, the vast majority of questions covered in the in-depth interviews and the phone surveys were identical, which allows the results to be combined into one survey analysis dataset.

NOTE: The data from the builder survey cannot be used as a statistical baseline of market saturation as the survey was designed to measure the percentage of builders engaging in certain practices and not the actual market penetration of specific equipment. The Alliance did conduct a market saturation study of building characteristics with Ecotope in 1998 ("The Baseline Report") and plans to conduct another saturation study in 2005-2006.

[10] In the next builder survey scheduled for 2006, we will separate out the program participants and compare responses on key variables over time among non-participant builders to track changes in attitudes and perceptions on key efficiency and program issues over time.

[11] The American Association of Public Opinion Researchers defines the response rate as the number of completes or partial completes divided by the number of eligible non-respondents and the non-respondents where the eligibility is unknown plus completes and partial completes.

Table 12. Builder Survey Sample by Construction Volume

State	Number of Units Built (2003)					
	1-4	5-9	10-24	25-99	> 100	Total
WA	15	7	14	6	8	50
OR	9	2	4	7	3	25
ID	5	7	10	5	4	31
MT	9	3	2	0	0	14
Total	38	19	30	18	15	120

Two different weighting methods are used for the builder survey results. The first method weights individual builders to the population of builders. The second method applies an additional weight based on the number of the volume of homes built each year. Since we have over-sampled large volume builders (particularly with the in-depth interviews), the first weighting scheme guards against the large volume builders having too much influence over the sample as these builders actually comprise a very small portion of the overall builder population. The second weighting scheme accounts for the fact that these larger builders will have a proportionately greater impact on the market than the smaller builders based on the number of homes built.

In most cases we have reported the builder survey results using both weighting schemes. For some questions relating to builder perceptions, results are reported only using the builder weighting scheme. A few results are reported unweighted, such as those questions relating to program satisfaction among participating builders.

Selected builder survey results are presented below in three sections. The first section provides results relating to current builder practices. The second section presents builder attitudes and perceptions related to the ENERGY STAR home label. The third section contains process-related questions asked of a small sample of early program participants.

In addition to the current builder survey results, results from the previous Baseline Study are also presented (when available). Note, however, that questions in the previous study were worded differently and some information was collected through on-site audits rather than by phone. As a consequence the results are not directly comparable to those in the current survey, but they do provide some indication of how building practices have changed since 1999.

3.2 BUILDING PRACTICES

The builder survey sample was designed to produce a mix of builder types, and Table 12 shows the distribution of the final survey sample based on several builder characteristics. Participants in the ENERGY STAR Homes program comprised 12 percent of the sample, and we anticipate that this share will increase as we talk to more participating builders during the process evaluation scheduled for the upcoming evaluation reports. Note that participants are over-represented in our sample (12 percent of the sample relative to less than 1 percent in the builder population), and given that these are early participants (and therefore much more receptive to

energy efficient building practices) their responses tend to skew the survey results more favorably toward energy efficiency. The presence of these builders also biases upward the reported experience with the various energy efficiency components (ENERGY STAR lighting, duct testing, etc.) relative to the overall builder population. This is by design, as one of the purposes of the builder survey was to gather information from builders that have had experience with the various measures required by the ENERGY STAR Homes program.

A large share of the builders we talked to (44 percent) constructed mostly production or "spec" homes that followed a pre-set design. For 44 percent of our sample, 75 percent of the homes built by these builders were production (non-custom) design homes. There was also a mix of home prices, with 27 percent of the sample building homes with an average price of $125,000 or less and 13 percent of the sample building homes with an average price of $250,000 or more. (The median home price was in the $150,000-$199,000 range).

ES Program Participants		Percent Production Homes (Non-Custom Homes)			Average Home Price				
Yes	No	0-24%	25-74%	75%+	< $125K	$125-149K	$150-199K	$200-250K	$250K+
12%	88%	29%	27%	44%	27%	15%	25%	21%	13%

The remainder of this section presents survey results that focus on builder practices relating to the specific energy efficiency components contained in the ENERGY STAR Homes BOP.

Heating and Cooling

Table 13 shows the types of heating systems that builders we surveyed install in non-ENERGY STAR homes. As shown in Table 13, the most common type of heating system among surveyed builders was the *high efficiency gas furnace* (AFUE 90+ percent) with 65 percent saying they install it in at least some of the non-ENERGY STAR homes they build. When weighted to represent the number of homes built, *standard efficiency gas furnaces* are more prevalent (73 percent compared to 65 percent for *high efficiency gas*). This decrease in percentage between the two weighting schemes indicates that builders that build fewer homes (and therefore are more likely to be building custom homes) tend to install high efficiency gas furnaces more often than the higher volume builders. *High efficiency heat pumps (HSPF 8.0+)* and *hot water heating* were mentioned by about one fifth of the builders; however, the *high efficiency heat pump* option appears less frequently when the results are weighted by homes.

The in-depth builder interviews suggest that high efficiency gas heating is less prevalent, although most builders appear to offer it as an option. The high population areas of Western Washington and Oregon are also the areas with the most temperate climates, which makes high efficiency furnaces less cost effective and therefore a tougher sell (according to builders).

Table 13. Heating Systems in Non-ENERGY STAR Homes

Heating System	WA	OR	ID	MT	Total Weighted by Builders	Total Weighted by Builders and Homes Built
High efficiency gas (AFUE 90+)	67%	72%	86%	38%	65%	65%
Standard efficiency gas	55	48	33	52	49	73
High efficiency heat pump (HSPF 8.0+)	32	12	17	1	19	10
Hot water heating	1	13	20	44	16	17
Standard efficiency heat pump	12	4	0	0	6	6
Wood burning	2	3	21	0	5	3
Gas/oil fired boiler	0	1	17	4	4	3
Only build Energy Star homes	0	0	6	10	3	3
Electric resistance	2	3	0	0	1	4
Don't know	1	0	0	0	1	0

Q25C. Which of the following types of heating systems do you install in the non-ENERGY STAR homes you build? (Sample Size=115, state-level results weighted to builder population)

NOTE: Multiple responses were accepted and percentages therefore add to more than 100 percent. Data are therefore not comparable to the Baseline Study and should be interpreted appropriately. For example, 65 percent of builders reported installing high-efficiency gas furnaces in at least SOME of the homes they build, but since builders report installing multiple heating systems, the saturation of these furnaces is less than 65 percent.

Table 14 shows the heating type results from the Baseline Report including the frequency of homes with high efficiency gas heating. The current builder survey results are not directly comparable with the previous baseline because the heating equipment categories are different. Also, the prior baseline used on-site home audits to identify heating type which allowed a measure of new home saturation, as opposed to the current builder survey where builders reported all the types of heating systems they have installed in new homes. With this in mind, both the Baseline Report and the current builder survey indicate that forced air gas heating is the prevalent heating type across all states. The builder survey and the in-depth builder interviews suggest that radiant hot water heating is becoming more common in Idaho and Montana, which represents a change from the earlier Baseline Report results.

Table 14: Baseline Report Home Heating System Selection (1999)

State	System Type						
	Forced-Air Furnace	Heat Pump	Zone Heat	Boiler	Wood / Other	High Efficiency Gas Furnace	Percent with Air Conditioning
ID	94.2%	1.0%	3.8%	1.0%	0.0%	16%	72.1%
MT	65.0	1.7	11.7	20.0	1.7	25	18.0
OR (1999)	91.1	8.9	0.0	0.0	0.0	13	18.2
OR (1994)	86.1	3.0	8.5	1.8	0.7	--	23.7
WA	77.1	14.0	6.4	1.9	0.6	6	21.0

Source: *Market Research Report: Baseline Characteristics of the Residential Sector; Idaho, Montana, Oregon, and Washington.* Prepared by Ecotope for NEEA, 2001.

For home cooling systems, Table 15 shows *High efficiency air conditioners* (SEER 13+) were mentioned most often by builders, indicating that the majority of builders install high efficiency cooling in at least some of the homes they build. When the responses are weighted by the number of homes built, however, *Standard efficiency air conditioners* are most widespread (48 percent compared to 18 percent for high efficiency). This indicates that builders that build fewer homes (and therefore are more likely to be building custom homes) tend to install high efficiency cooling systems more often than the higher volume builders. The next most frequent types of cooling were *High efficiency heat pumps* and *Standard efficiency heat pumps* (10 to 15 percent of the builder-weighted responses). The frequency of heat pump installations also declines when the survey responses are weighted by home volume. When compared with data form the Baseline Study (see Table 14), it appears that more cooling systems are being installed in new homes throughout the region relative to 1999.

From our in-depth interviews with builders, for homes with cooling systems it appears that 12 SEER units are commonly installed. The availability of high efficiency cooling equipment was generally not considered a problem, but a couple of builders had supply issues in Idaho, with even 12 SEER units difficult to find and costing significantly more.

Table 15. Cooling Systems in Non-ENERGY STAR Homes

Cooling System	WA	OR	ID	MT	Total Weighted by Builders	Total Weighted by Builders and Homes Built
No cooling system	50%	23%	15%	40%	36%	37%
High efficiency air conditioner (SEER 13+)	37	41	47	18	36	18
Standard efficiency air conditioner	16	55	49	23	31	48
High efficiency heat pump (HSPF 8.0+)	16	19	19	5	15	13
Standard efficiency heat pump	15	5	1	10	10	9
Only build ENERGY STAR homes	0	0	6	10	3	3
Room air conditioner	0	0	0	0	0	1

Q26C. Which of the following types of cooling systems do you install in the non-ENERGY STAR homes you build?
(Sample Size=115)

Note: Multiple responses were allowed and therefore percentages add to greater than 100 percent. As a result, these data are not directly comparable to the Baseline Study and should be interpreted appropriately.

Lighting

Builders were asked a series of questions related to the type of lighting installed in the non-ENERGY STAR homes they build. As with the heating and cooling questions, the responses to the lighting questions reflect the percentage of builders who have experience installing each type of lighting in the non-ENERGY STAR homes they build and does not reflect a market share or absolute installation rate for each lighting type covered. The relatively high levels of experience with some of the high efficiency options such as T5s, CFLs, and CFL fixtures are likely due to the over-representation of participating builders in the sample and the recruitment of builders for in-depth interviews from a contact list provided by the program implementer, as builders contacted by the program are more likely to have some experience with energy efficient building practices.

Table 16 shows the results of a question that focused on lighting measures other than the standard incandescent lamps. *Halogen* lighting was mentioned by two-thirds of builders (65 percent) as the most common non-incandescent lighting used. *CFLs* were the next most common and were mentioned by approximately half of the builders (49 percent). *T8s*, *dedicated CFL fixtures,* and *T5s* all received just over a quarter of builder responses.

Table 16. Types of Lighting in Non-ENERGY STAR Homes

Lighting Types	Weighted to Builder Population	Weighted to Builder Population and Homes Built
Halogen	65%	33%
CFL bulbs	49	30
T8	30	20
Dedicated CFL fixtures	26	19
T5	26	17
T12	21	14
Other	5	1
Incandescent Only	26	52
Don't know	5	2

Q35C. Which of the following types of lighting, if any, do you install in the non-ENERGY STAR homes you build? (Sample Size=105)

Note: Multiple responses were allowed and therefore the survey totals add to more than 100 percent. As a result, data are not comparable to the previous Baseline Study and should be interpreted appropriately. For example, 49 percent of builders representing 30 percent of new homes built reported installing CFLs in at least some homes they build, but the percentage of all new homes with CFLs is less than 30 percent and the percentage of sockets with CFLs is smaller still.

When weighted the by builder population and home volume, the incidence high efficiency lighting declines. Note that under this weighting scheme, 30 percent of the market installs CFLs as compared to 49 percent when weighted to the builder population. Again, this reflects the fact that large production builders (who are typically more cost sensitive) are less likely to adopt high efficiency lighting measures than those builders that produce fewer homes and may be better positioned to incorporate high efficiency lighting measures into their custom home designs.

The results of our in-depth interviews suggest that few builders are installing CFLs and dedicated CFL fixtures in non-ENERGY STAR homes, which contrasts somewhat with the results of the phone survey where a significant number of builders indicated that CFL bulbs and dedicated fixtures are installed in at least some new homes. This may reflect the fact that the in-depth interview sample was skewed more toward the volume builders who are generally more cost sensitive. For custom homes, builders indicated that customers are often given a lighting budget, and in these cases the choice of lighting is generally determined by the homebuyer rather than the builder.

The builders we interviewed said that availability of CFL fixtures or bulbs was not a problem, although a couple of builders did comment on the limited fixture selection. CFL performance was considered problematic for several builders we interviewed with flicker, light quality, and incompatibility with fixtures all mentioned as problems.

The reasons builders gave for not installing ENERGY STAR lighting are shown in Table 17. Builders representing 44 percent of the homes and 39 percent of builders thought that *customers did not demand it*. Others mentioned that it *adds too much to the home price* (27 percent of

builders, 24 percent of homes). *Poor light quality* was also mentioned by about 20 percent of respondents.

Table 17. Reasons for Not Installing ENERGY STAR Lighting

Reasons	Weighted to Builder Population	Weighted to Builder Population and Homes Built
Customers don't demand it	39%	44%
Adds too much to price	27	24
Poor light quality	20	20
Energy savings not enough	6	4
All homes are ES homes	5	2
Don't know	5	2
Other	10	27

Q39C. Why don't you install ENERGY STAR lighting in the homes you build? (Sample Size=63, multiple responses allowed)

Duct Sealing/Testing

Table 18 shows the percentage of builders aware of duct testing and sealing. Among all builders, 59 percent say they are aware of duct testing and duct sealing.

Table 18. Duct Testing and Sealing Awareness

Familiarity	Weighted to Builder Population
Yes	59%
No	41

Q54. Are you familiar with duct tightness testing and duct sealing for new homes? (Sample Size=120)

As shown in Table 19, approximately one-quarter (24 percent) of builders representing 37 percent of the homes built report that they have duct tests performed in at least some of the homes they build.

From the in-depth interviews, most builders said they are familiar with duct testing and sealing for new homes, but only about half of those who are familiar have testing performed on the homes they build, and most of those tend to be among the smaller builders interviewed. Builders are certainly familiar with duct sealing because sealing with mastic is explicitly required by the Washington energy code.[12] However, Washington's code does not require duct testing. Several

[12] This may explain the high frequency of duct testing responses in this question in the phone survey, as some builders may have been interpreting the question to also include duct sealing as well as duct testing. Half of the positive responses for this question came from Washington builders.

builders said they do duct tests only as required by the specific program they are enrolled in, citing ENERGY STAR as well as Earth Advantage.

Table 19. Duct Tightness Test Performed

Response	Weighted to Builder Population	Weighted to Builder Population and Homes Built
Yes	17%	21%
Sometimes	7	16
No	33	24
Don't know	3	1
Not aware of duct testing	41	38

Q55. Do you have duct tightness tests performed for the homes you build? (Sample Size=117)

The reasons builders gave for not having duct tests done are shown in Table 20. *Not required* is the top response for builders at 31 percent, followed closely by *Too expensive* at 29 percent. However, when weighted by home volume and builder population, *Too expensive* appears as more of a barrier with a weighted response rate of 43 percent.

The in-depth interviews with builders revealed that the extra cost and time involved with duct tests were the biggest barriers. Similarly, some of the HVAC contractors we interviewed felt that the duct tests were of little value and imposed an unnecessary cost on those contractors that already do high quality duct installations.

Table 20. Reasons for Not Having Ducts Tested

Reasons	Weighted to Builder Population	Weighted to Builder Population and Homes Built
Not required	31%	22%
Too expensive	29	45
Other	23	8
No problems	6	2
Time consuming	6	24
Don't know	4	3
Not worth hassle	1	16
Customers don't consider valuable	1	9
Don't know who to call	0	2
Delays in scheduling testers	0	18

Q61C. (Of those aware of duct testing) Why don't you have the ducts tested in the homes you build? (Sample Size=45)

Builder perceptions of the benefits of duct testing are shown in Table 21. Among the 26 builders aware of duct testing that have had them tested, the most common response was that there are no

benefits to the builder (mentioned by 28 percent). The other responses were split among related benefits; approximately one quarter said that it *verified the HVAC had been installed correctly* (26 percent); 25 percent of respondents also said that it helped to *catch problems before customer discovered them*; and 20 percent mentioned that the duct testing *verified that ducts do not leak*. An additional 12 percent specifically mentioned reduced callbacks as a benefit to the builder, which is one of the metrics that will be used to track program progress.

During the in-depth interviews, benefits mentioned by builders included assurance that ductwork and overall HVAC installation are done correctly and a reduction in callbacks. Other benefits cited include improved efficiency as well as reduced liability, warranty, and airflow problems. HVAC contractors we interviewed gave similar responses, citing reduced customer complaints and the assurance that ductwork was installed correctly as duct testing benefits.

Table 21. Benefits of Duct Testing and Sealing

Benefits	Weighted to Builder Population
No benefit	28%
Verification HVAC correct	26
Catch problems before customer (liability, warranty)	25
Verification that ducts don't leak	20
Reduced callbacks	12
Smaller furnace size	1
Other	19
Don't know	0

Q60C. (Of those who have had duct testing) What do you view as the benefits to the builder, if any, of duct testing and sealing? (Sample Size=26)

As we saw in Table 19, approximately one-quarter of the respondents said they have duct testing performed in at least some of the houses they build. Table 22 shows who performed the tests. HVAC contractors were the most common testers (46 percent). The next most common testers were third party consultants (35 percent). The *other* category included individuals from the Earth Advantage program, the state energy office, and a window installer.

Table 22. Who Does the Duct Testing

Duct Tester	Unweighted
HVAC contractor	46%
Third party consultant	35
Other	15
Alliance/program staff	4

Q55. (Of those who have had ducts tested) Who performs the duct testing for your homes? (Sample Size=26)

Table 23 shows that approximately one-third of respondents said their *duct testers were PTCS certified*. Most (65 percent), however, *did not know* and only 4 percent *knew their tester was not*

certified. Although the sample size for this question is small, the percentage of builders that had duct tests done by a PTCS-certified tester is relatively high given the number of testers currently available. This high response rate is due to the over-representation of program participants in the sample, as program participants accounted for 5 of the 8 respondents that said their duct testers were PTCS certified.

Table 23. Duct Testers that are PTCS Certified

Response	Unweighted
Don't know	65%
Yes, duct testers are PTCS certified	31
No, duct tester are not PTCS certified	4

Q56. (Of those who have had ducts tested) Do you know if the duct testers you use are officially PTCS certified? (Sample Size=26)

As shown in Table 24, those builders who have had their ducts tested generally report few problems. Three-quarters of the respondents either stated that they had *no problems* (52 percent) or *did not know* (22 percent). The problems that they mentioned most often included *expense* and *time*. *Other* problems included the *delay in training staff to install correctly*, *problems get caught too late in building process (testing occurs just before customer moves in)*, and *testers having equipment problems*.

Table 24. Problems with Duct Testing

Problems	Unweighted
No problems	52%
Don't know	22
Too expensive	13
Other	13
Time consuming	9
Delays in scheduling testers	4
Lack of competence w/testers	4

Q57. (For those who have had ducts tested) What are the problems, if any, with duct testing? (Sample Size=26)

Windows

Table 25 displays the types of windows that builders typically install in their new homes. As expected, *high efficiency windows* (U-value of 0.35 or less) are widely used and account for over 50 percent of the builder responses. When combined with the builders that indicated that they install *both high efficiency and standard efficiency windows*, almost three-quarters (72 percent) of builders install high efficiency windows in at least some homes. Only 14 percent of builders said they only used *standard efficiency windows.*

The market share values shown in Table 25 are consistent with estimates from earlier evaluation research performed for the Alliance's ENERGY STAR Windows Project. From the final MPER for the ENERGY STAR Windows Project, the market share for high efficiency windows (U-

value of 0.35 or less) was estimated at 57 percent in 2000.[13] For the single-family new construction market in 2000, the market share for high efficiency windows was estimated at 63 percent based on builder survey results. As shown in Table 25 using the current builder survey results, high efficiency windows are used by builders exclusively about half the time (52 percent when weighted by homes) with additional installations from the 21 percent of builders that reported installing both high efficiency and standard efficiency windows.

Table 25. Windows Installed in Non-ENERGY STAR Homes

Type of Windows	WA	OR	ID	MT	Total Weighted by Builders	Total Weighted by Builders and Homes Built
High efficiency windows (U-value of 0.35 or less)	48%	22%	59%	79%	51%	52%
Both high efficiency and standard efficiency	24	32	24	1	21	21
Standard efficiency windows	16	15	16	10	14	20
Don't know	12	22	1	10	12	8

Q48C. Which type of windows do you install in the non-ENERGY STAR homes you build? (Sample Size=120, weighted to builder population)

Table 26 shows the distribution of window efficiency in 1999 from the Baseline Report. Note that data from the Baseline Report were collected through on-site audits of newly constructed homes and are therefore not completely comparable with the current phone survey results. In the Baseline Report, the most efficient window category had a U-value less than 0.38, and the frequency of this efficiency level was relatively low for Idaho and Washington (21 percent and 25 percent, respectively). Higher rates for the U-38 or better windows were observed in Oregon (43 percent) and Montana (54 percent) in 1999. In the current 2004 builder survey, "high efficiency" was defined as a U-value of 0.35 or better, and on average 51 percent of the builders said that they used high efficiency windows in the non-ENERGY STAR homes they build. The increased adoption of high efficiency windows is not surprising given the stricter glazing requirements included in the 2002 revision to Washington's residential building code and the extensive ENERGY STAR Residential Windows program sponsored by the Alliance that effectively transformed the market for high efficiency windows in the region.

[13] *Market Progress Evaluation Report for the ENERGY STAR Windows Project (Final Report)*. Prepared by Quantec for the Northwest Energy Efficiency Alliance (January 2002).

Table 26. Window Efficiency From the Baseline Report (1998)

Window Types	Idaho	Montana	Oregon	Washington
< Class 38	21.0	54.2	43.3	25.3
Class 38-40	2.2	25.4	50.7	6.6
Class 41-46	4.9	5.6	3.8	4.8
Class 47-50	47.8	13.5	1.4	47.1
Class 51-60	24.2	0.0	0.8	16.1
> Class 60	0.0	1.3	0.0	0.1
Total	100	100	100	100

Source: *Market Research Report: Baseline Characteristics of the Residential Sector; Idaho, Montana, Oregon, and Washington.* Prepared by Ecotope for NEEA, 2001.

Appliances

The in-depth builder interviews indicate that most builders have little influence and are generally unaware of the appliances ultimately chosen by the homebuyer with the exception of the dishwasher and possibly the refrigerator. As a consequence, our appliance questions focused only on these two items. Still, one-quarter of builders said they did not know what type of dishwasher or refrigerator gets installed in the homes they build. Overall, about one-half of builders (49 percent) representing two-thirds of homes said they installed ENERGY STAR dishwashers. Refrigerators were less common with closer to one-quarter of builders having them installed.

Table 27. ENERGY STAR Appliances installed in Non-ENERGY STAR Homes

Appliances	Weighted to Builder Population	Weighted to Builder Population and Homes Built
ENERGY STAR Dishwasher	49%	62%
ENERGY STAR Refrigerators	26	27
None	20	14
Don't use	3	2
Refused	0	0
Don't know	25	20

Q42C. Which of the following types of appliances do you install in the non-ENERGY star homes you build? (Sample Size=113, multiple responses allowed)

Building Practices Summary

In summary, most of the building practices examined have shown improvement in efficiency levels since the 1999 practices reported in the Baseline Report. Many builders now offer high efficiency gas furnaces at least as an option for new homes, although it is difficult to determine if the frequency of high efficiency installations has increased significantly since 1999. Similarly, the installation of ENERGY STAR appliances and high efficiency windows appears to be more

common in new homes. Builders also appear to be more familiar with CFLs and CFL fixtures than in 1999. The increase in efficiency levels for these building components is due in part to the changes in building codes in Washington and Idaho since 1999. In addition, multiple efficiency programs sponsored by the Alliance and additional efficiency programs offered by local utilities have also helped shift the market during this period.

3.3 Builder Attitudes and Perceptions

The following tables detail builder attitudes and perceptions related to the ENERGY STAR label, energy efficiency in general, and the value that each brings to a new home. These responses will serve as the baseline for this evaluation and these same factors will be addressed in the next builder survey scheduled for late 2005.

Table 28 shows those components builders consider most influential in reducing a home's energy consumption. Both *roof insulation* and *wall insulation* were mentioned by most builders (78 percent) as being the most important component for reducing energy use. This was followed by *windows* (66 percent). Builders also mentioned *furnace* and responses relating to *AC/HVAC* as being important, but the frequency of these responses, while significant, was noticeably lower than those relating to insulation and windows. Note that only 3 percent of builders mentioned ducts as important for reducing energy consumption. As the ENERGY STAR Homes program reaches more builders and educates them on the importance of tight ducts, the frequency of this response should increase for this question.

Table 28. Most Important Components for Reducing Energy Consumption

Component	WA	OR	ID	MT	Total
Insulation roof	76%	62%	86%	90%	78%
Insulation wall	71	70	86	90	78
Windows	55	79	86	57	66
Furnace	41	21	54	34	38
AC/HVAC	0	28	15	33	16
Construction tightness	12	12	27	3	13
Appliances	2	32	3	0	8
Lighting	1	9	0	10	5
Using more gas or electric	5	9	0	0	4
Whole house design	2	2	3	11	4
Ducts	0	0	14	0	3
Water heater	1	11	0	0	3
Day lighting	0	9	0	0	2
Heat pump	0	10	0	0	2
Other (verbatim)	7	9	30	14	13

Q9. What components of the home do you consider most important for reducing home energy consumption? (Sample Size=119, unaided responses with multiple responses allowed, weighted to the builder population)

Table 29 describes builders' perceptions of a home's most important energy-saving features in 1999 as reported in the Baseline Report. The baseline uses a slightly different question format than that posed in the current builder survey and the baseline results are unweighted. Despite the difference in question format, it appears that windows have increased in importance among builders since the time of the Baseline Report. This is likely due to a combination of events occurring since the Baseline Report, including the enactment of more stringent building codes in Washington and Idaho and the Alliance ENERGY STAR Residential Windows program that promoted high efficiency windows throughout the region.

Table 29: Most Important Components Affecting Energy Use (1999)

Component	WA	OR	MT
Insulation Levels	66%	80%	67%
Windows	40	42	25
Home Design	18	15	12
Home Size	31	20	14
Framing	15	14	13
Fuel	42	26	57
Appliances	9	8	8

Q. Which of the following most affects energy performance in homes? Rate 1 to 5 scale (percentage indicating '5' for each response shown)

Source: *Market Research Report: Baseline Characteristics of the Residential Sector; Idaho, Montana, Oregon, and Washington*. Prepared by Ecotope for NEEA, 2001. (Results for Idaho not reported.)

Table 30 shows the general awareness levels among builders of the ENERGY STAR label for homes. While the ENERGY STAR Homes Northwest program was just beginning at the time of our survey, over half of the builders (56 percent) representing over two-thirds of homes were already aware of the ENERGY STAR label for homes. This includes 14 participating builders along with 61 builders that are aware of the ENERGY STAR label for homes but not participating in the program. As discussed in the market characterization section of this report, awareness of the ENERGY STAR label for homes from the Baseline Report was 17 percent among builders in 1999.

Table 30. Awareness of ENERGY STAR Homes Label

Aware	Weighted to Builder Population	Weighted to Builder Population and Homes Built	Baseline Report (1999)
Yes	56%	69%	17%
No	44	31	83

Q10. Have you ever heard of the ENERGY STAR label for new homes? (Same question in 1999 and 2004) (Sample Size=120)

We asked builders to describe the benefits of the ENERGY STAR Homes label to builders, as builder recognition of ENERGY STAR benefits is key for increasing the market for these homes. As demonstrated by their answers, many builders do not yet perceive benefits to themselves of building ENERGY STAR homes. This is not surprising given the early stage of the program. As shown in Table 31, 27 percent of builders who are aware of the ENERGY STAR label for new homes cited *product differentiation* as a benefit. *Higher quality* is mentioned generally by 16 percent of builders and the benefit to the builder of knowing the house is *energy efficient* was mentioned by 13 percent of builders. In all cases, the frequencies of responses other than product differentiation decreased when the survey results were weighted by home volume, indicating that these benefits are perceived more by those builders that build fewer (likely custom) homes.

Table 31. Benefits of ENERGY STAR Homes to Builder

Benefits	Weighted to Builder Population	Weighted to Builder Population and Homes Built
Marketing/Product differentiation	27%	48%
Higher quality	16	6
Energy efficiency	13	3
Promotion assistance	4	4
Rebate from utility	4	1
Sells faster	2	5
Higher price	0	2
Other	4	18
Don't know	42	26

Q11C. To the best of your knowledge, what do you believe are the primary benefits to the builder, if any, of building ENERGY STAR Homes? (Sample Size=74, aware of ENERGY STAR homes label)

Table 32 shows the percent of builders that agree or disagree with a series of attitudinal statements about ENERGY STAR homes. More than half of builders agreed somewhat or strongly that the ENERGY STAR label adds value and makes homes more marketable, with the strongest agreement for the statement *ENERGY STAR certified homes tend to be higher quality overall.* Builders are not yet convinced, however, that ENERGY STAR homes sell for a higher price or that they sell faster than other homes.

Builders had mixed but strong opinions about whether homes *built to code are energy efficient enough*. Almost half (47 percent) of builders either strongly or moderately disagreed with the statement, slightly less either slightly or strongly agreed (44 percent), and just 9 percent neither agreed nor disagreed. These results indicate that convincing some builders of the value of an ENERGY STAR label that is 15 percent better than code may prove challenging in some areas.

Table 32. Attitudes about ENERGY STAR Label in Marketplace

Statements	Strongly Agree (1)	Somewhat Agree (2)	Neither (3)	Somewhat Disagree (4)	Strongly Disagree (5)	Don't know	Mean
The ENERGY STAR label makes homes more marketable to home buyers	14%	48%	18%	11%	6%	4%	2.5
ENERGY STAR certified homes tend to be higher quality overall	30	21	14	20	14	1	2.7
Builders of ENERGY STAR homes enjoy a competitive advantage in the market	12	39	13	18	9	8	2.7
ENERGY STAR certified homes sell for a higher price than non-ENERGY STAR homes	9	25	21	20	12	12	3.0
ENERGY STAR certified homes sell faster than non-ENERGY STAR homes	1	32	14	32	6	15	3.1
Homes built to code are energy efficient enough	16	28	9	28	19	0	3.1

Q12. Please tell me how much you agree or disagree with each of the following statements.
(Sample Size =75, aware of ENERGY STAR label for homes, weighted to builder population)

Those builders that are aware of the ENERGY STAR label for homes but are not currently participating in the program were asked what it would take to get them to participate. These results are shown in Table 33. Just over half of the builders (53 percent) needed additional information on the program before they would be willing to begin offering an ENERGY STAR option for homes. Builders also indicated that they needed to see more demand by consumers, as reflected by the 21 percent of builders that require the ENERGY STAR standard to be cost effective and the 13 percent that need to observe more customer demand for ENERGY STAR homes before they begin offering them as an option.

Table 33. Requirements For Offering ENERGY STAR Option

Builder Requirement	Weighted to the Builder Population	Weighted to the Builder Population and Homes Built
More information	53%	51%
Cost effectiveness	21	22
Customer demand	13	9
Other	12	13
Don't know	1	4

Q21C. What would it take for you to begin offering ENERGY STAR homes as an option in the homes you build?
(Sample Size=62)

3.4 ENERGY STAR PARTICIPANT ATTITUDES

This section describes the responses from the 14 ENERGY STAR participating builders included in our survey sample. The first builder was signed up for the program near the end of April 2004 and our survey was conducted in May 2004. As a consequence, the number of participating builders available for the survey was very small. In addition, no houses had been certified through the program at the time of the survey, so the builder experience with some program elements is limited. A larger sample of participating builders will be used in the next builder survey once the program becomes more established. Despite the small sample size, the responses to these questions do provide some insights into the program at this early stage.

Regarding the ENERGY STAR certification process, Table 34 shows that 79 percent of respondents agreed that it did not delay home construction. Similarly, 83 percent of participants agreed that *Customers understand the benefits of ENERGY STAR* and 79 percent agreed that *Homebuyers link the ENERGY STAR label with home comfort and home value.* These results are not surprising among participating builders, as they have already bought into the ENERGY STAR program. One-half the participants disagreed either somewhat or strongly, however, that *Customers understand the value of duct testing and duct sealing*.

Table 34. Participant Attitudes about ENERGY STAR Label

Statements	Strongly Agree (1)	Somewhat Agree (2)	Neither (3)	Somewhat Disagree (4)	Strongly Disagree (5)	Don't know	Mean
The certification process for ENERGY STAR homes does not delay home construction	36%	43%	7%	0%	7%	7%	1.9
Customers understand the benefits of the ENERGY STAR label	21	64	7	7	0	0	2.0
Homebuyers link the ENERGY STAR label with home comfort	29	50	14	7	0	0	2.0
Homebuyers link the ENERGY STAR label with home value	21	57	0	21	0	0	2.2
Customers understand the value of duct testing and duct sealing	14	21	14	43	7	0	3.1

Q62A. Please tell me how much you agree or disagree with each of the following statements (Sample Size=14, unweighted).

Builders evaluated several facets of the program as well as the program overall, and these responses are shown in Table 35. In general, participants appear to be only moderately satisfied with the program overall. Among these early participants, 8 of the 14 (57 percent) were somewhat or extremely satisfied. Only one builder was somewhat dissatisfied overall and four others (29 percent) were neither satisfied nor dissatisfied. Suggestions for improving the program tend to focus on increasing the incentives and providing marketing support and consumer education. Note that these results represent builder experiences very early in the

program as the builder survey was conducted in May 2004, just one month after the first builder had been signed into the program and before any homes had completed the certification process.

Responsiveness of program staff received similar satisfaction ratings; half of the respondents were satisfied, about a third (36 percent) were neither satisfied nor dissatisfied, and 14 percent of the builders were dissatisfied in some way. Satisfaction with the *Certification and verification process* differed slightly from the previous statements, with one builder indicating that he was extremely dissatisfied while the majority (57 percent) was somewhat satisfied and 14 percent were extremely satisfied. At the time of the survey, however, the program had not yet certified any completed ENERGY STAR homes so it is difficult to assess satisfaction for this particular program component.

Builders reported similar levels of satisfaction in terms of *ease of participation*, *amount of paperwork required to participate*, and the *cost of participation*. The quality *of marketing support materials* and *amount of co-op advertising* were noticeably lower in satisfaction. The program had not kicked off the major portion of their effort in these areas, however, so these results reflect a baseline of participant satisfaction.

Table 35. Participant Attitudes about Program Aspects

Program component	Extremely Dissatisfied(1)	Somewhat Dissatisfied (2)	Neither (3)	Somewhat Satisfied (4)	Extremely Satisfied (5)	Don't know	Mean
The program overall (n=14)	0%	7%	29%	36%	21%	7%	3.8
Responsiveness of program staff (n=13)	0	14	36	21	29	0	3.7
Certification and verification process (n=14)	7	7	7	57	14	7	3.7
Ease of participation (n=14)	0	14	36	21	29	0	3.6
Amount of paperwork required to participate (n=14)	0	7	36	43	14	0	3.6
Cost of participation (n=14)	7	7	50	14	21	0	3.4
Quality of marketing support materials (n=12)	8	8	42	25	8	8	3.2
Amount of co-op advertising (n=11)	9	27	9	27	0	27	2.8

Q 67C. Now I am going to ask you to rate your satisfaction with each of the following aspects of the ENERGY STAR homes program… (Unweighted)

Table 36 shows which ENERGY STAR home benefits are promoted by builders to homebuyers. Not surprisingly, energy savings was promoted by most (89 percent). Improved home comfort and better resale value were also cited by multiple builders.

Table 36: Benefits of ENERGY STAR Homes Promoted by Builders

Benefits Promoted	Percent
Energy Savings	89%
Comfort	44
Resale value	22
Quality / Whole house design	22
Quiet	11
Other	11

Q64C. (Of those participating who actively promoted their ENERGY STAR Homes) What specific benefits, if any, do you promote about your ENERGY STAR homes? (Sample Size=9, multiple responses, unweighted)

Table 37 shows that only 1 builder (11 percent) out of the 9 who indicated that they actively promoted ENERGY STAR homes said that he had received outside funds for these promotions. The majority of these builders (78 percent) said that they use their own resources to promote their ENERGY STAR homes. As the ENERGY STAR Homes Northwest program reaches more builders over time, it is likely that – at least in the short term – builders will rely more on co-op funds and other promotional resources supplied through the program.

Table 37. Outside Resources to Promote ENERGY STAR Homes

Response	Unweighted
No one	78%
Receive Co-op funds	11
Other	11

Q66C. (Of those who promoted ES Homes) From whom, if anyone, do you receive any financial assistance for these promotions? (Sample Size=9, unweighted)

3.5 BUILDER SURVEY SUMMARY

The builder surveys provide information on several important trends related to builder attitudes, perceptions, and current building practices:

- **Builder awareness of the ENERGY STAR label for homes is already substantial**. Even before widespread promotion by the program, most builders are already aware of the ENERGY STAR label for homes. In our survey, 56 percent of the builders indicated that they were aware of the ENERGY STAR label for homes, which is an increase over the 17 percent builder awareness rate reported in the Baseline Report.

- **Builders do not yet perceive benefits to building ENERGY STAR homes.** Just under half of the builders are not aware of the ENERGY STAR homes label. Of those that are aware, 42 percent do not know what the benefits are of the ENERGY STAR label. Among those builders that are aware of the ENERGY STAR homes label, however, 27 percent indicated that marketing and product differentiation were the primary benefit to them of building ENERGY STAR homes.

- **There is a significant amount of installation of various high efficiency components already occurring.** For the various energy efficient home components addressed in our survey, many builders said that high efficiency was offered as an option and were installed in at least some of the non-ENERGY STAR homes they built. For high efficiency windows and appliances, over half of the builders indicated that they sometimes install these in the homes they build. Builders also had experience with high efficiency lighting, furnaces, and air conditioners, although these tended to be more common among smaller builders doing custom homes.

- **Most builders are not convinced that duct testing is beneficial.** Of the builders we surveyed, 59 percent were aware of duct testing and 24 percent said they have the tests performed in at least some of the houses they build. Among builders that are aware of duct testing, 31 percent said that they did not do duct tests since they are not required by the building code and 29 percent said the duct tests were too expensive. The perception that duct tests provide no benefit was also common and was mentioned by 28 percent of the builders.

  Despite these responses, there is a significant minority that acknowledges some benefits from duct testing. The most frequent positive response was that duct tests help catch problems before the customer does, with 25 percent of the builders aware of duct tests mentioning this benefit. Builders also mentioned that duct tests do help verify that the HVAC and ducts are functioning properly (26 and 20 percent mentioning, respectively).

- **Builders are not expressing strong positive attitudes about ENERGY STAR-certified homes**. Not surprisingly given the early stage of the program, builders do not yet have strong beliefs on the potential benefits of the ENERGY STAR label. In all of the responses to the ENERGY STAR attitudinal questions, the average response tended to reflect a middle-of-the-road response perception of the value of the ENERGY STAR label. Builders did seem to agree slightly more with the statements "ENERGY STAR homes are more marketable" (62 percent at least somewhat agree), "ENERGY STAR homes are higher quality" (51 percent at least somewhat agree), and that "ENERGY STAR homes have a competitive advantage in the market" (51 percent at least somewhat agree).

- **Early participants indicate modest satisfaction levels with the program so far.** 57 percent of the builders said that they were either extremely satisfied or somewhat satisfied with the ENERGY STAR Homes Northwest program, and suggestions for program improvement focused on increasing incentive amounts and providing more support for marketing and consumer education. This is not surprising given that builders are participating during the very early stages of the program and consumer interest in these homes is still low.

4. HOMEBUYER SURVEY

This chapter presents the results of a phone survey of more than 300 homebuyers that had purchased a newly constructed home within the last two years. The distribution of the homebuyer survey sample by state is shown in Table 38. The survey utilized a random, stratified sample with the sample quotas set by state to correspond to new home construction activity. The survey was fielded by Quantum Consulting during June 2004. (The homebuyer survey instrument is included in Appendix B.)

Table 38. Homebuyer Survey Sample

	Number of Respondents	Percent of Total Sample
WA	145	48%
OR	72	24
ID	61	20
MT	26	9
Total	304	100

Table 39 shows the survey sample by home size and price with a fairly even distribution across the sample. Approximately 75 percent of respondents claimed their homes were between 1,700 and 2,799 square feet, and the distribution within that range proved relatively equal; roughly one-fifth of respondents claimed their homes were larger than 2,800 square feet. The distribution of respondents by home price appears similar; more than three-fourths of respondents claimed their homes were priced in the $150,000 to $299,000 range, and 18 percent claimed they paid in excess of $300,000 for their homes.

Table 39. Respondents by Home Size and Price

	Percent of Total Sample
Home Size	
<1700 ft^2	25%
1700-2099 ft^2	26
2100-2799 ft^2	25
≥2800 ft^2	20
Home Price	
< $150,000	28%
$150,000-$199,999	26
$200,000-$299,999	23
≥ $300,000	18

(Sample Size = 304)

Table 40 shows the stated importance of particular home features on new home purchases. Not surprisingly, respondents claimed *price*, general *design*, *number of bedrooms*, and overall *home size* were the most influential features in their home selection. Of the remaining features included in the survey, respondents ranked a home's *energy efficient features* highest followed by the *size of the home's kitchen*, the amount of *local street noise*, and the *homebuilder's reputation*.

Table 40. Considerations in New Home Selection

Home Characteristic	Rank (average)
Price	8.7
Layout and Design	8.4
Number of Bedrooms	8.2
Overall Home Size	8.0
Energy Efficient Features	**7.7**
Size of Kitchen	7.5
Amount of Noise/Traffic on Street	7.2
Builder Reputation	7.1
Size of Yard	6.8
Commuting Distance	6.2
Schools	5.4

Q9A. Using a 1 to 10 scale where 1 is not at all important and 10 is extremely important, how important were each of the following characteristics in your selection of a new home?
(Sample Size = 304)

Table 41 reports the perceived value attributed to an energy efficient home. Most respondents viewed an efficient home as highly valuable—rated 4 or 5 on a 5-point value scale—and very few respondents claimed a home's efficiency offered little to no value. Overall, respondents gave efficient homes an average rating of 4.4, indicating that homeowners place significant value on efficiency in a new home.

Table 41. Value Of An Energy-Efficient Home

	Percent
5 Extremely valuable	61%
4	25
3	11
2	2
1 Not at all valuable	1
Mean Value	4.4

Q35. On a scale of 1 to 5, how would you rate the value of having an energy-efficient home? (1 is not at all valuable and 5 is extremely valuable)
(Sample Size = 304)

Because homebuyers were considered to be more familiar with various energy efficient home components than with the relatively new ENERGY STAR homes label, they were first asked questions related to energy efficiency before being asked about their perception of the ENERGY STAR homes. Table 42 provides the results of questions designed to determine homebuyer attitudes and perceptions toward a variety of energy efficiency issues.

As shown in Table 42, the homebuyer responses to statements relating to general efficiency levels provided some interesting results. Most homebuyers agree that *new homes are highly energy efficient*, with 47 percent somewhat agreeing and 27 strongly agreeing with this statement. Most homebuyers also agree that *most newly built homes can be made much more energy efficient*, with 72 somewhat or strongly agreeing with that statement. This indicates that homebuyers believe that there is room for improvement in terms of energy efficiency and suggests some potential demand for homes that are more efficient. Relatively high levels of agreement were also observed for statements that link energy-efficiency with home comfort and increased home value.

Table 42. Homebuyer Attitudes and Perceptions Regarding Energy Efficiency

Statements	Strongly Agree (1)	Somewhat Agree (2)	Neither (3)	Somewhat Disagree (4)	Strongly Disagree (5)	Don't know	Mean
Energy-efficient homes have lower energy bills	73%	22%	2%	0%	1%	3%	1.3
Energy-efficient homes have greater resale value	55	32	4	4	2	4	1.6
Energy-efficient homes are more comfortable than standard new homes	50	27	9	5	1	7	1.7
Most newly built homes could be much more energy-efficient	42	30	6	13	3	5	2.0
New homes are highly energy-efficient	27	47	5	13	3	6	2.1
New homes often allow heated or air-conditioned air from the inside to escape to the outside	10	33	7	20	14	15	3.0
New homes often have leaky air ducts	8	16	11	24	15	26	3.3

Q21. Please tell me how much you agree or disagree with each of the following statements. Would you say that you strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, or strongly disagree that… (Sample Size =304)

Table 43 provides a breakdown of respondents by their familiarity with the ENERGY STAR label. The vast majority (82 percent) of the homebuyers we surveyed were aware of the ENERGY STAR label from other products such as refrigerators, clothes washers, and dishwashers. While most respondents were familiar with the ENERGY STAR label for appliances and consumer goods, most new homebuyers (79 percent) were not aware of the ENERGY STAR label for new homes. Future responses to this question will be compared as a measure of program progress.

Table 43. Awareness of the ENERGY STAR Label

	ENERGY STAR label	ENERGY STAR Homes label
Aware	82%	19%
Unaware	17	79
Don't Know	1	3

Q10, Q13. Have you ever seen or heard of the ENERGY STAR label / ENERGY STAR label for Homes?
(Sample Size = 304)

Table 44 reports the share of respondents who said that they specifically looked for the ENERGY STAR label when shopping for their new home. Consistent with the general lack of consumer familiarity with the homes label, nearly all respondents—94 percent—said they did not shop specifically for an ENERGY STAR-certified home.

Table 44. Respondents Who Shopped for an ENERGY STAR Home

	Percent
No	94%
Refused	3
Don't Know	3

Q18. Did you consider an ENERGY STAR home when shopping for your new home?
(Sample=34)

Table 45 describes respondents' perceptions of the features included in an ENERGY STAR certified home. The largest groups of respondents thought certification implied better *insulation* and increased *energy savings* (39 and 35 percent mentioning, respectively). Slightly smaller groups of respondents believed that the certification would include a *high efficiency furnace* and would *save money*. Respondents thought *high efficiency windows*, improved *home positioning*, *high efficiency cooling*, *tight construction*, and *ENERGY STAR appliances* were—for the most part—equally likely to be included in certification; *CFL lighting*, *tight ducts*, and *recyclable building materials* were mentioned to a significantly lesser extent.

Table 45. Perceived Components of ENERGY STAR Certification

Component	Percent who think component is part of certification
Increased Insulation	39%
Save Energy/Efficiency	35
High efficiency furnace	26
Save Money	23
High efficiency Windows	18
House positioned to reduce energy needs	18
High efficiency cooling	16
Tight Construction	14
ENERGY STAR appliances	14
Lighting (CFLs)	4
Tight Ducts	2
Recyclable Building Materials	2

Q16. To the best of your knowledge, what does it mean if a home is ENERGY STAR certified?
(Sample Size = 57, homebuyers aware of ENERGY STAR homes)

Table 46 reports what respondents believe are the benefits of an ENERGY STAR certified home, which is closely related to the previous questions addressing the specific components required for ENERGY STAR certification. A majority of respondents—86 percent—felt a certified home would allow for *lower energy bills*; the next largest groups of respondents felt a certified home would be "Green," or *environmentally friendly* (26 percent), would have a *higher resale value* (19 percent), and *more energy efficient heating equipment* (14 percent). Equal shares of respondents recognized *improved indoor air quality*, *more energy efficient cooling equipment, more efficient building materials*, and *improved comfort* as benefits of a certified home. Only a very small share of respondents (2 percent) could not identify specific benefits.

Table 46. Perceived Benefits of an ENERGY STAR Home

Benefit	Percent who recognize benefit
Lower Energy Bills	86%
Green/environmentally friendly	26
Higher resale value	19
More energy efficient heating equipment	14
Better indoor air quality	9
More energy efficient cooling equipment	9
More efficient building materials	9
Comfort	9
Reduced draftiness	5
Other	2
Don't know	2

Q29. What do you consider to be the benefits of having an ENERGY STAR certified home?
(Sample Size = 57, homebuyers aware of ENERGY STAR Home label)

Table 47 shows homebuyer responses to various statements regarding the perceived value of ENERGY STAR homes. Note that these responses are only for those homebuyers that are aware of the ENERGY STAR label for homes and therefore represent only 19 percent of the recent homebuyers. The vast majority of homebuyers aware of the ENERGY STAR label for homes felt that ENERGY STAR homes have lower energy bills (72 percent strongly agreed and 25 percent somewhat agreed with this statement). There was also a general perception that the ENERGY STAR label adds value, with 77 percent somewhat or strongly agreeing that ENERGY STAR homes are worth more and 79 percent somewhat or strongly agreeing that ENERGY STAR homes provide additional quality. The majority of these homebuyers (56 percent) also agreed that ENERGY STAR homes are more comfortable. Finally, most of the aware homebuyers disagreed with the statement that the ENERGY STAR benefits were hard to understand, with 51 percent strongly disagreeing and 33 percent somewhat disagreeing with that statement.

Table 47. Homebuyer Attitudes and Perceptions Regarding the ENERGY STAR Homes Label

Statements	Strongly Agree (1)	Somewhat Agree (2)	Neither (3)	Somewhat Disagree (4)	Strongly Disagree (5)	Don't know	Mean
ENERGY STAR homes have lower energy bills.	72%	25%	2%	0%	2%	0%	1.4
ENERGY STAR homes are worth more.	49	28	9	5	2	7	1.7
ENERGY STAR homes provide additional quality.	46	33	9	5	4	4	1.8
ENERGY STAR homes are more comfortable than standard new homes.	28	37	16	7	2	11	2.1
Most new homes are highly energy-efficient even if they are not ENERGY STAR homes.	19	44	7	19	4	7	2.4
ENERGY STAR home are hard to find.	19	26	12	16	9	18	2.6
It is hard to understand the benefits of ENERGY STAR homes.	4	9	4	33	51	0	4.2

Q21. Please tell me how much you agree or disagree with each of the following statements. Would you say that you strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, or strongly disagree that… (Sample Size =57)

Table 48 reports shares of respondents with ENERGY STAR certified appliances and fixtures. The largest shares of respondents reported that their *refrigerators, dishwashers, clothes washers, windows*, and *furnaces* were ENERGY STAR. *Light fixtures* were the least likely of all household items to be ENERGY STAR and were also most likely to be identified as "unknown" when respondents considered the efficiency of their appliances. In the case of both *windows* and *furnaces*, half of the respondents said the features were ENERGY STAR, and most of the remaining half said they did not know the appliance efficiency.

Table 48. New Home ENERGY STAR Features

Appliance	Percent who say appliance is ENERGY STAR			
	Yes	No	Don't Know	Don't Have Appliance
Clothes Washer	53%	28%	19%	N/A
Refrigerator	67	18	14	N/A
Air Conditioner	24	6	27	44
Dishwasher	57	15	28	0
Lighting Fixtures	18	28	54	0
CFL Bulbs	30	8	15	47
Furnace	50	14	32	4
Windows	51	9	40	N/A

Q27. Is your <appliance> ENERGY STAR?
(Sample Size = 249)

Finally, after listening to a marketing-oriented description of an ENERGY STAR home,[14] homebuyers were asked if they would be willing to pay any additional amount for an ENERGY STAR-certified home. While these types of stated preference questions are notoriously unreliable for estimating exact willingness-to-pay values, the general responses to this question do provide information on the overall willingness of homebuyers to pay at least some premium for an ENERGY STAR home. This result is encouraging, as both builders and realtors have expressed concern that consumers may not be willing to pay more for an ENERGY STAR home.

Table 49 shows the willingness to pay responses for an ENERGY STAR home. Among recent homebuyers, 36 percent indicated that they would not pay any premium while 17 refused to answer or did not know how much extra they would pay. Some homebuyers stated that they would be willing to pay a premium, however, with 7 percent saying they would pay a thousand dollars or less and 17 percent saying they would pay an additional $1,001-$5,000. An additional 14 percent said they would be willing to pay a premium of $5,001-$10,000 and 9 percent said they would be willing to pay more than $10,000 for an ENERGY STAR home. Not surprisingly, the willingness-to-pay for ENERGY STAR tended to increase with the original home price among the homebuyers in the sample. On average and including those that would not pay any premium, average incremental willingness-to-pay for an ENERGY STAR home is $5,710 among recent homebuyers.

[14] The following is the description of an ENERGY STAR home provided during the homebuyer survey: "The Energy Star Label is awarded to homes that have been certified to be 15 percent more energy efficient than required by state law. As a result, ENERGY STAR-certified homes are more comfortable because they are less drafty and have better indoor air quality. These homes also require lower maintenance due to the tight construction, and independent testing required to earn the ENERGY STAR Label. Buyers of ENERGY STAR homes also enjoy lower energy bills because the homes are constructed with high efficiency heating and cooling systems, appliances, and windows."

Table 49. Premium Homebuyers Willing to Pay for ENERGY STAR Home

Dollars	Percent Response	Average Premium	Average Home Value
$0	36%	$0	$196,579
<$1,000	7	295	184,722
$1,001-$5,000	17	4,054	198,370
$5,001-$10,000	14	9,378	222,297
>$10,000	9	29,896	306,250
Don't know/Refused	17	0	213,587
Mean		$5,710	$213,569

Q37B. Considering the home you just purchased, please tell me how much more, if anything, you would have been willing to pay if your home had been an ENERGY STAR home, and included all the features and benefits I just described. (Sample Size=266)

Homebuyer Survey Summary

The following are key findings from the homebuyer survey:

- **There is already significant awareness of the ENERGY STAR label for homes.** Among recent homebuyers, 19 percent said that they were aware of the ENERGY STAR label for homes. However, none of the homebuyers in our sample looked for an ENERGY STAR label when making their home purchase.

- **Energy efficiency is considered an important feature of a new home**. On a 1 to 10 scale, energy efficiency had an average rating of 7.7, indicating that this is considered at least somewhat important among new homebuyers. Not surprisingly, energy efficiency did rate lower than traditionally important factors such as price, number of bedrooms, home layout, and home size. In a related question, 61 percent rated energy efficiency as "extremely important" for a new home.

- **The ENERGY STAR home label is linked primarily to lower utility bills.** The vast majority of homebuyers who were aware of the ENERGY STAR Homes label (86 percent) said that the ENERGY STAR label meant lower utility bills. Other responses included that the home was environmentally friendly (26 percent) and would have higher resale value (19 percent). Other potential benefits such as improved comfort and indoor air quality were only mentioned by 9 percent of the homebuyers.

- **Consumers do not believe that ENERGY STAR benefits are difficult to understand.** When asked if the benefits of the ENERGY STAR home label were difficult to understand, 51 percent strongly disagreed with this statement and 33 percent somewhat disagreed with this statement.

- **Homebuyers appear to be linking the ENERGY STAR label with home quality and value**. Among homebuyers already aware of the ENERGY STAR label for homes, 46 percent strongly agreed and 33 somewhat agreed that ENERGY STAR homes are of

higher quality. Similarly, 49 percent strongly agreed and 28 somewhat agreed that ENERGY STAR homes are worth more. This finding is consistent with the underlying program theory that leveraging the existing ENERGY STAR brand will accelerate consumer acceptance of ENERGY STAR homes. These questions were only asked of recent homebuyers that were aware of the ENERGY STAR home label, however, and responses therefore reflect only a small part of the overall home market (19 percent).

- **Homebuyers may be willing to pay a premium for an ENERGY STAR home.** Homebuyers indicated that, on average, they would be willing to pay an additional $5,700 if the home were ENERGY STAR certified. While these types of willingness-to-pay stated preference questions are notoriously imprecise for developing specific estimates, the generally positive response to this question suggests that homebuyers in the mid- to high- price range would be willing to pay at least some premium for an ENERGY STAR home. This conclusion is supported by the homebuyer opinions regarding energy efficiency and a home's resale value and overall home quality.

- **New homes can be made more energy efficient**. The majority of homebuyers surveyed indicated that new homes could be more energy efficient, with 42 percent strongly agreeing and 33 somewhat agreeing with this statement. Interestingly, there appears to more agreement on this issue among homebuyers than among builders, where 16 percent of the builders strongly agreed that homes built to code are energy efficient enough and 28 percent somewhat agreed with this statement.

5. MARKET ACTORS

This chapter reports the findings from 23 in-depth interviews with market actors targeted by some aspect of the ENERGY STAR Homes Northwest program. For this report, we focused the market actor interviews on realtors, HVAC contractors, and lighting distributors in order to provide an additional perspective on key practices and market conditions for lighting, heating and cooling, and the general demand for energy efficiency in the new homes market.[15]

Table 50 shows the sample distribution across states for each of the market actor categories included in this evaluation. For these interviews, we generally talked with larger companies as they represent a greater share of the market. We also attempted to conduct interviews with market actors in each state covered by the program.[16]

Table 50. Market Actor Interview Sample

	Realtors	HVAC Contractors	Lighting Distributors
WA	5	1	2
OR	2	2	1
ID	2	1	0
MT	2	4	1
Total	11	8	4

Summaries for the realtor, HVAC contractor, and lighting distributor in-depth interviews are provided below and detailed results form the builder in-depth interviews are included in Appendix A. Key findings from the builder in-depth interviews and some of the other market actor interviews were incorporated with the builder phone survey results discussed earlier.

5.1 REALTORS

During September of 2004, we interviewed Northwest realtors to determine the influence of energy efficiency in real estate sales and, more specifically, to evaluate perceptions and opinions of the ENERGY STAR Homes Northwest program. We selected 11 realtors—5 from Washington, 2 from Oregon, 2 from Idaho, and 2 from Montana—who sold at least some new homes for mid-size realty companies.

Marketing arrangements for Northwest homes appear consistent across builders and realtors. Although different companies sold homes for different numbers of builders, all realtors claimed

[15] In-depth interviews were also conducted with builders, but most of the key findings from these interviews were incorporated in the previous Builder Survey chapter. To avoid repetition, the detailed builder in-depth interview results are included as Appendix A rather than part of the main report.

[16] For lighting, we were unable to recruit any distributors located in Idaho, but the distributor we interviewed in Washington also served the Idaho market.

they could sell for any builder, and some builders and realtors are informally allied to simplify the sales process. While all realtors handled marketing for their respective builders, not all realtors actually paid for advertising; in some cases, builders forgo some part of their sales commission to support a marketing fund, and in others, realtors pay part of their commission back to builders who in turn purchase advertising. Across all financing arrangements, however, the Internet proved to be the preferred advertising vehicle for all agents; other frequently mentioned advertising media included outdoor signs, real estate ads, and local newspapers, with model homes and sales brochures also used to promote homes.

Realtors' perceptions of energy efficiency issues were largely consistent. Of the 11 agents interviewed, 5 believed insulation (in the roof and walls) was the most important factor in determining a home's energy efficiency, and 4 agents believed efficient windows were most important. (In a majority of cases, an agent who claimed insulation was the most important claimed windows were second most important, and vice versa.) Overall, this trend reflects a belief that a home's exterior construction—and its ability to limit heat loss—most affect its relative efficiency. Further, some agents suggested that efficient insulation and windows have come to be part of the buyer's standard expectations for a new home. While other features such as efficient lighting and appliances were thought to be important, agents felt these elements were more in the buyer's control and thereby less of a factor in general efficiency considerations.

Realtors were not universally familiar with the ENERGY STAR program. Of those agents who claimed to have heard of the program, only one—a Washington realtor—had actually sold an ENERGY STAR home. Others—whether or not they had heard of the program itself—associated the ENERGY STAR brand with various consumer products, and most of those who had heard of the program expected that the advantages of selling ENERGY STAR-certified homes would outweigh disadvantages. Potential disadvantages mentioned by realtors included increased home costs and a perception that indoor air quality would be reduced due to homes being built too tight under ENERGY STAR specifications. Nonetheless, realtors mostly agreed that certified homes would be more marketable than non-certified homes and might sell faster *provided that* prospective buyers were sufficiently familiar with the ENERGY STAR Homes Northwest program specifications and benefits. Realtors also claimed they would actively promote an ENERGY STAR home as such but again suggested that the extent of promotion—and the extent to which the promotion would influence the buying public—would depend on the agent's ability to demonstrate verifiable cost savings. While realtors saw other benefits to the buyer associated with a certified home, reduced utility costs were universally viewed as the program's most salable benefit.

A majority of realtors said brochures and other promotional materials—those that give the homebuyer a clear, "dollars and cents" explanation of program features and expected benefits—would be helpful in the sales process for ENERGY STAR homes. Many claimed realtor-oriented training on selling the features would also be helpful but again seemed to emphasize the influence of tangible evidence in the sales process. At one extreme, several realtors claimed buyer-oriented literature would be sufficient to sell the homes while another claimed—based on his experience with a different efficiency program—that literature is, in many cases, overwhelming and therefore ineffective for some buyers. Nonetheless, almost every agent claimed that some sort of regional marketing campaign—funded by either ENERGY STAR itself or other utilities—would be critical to the buyer awareness required for effective sale. Given that

builders make the initial investment in efficient homes, some agents suggested that the program first focus on builder awareness and incentives; however, many felt the initial investment would not necessarily guarantee a return in higher home sales price:

- "…[the label may add] between $1,000 and $5,000, but it depends on how well you can show the consumer how much he will save and how quickly the savings are recovered."
- "…[the increase in value] depends on the amount of savings the label would imply and how long the savings would last. Most people stay in a house for 3-5 years only."
- "…buyers are willing to pay $2,000 to $3,000 more based on their perception of monthly savings over the first few years, but unless ENERGY STAR can prove and document a major technical advance that reduces costs, you can't add too much to the value."
- "…[the label might yield] a 1 percent difference – not much. If prices were the same, buyers would pick an ENERGY STAR home."
- "…people really only care if they can afford their monthly [mortgage] payment. Most times people are not thinking about the costs of running a house when they buy it—most just want to buy it for other reasons so unless the energy difference is big enough, other factors will matter more."

Ultimately, an Idaho agent's comment summarizes the realty community's opinions and perceptions of energy efficiency and, more specifically, the ENERGY STAR program:

"If it's going to save money and last long enough, the program would be worthwhile to look at. Everyone's looking for something that improves quality without costing more."

5.2 HVAC CONTRACTORS

For our HVAC contractor interviews, we conducted eight interviews in June 2004 with contractors from each of the four states covered by the program (see Table 50). Contractors were recruited using contact information contained in Dun and Bradstreet data. Due to the small sample, we attempted to recruit larger HVAC contractors as they were more likely to be familiar with the new home construction market.[17] The instrument (included in Appendix B) used for the interviews was relatively open-ended to provide contractors an opportunity to explain and expand upon their statements. All of the HVAC contractors interviewed do both new and retrofit installations, and all focus almost exclusively on single-family homes.

Overall, the results of the interviews indicate that HVAC contractors of all sizes have only passing familiarity with the ENERGY STAR program. About half know that high efficiency equipment is required, but do not know the specific requirements of the current program (e.g., they think 12 SEER is the AC efficiency requirement). Moreover, their experience with specific

[17] The very small HVAC contractors were assumed to be more involved with retrofits and repair rather than with new construction and therefore would have a more limited perspective for the purposes of this evaluation. The small contracting outfits also tend to have less time to devote to interviews and consequently are more difficult to recruit.

program requirements – notably duct testing – is limited, with only two of the interviewed contractors ever having a duct installation tested. Contractors show only mild interest in training or other assistance that would make them more knowledgeable about the ENERGY STAR program; most say that what is needed is advertising or other marketing to raise consumer awareness and promote demand.

Contractor Characteristics and Role

The number of residential HVAC systems installed by respondents over the past year ranged from 30 to 450. On average, about 60 percent of these installations were new homes, a higher proportion than is typical, in part because contractors in all four states reported a strong new construction market in their area. Single-family homes predominate, accounting for more than 95 percent of installations.

Gas furnaces are the most common equipment installed, accounting for about 80 percent of all heating equipment. Heat pumps represent about 5-10 percent of heating equipment, with one or two contractors noting that they install a few ground source heat pumps or heat pumps that use well water for cooling. Boilers, either as conventional baseboard or radiant heating systems, account for about 10-15 percent of heating systems. Several contractors in Montana noted that boilers in general and radiant heating systems in particular are becoming more popular with buyers, particularly in colder climates.

The percentage of installations that include air conditioning ranged from less than 5 percent for one Washington contractor to 95 percent for a respondent in Idaho, with most other contractors noting that about 40-60 percent of new homes have air conditioning. One Oregon respondent said he uses gas furnaces if central cooling is not desired; heat pumps if it is. All of the contractors except one that specializes exclusively in hydronic systems say they do all their own ductwork installations.

Contractors who do larger volumes of new construction work on production homes were more likely to say that they work with the builder to select mechanical equipment, while those who do fewer projects and generally work on custom homes were more likely to say they work directly with the homebuyer. Contractors work for multiple builders, and most builders tend to work with one or two contractors. One respondent said that "About 90 percent of the builders we work for use us exclusively; maybe 10 percent are looking for the lowest price."

Contractors said they typically offer buyers a range of options – either directly or through the builder. "We try to give them options based on what they have to spend and what they want," said one contractor. There appears to be little direct specifying of equipment by builders or their engineers. "If there is a spec," one said, "it's usually worthless and gets ignored. But at least 90 percent of the time there is no spec sheet and they leave it to us."

Equipment Efficiency

The percentage of high efficiency systems installed by contractors varies widely.

- At the low end, one Idaho contractor said "Less than 5 percent of furnaces are high efficiency. It costs about $500 more for a 90 percent AFUE model, and most customers

don't want to spend that." A Bellingham Washington contractor reported only about 30 percent high efficiency heating systems.

- On the other hand, several contractors say they install 90 percent AFUE furnaces almost exclusively. An Oregon contractor said all but 10 percent of systems were high efficiency, because "there's a $350 tax credit in Oregon for variable speed drives on the air handler," while a contractor in Montana said he has installed nothing but 90 percent plus systems for the past several years. The same Oregon contractor stated that "cost differences are minimal for furnaces because high efficiency is cheaper to install (several hundred dollars less) because you can use just a PVC vent instead of a high temperature flue."

- For boiler installations, high efficiency condensing boilers appear to be growing in popularity, with two contractors who install significant numbers of boilers noting that about two-thirds of those they install are high efficiency condensing models.

- Air conditioning systems are largely standard efficiency, with 12 SEER systems accounting for 10 percent or fewer of installations. A number of contractors noted that cooling loads are relatively light, and high efficiency AC systems have too long a payback period. A single Oregon contractor who reported installing 50 percent 12 SEER plus cooling systems said he did so because of the high efficiency heat pumps he sold using the Oregon tax credit. Even then, he said, he sells the variable speed fan systems on comfort rather than on energy savings.

Awareness/Knowledge/Participation in ES Homes Program

All of the contractors we spoke to were familiar with the ENERGY STAR program and the ENERGY STAR logo, but only five of the eight were aware of an ENERGY STAR new homes program. Several noted that the furnaces or boilers they install carry the ENERGY STAR label. Three of those who had heard of the ENERGY STAR homes program said they heard of it through their equipment suppliers. An Idaho contractor said several employees had gone through training for the Idaho GemStar program.

Only a single contractor said that they "had done an ENERGY STAR home for a BPA employee who was retiring." None of the others had installed HVAC for an ENERGY STAR home.

Of the five contractors who knew about the ENERGY STAR program, one said he did not know what the requirements were while four identified high efficiency equipment as a program requirement, with three of these citing 90 percent AFUE and 12 SEER as the program minimum. The fourth contractor who knew about the program said he only does hydronic systems and did not know the specific requirements for boilers. In addition to equipment, three respondents cited duct sealing and two cited mechanical ventilation systems.

Contractors who were at least somewhat familiar with the ENERGY STAR program did not think that the requirements would pose significant technical challenges, but they did think the duct testing and ventilation requirements in particular would add to the complexity and cost of the HVAC installation. Estimates of this additional cost ranged up to $4,000:

- "Without the test, probably about $500 just in labor and small amount of material. And if we were doing the test, another $100-150."

- "It probably would add $4000 additional for an ERV and HRV in addition to the existing system."

- "As far as the high efficiency equipment the cost isn't that much more. The additional expense would come in the testing. To the guys who are doing it (the HVAC installation) right that would be worthless. Plus having certified testers come here would cost a lot; they'd have to travel here."

HVAC contractors generally knew about duct sealing and testing, but only two had ever had homes tested. One of those noted that the duct testing (for the ENERGY STAR home mentioned above) had been done by an out-of-town firm and said that his own company had been approached about becoming PTCS certified. He had declined, however, stating "I don't want to put a shadow on my relationship with the customer."

A few respondents recognized benefits to builders and homebuyers from testing, generally the assurance that ductwork had been installed properly. Several noted, however, that benefits to the contractor were minimal if they were already doing a good job, and that those contractors whose work needed testing would be least likely to have it done. Both the cost and time associated with duct testing were seen as significant drawbacks. Comments regarding duct testing included:

- "That (the benefit from testing) would depend on who installed it. I've seen a lot of people do really nice work and other guys who just do it fast as they can. Testing would hold them accountable."

- "Benefits are energy savings and comfort. The primary disadvantage would be that the full envelope might be having an issue -- could be insulation, windows-- but mechanical will get a black eye even if the problem is something else."

- "I know guys who used to work in WA where they required it and it was just a lot of extra work."

- "There were no benefits really on the home where we did it (testing) because all the ductwork was in the basement; it would have helped with ducts in unconditioned space. The big disadvantage is all the expense; it probably added 15-20 percent to the cost of the HVAC system."

- "We want a satisfied customer. If tightening ducts gets us fewer complaints, that's good for us."

- "Duct testing doesn't provide much benefit or prove much. If it's an attic or uninsulated crawl space, I can see that, but it usually is not."

When asked what kinds of assistance would help them market or install ENERGY STAR qualifying HVAC equipment, most contractors cited consumer education as the primary need, as reflected in several of their comments.

- "They have to educate the consumer; the lion's share don't understand it."
- "Public awareness to the home buyer would be most helpful."
- "There needs to be a push to educate the consumer and along with that have hard numbers on how much it (the ENERGY STAR package) would save."
- "They need to be clear about what exactly the ENERGY STAR label means. I've seen that on heat pumps, but when you install those in our area, it's very wasteful."

In addition, several builders were not aware of any ENERGY STAR options that incorporated hydronic heating and suggested a more explicit focus on hydronic heating and on specs more suited to northern Montana's cold climate.

- "I'd like to see an ENERGY STAR standard for homes that have hydronic heating systems in general and radiant heating systems in particular."
- "I've heard about Super Good Cents houses being too tight and creating sick buildings. I install heat recovery ventilators. In our area, Heat Recovery Ventilators will work; Energy Recovery Ventilators won't. Super Good Cents keeps suggesting Energy Recover Ventilators, because the specs are written in Pennsylvania. ENERGY STAR would need a local spec that works for our area."

While only two of the contractors said they would be interested in attending training on ENERGY STAR, several others said they were open to finding out more about the program, particularly if there were going to be an effort to raise customer awareness and create a demand among homebuyers.

5.3 LIGHTING DISTRIBUTORS

In September 2004, we conducted four in-depth interviews with lighting distributors to get their perspective on issues relating to the ENERGY STAR Homes Northwest program. Distributors were recruited using Dun and Bradstreet data and a contact list supplied by Ecos Consulting, the firm conducting the lighting market activities for the Alliance's Residential Sector Initiative. Since we were only conducting four interviews, we focused our recruiting on the larger distributors to ensure that the distributors selected covered the four states targeted by the ENERGY STAR Homes Northwest program. All of the lighting distributors interviewed had strong residential exposure and all carried ENERGY STAR lighting products. Three of the companies had showrooms for their lighting and one was strictly a distributor.

As a portion of their total lighting related sales, the types of lighting were between 60 and 90 percent incandescent. Compact fluorescents were less than 5 percent for each respondent. Fluorescent tubes, however, ranged from 3 to 10 percent. Other lighting equipment such as

photosensors and other controls were marginal (1-2 percent). Halogen accounted for up to 10 percent and mostly for outdoor use.

One of the main comments we received from lighting distributors was that the styles are not yet in the market to fully equip a house with ENERGY STAR approved lighting. They can usually get one or possibly two lines of fixtures that are ENERGY STAR, but that does not provide enough options for customers to meet their design needs.

The respondents with showrooms said their salespeople had a lot of influence on the type of lighting installed in new homes. One distributor suggested that he would like to train his showroom salespeople to push the ENERGY STAR fixtures more. Otherwise, most said the homeowner coming in had a lot of influence, although one mentioned that the builder as having at least equal influence on the lighting decisions.

Distributors were asked about what type of lighting they typically recommended and we received a range of responses. One distributor said that they suggest ENERGY STAR for everyone, while one said they only recommend ENERGY STAR sometimes but could do so more often. Another distributor said he pushed the fixtures if the customer shows interest. The other distributor mentioned that they do not suggest ENERGY STAR because they are dealing with high-end residential customers and the current lighting lacks the controls desired by that market.

None of the lighting professionals knew the precise specifications for lighting in an ENERGY STAR home. Most assumed that it included different ceiling and wall fixtures, and some mentioned exterior fixtures, while none mentioned CFLs specifically. When the 50 percent requirement was explained, there were a few concerns for their business. Price was mentioned as a problem for one distributor in order for the requirement to fit within a typical lighting budget. Lack of selection was also mentioned as a concern. One distributor said that given the way the rebates worked, it was very difficult to quote prices for ENERGY STAR lighting because the rebates were limited. If the rebates run out, they are forced to sell the lighting at too low a price so they tend to keep their prices high even with the rebates they receive.

Regarding specific problems with the equipment, one mentioned lack of controls for most models, particularly the lack of dimmers. In general, the distributors we interviewed are hoping to see more variety and stylish lamp and fixture options from the manufacturers.

The respondents generally recognized the need to increase consumer demand so that salespeople (if they have a showroom) do not have to sell to a blind market. Also, one mentioned the need to be more honest about the lamp brightness so that this is not misrepresented to the buyer. One respondent with a showroom definitely thought the ENERGY STAR lights provided much more light in the display and thought the light was much better. One distributor said that there needs to be more incentives built into the sales arrangements with the showrooms. That is, they need to be able to compete with incandescent fixture sellers who give commissions for sales of their product.

5.4 MARKET ACTOR INTERVIEW SUMMARY

The following are the key findings from our interviews with the market actors:

- **HVAC contractors are generally unconvinced of the benefits of duct testing.** HVAC contractors we talked were generally aware of duct testing, but only two had ever had homes tested. Several noted that benefits to the contractor are minimal if they are already doing good work, and that those contractors whose work needed testing the most would be least likely to have it done. Both the cost and time involved were seen as significant drawbacks to duct testing.

- **Benefits need to be clearly expressed to homebuyers if ENERGY STAR homes are going to command a premium price**. Realtors said that the an ENERGY STAR home might be able to sell at a premium price, but homebuyers will only pay this premium if they understand the benefits they are paying for. The payback period for energy savings was also considered important, as homebuyers often do not stay in homes more than a few years. HVAC contractors also said that the more moderate climate in western Oregon and Washington increases payback periods for high efficiency air conditioners and furnaces and thus makes them less attractive to homebuyers. Both realtors and HVAC contractors stressed the need for a regional marketing effort to help homebuyers understand the ENERGY STAR home benefits before demand for these homes would increase.

- **Lack of lighting options is a potential barrier.** Lighting distributors mentioned that the lack of dimmable CFLs and limited selection of more stylish lamp and fixture options are potential barriers for ENERGY STAR LIGHTING in some applications. Distributors also echoed the need to increase consumer demand for ENERGY STAR lighting so that lighting sales staff do not need to convince customers of the potential benefits.

6. EVALUATION CONCLUSIONS AND RECOMMENDATIONS

The following general conclusions are drawn from the data sources and analysis presented in this report:

- **Builders are beginning to believe in the marketing advantages of the ENERGY STAR homes label.** As of November 2004, 100 builders had enrolled in the program and 2,354 ENERGY STAR homes had been committed. These numbers indicate that builders are beginning to see the marketing potential of the ENERGY STAR label for homes. This conclusion is supported by the builder survey results, where marketing and product differentiation were the most common benefits cited among builders that were aware of the ENERGY STAR label for homes. Builders aware of the ENERGY STAR homes label also agreed that the ENERGY STAR label made homes more marketable, with 62 percent of builders strongly or somewhat agreeing with this statement. In a similar question, 51 percent of builders either somewhat or strongly agreed that ENERGY STAR homes have a competitive advantage in the market.

- **Gaining acceptance of the duct testing requirement will likely be a significant challenge for the program**. Of the builders we surveyed, 41 percent were unaware of duct testing. Of builders that are aware, the perceived high cost of duct tests was mentioned by 29 percent as the primary reason for not having duct tests done. An additional 31 percent of the builders said that they did not do duct tests since they are not required by the building code. The most frequent response to the question regarding duct test benefits was "No benefit", cited by 28 percent of builders and only 3 percent of builders mentioned ducts as an important component for reducing home energy consumption. Similarly, HVAC contractors indicated that duct tests were expensive, time-consuming, and often unnecessary.

  Despite the general lack of perceived duct test benefits, some do consider duct testing beneficial. When asked about duct test benefits, 25 percent of builders aware of duct testing said that the tests catch problems before the customers do and 15 percent mentioning reduced callbacks. Builders also mentioned that duct tests help verify that the HVAC and ducts are functioning properly (26 and 20 percent, respectively).

- **Builders are not expressing strong agreement on the potential ENERGY STAR benefits**. Not surprisingly, builders do not yet have strong beliefs on the potential benefits of the ENERGY STAR label. In all of the responses to the ENERGY STAR attitudinal questions, the average response tended to reflect a middle-of-the-road attitude in terms of the perceived value of the ENERGY STAR label. Builders did seem to agree slightly more with the statements "ENERGY STAR homes are marketable" (62 percent at least somewhat agree), "ENERGY STAR homes are higher quality" (51 percent at least somewhat agree), and that "ENERGY STAR homes enjoy a competitive advantage in the market" (51 percent at least somewhat agree).

- **Consumers appear to be receptive to ENERGY STAR homes and their benefits.** When asked if the benefits of the ENERGY STAR home label were difficult to understand, 84 percent of the homebuyers either moderately or strongly disagreed with

this statement. This finding is encouraging given that builders and realtors both consider homebuyer education as critical for the future development of the ENERGY STAR homes market.

Among homebuyers already aware of the ENERGY STAR label for homes, 79 percent either moderately or strongly agreed that ENERGY STAR homes are of higher quality. In addition, 77 percent either moderately or strongly agreed that ENERGY STAR homes are worth more. While these initial numbers are encouraging, they represent only those homebuyers that are aware of ENERGY STAR homes (19 percent of homebuyers) and therefore are only a small share of the overall population.

- **Homebuyers may be willing to pay a premium for an ENERGY STAR home. When homebuyers were presented with a marketing-oriented statement about the benefits of ENERGY STAR certified homes,** they indicated that on average, they would be willing to pay an additional $5,700 for an ENERGY STAR certified home. While these types of willingness-to-pay stated preference questions are notoriously imprecise, the generally positive response to this question does suggest that homebuyers would be willing to pay at least some premium for an ENERGY STAR home once they understand and believe all the associated benefits. This conclusion is supported by the homebuyer opinions regarding energy efficiency and a home's resale value and overall home quality. Realtors we interviewed also indicated that ENERGY STAR homes may sell for a higher price but only if the added benefits are clearly communicated to homebuyers.

- **Consumers believe that new homes can be made more energy efficient**. The majority of homebuyers we surveyed indicated that new homes could be more energy efficient, with 42 percent strongly agreeing and 33 somewhat agreeing with this statement. Interestingly, there appears to be more agreement on this issue among homebuyers than among builders, where 16 percent of the builders strongly agreed and 28 percent somewhat agreed that homes built to code are energy efficient enough.

- **The ENERGY STAR lighting requirement may also pose a significant challenge for the program.** While most builders we interviewed had some experience with ENERGY STAR lighting, some expressed concern about the lighting requirement for the program. In particular, volume builders are very cost sensitive and the higher costs associated with ENERGY STAR lighting can be prohibitive for this market. These concerns were echoed by lighting distributors who also mentioned the higher cost and both a lack of fixture selection and dimmable CFL lamps as potential problems in the new homes market.

The following recommendations are based on the above findings:

- **The Program should consider how to shift builder attitudes and awareness regarding duct performance testing.** Most builders do not understand that there are issues with duct efficiency and do not perceive the value of duct testing for themselves or their customers. Only 3 percent of builders surveyed mentioned ducts when asked what components of the home they considered most important for reducing home energy

consumption. Builder marketing efforts should promote the critical importance of duct efficiency to whole home energy efficiency.

- **Consider how to better educate builders on the costs and availability of CFLs.** Builders expressed some concern about these issues in the builder survey, with some volume builders indicating that the bulbs were too expensive. In addition, lighting distributors mentioned the extra cost and a lack of availability for some applications. Increased education and marketing on product availability and the long-term value of ENERGY STAR lighting should help alleviate some of these issues. Promoting high-quality new products as they become available, particularly in those applications where availability has been an issue (such as dimmable fixtures or smaller fixtures where CFLs currently do not fit), should also benefit the Program.

- **Incorporate findings from the homebuyer survey into Program marketing efforts to builders.** Key results from the homebuyer survey include:

    - Homebuyers' high awareness of the ENERGY STAR label (82 percent)

    - Homebuyer stated willingness to pay $5,700 more, on average, for an ENERGY STAR home

    - Homebuyer perceptions that new homes can be made more efficient (75 percent agree)

  These homebuyer survey results are in contrast to some of the findings from the builder survey, where many builders indicated that homes built to code are efficient enough and lack of consumer demand was commonly given as a reason for not building more energy efficient homes. Using the homebuyer survey results in the marketing of the program to builders should help correct these misperceptions.

- **Approach Multiple Listings Services (MLS) about including ENERGY STAR designation in the listing information.** With several large-scale prominent builders participating in the program and compelling data regarding consumer recognition of the ENERGY STAR label and the potential value placed on an ENERGY STAR home, MLS may be willing to begin including this information in its listings.

APPENDIX A: BUILDER IN-DEPTH INTERVIEW RESULTS

As discussed above, we conducted in-depth interviews with 20 builders as part of this evaluation. While much of this information was combined with the builder phone survey results, additional information on perceptions and attitudes was obtained from builders as part of these interviews. The results of these more detailed discussions with builders are presented in this section.

Table 51 shows the sample distribution by state for the in-depth builder interviews.

Table 51. Builder In-Depth Interview Sample

	Builders
WA	6
OR	9
ID	3
MT	2
Total	20

The instrument used for the builder interviews was the same as that used for the phone survey; however, the interviews provided more opportunity for builders to explain and expand upon their statements. As a result, the analysis presented here is more qualitative in scope and includes verbatim comments to give the reader a sense of key builder perceptions and practices. For each comment, both the number of homes built by the respondent and his or her state are presented.

Builder Characteristics

The number of homes built in 2003 for interviewed builders ranged from 5 or 6 to more than 1,200, for a total of over 4,500 homes for the 20 interviewed builders. Washington and Oregon builders were the largest, while those in Idaho and particularly Montana were generally smaller.

Price range also varies widely. The builders interviewed included both custom builders and large-scale production builders, and prices ranged from $84,000 to more than $1 million. Typically, however, production builders offer homes to “move-up” buyers, with price ranges of $175-250,000 commonly cited. The vast majority of homes are single family detached; only 6 percent of homes were either attached or multifamily. Comments include:

- The range is from $100-500,000 plus, but "typical" is a little over $200,000. (100 homes, ID)
- The price depends on the development (500 homes, OR)
- We do non starter, move-up and high end (98 homes, ID)

Over half the builders interviewed say they use stock designs (the number of designs among builders who reported them ranged from 14 to 35), although a number were quick to point out that those designs are modified to suit a specific development or even an individual buyer. About

one-fourth of builders used architect designs and another fourth developed custom designs in response to the needs of the buyer (several builders reported using more than one method.) Comments included:

- We develop stock designs, using the Washington State Energy code as our design basis (170 homes, WA)
- Plans are a combination. I'm the in-house architect; we have some stock and also customize and provide custom design services (100 homes, ID)
- In production homes there may be minor modifications that we do in house; custom homes we do design-build and work with the client's architect (250 homes, ID)
- We use stock plans and then our format is to create, in advance, multiple options, like added windows. Customers can choose the options. (850 homes, WA)

Realtors play an important role in marketing for these builders. About 40 percent of builders use both their own sales agents and realtors; another 40 percent use realtors only, and about 20 percent use only their own sales force. Among those who use both sales channels, realtors typically account for a larger share of sales with estimates ranging from 50 to 95 percent.

Newspaper advertising was the most commonly cited method of promotion, but the Internet, TV/radio, brochures, model homes, and outdoor signs were all mentioned by about half of the builders. A number of respondents pointed out that realtors take care of all the advertising for them.

Awareness/Knowledge/Participation in ES Homes Program

Insulation was cited by almost all builders as a home component contributing to energy efficiency; windows were noted by slightly over half, and high efficiency furnaces by about one-third. Several builders mentioned either duct tightness/sealing or overall home sealing and caulking to minimize air infiltration and also emphasized the importance of overall high quality construction practices.

About 80 percent of respondents said they had heard about the ENERGY STAR program. Several mentioned having participated in it, hearing about it through utility programs, or reading about it in trade publications.

When asked the primary benefit to the builder from building ENERGY STAR homes, most builders responded with the somewhat broad term "marketing.' When pressed, they indicated that the ENERGY STAR label has "name recognition," serves as "a selling point," or gives "an indication that they are an industry leader." Several builders commented that the ENERGY STAR label resonates with a certain market segment that is aware of the benefits of a "green" approach to construction. Comments regarding benefits of ES include:

- People who buy Chevrolets don't look at these homes; people who buy this kind of home are non first-time, they know the difference. They expect and are willing to pay for higher quality. (5 homes, MT)

- Primarily awareness of buyer that you're building and energy efficient home (100 homes, WA)

- I believe the benefit is that it gets some business I wouldn't otherwise get (18 homes, ID)

- Making the planet better, also marketing; lets people buy the best possible home (100 homes, ID)

- As awareness among homebuyer increases (of cost, comfort, green building) then it becomes a benefit in terms of a selling point (850 homes, WA)

- Pride of workmanship, resource conservation, challenge to do better (3 homes, MT)

- It indicates a step above and that you are staying in the market, "leader in industry"; also helps deal with long term energy prices (98 homes, ID)

A few respondents, however, noted that they see no benefit to builders, and that participation in ENERGY STAR would raise their costs and lead to a loss of market share to other, lower cost builders. This was particularly true for several large builders who describe themselves as catering to the entry-level market. Comments included:

- I don't see any positive for a builder, it's hard to market. The entry-level market where we compete is all price-driven. We've asked for research from Idaho Power on how long it takes to recoup costs of more insulation, etc. We offered 2x6 framing and increased wall and ceiling insulation. It costs 5-10K to do this, and takes 10-12 years to recoup, while our typical buyers don't stay any longer than about 6 years. We're building about 70 percent spec homes. If we start putting out higher priced, more energy efficient homes, it's an easy sale for our competition. ENERGY STAR won't take off until it's mandated or the prices of energy go way up. (215 homes, ID)

- It makes the home too expensive (176 homes, WA)

Among builders who had heard about the program, most mentioned energy efficient HVAC, higher insulation levels, better windows, and ENERGY STAR appliances as among the primary energy-saving measures included in the ENERGY STAR Homes Northwest program. Only about half as many cited duct sealing, duct testing, and energy efficient lighting.

Builders who were familiar with the ENERGY STAR program agreed most strongly that the program makes homes more marketable to buyers; they disagreed most strongly with the statement that homes built to code are energy efficient enough.

Six of the interviewed builders said they were currently participating in the ENERGY STAR program – four of those were in Idaho; the other two in Montana. (Most of these were from the list provided to ECONorthwest by PECI.)

Five participating builders said they planned to increase the number of ENERGY STAR homes they built in 2004. Two builders – one in Idaho and one in Oregon – said they planned to build more than 100. Three other builders said they expected to build fewer than a dozen. One very

large builder said his company was finalizing the development of their ENERGY STAR offering and would make it available to buyers as an option (all their homes are pre-sold before construction begins), so they did not know how many they would build.

Several builders in Idaho expressed confusion about the new ENERGY STAR program (which they had heard about) and the Idaho GemStar program, which incorporates ENERGY STAR standards. All said they would welcome more information about the new program. One builder noted that "regional adjustments for Idaho would be useful," while another said that "some form of direct contact would be good" to help explain the program.

Several participating builders said they exceed ENERGY STAR standards for some components, although not with specific packages of ENERGY STAR plus options. Most said they use above-requirement measures or technologies in all their ENERGY STAR homes, citing higher R-value insulation in the walls, roof, or floor; insulated sheathing; triple-pane windows; 93% AFUE furnaces; better envelope sealing; and controlled air flow through the attic. None of them expressed interested in a formal "plus" package, however.

Non-participating builders generally said that they did not participate in ENERGY STAR because they could not recoup the added cost of building to program standards, as customers do not demand energy efficiency. Comments included:

- Not for our market. Would love to sell ES homes, but in the entry level market, price is everything (215 homes, ID)
- It would probably cause delays (100 homes, WA)
- I haven't heard much about it, but mostly with programs like that you get all different agencies involved and it's too much paperwork. (48 homes, ID)
- We're considering an energy program. Don't know which one to use, yet. We would like to be 100 percent some program by October. (1250 homes, OR and WA)

When asked what it would take to get them to participate in the program, builders generally restated their reasons for not participating, noting that either the extra cost of construction would have to be covered by ENERGY STAR or customers would have to be willing to pay the extra cost. Comments included:

- The marketplace would have to demand it. We already build energy efficient homes with energy efficient windows and high insulation levels because the market demands it. But there's no sign that they demand ENERGY STAR. (170 homes, WA)
- It would have to either become part of code, or energy prices would have to increase dramatically. (215 homes, ID)
- We would run an analysis to see if it was worthwhile. What does it entail, does the market have an interest, is there a real savings or benefit? (250 homes, WA)

- I doubt if they could offer enough to make it worth my while. A couple of hundred dollars wouldn't do it, if it was $5000 that would be different. (48 homes, ID)

- Maybe if it didn't add too much to the home price. (500 homes, OR)

Relatively few builders said that they participate in any other energy efficiency programs. Build Green was the most commonly cited, with several builders pointing out that this program is designated by individual communities, who then require all builders in that community to participate. There are several levels (stars) of this program, with different requirements. One respondent said the program is run by the Master Builder Association of King and Snohomish Counties. While much of the program's focus is on use of recycled or green materials and disposal of construction waste, there are envelope and heating/cooling components of it as well.

A few Oregon builders mentioned the Earth Advantage Program, while several builders from across the region said they had previously participated in the Super Good Cents program. One builder noted that this program had declined over the years: "They used to have Super Good Cents, but you don't see it anymore. They gutted it." In addition, a few builders said they received rebates from utilities: "Inland gives us rebates; used to be part of Good Cents; that's gone, but they still give some rebates on heat pump homes."

Building Practices/Components: Awareness, Knowledge, Practices, Perceptions

Builders were also asked about their selection of equipment and appliances for the homes they construct, including heating and cooling, windows, appliances, lighting, and duct sealing and testing.

Heating and Cooling

ENERGY STAR homebuilders generally used high efficiency gas furnaces, while most other used standard efficiency gas furnaces. A few used heat pumps: high efficiency for ENERGY STAR homes, standard efficiency for others. For cooling, most of those who said they were ENERGY STAR participants said they installed 12 SEER air conditioning systems. About a third of respondents (particularly those in Washington) said that they typically do not install air conditioning, regardless of whether they were participants or not.

Most builders consider energy savings the primary benefit of high efficiency heating and cooling systems. A substantial minority also mentioned improved comfort, and a few builders noted that high efficiency air conditioners are quieter. Comments with regard to heating and cooling included:

- We do all high efficiency furnaces; that makes a difference here. (50 homes, MT)

- We've tried to offer upgrades above 80-85, and people don't want to pay the extra. We can't just do what someone asks, have to have upgrade options. (460 homes, WA)

- Probably about 20 percent of homes go with 90+. (170 homes, WA)

- We only use heat pumps in more remote areas if no gas available. (215 homes, ID)
- Very few buyers choose 90+ furnaces (850 homes, WA)
- We live in such a temperate climate, it's hard to get people to care (about heating or cooling) (460 homes, WA)
- High efficiency is offered as an option, but only chosen by 1 or 2 percent (176 homes, WA)
- There's concern that 90% furnaces require more maintenance, so life cycle cost is higher (100 homes, ID)
- The venting of high efficiency equipment is different -- not worse necessarily, but different can be a problem when you build a lot of homes. (1250 homes, OR and WA)

Most builders who install high efficiency systems say they promote them to their buyers, although a few said they just promote the overall efficiency of their homes. Those who do not install high efficiency HVAC systems cite either cost, lack of customer demand, or the inability to recoup the extra cost in energy savings as their reason for not doing so.

Availability of high efficiency heating systems was generally not perceived to be a problem, but several Idaho builders reported having trouble finding high efficiency cooling systems. Comments included:

- The Idaho market is weird because it is really a dumping ground for low efficiency equipment. Nobody carries even 12 SEER, they have to order it (98 homes, ID)
- Suppliers say it's hard to get and very expensive. Even 12 SEER is a significant extra cost (100 homes, ID)

Lighting

All of the ENERGY STAR Homes Northwest participants said they install CFL bulbs in their homes, while about half said they use CFL fixtures. In accordance with program requirements, most said they install CFL bulbs in 50 percent of fixtures; one or two said they use them everywhere or in all but very few locations. CFL fixtures are used in a wide range of applications, with builders specifically mentioning recessed lighting applications in bathrooms and kitchens, as well as utility rooms and closets.

CFL fixtures and bulbs are not widely used in non-ENERGY STAR homes, with only two builders citing CFL bulbs and one citing fixtures. Incandescent bulbs remain the market standard – largely on the basis of low first cost and ready customer acceptance. Comments included:

- Probably 30-35 percent of buyers go with at least some CFL bulbs or fixtures. There is a trend toward that. Bathroom and garages is where they go. Also more in the kitchen. (170 homes, WA)

- We pay only $.12 per incandescent lamp, far cheaper than CFLs. (176 homes, WA)

- There's not much interest in energy efficient lighting (in Idaho). We're about 12 years behind the market. (215 homes, ID)

About half of the builders interviewed said that buyers could choose lighting features within a given lighting budget; others offer a range of lighting packages. Custom builders are more apt to let customers make all the decisions, while speculative production builders usually make all the decisions – typically standard incandescent only, but sometimes some CFL fixtures or bulbs. Comments regarding the selection process included:

- We have base light fixture and offer upgrade options. About 60 percent of our homes are pre-sold so people can choose. We try to work with them to offer upgrade options, but there is no interest in fluorescent. (460 homes, WA)

- We have 5 families of lighting packages based mostly on style. (1250 homes, OR and WA)

- About 90 percent of our homes are spec, so we decide what goes in. (50 homes, ID)

- On the spec, we decide. On pre-solds, we have an electrical plan, and customers decide (18 homes, ID)

By far the most frequently cited benefit of energy efficient lighting was the reduction in energy use, although a significant number of builders also mentioned longer bulb life. Several respondents said they saw no benefits to homebuyers. Extra cost and lack of customer demand were most often cited as reasons for not installing ENERGY STAR lighting, with one respondent mentioning light quality.

Availability is not seen as a problem for CFL fixtures or bulbs, although one or two builders commented on a relative lack of CFL fixture selection. CFL performance was considered problematic by a handful of builders who cited flicker, light quality, and the fact that CFL bulbs would not fit in all fixtures. Comments included:

- The biggest problem for ENERGY STAR lights is that they have approved almost everything, they've let lots of poor quality in. (6 homes, MT)

- The originals a few years ago weren't very good, but they've overcome that. (250 homes, ID)

- In this area, people are more aware of and receptive to CFLs. (850 homes, WA)

Windows

The effect of code changes and past efforts to improve acceptance of ENERGY STAR windows in the Northwest are reflected in builder practices and perceptions with regard to windows. About two-thirds of builders reported installing windows with U-values of .35 or lower. While some builders do this as part of ENERGY STAR program participation, others do it for code

compliance, such as when builders install more efficient windows to compensate for other aspects of home design in accordance with the ResCheck software plan review needed for code compliance. Comments included:

- Currently code is .4, ES is .35. We have some .35 to make up for 2 by 4 walls with R-15 insulation; the building code lets you do that, but the percentage is small.(850 homes, WA)

- We use dual glazed windows as required by code. If the home design passes ResCheck or Energycheck, we just use those windows, if not we can go to higher efficiency. The state has a site where you can run ResCheck before you submit the documents. (215 homes, ID)

- Architect has to go through the ResCheck; has to meet code. We exceed that. We have low-e windows, R19 in the walls and R38 in the ceilings. (48 homes, ID)

Builders were about equally divided on whether window suppliers always or usually recommend high efficiency windows, with about half saying they never received recommendations from suppliers.

While energy savings were seen as the primary benefit from efficient windows, a number of builders also cited improved comfort (less heat gain, fewer drafts), UV screening, and noise reduction. Most builders who install efficient windows said they specifically promote them in selling their homes, sometimes with the involvement of the window manufacturer. Builders who did not install high efficiency windows typically said that customers did not demand them or that they cost too much. Comments included:

- The benefit to the customer is when it gets to 20 below and the wind is blowing. And they'll get cost back in 3-4 years.(170 homes, Eastern WA)

- We get more benefit from proper sealing and installation than from lower U value (450 homes, WA)

- People don't care about it. Maybe 1 out of 50 will be interested in the windows (48 homes, ID)

Appliances

All of the builders interviewed supply built-in appliances like ovens, ranges, and dishwashers; about half include refrigerator-freezers and even fewer provide washer-dryers. ENERGY STAR dishwashers are included not only by program participants but also by most other builders. In addition, a few builders claimed to supply ENERGY STAR range hoods. Comments included:

- For most appliances, about 10-15 percent of customers select ENERGY STAR. (250 homes, WA)

- In the better quality lines, the appliances are all ENERGY STAR (250 homes, Idaho)

- About 20 percent of our homes have ENERGY STAR dishwashers (1250 homes, OR and WA)

- We might put in one washer out of 50 homes (98 homes, ID)

- ENERGY STAR for appliances doesn't mean much anymore, it's lost its edge. All of them have some kind of sticker. Most of the dishwashers are ENERGY STAR anyway. (100 homes, ID)

Builders say ENERGY STAR appliance are readily available, and they report no performance problems. The builders who do not offer ENERGY STAR appliances said there was no customer demand or that it would add too much to the cost of the home.

Duct Testing/Sealing

Most builders say they are familiar with duct testing and sealing for new homes, but only about half of those who are familiar have testing performed on the homes they build, and most of those tend to be among the smaller builders interviewed. Builders are certainly familiar with duct sealing, because sealing with mastic is explicitly required by the Washington energy code. The code does not require duct testing, however. Several builders said they do duct tests only as required by the specific program they are enrolled in, citing ENERGY STAR as well as Earth Advantage. Few builders know whether their duct tester is PTCS certified.

Perceived benefits to the builder focus on assuring that ductwork and overall HVAC installation are done correctly, with a subsequent reduction in callbacks. Other benefits cited include improved efficiency as well as reduced liability, warranty, and airflow problems. Perceived drawbacks to duct testing include its cost and the amount of time it takes, with several builders citing costs in the $400-500 range.

Some builders promote the fact that their homes' ducts have been tested, but others doubt whether customers care. Comments on duct testing and sealing include:

- Customers don't understand duct blast testing but they do understand the sealing (15 homes, ID)

- We have done testing on one home out of 2,000 homes. It's tough to schedule these things when you're busy (1,250 homes, OR and WA)

- I encourage customers to be there. Lots of men like to come out and see that; it makes them better informed about their homes.(18 homes, ID)

- It makes the ducts more efficient, so you can have a smaller furnace (500 homes, OR)

Participant Attitudes and Marketing Practices

ENERGY STAR builders tended to agree strongly that customers value the ENERGY STAR label and that the certification process does not delay construction. They also agreed that buyers

link ENERGY STAR with both comfort and value. They disagreed, however, with the statement that buyers understand the value of duct testing.

All participating builders say they actively promote their ENERGY STAR homes, with most of them stating that they promote the full range of ENERGY STAR features rather than a single aspect of design. For example, one builder said they emphasize that ENERGY STAR homes are "comfortable, energy saving, quiet, dust free."

When asked what energy saving features are most marketable to consumers, builders most often mentioned roof and wall insulation followed by windows, furnace, and "overall design." Appliances, lighting, and duct testing were less frequently mentioned.

When asked to rate their satisfaction with specific program elements, participating builders gave the highest ratings to the ease of participation, the amount of paperwork required, and the overall certification process. They were least satisfied with the cost of participation and amount of co-op advertising support.

Comments regarding program features and the overall program from both participants and nonparticipants included:

- Requirements are too lax, needs to have more value, need to have an ENERGY STAR label mean something. Make minimum standard higher; if they lowered air changes it would force changes in practice. Framing would have to be done differently; inside and outside corners; proper sheeting, we don't use vapor barrier. My competitors probably would have to add 3-4% in labor cost. (6 homes, MT)

- If we could say we build to this standard – that would be good for us. (460 homes, WA)

- I'd say just that it gives me some way to show that I'm building in a more responsible way that will lead to less resource use, etc. (18 homes, ID)

- Some form of direct contact would be good. I'm dealing now through someone else at Kootenay Electric. I'm not aware of a local rep or 800 number where I could call. (225 homes, ID)

- Doesn't do anything for me. I build three times as many houses as another guy in town who promotes ENERGY STAR. (48 homes, ID)

APPENDIX B: SURVEY INSTRUMENTS

HOME BUILDER PHONE SURVEY

Hello, my name is _____ with Quantum Consulting, an energy market research firm based in Berkeley, California. First, I want to assure you that this is not a sales call. The Northwest Energy Efficiency Alliance has asked us to help them better understand the market for energy-saving features in the new home construction market. Could I speak to _____ or could I speak to the person responsible for making design and construction decisions affecting energy use of the homes you build?

[WHEN CORRECT PERSON IS ON-LINE:]

Hello, my name is _____ and I'm calling from Quantum Consulting, an energy market research firm based in Berkeley, California. First, I want to assure you that this is not a sales call. The Northwest Energy Efficiency Alliance has asked us to help them better understand the market for energy-saving features in the residential new home construction market. Can I confirm that you're the person responsible for making design and construction decisions affecting energy use of the homes you build?

Yes	[CONTINUE]
No/DK	[ASK TO SPEAK WITH CORRECT PERSON, OR TERMINATE]
Refused	[TERMINATE]

This survey is important for our ability to make our construction programs as useful as possible to builders like yourself. Our survey will take about 15 minutes and all your answers are held confidential and we never link any information to a particular person or company.

Is now a good time?

Yes	[CONTINUE]
No	[SET UP CALLBACK]
DK/refused	[TERMINATE]

I. BACKGROUND / FIRMOGRAPHIC INFORMATION

Q 1. How many new homes did you build in 2003? Number built_____

88) Don't know
99) Refused

Q 2. Of the homes built in 2003, what percentage were built inside the states of Washington, Oregon, Idaho, and Montana?

1) Percent within states_____

88) Don't know
99) Refused

Q 3. And of those homes inside these states, what percentages are:

Single family detached (If 0, TNT)
Single family attached (duplex, townhouse, rowhouse)
Multifamily
88) Don't know
99) Refused

Q 4. What is the approximate price range of the homes you build? (READ LIST)

Give Range:_____
88) Don't know
99) Refused

Q 5. Which electric utility serves the homes you build (accept multiple answers)

Utility:_____
88) Don't know
99) Refused

Q 6. What percent of your homes are "spec" built or have been almost completely built without the customer's direct involvement.

Percent _____
88) Don't know
99) Refused

Q 7. Do you sell your homes through your own sales representatives, or through real estate agents?

Sales reps
Real estate agents
Both
Other, please specify:_____
88) Don't know
99) Refused

Q 8. What is the most important way you use to promote your home?

Newspaper ads
TV/Radio
Real estate ads
Outdoor signs
Model homes

Brochures / Sales materials
Internet
Other_____
88) Don't Know
99) Refused

II. Awareness/Knowledge/Participation in ES Homes Program

Next I would like to ask you about energy efficiency and its role in your business.

Q 9. What components of the home do you consider most important for reducing home energy consumption? [DO NOT READ; CIRCLE ALL; MARK CHOICE THAT IS FIRST MENTION.]

Air conditioner/HVAC
Construction tightness, air seal, building envelope (not window envelope)
Appliances
Clock thermostat
Daylighting
Ducts – tight ducts, insulated ducts
Fans (attic, whole-house)
Furnace
Using more gas or electric
Heat pump
Insulation (Roof)
Insulation (Walls)
Windows
Lighting
Water Heater
Whole-house Design
Other _____
Don't Know
99) Refused

Q 10. Have you ever heard of the ENERGY STAR label for new homes?

Yes
No (Skip to Q 21)
Don't know (Skip to Q 21)
99) Refused (Skip to Q 21)

Q 11. To the best of your knowledge, what do you believe are the primary benefits to the builder, if any, of building ENERGY STAR Homes? (DO NOT READ)

Marketing/ Product differentiation
Higher quality
Higher price
Sells faster
Rebate from utility
Promotion assistance
Reduced callbacks
Other, please specify:_____
88) Don't know
99) Refused

Q 12. Please tell me how much you agree or disagree with each of the following statements. Would you say that you strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, or strongly disagree that: [RANDOMIZE].

The ENERGY STAR label makes homes more marketable to homebuyers

ENERGY STAR-certified homes tend to be higher quality overall

ENERGY STAR-certified homes sell faster than non-ENERGY STAR homes

ENERGY STAR-certified homes sell for a higher price than non-ENERGY STAR homes

Builders of ENERGY STAR homes enjoy a competitive advantage in the market

Homes built to code are energy efficient enough

Q 13. Are you currently participating in the ENERGY STAR Homes program?

Yes
No (Skip to Q 19)
88) Don't know (Skip to Q 19)
99) Refused (Skip to Q 19)

Q 14. How many ENERGY STAR homes did you build in 2003?

Number of homes:_____
Don't know
99) Refused

Q 15. And how many ENERGY STAR homes do you plan to build in 2004?

Number of homes:_____
88) Don't know

99) Refused

Q 16. Do you offer ENERGY STAR as an optional feature for the homes you build, or all your homes ENERGY STAR?

ENERGY STAR offered as an option
All homes built are ENERGY STAR
Don't know
99) Refused

Q 17. Do any of the homes you build exceed the ENERGY STAR requirements?

Yes
No (SKIP TO q.26)
88) Don't know (SKIP TO q.26)
99) Refused (SKIP TO q.26)

Q 18. How specifically how do you exceed the ENERGY STAR REQUIREMENTS:

Specify:_____
88) Don't know
99) Refused

Q 19. Why don't you participate in the ENERGY STAR program for the homes you build? (DO NOT READ, ACCEPT MULTIPLE ANSWERS)

Adds to home price
Don't want to have performance tests
Too much hassle
Process delays construction
Customers don't want it
Already build to ENERGY STAR standard, don't need label
Hadn't heard about it
Plan to begin building ENERGY STAR homes
1) Other (specify)_____

Don't know
99) Refused

Q 20. What would it take for you to begin offering ENERGY STAR home as an option in the homes you build?

Get verbatim response:_____
88) Don't know

99) Refused

Q 21. What energy efficiency programs for residential new construction, if any, are you participating in at present? What programs have you participated in the past?

	Present	Past
1) Earth Advantage		
2) Built Green		
3) Environments For Living		
4) Super Good Cents		
5) Other (specify)		
88) Don't know		
99) Refused		

III. Building Practices/Components: Awareness, Knowledge, Practices, Perceptions

Next I want to ask you about some of your standard practices regarding specific home features.

Heating and Cooling

The next set of questions refers to high efficiency heating and cooling equipment. For gas heating, "high efficiency" is defined as having an AFUE rating of 90 or higher. With an electric heat pump, "high efficiency" is defined as having an HSPF rating of 8.0 or higher. For cooling, "high efficiency" is defined as the air conditioner having a SEER rating of 13.0 or higher.

IF NO ENERGY STAR HOMES, SKIP NEXT 2 QUESTIONS

Q 22. Which of the following types of heating systems do you install in the ENERGY STAR homes you build? [READ and CHECK ALL THAT APPLY]

1) High efficiency gas (AFUE 90 or higher)
2) Electric Resistance
3) High Efficiency Heat Pump (HSPF of 8.0 or higher)
4) Do not build any ENERGY STAR homes [DO NOT READ]
88) Don't know
99) Refused

Q 23. Which of the following type of cooling systems do you install in the ENERGY STAR homes you build? [READ LIST and CHECK ALL THAT APPLY]

1) High Efficiency Heat Pump (SEER 13.0 or higher)
2) High efficiency air conditioner (SEER of 13.0 of higher)
3) No cooling system

4) Do not build any ENERGY STAR homes [DO NOT READ]
88) Don't know
99) Refused

ASK EVERYONE

Q 24. Which of the following types of heating systems do you install in the [IF ENERGY STAR HOMES: non-ENERGY STAR] homes you build? [READ and CHECK ALL THAT APPLY]

1) Only build ENERGY STAR homes (DO NOT READ)
2) Standard efficiency gas
3) High efficiency gas (AFUE 90 or higher)
4) Electric Resistance
5) Standard Efficiency Heat Pump
6) High Efficiency Heat Pump (HSPF of 8.0 or higher)
7) Hot water heating
8) Gas/oil fired boiler
9) Wood burning stove
10) Other, please specify:_____
88) Don't know
99) Refused

Q 25. Which of the following types of cooling systems do you install in the [IF ENERGY STAR HOMES: non-ENERGY STAR] homes you build? [CHECK ALL THAT APPLY

1) Only build ENERGY STAR homes (DO NOT READ)
2) Standard Efficiency Heat Pump
3) High Efficiency Heat Pump (SEER 13.0 or higher)
4) Standard Efficiency air conditioner
5) High efficiency air conditioner (SEER of 13.0 of higher)
6) Room air conditioners only
7) No cooling system
88) Don't know
99) Refused

Q 26. Have you ever had any problems with <u>availability</u> of high efficiency heating or cooling equipment through your regular suppliers?

1) No
2) Yes, high efficiency <u>heating</u> equipment
3) Yes, high efficiency <u>cooling</u> equipment
4) Yes, both high efficiency heating and cooling equipment

5) Other, please specify:_____
88) Don't know
99) Refused

Q 27. What do you view as the primary benefits to the customer of high efficiency heating and cooling equipment? [DO NOT READ LIST]

1) Reduced energy bills
2) Improved indoor air quality
3) Improved home comfort
4) More reliable equipment
5) Other, please specify:_____
6) No benefit
88) Don't know
99) Refused

IF NO ENERGY STAR HOMES AND ONLY INSTALL STANDARD EFFICIENCY EQUIPMENT IN Q 24 AND Q 25, THEN SKIP TO Q 29.

Q 28. Do you specifically promote the fact that your homes feature either high efficiency heating or cooling system?

1) Yes, cooling only (Skip to Q 30)
2) Yes, heating only (Skip to Q 30)
3) Yes, both (Skip to Q 30)
4) No (Skip to Q 30)
88) Don't know (Skip to Q 30)

99) Refused (Skip to Q 30)

Q 29. Why don't you install high efficiency heating and cooling equipment in the homes you build [Do NOT READ. CHECK ALL THAT APPLY]?

1) Cost
2) Install high efficiency heat, but customers don't demand cooling
3) Customers don't demand it
4) Poor equipment performance/reliability
5) Energy savings not high enough to justify extra cost
6) Other, please specify:_____
88) Don't know
99) Refused

Q 30. Are there specific performance problems with any of the high efficiency heating and cooling systems that keep you from using them in the homes you build? [ACCEPT MULTIPLE ANSWERS. IF THEY HAVE PROBLEMS, WE REALLY NEED TO PROBE TO DETERMINE THE ISSUES FOR EACH ONE.]

1) Yes (Specify:_____)
2) No
88) Don't know
99) Refused

Lighting

The next set of questions refers to high efficiency lighting. For these questions, "high efficiency" is defined as any fixtures or lamps with the ENERGY STAR label. This includes various types of compact fluorescent light bulbs (CFLs) and dedicated CFL fixtures that use only fluorescent light bulbs, and any fixtures and lamps with the ENERGY STAR label.

IF NO ENERGY STAR HOMES, SKIP TO Q34 (not linked)

Q 31. Which of the following types of lighting do you install in the ENERGY STAR homes you build? [READ LIST AND CHECK ALL THAT APPLY]

1) Compact fluorescent light bulbs (CFLs)
2) Dedicated compact fluorescent fixtures
3) Halogen lighting
4) T-5's (long slender fluorescent tubes)
5) T-8's (long slender fluorescent tubes)
6) T-12's (long slender fluorescent tubes)
7) Other, please specify:_____
88) Don't know
99) Refused

IF FIXTURES IN Q 31, ASK:

Q32a. For which lighting applications do you install ENERGY STAR fixtures?

1) Kitchen
2) Dining Room
3) Living Room
4) Family Room
5) Master Bedroom
6) Other Bedrooms
7) Bathrooms
8) Closets

9) Hall
10) Utility Room
11) Garage
12) Outdoor Lighting
13) Did not install
14) Other Specify_____
98) Don't know
99) Refused

Q32b. What percentage of dedicated lighting fixtures is ENERGY STAR-certified in the ENERGY STAR homes you build?

1) Percentage of fixtures:_____
88) Don't know
99) Refused

Q.32c. For which lighting applications do you install ENERGY STAR light bulbs? (probe for type and location)

1) Application/location:_____
88) Don't know
99) Refused

Q 32. What percentage of light bulbs/lamps is ENERGY STAR-certified in the ENERGY STAR homes you build? (DO NOT READ)

1) Less than 50 percent
2) 50 percent (required by Energy Star)
3) More than 50 percent
88) Don't know
99) Refused

ASK EVERYONE

Q 33. How do you typically decide on the type of lighting that goes into a home?

1) Buyer has lighting budget, they choose lighting features within the budget
2) Buyer chooses everything, no preset budget or lighting packages
3) Builder has different lighting package options, buyer chooses one
4) Builder installs all standard efficiency fixtures
5) Builders installs all fixtures but uses CFLs in some or all sockets
6) Builder gives general instructions, electrician pick specifics
7) Other _____

Q 34. Which of the following types of lighting, if any, do you install in the [IF ENERGY STAR HOMES: non-ENERGY STAR] homes you build? [READ LIST AND CHECK ALL THAT APPLY]

1) Compact fluorescent light bulbs (CFLs)
2) Dedicated compact fluorescent fixtures
3) Halogen lighting
4) T-5's (long slender fluorescent tubes)
5) T-8's (long slender fluorescent tubes)
6) T-12's (long slender fluorescent tubes)
7) Other, please specify:_____
8) Don't know
9) Refused

Q 35. Have you ever had any problems with the availability of ENERGY STAR light bulbs or fixtures through your regular electrical suppliers?

1) No
2) Yes, bulbs
3) Yes, lighting fixtures
4) Yes, both CFL bulbs and fixtures
5) Other, please specify:_____
88) Don't know
99) Refused

Q 36. What do you view as the primary benefits to the customer of installing ENERGY STAR lighting? [DO NOT READ LIST]

1) Reduced energy bills
2) Longer lasting
3) Better light quality
4) More reliable equipment
5) Other, please specify:_____
6) No benefit
88) Don't know
99) Refused

IF NO ENERGY STAR HOMES AND THEY DO NOT INSTALL ANY HIGH EFFICIENCY LIGHTING (Q 34 RESPONSES DO NOT INCLUDE CFL BULBS OR FIXTURES) THEN SKIP TO

Q 38.

Q 37. Do you specifically promote the fact that your homes feature ENERGY STAR lighting?

1) Yes (Skip to Q 39)
2) No (Skip to Q 39)
88) Don't know (Skip to Q 39)
99) Refused (Skip to Q 39)

Q 38. Why don't you install ENERGY STAR lighting in the homes you build [DO NOT READ. CHECK ALL THAT APPLY]?

1) All homes are ENERGY STAR
2) Adds too much to home price
3) Bulbs burn out
4) Can't find fixtures
5) Poor light quality / weak light
6) Customers don't demand it
7) Equipment problems with fixtures
8) Energy savings not high enough to justify extra cost
9) Other, please specify:_____
88) Don't know
99) Refused

Q 39. Are there specific performance problems with either compact fluorescent light bulbs or fixtures that keep you from using them in the homes you build? [PROBE FOR PROBLEMS WITH BOTH CFL LIGHT BULBS AND FIXTURES.]

1) Yes (Specify:_____)
2) No
88) Don't know
99) Refused

Appliances

The following questions relate to high efficiency appliances. Typically "high efficiency" appliances will have the ENERGY STAR label.

IF NO ENERGY STAR HOMES, SKIP NEXT QUESTION

Q 40. Which of the following types of ENERGY STAR appliances do you install in the ENERGY STAR homes you build? [PROBE FOR MULTIPLE RESPONSES, CHECK ALL THAT APPLY]

1) ENERGY STAR dishwasher
2) ENERGY STAR refrigerators
8) Other, please specify:_____

88) Don't know
99) Refused

ASK EVERYONE

Q 41. Which of the following types of appliances do you install in the [IF ENERGY STAR HOMES: non-ENERGY STAR] homes you build?

1) ENERGY STAR dishwasher
2) ENERGY STAR refrigerators
3) Other, please specify:_____
88) Don't know
99) Refused

Q 42. Have you had any problems with availability of ENERGY STAR appliances through your regular suppliers? (CHECK ALL THAT APPLY)

1) No
2) Yes, ENERGY STAR dishwashers
3) Yes, ENERGY STAR refrigerators
4) Other, please specify:_____
88) Don't know
99) Refused

Q 43. What do you view as the primary benefits to the customer of ENERGY STAR appliances? [DO NOT READ LIST]

1) Reduced energy bills
2) Reduced water bills
3) Higher quality equipment
4) Last longer
5) Comfort
6) Other, please specify:_____
7) No benefit
88) Don't know
99) Refused

IF NO ENERGY STAR HOMES AND IF THEY DO NOT INSTALL ANY ENERGY STAR APPLIANCES BASED ON Q 41, THEN SKIP TO Q 45

Q 44. Do you specifically promote the fact that your homes feature ENERGY STAR appliances?

1) Yes

2) No (Skip to Q 46)
88) Don't know (Skip to Q 46)
99) Refused (Skip to Q 46)

Q 45. Why don't you install ENERGY STAR appliances in the homes you build [CHECK ALL THAT APPLY]?

1) All homes are ENERGY STAR
2) Poor quality
3) Adds too much to home price
4) Can't find qualifying appliances
5) Customers don't demand it
6) Energy savings not high enough to justify extra cost
7) Other, please specify:_____
88) Don't know
99) Refused

Q 46. Are there specific performance problems with any of the ENERGY STAR appliances that keep you from using them in the homes you build? [ACCEPT MULTIPLE ANSWERS. IF THEY HAVE PROBLEMS, WE REALLY NEED TO PROBE TO DETERMINE THE ISSUES FOR EACH ONE.]

1) Yes (Specify:_____)
2) No
88) Don't know
99) Refused

Windows

The next set of questions relate to high efficiency windows. For these questions, "high efficiency" windows are defined as those that are ENERGY STAR-certified and have a U-value of 0.35 or better.

Q 47. Which type of windows do you install in the [IF ENERGY STAR HOMES: non-ENERGY STAR homes] you build? [READ LIST and CHECK ALL THAT APPLY]

1) High efficiency windows (U-value of 0.35 or lower)
2) Standard efficiency windows (U-value of 0.35 or greater)
3) Both high efficiency and standard efficiency windows
4) Other, please specify:_____
88) Don't know
99) Refused

Q 48. Generally speaking, would you say that your window suppliers usually recommend using ENERGY STAR windows?

1) Yes, recommend always
2) Yes, recommend most of the time
3) Occasionally recommend
4) Never recommend
88) Don't know
99) Refused

Q 49. What do you view as the primary benefits to the customer of high efficiency windows? [DO NOT READ LIST]

1) Reduced energy bills
2) Longer lasting
3) Look better
4) Better sealing
5) Better quality
6) Less heat gain in the summer
7) Less drafty
8) Interior comfort/temperature
9) Noise reduction
10) Ultra violet (UV) light blocking/ Reduces fading
11) Other, please specify:_____
12) No benefit
88) Don't know
99) Refused

IF NO ENERGY STAR HOMES AND THEY DO NOT INSTALL HIGH EFFICIENCY WINDOWS IN ANY HOMES (Q 47 NOT EQUAL TO 1 OR 3), THEN SKIP TO Q 51.

Q 50. Do you specifically promote the fact that your homes feature high efficiency windows?

1) Yes (Skip to Q 52)
2) No (Skip to Q 52)
88) Don't know (Skip to Q 52)
99) Refused (Skip to Q 52)

Q 51. Why don't you install high efficiency windows in the homes you build [CHECK ALL THAT APPLY]?

1) All homes are ENERGY STAR
2) Adds too much to home price

3) Can't find windows
4) Poor quality
5) Customers don't demand it
6) Energy savings not high enough to justify extra cost
7) Other, please specify:_____
88) Don't know
99) Refused

Q 52. Are there specific performance problems with high efficiency windows that keep you from using them in the homes you build? [ACCEPT MULTIPLE ANSWERS. IF THEY HAVE PROBLEMS, WE REALLY NEED TO PROBE TO DETERMINE THE ISSUES FOR EACH ONE.]

1) Yes (Specify:_____)
2) No
88) Don't Know
99) Refused

Duct Testing and Sealing

Q 53. Are you familiar with duct tightness testing and duct sealing for new homes?

1) Yes
2) No (SKIP TO Q.64))
88) Don't Know ()
99) Refused ()

Q 54. Do you have duct tightness tests performed for the homes you build?

1) Yes
2) No, (Skip to Q 60)
3) Sometimes
4) Do for ENERGY STAR Homes only
88) Don't know (Skip to Q 60)
99) Refused (Skip to Q 60)

Q 55. Who performs the duct testing for your homes?

1) HVAC contractor
2) Third Party Consultant
3) Utility staff
4) Alliance / program staff
5) Other, please specify:_____
88) Don't know

99) Refused

Q 56. For a new home to qualify for the ENERGY STAR label, the duct tests must conform to the Performance Comfort Testing System (PCTS) procedures and some contractors have been officially certified as testers that conform to the PCTS standard. Do you know if the duct testers you use are officially PCTS certified?

1) Yes, duct testers are PCTS certified

2) No, duct testers are not officially PCTS certified

88) Don't know

99) Refused

Q 57. What are the problems, if any, with duct testing?

1) Time consuming
2) Tests inaccurate, do not reflect actual equipment performance
3) Too expensive
4) Delays in scheduling testers
5) Testers not available in area
6) Lack of competence among testers
7) Other, please specify:_____
8) No problems
88) Don't know
99) Refused

Q 58. Do you promote to customers the fact that your homes have undergone duct testing and sealing?

1) Yes
2) No
88) Don't know
99) Refused

Q 59. What do you view as the benefits to the builder, if any, of duct testing and sealing [DO NOT READ LIST]

1) Reduced callbacks (liability, warranty issues)
2) Verification that HVAC done correctly
3) Verification that ducts do not leak
4) Catches some problems before customer moves in
5) Other, please specify:_____

6) No benefit
88) Don't know
99) Refused

[IF Q 54 = 1,3,4 THEN SKIP TO Q 61]

Q 60. Why don't you have the ducts tested in the homes you build?

1) Time consuming
2) Tests inaccurate, do not reflect actual equipment performance
3) Too expensive
4) Not worth hassle
5) Customers do not consider testing valuable
6) Delays in scheduling testers
7) Testers not available in area
8) Certified testers not available in my area
9) Lack of competence among testers
10) Other, please specify:_____
11) No problems
12) Don't know who to call
13) Not familiar with duct testing

88) Don't know
99) Refused

IV. Participant Attitudes and Marketing Practices

Ask the following questions only for ENERGY STAR Homes program participants

Q 61. Please tell me how much you agree or disagree with each of the following statements. Would you say that you strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, or strongly disagree with the following statements [RANDOMIZE ORDER]:

65a) Customers understand the benefits of the ENERGY STAR label

65b) Customers understand the value of duct testing and duct sealing

65c) Homebuyers link the ENERGY STAR home label with home value

65d) Homebuyers link the ENERGY STAR label with home comfort

65e) The certification process for ENERGY STAR homes does not delay home construction

Q 62. Do you actively promote the fact that your homes are ENERGY STAR?

1. Yes (Skip to Q 63)
2. No (Skip to Q 66)

88) Don't know (Skip to Q 66)

99) Refused (Skip to Q 66)

Q 63. What specific benefits, if any, do you promote about your ENERGY STAR homes?

1) Specify:_____
2) Don't promote any particular feature, just general ENERGY STAR label
3) Do not promote

88) Don't know

99) Refused

Q 64. And based on your experience, which energy saving features are most marketable to consumers? [DO NOT READ; CIRCLE ALL; MARK CHOICE THAT IS FIRST MENTION.]

1) Air conditioner/HVAC
2) Appliances
3) Clock thermostat
4) Daylighting
5) Ducts – tight ducts, insulated ducts
6) Fans (attic, whole-house)
7) Furnace
8) Heat fuel choice
9) Heat pump
10) Insulation (Roof)
11) Insulation (Walls)
12) Windows
13) Lighting
14) Water Heater
15) Whole-house Design
16) None

88) Don't Know

99) Refused

Q 65. From whom, if anyone, do you receive any financial assistance for these promotions?

1) No one, advertising expenses entirely out-of-pocket
2) Yes, receive coop marketing funds from Energy Star Homes program
3) Yes, share promotion expenses with utility or other agency
4) Other (Specify)_____

88) Don't Know

99) Refused

Now I would like to discuss your experience participating in the ENERGY STAR homes program.

Q 66. Now I am going to ask you to rate your satisfaction with each of the following aspects of the ENERGY STAR homes program. For each, please rate your satisfaction on a 1 to 5 scale, with 5 indicating extremely satisfied and 1 indicating extremely dissatisfied:

	Not at all	Not Very	Somewhat	Very
Cost of participation				
Quality of marketing support materials				
Certification and verification process				
Ease of participation				
Responsiveness of program staff				
Amount of co-op advertising support				
Amount of paperwork required to participate				
The program overall				

Q 67. What single aspect of the ENERGY STAR homes program have you found most helpful?

Q 68. And what single aspect of the program have you found least helpful?

Q 69. What changes, if any, would you recommend for the program?

Q 70. Do you have any final comments about the ENERGY STAR homes program?

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

7. HOME BUYER PHONE SURVEY

Hello, my name is _____ with Quantum Consulting and I'm calling on behalf of the Northwest Energy Efficiency Alliance, a regional corporation that works to make energy-efficient products and services available in the marketplace. We're conducting a study among households about their home buying decision. I want to assure you that this is not a sales call and that the information that you provide will be kept strictly confidential. This will only take about 10 minutes of your time.

(DO NOT READ) If asked about the Northwest Energy Efficiency Alliance, say:

The Alliance is a non-profit corporation supported by electric utilities, public benefits administrators, state governments, public interest groups and energy efficiency industry representatives. These entities work together to make affordable, energy-efficient products and services available in the marketplace. [WHEN

CORRECT PERSON IS ON-LINE:]

Hello, my name is _____ with Quantum Consulting, an energy market research firm based in Berkeley, California. I'm calling on behalf of the Northwest Energy Efficiency Alliance. We're conducting a study among households about their home buying decision. I want to assure you that this is not a sales call and that the information that you provide will be kept strictly confidential. This will only take about 10 minutes of your time.

SCREEN1 Can I confirm that you were responsible for choosing the house you purchased?

1 Yes [CONTINUE]
2 No
88 REFUSED
99 DON'T KNOW

SCREEN2 Can I confirm that the house you purchased is a newly constructed home? That is, was your house built shortly before you moved in and are you the first occupant?

1 Yes [CONTINUE]
2 No
88 REFUSED
99 DON'T KNOW

SCREEN3 Also, can I confirm that the house is currently occupied by the owner as a single-family household?

1 Yes [CONTINUE]
2 No
88 REFUSED

99 DON'T KNOW

SCREEN4 And is the home a single family detached home?

1 Yes [CONTINUE]
2 No
88 REFUSED
99 DON'T KNOW

I. HOME PURCHASE INFO

Q1. What year was your home built?

1: 2004,
2: 2003,
3: 2002,
4: 2001,
5: 2000 or before,
88 REFUSED
99 DON'T KNOW

Q2_MO

In what month and year did you purchase your new house?

1: January
2: February
3: March
4: April
5: May
6: June
7: July
8: August
9: September
10: October
11: November
12: December
88 REFUSED
99 DON'T KNOW

Q2_YR

And if which year?

1: 2004,
2: 2003,
3: 2002,
4: 2001,
5: 2000,
6: Before 2000
88 REFUSED
99 DON'T KNOW

Now we would like to know a little about the characteristics of the house you purchased?

Q3 How many bedrooms does it have?

1,
2,
3,
4,
5,
6,
7,
8,
9,
10
88 REFUSED
99 DON'T KNOW

Q4 How many bathrooms does it have? (use decimals for partial bathrooms)

FORMAT is n.n (2 and 1\2 baths = 2.5)
REFUSED IS 8.8 and DON'T KNOW is 9.9
____ Bathrooms

Q5 What is the approximate square footage of the house?

88888 is REFUSED 99999 is DON'T KNOW

Q6 What type of heating fuel does your house use?

1) Gas furnace
2) Electric (baseboard)
3) Electric (Central "forced air")
4) Heat pump
5) Propane
6) Oil
7) wood
77 OTHER SPECIFY
88 REFUSED
99 DON'T KNOW

Q7 Does your house have air conditioning? (Probe for central AC or window units)

1) Yes, Central
2) Yes, window units
3) Yes Both
4) None
88 REFUSED
99 DON'T KNOW

Q8 Did you have input on the final design of your home?

1 Yes
2 No
88 REFUSED
99 DON'T KNOW

IF Q8 (YES)

Q8A What specific features did you have input on?

77 OTHER SPECIFY
88 REFUSED
99 DON'T KNOW

DISPLAY: Using a 1 to 10 scale, where 1 is not at all important and 10 is extremely important, please tell me how important each of the following characteristics were to you in your selection of a new home?

How important was _____to you (RANDOMIZE)

Q9A # of bedrooms

Q9B Size of kitchen
Q9C Size of yard
Q9D Price
Q9E Amount of noise/traffic on the street
Q9F Energy efficiency features
Q9G Schools
Q9H Layout and design
Q9I Builder reputation
Q9J Overall home size
Q9K Commuting distance

FIND: Which of the following resources did you use to find your new home? [After reading list, ask/probe if any others]

1 Real estate agent
2 Real estate company (probe for name)
3 Real estate tabloid (free)
4 Real estate section in newspaper
5 Classified advertising
6 Internet search engine
7 Internet web sites (probe for names)
8 Friends/family
9 Builder/developer brochures/advertising
77 OTHER SPECIFY
88 REFUSED
99 DON'T KNOW

IF FIND (Real estate company)

FIND2 Which real estate companies did you use?

77 OTHER SPECIFY
88 REFUSED
99 DON'T KNOW

IF FIND(Internet Web Sites)

FIND7 Which Internet Web Sites did you use?

77 OTHER SPECIFY
88 REFUSED
99 DON'T KNOW

II. ENERGY STAR AWARENESS

Q10 Have you ever seen or heard of the ENERGY STAR label?

1 Yes
2 No
88 REFUSED
99 DON'T KNOW

IF Q10 IS NO, REFUSED or DON'T KNOW ASK Q11;

Q11 The ENERGY STAR Label is used to signify energy efficiency for appliances, lighting, and consumer products. The label has the word "energy" and a star symbol. Now that I've described ENERGY STAR label to you, do you recall seeing or hearing anything about it before this survey?

1 Yes
2 No
88 REFUSED
99 DON'T KNOW

IF Q10 (YES) or IF Q11 (YES) ELSE SKIP TO Q35;

Q12 On what types of products have you seen the ENERGY STAR label? (Multiple Response, Do Not Read)

1: Clothes washers
2: Dehumidifiers,
3: Dishwashers,
4: Refrigerators,
5: Room Air Conditioner,
6: Central AC,
7: Ceiling Fans,
8: Programmable Thermostat,
9: Furnace,
10: DVD,
11: VCR,
12: Television,
13: Cordless Phones,
14: CFL Bulbs,
15: Computers,
16: Copiers,
17: Printers,

18: Scanners
19: Windows/Doors/Skylights,
20: Water coolers,
77 OTHER SPECIFY
88 REFUSED
99 DON'T KNOW

Q13 Have you ever seen or heard of the ENERGY STAR label for homes?

1 Yes
2 No
88 REFUSED
99 DON'T KNOW

IF Q13 (YES) ELSE SKIP TO Q27;

Q14 How did you find out about Energy Star homes? (multiple response) DO NOT READ

1: Friends/Family/Word of mouth
2: Realtor
3: Lender
4: Builder
5: Internet
77 OTHER SPECIFY
88 REFUSED
99 DON'T KNOW

Q15 How would you rate the value of having an ENERGY STAR-certified home on a scale of 1-5, where 1 is not at all valuable and 5 is extremely valuable?

1: 1 NOT AT ALL VALUABLE,
2: 2
3: 3
4: 4
5: 5 EXTREMELY VALUABLE
88 REFUSED
99 DON'T KNOW

Q16 To the best of your knowledge, what does it mean if a home is ENERGY STAR – certified? (Do NOT READ probe 'anything else' to exhaustion).

1: Increased Insulation

2: Tight construction
3: High efficiency windows
4: Energy star appliances
5: Tight ducts
6: High efficiency furnace
7: High efficiency air conditioner
8: Lighting (CFLs or dedicated fixtures)
9: Construction materials are recyclable or less damaging
10: Downspouts disconnected
11: House positioned to reduce energy needs
12: House inspected by state energy office
13: NOTHING MORE
77 OTHER SPECIFY
88 REFUSED
99 DON'T KNOW

III. ENERGY STAR HOME EXPERIENCE

Q17 Is your new home an Energy Star home?

1 Yes
2 No
88 REFUSED
99 DON'T KNOW

IF Q17 (NO) ASK Q18 & Q19 ELSE SKIP TO Q20

Q18 Did you consider an Energy Star home when shopping for your new home?

1 Yes
2 No
88 REFUSED
99 DON'T KNOW

Q19 Why didn't you purchase and ENERGY STAR home? (DO NOT READ)

1: Cost
2: Didn't believe claims on energy savings/benefits
3: Inconvenient features
4: Hassle of certification
5: Wasn't offered for the house we wanted
77 OTHER SPECIFY

88 REFUSED
99 DON'T KNOW

Q20 What do you consider to be the benefits of having an Energy Star-certified home? (DO NOT READ LIST, PROBE FOR MULTIPLE RESPONSE TO EXHAUSTION)

1: Reduced draftiness
2: Better indoor air quality
3: Low energy bills
4: More energy efficient heating equipment (boiler, furnaces, heat pumps)
5: More energy efficient cooling equipment (central AC)
6: "Green" or environmentally friendly
7: House inspected by state energy office
8: NOTHING MORE
77 OTHER SPECIFY
88 REFUSED
99 DON'T KNOW

DISPLAY: Please tell me how much you agree or disagree with each of the following statements. Would you say that you strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, or strongly disagree that: [RANDOMIZE].

Q21A Energy Star homes are hard to find

Q21B ENERGY STAR homes are more comfortable than standard new homes

Q21C Most new homes are highly energy-efficient even if they are not ENERGY STAR certified

Q21D ENERGY STAR homes provide additional quality

Q21E ENERGY STAR homes are worth more

Q21F It's hard to understand the benefits of Energy Star homes

Q21G ENERGY STAR homes have lower energy bills

IF Q17(YES) CONTINUE ELSE SKIP TO Q27.

ENERGY STAR Homes Only

Q22 What did you consider to be the most important benefit of purchasing an ENERGY STAR home? (DO NOT READ)

1: Lower energy bills
2: More comfort

3: Higher quality
4: Environmentally friendly
77 OTHER SPECIFY
88 REFUSED
99 DON'T KNOW

Q23 Did the sales agent or builder promote the fact that your home was an ENERGY STAR home?

1 Yes
2 No
88 REFUSED
99 DON'T KNOW

IF Q23 (YES)

Q24 What ENERGY STAR features did the sales agent or builder promote? (DO NOT READ LIST)

1: Energy efficiency
2: Air quality
3: Overall quality
4: Cooling system
5: Heating system
6: Duct tightness
7: Tight construction/less draftiness
77 OTHER SPECIFY
88 REFUSED
99 DON'T KNOW

Q25 Did the sales agent or builder mention anything about the heating and cooling ducts in the home being tested for tightness to ensure they don't leak?

1 Yes
2 No
88 REFUSED
99 DON'T KNOW

IF Q25 (YES) ASK Q26

Q26. Do you view this as an important benefit?

1 Yes

2 No
88 REFUSED
99 DON'T KNOW

Home Features

DISPLAY: Please tell me which of the following items in your home are ENERGY STAR [READ LIST]?

Q27A Clothes Washer
Q27B Refrigerator
Q27C Air Conditioner
Q27D Dishwasher
Q27E Lighting Fixture(s)
Q27F Compact Fluorescent light bulbs (CFLs)
Q27G Furnace
Q27H Windows

DISPLAY: For each of the items I just mentioned did you consider buying ENERGY STAR but chose not to. Did you consider an ENERGY STAR _____

Q28A Clothes Washer
Q28B Refrigerator
Q28C Air Conditioner
Q28D Dishwasher
Q28E Lighting Fixture(s)
Q28F Compact Fluorescent light bulbs (CFLs)
Q28G Furnace
Q28H Windows 1) Clothes Washer

IF Q27H (YES) then continue ELSE SKIP to Q34

Q29: Please tell me which rooms have CFLs in them? READ LIST AND ACCEPT MULTIPLES.

1 Kitchen
2 Dining Room
3 Living Room
4 Family Room
5 Master Bedroom
6 Other Bedrooms
7 Bathrooms
8 Closets
9 Hall

10 Utility Room
11 Garage
12 Outdoor Lighting
13 Did not install
77 Other:_____
88 Refused
99 Don't Know

DISPLAY: For each room above == YES, How many CFLS are installed in …

Q29KITCH Kitchen
Q29DR Dining Room
Q29LR Living Room
Q29FR Family Room
Q29MBR Master Bedroom
Q29OBR Other Bedrooms
Q29BATH Bathrooms
Q29CLOS Closets
Q29HALL Hall
Q29UTIL Utility Room
Q29GAR Garage
Q29OUT Outdoor Lighting
Q29OTH OTHER

Q30. Have you ever replaced any of the CFLs?

1 Yes
2 No
88 REFUSED
99 DON'T KNOW

IF Q30(YES) CONTINUE ELSE SKIP to Q34

Q31 How many CFLs did you replace?

Enter in a number or 77 = all of them, 88 = refused or 99 = don't know

Q32. Why did you replace the CFL(s) [ACCEPT MULTIPLE ANSWERS]?

1: Burnt out
2: Too dim
3: Took to long to start up
4: Poor light color
77 Other:_____
88 Refused

99 Don't Know

Q33. Did you replace the CFL with another CFL or with a standard incandescent bulb?

1: Replaced with CFL
2: Replaced with incandescent
3: Both CFLs and incandescents
4: Haven't replaced yet
88 Refused
99 Don't Know

DISPLAY: Earlier you said you considered purchasing a _____but decided against it. Why didn't you buy an ENERGY STAR _____?

Q34A CLOTHES WASHER
Q34B REFRIGERATOR
Q34C AIR CONDITIONER
Q34D DISHWASHER
Q34E LIGHTING FIXTURES
Q34F CFL COMPACT FLUORESCENT LIGHT BULBS
77 OTHER SPECIFY
88 REFUSED
99 DON'T KNOW

Q35 How would you rate the value of having an energy-efficient home on a scale of 1-5, where 1 is not at all valuable and 5 is extremely valuable?

1: 1 NOT AT ALL VALUABLE
2: 2
3: 3
4: 4
5: 5 EXTREMELY VALUABLE
88 REFUSED
99 DON'T KNOW

DISPLAY: Please tell me how much you agree or disagree with each of the following statements. Would

you say that you strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, or

strongly disagree that: [RANDOMIZE].

Q36A Energy efficient homes are more comfortable than standard new homes

Q36B Most new homes are highly energy-efficient

Q36C Energy efficient homes have lower energy bills

Q36D Most newly built homes could be much more energy efficient

Q36E New homes often allow heated or air-conditioned air from inside to escape to the outside

Q36F New homes often have leaky air ducts

Q36G Energy efficient homes have a greater resale value

DISPLAY_____The Energy Star Label is awarded to homes that have been certified to be 15 percent more energy efficient than required by state law. As a result, ENERGY STAR CERTIFIED homes are more comfortable because they are less drafty and have better indoor air quality. These homes also require lower maintenance due to the tight construction, and independent testing required to earn the ENERGY STAR LABEL. Buyers of ENERGY STAR homes also enjoy lower energy bills because the homes are constructed with high efficiency heating and cooling systems, appliances, and windows.

!! _____Considering the home you just purchased, please tell me how much more, if anything, you would have been willing to pay if your home hade been an ENERGY STAR home, and included all the features and benefits I just described.\;

PROMPT IF RESPONDENT ASKS HOW MUCH THEY'LL SAVE IF THEY HAD AN ENERGY STAR HOME, TELL THEM.....

!! _____It is expected you will save 15 percent off of your energy bill.

1: They DID NOT ask,

2: They ASKED for percentage

AMT_SVD: ENTER DOLLAR AMOUNT THAT THEY WOULD PAY\,

____

88888 is REFUSED 99999 is DON'T KNOW\;

DEMOGRAPHICS

The following questions are for classification purposes only. All your answers are kept confidential.

Q38 Including yourself, how many people live in your home? Please include children.?

1

2

3

4

5
6
7
8
9
10
11
12
13
14
15
More than 15
88 REFUSED
99 DON'T KNOW

Q39 Please tell me which of the following categories best describes your age.

1: Less than 25
2: Between 25 and 34
3: Between 35 and 44
4: Between 45 and 54
5: Between 55 and 64
6 65 and older
88 REFUSED
99 DON'T KNOW

Q40 Which of the following describes your educational background?

1: Less than high school,
2: High school or GED
3: Some college
4: Technical College (2 year degree)
5: 4 Year college
6: Graduate degree

Q41 Please stop me when I read the price range that includes the price you paid for your new home

1: Less than 150K
2: 150 – 199K
3: 200 – 249K

4: 250 – 299K
5: 300 – 399K
6: 400 – 499K
7: 500K and over
88 REFUSED
99 DON'T KNOW

IF Q17 (YES)

Q42 Did you pay more for your house because it was ENERGY STAR-certified?

1 Yes
2 No
88 REFUSED
99 DON'T KNOW

IF Q42 (YES)

Q43 How much more did you pay for your house because it was ENERGY STAR-certified?

Dollar amount (whole dollars) or
88888 is REFUSED 99999 is DON'T KNOW

Q44 Which of the following best represents your annual household income (IF NEEDED, from all sources in 2003, before taxes)?

1: << 40K
2: Between 40K and 60K
3: Between 61K and 80K
4: Between 81K and 120K
5: Over 120K
88 REFUSED

VNAME For verification purposes only, may I have your name.

GENDER Record M or F .

Those are all the questions I have for you. Thank you very much for your time.

NEEA: Energy Star Homes Evaluation -2- June 18, 2004

8. ENERGY STAR LIGHTING DISTRIBUTOR INTERVIEW GUIDE

8/13/04

Hello, my name is _____ calling on behalf of ECONorthwest, an energy market research firm based in Portland. First, I want to assure you that this is not a sales call. The Northwest Energy Efficiency Alliance has asked us to help them better understand the market for energy-saving features in the residential new home new home construction market. Could I speak to _____ or could I speak to the person at your firm most involved in supplying the residential new construction market?

[IF NECESSARY:] This survey is extremely important to the Alliance's understanding of the new homes market, and will help in the design and delivery of programs that will directly affect firms like yours. We're willing to work around your company's schedule to find a time when the appropriate person at your firm can speak with us for about twenty minutes.

[IF NECESSARY:] The Northwest Energy Efficiency Alliance is a non-profit corporation supported by electric utilities, public benefits administrators, state governments, public interest groups and energy efficiency industry representatives. These entities work together to make affordable, energy-efficient products and services available in the marketplace. The Alliance is currently in the process of developing and offering a Northwest regional version of the national ENERGY STAR homes program. That's why they are looking for input from builders, distributors, and other firms who operate in the Pacific Northwest new homes market.

[WHEN CORRECT PERSON IS ON-LINE:]

Name: _____
Company: _____
Title: _____
Phone: _____

Hello, my name is _____ and I'm calling on behalf of ECONorthwest, an energy market research firm based in Portland. First, I want to assure you that this is not a sales call. The Northwest Energy Efficiency Alliance has asked us to help them better understand the market for energy-saving features in the residential new home construction market. We are talking to lighting distributors to get their perspectives on energy efficient lighting in the new homes market. Can I confirm that you're involved in the sale of lighting equipment for <u>new</u> homes in the Pacific Northwest?

If YES, continue. If NO, thank and terminate: For this interview, we are primarily interested in the role of distributors in supplying lighting for new homes. Thank you for your time.

I. INTRODUCTION AND BUSINESS SCOPE

I'd like to start with some general information about you and your company.

1. How long has (NAME OF COMPANY) been in business?
2. About how many full-time employees does your company employ? _____ How many of those are outside of the Northwest? _____
3. How would you divide your business among the residential and commercial/industrial market?

   Residential _____ percent

   C/I _____ percent
4. And approximately what percentage of your residential business is for new homes as opposed to retrofit or remodeling applications?

   New construction _____ percent
5. Approximately how many new homes does your organization supply lighting for per year? _____
6. Do you sell ENERGY STAR qualified lighting fixtures and CFLs?

II. STRUCTURE OF THE MARKET

What percentage of the lighting equipment that you sell for residential applications is purchased from each of the following sources:

_____ Direct from the manufacturer
_____ From the manufacturer through a manufacturer's rep
_____ From a manufacturer-owned distributor/wholesaler
_____ From an independent distributor/wholesaler
_____ Other _____

7. What percentage of the lighting equipment you sell for residential applications is sold through each of the following:

_____ Directly to the homeowner or buyer
_____ Directly to the builder
_____ To a lighting or electrical contractor
_____ To a general contractor
_____ To a retailer
_____ Other _____

8. For residential new construction projects, who influences the type of lighting to be installed? (DO NOT READ LIST, CHECK ALL THAT APPLY.) If more than one, which of these is most important? (LIST AS "MI") How about for new construction projects (are there any differences?)

   Owner or buyer _____
   Builder or developer _____

Lighting contractor _____
Lighting designer or architect _____
Lighting distributor _____
Other _____ _____

9. And approximately what percentage of the lighting you sold for <u>new</u> residential installations over the past year was accounted for by each of the following types of equipment:

	%
Incandescent fixtures	____
Compact fluorescent fixtures	____
T12 fluorescent fixtures	____
T8 fluorescent fixtures	____
T5 fluorescent fixtures	____
Halogen fixtures	____
CFL bulbs	____
Photosensors and other controls	____
Other (specify) _____	____

10. Have you ever had any problems with availability of energy efficient lighting equipment through your regular suppliers? (Probe for nature of problems, if any; e.g., not available at all, takes too long, too few suppliers, etc. Also if problem has been resolved.)
11. Have you encountered any performance or reliability problems with any of the energy efficient lighting you sell for residential applications? (Probe for current problem, etc.)
12. How often do you recommend energy efficient lighting for new residential applications? (probe for frequency, type of lighting recommended, extent to which recommendations are followed.)

III. AWARENESS/KNOWLEDGE OF ES HOMES PROGRAM

13. Have you ever heard of the ENERGY STAR label for new homes? (Probe for when and where first heard, what information sources used to investigate, credibility of information sources)

    1) Yes
    2) No (Skip to Q 17)
    88) Don't know (Skip to Q 17)
    99) Refused (Skip to Q 17)

14. Have you supplied lighting equipment for any new homes in the ENERGY STAR Homes program?

    1) Yes
    2) No (Skip to Q 15)
    88) Don't know (Skip to Q 15)
    99) Refused (Skip to Q 15)

15. How many new ENERGY STAR homes have you supplied equipment for in the past year?

    1) Number of homes:_____ (any existing?)
    88) Don't know
    99) Refused

Next I would like to ask you about specific lighting-related ENERGY STAR homes features.

16. To the best of your knowledge, what are the primary lighting-related requirements of the ENERGY STAR Homes program? (CHECK ALL THAT ARE MENTIONED)

    1) Compact fluorescent fixtures (what percent?)
    2) Compact fluorescent bulbs (what percent?)
    3) T-5s
    4) T-8s
    5) Other fluorescent
    6) Controls
    7) Daylighting
    7) Other, please specify:_____
    88) Don't know
    99) Refused

17. Which of the ENERGY STAR requirements, if any, pose (or would pose) significant challenges to your firm in supplying qualifying equipment?

18. What do you view as the primary benefits to the homebuyer of ENERGY STAR qualified lighting? Any disadvantages?

19. What do you view as the primary benefits to the builder of ENERGY STAR qualified lighting? Any disadvantages?

20. What are the problems, if any, ENERGY STAR qualified lighting? (Probe for most important)

    1) Light output
    2) Light quality
    3) Too expensive

4) Reliability
5) Noise/electrical interference
6) Lack of availability
7) Other, please specify:_____
8) No problems
88) Don't know
99) Refused

21. What kinds of assistance would help you more effectively market ENERGY STAR qualifying lighting equipment?
    1) training on how to sell ENERGY STAR lighting
    2) materials that show dollar savings for ES lighting
    3) materials that show other benefits of ES lighting
    4) advertising to build home buyer awareness and interest in energy efficiency
    5) other _____
22. Would you be interested in attending training that would help you more effectively work with the ENERGY STAR new homes program?
23. Based on your experience, on a lighting installation that would otherwise cost $2,000, about how much -- if anything -- would meeting the ENERGY STAR requirements add to the cost of the installation? Why do you say that?
24. Do you have any final comments on the ENERGY STAR new homes program and how it affects lighting distributors like you?

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

9. ENERGY STAR REALTOR INTERVIEW GUIDE

8/16/04

Hello, my name is _____ calling on behalf of ECONorthwest, an energy market research firm based in Portland. First, I want to assure you that this is not a sales call. The Northwest Energy Efficiency Alliance has asked us to help them better understand the market for energy-saving features in the residential new home new home construction market. Could I speak to _____ or could I speak to one of the senior real estate agents in your organization?

[IF NECESSARY:] This survey is extremely important to the Alliance's understanding of the new homes market, and will help in the design and delivery of programs that will directly affect firms like yours. We're willing to work around your company's schedule to find a time when the appropriate person at your firm can speak with us for about twenty minutes.

[IF NECESSARY:] The Northwest Energy Efficiency Alliance is a non-profit corporation supported by electric utilities, public benefits administrators, state governments, public interest groups and energy efficiency industry representatives. These entities work together to make affordable, energy-efficient products and services available in the marketplace. The Alliance is currently in the process of developing and offering a Northwest regional version of the national ENERGY STAR homes program. That's why they are looking for input from builders, realtors, and other firms who operate in the Pacific Northwest.

[WHEN CORRECT PERSON IS ON-LINE:]

Name: _____
Company: _____
Title: _____
Phone: _____

Hello, my name is _____ and I'm calling on behalf of ECONorthwest, an energy market research firm based in Portland. First, I want to assure you that this is not a sales call. The Northwest Energy Efficiency Alliance has asked us to help them better understand the market for energy-saving features in the residential new home construction market. We are talking to realtors and real estate sales agents to get their perspectives on energy efficiency in the new homes market. Can I confirm that you're involved in selling new homes in the Pacific Northwest?

If YES, continue. If NO, thank and terminate: For this interview, we are primarily interested in the role of realtors in selling new ENERGY STAR homes. Thank you for your time.

I. INTRODUCTION AND BUSINESS SCOPE

1. Approximately how many home sales per year does your organization handle (either as listing broker, cooperating broker, or buyer's agent) in a given year? [PROBE WHETHER THEY ARE TALKING ABOUT THE INDIVIDUAL BROKER, THE LOCAL OFFICE, OR THE UMBRELLA ORGANIZATION – EG REMAX, CENTURY 21. WE WANT TO GET THE LARGEST ORGANIZATIONAL SCOPE THAT THE RESPONDENT IS THOROUGHLY FAMILIAR WITH.]

2. To get a sense of your overall residential sales mix, approximately what proportion of your sales (by number of homes) are:

   New home sales
   Existing home sales

3. And approximately what percentage of your new home sales are:

   Single family detached
   Single family attached (town or row houses)
   Multifamily and condos
   Mobile or manufactured homes

4. And how would you break down the percentage of your new SFD home sales (by number of homes, not value) by:

   Custom homes
   Production homes

5. Approximately how many builders do you sell new homes for? Does a single builder use a single realtor or agent exclusively, or can you sell new homes for any builder?

6. What are the typical marketing arrangements for the new homes you sell? Does the builder place ads and handle advertising, etc. or is that handled by the realtor, or do both play a role?

7. IF REALTOR PLAYS A ROLE: Which of the following methods do you use to promote the homes you sell?

   1) Newspaper ads
   2) TV/Radio
   3) Real estate ads
   4) Outdoor signs
   5) Model homes

6) Brochures / Sales materials

7) Internet

8) Multiple listing service

9) Other_____

88) Don't Know

99) Refused

II. AWARENESS/KNOWLEDGE OF ES HOMES PROGRAM

Next I would like to ask you about energy efficiency and its role in the new homes market.

8. What components of the home do you think are most important for reducing home energy consumption? [DO NOT READ; CIRCLE ALL; MARK CHOICE THAT IS FIRST MENTION.] (Probe for reason for most important and relative importance of others.)

   1) Air conditioner/HVAC
   2) Appliances
   3) Clock thermostat
   4) Daylighting
   5) Ducts – tight ducts, insulated ducts
   6) Fans (attic, whole-house)
   7) Furnace
   8) Using more gas or electric
   9) Heat pump
   10) Insulation (Roof)
   11) Insulation (Walls)
   12) Windows
   13) Lighting
   14) Water Heater
   15) Whole-house Design
   16) Other _____
   88) Don't Know
   99) Refused

9. Have you ever heard of the ENERGY STAR label for new homes? (Probe for when and where first heard, what information sources used to investigate, credibility of information sources)

   1) Yes
   2) No (Skip to Q 17)

88) Don't know (Skip to Q 17)

99) Refused (Skip to Q 17)

10. To the best of your knowledge, what do you believe are the primary benefits to the realtor, if any, of selling ENERGY STAR Homes? (DO NOT READ)

    1) Higher quality
    2) Higher price
    3) Sells faster
    5) Promotion assistance
    6) Reduced customer complaints/callbacks
    7) Other, please specify:_____
    88) Don't know
    99) Refused

11. And what, if any, are the primary disadvantages to the realtor of selling ENERGY STAR homes?

12. Would you say the disadvantages outweigh the advantages, or vice versa? Why do you say that?

13. Please tell me how much you agree or disagree with each of the following statements, using a 1 to 5 scale, where 1 means you strongly disagree and 5 means you strongly agree. [RANDOMIZE].

    The ENERGY STAR label makes homes more marketable to homebuyers

    ENERGY STAR-certified homes tend to be higher quality overall

    ENERGY STAR-certified homes sell faster than non-ENERGY STAR homes

    ENERGY STAR-certified homes sell for a higher price than non-ENERGY STAR homes

    Builders of ENERGY STAR homes enjoy a competitive advantage in the market

    Homes built to code are energy efficient enough

14. Have you sold any new homes for builders in the ENERGY STAR Homes program?

    1) Yes
    2) No (Skip to Q 24)
    88) Don't know (Skip to Q 24)
    99) Refused (Skip to Q 24)

15. How many ENERGY STAR homes have you sold in the past year?

    1) Number of homes:_____ (new or existing?)
    88) Don't know
    99) Refused

16. Would you recommend that builders you work with build their homes to ENERGY STAR standards? Why or Why Not?

Next I would like to ask you about the marketability of specific ENERGY STAR homes features and of the ENERGY STAR brand overall.

17. To the best of your knowledge, what are the primary energy-saving measures that the ENERGY STAR Homes program includes? (CHECK ALL THAT ARE MENTIONED)

    1) Energy efficient windows
    2) Energy efficient HVAC
    3) Duct Sealing
    4) Duct testing
    5) Energy efficient lighting
    6) Energy efficient appliances
    7) Insulation
    8) Whole house design
    9) Other, please specify:_____
    88) Don't know
    99) Refused

18. What do you view as the primary benefits to the home buyer of high efficiency heating and cooling equipment? Any other benefits? Any disadvantages?

19. What do you view as the primary benefits to the home buyer of high efficiency lighting? Any other benefits? Any disadvantages?

20. What do you view as the primary benefits to the homebuyer of ENERGY STAR appliances? Any other benefits? Any disadvantages?

21. What do you view as the primary benefits to the home buyer of high efficiency windows? Any other benefits? Any disadvantages?

22. One of the requirements of the ENERGY STAR new homes program is that ducts be sealed and tested to certify the home as meeting ENERGY STAR standards. What, if any, do you see as the primary benefit to the home buyer of this testing and certification? Any other benefits? Any disadvantages?

23. In selling ENERGY STAR homes, do you (or would you) actively promote the fact that homes are ENERGY STAR?

    1. Yes (Go to Q 23)
    2. No (Skip to Q 24)
    88) Don't know (Skip to Q 24)
    99) Refused (Skip to Q 24)

24. What specific benefits, if any, do you (or would you) promote about ENERGY STAR homes?

    1) Specify:_____
    2) Don't promote any particular feature, just general ENERGY STAR label
    3) Do not promote
    88) Don't know
    99) Refused

25. Based on your experience, which energy saving features are most marketable to consumers?

26. What kinds of assistance would help you more effectively promote ENERGY STAR new homes in the marketplace?

    25. training on how to sell ENERGY STAR features
    26. materials that show dollar savings for ES homes
    27. materials that show other benefits of ES homes
    28. advertising to build home buyer awareness and interest in energy efficiency
    29. other _____

27. Would you be interested in attending training on ENERGY STAR homes that would help you more effectively promote the ENERGY STAR features of new homes?

28. Based on your experience, on a home that would otherwise sell for $200,000, about how much -- if anything -- would the ENERGY STAR label add to the home's value? Why do you say that?

29. What are the dominant publications oriented to realtors in your area that you and your colleagues read? Also, are there specific local, regional, or national associations that might provide a good vehicle for disseminating information about the ENERGY STAR new homes program?

30. Do you have any final comments on the ENERGY STAR new homes program and how it affects realtors and real estate agents like you?

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

10. ENERGY STAR HVAC CONTRACTOR INTERVIEW GUIDE

8/16/04

Hello, my name is _____ calling on behalf of ECONorthwest, an energy market research firm based in Portland. First, I want to assure you that this is not a sales call. The Northwest Energy Efficiency Alliance has asked us to help them better understand the market for energy-saving features in the residential new home new home construction market. Could I speak to _____ or could I speak to the person at your firm most involved in new construction work?

[IF NECESSARY:] This survey is extremely important to the Alliance's understanding of the new homes market, and will help in the design and delivery of programs that will directly affect firms like yours. We're willing to work around your company's schedule to find a time when the appropriate person at your firm can speak with us for about twenty minutes.

[IF NECESSARY:] The Northwest Energy Efficiency Alliance is a non-profit corporation supported by electric utilities, public benefits administrators, state governments, public interest groups and energy efficiency industry representatives. These entities work together to make affordable, energy-efficient products and services available in the marketplace. The Alliance is currently in the process of developing and offering a Northwest regional version of the national ENERGY STAR homes program. That's why they are looking for input from builders, contractors, and other firms who operate in the Pacific Northwest new homes market.

[WHEN CORRECT PERSON IS ON-LINE:]

Name: _____
Company: _____
Title: _____
Phone: _____

Hello, my name is _____ and I'm calling on behalf of ECONorthwest, an energy market research firm based in Portland. First, I want to assure you that this is not a sales call. The Northwest Energy Efficiency Alliance has asked us to help them better understand the market for energy-saving features in the residential new home construction market. We are talking to HVAC contractors to get their perspectives on energy efficiency in the new homes market. Can I confirm that you're involved in the installation of heating and cooling equipment for <u>new</u> homes in the Pacific Northwest?

If YES, continue. If NO, thank and terminate: For this interview, we are primarily interested in the role of contractors in installing equipment in new homes. Thank you for your time.

I. INTRODUCTION AND BUSINESS SCOPE

1. Approximately how many residential HVAC equipment installations per year does your organization handle?

2. To get a sense of your overall business mix, approximately what proportion of your installations (by number of homes) are:

   New homes
   Existing homes

3. Approximately what percentage of your new installations are:

   Single family detached
   Single family attached (town or row houses)
   Apartments and condos
   Mobile or manufactured homes

4. And approximately what percentage of the new home installations over the past year had each of the following types of equipment:

   Gas furnace only (no AC)
   Air conditioning (exclude heat pumps)
   Heat pump
   Other (specify)

5. Thinking about your new home installations, what percentage of those did you also do the ductwork for? (IF LESS THAN 100%: Who did the ductwork on the other installations?)

6. Approximately how many builders do you do installations for? Does a single builder use a single contractor exclusively, or do they typically use multiple contractors?

7. In the typical new home installation, how is the HVAC equipment selected? Is there a spec that you meet with equipment of your own choosing? Do you install what the home buyers specifies? Probe for contractor's role, if any, in specifying equipment)

Next I would like to ask you about the efficiency of the heating and cooling systems that you installed in new homes over the past year.

8. Approximately what percentage of the gas furnaces you install in new homes are high efficiency models (AFUE 90 or higher)? _____ percent.

9. (IF HEAT PUMPS) Approximately what percentage of the heat pumps you install are high efficiency models with an HSPF of 8.0 or higher? _____ percent

10. What percentage of the central air conditioning systems that you install are high efficiency models with a SEER of 12 or higher? _____ percent. 13 or higher? _____ percent.

11. Have you ever had any problems with availability of high efficiency heating or cooling equipment through your regular suppliers? (Probe for nature of problems, if any; e.g., not available at all, takes too long, too few suppliers, etc.)

II. AWARENESS/KNOWLEDGE OF ES HOMES PROGRAM

12. Have you ever heard of the ENERGY STAR label for new homes? (Probe for when and where first heard, what information sources used to investigate, credibility of information sources)

    1) Yes
    2) No (Skip to Q 17)
    88) Don't know (Skip to Q 17)
    99) Refused (Skip to Q 17)

13. Have you installed HVAC equipment for any new homes in the ENERGY STAR Homes program?

    1) Yes
    2) No (Skip to Q 15)
    88) Don't know (Skip to Q 15)
    99) Refused (Skip to Q 15)

14. How many ENERGY STAR homes have you installed equipment for in the past year?

    1) Number of homes:_____ (new or existing?)
    88) Don't know
    99) Refused

Next I would like to ask you about specific HVAC-related ENERGY STAR homes features.

15. To the best of your knowledge, what are the primary HVAC-related requirements of the ENERGY STAR Homes program? (CHECK ALL THAT ARE MENTIONED)

    1) Energy efficient cooling (what SEER rating?)
    2) Energy efficient heating (what AFUE, HSPF?)
    3) Duct Sealing
    4) Duct testing
    5) Insulation
    6) Whole house design
    7) Equipment sizing
    7) Other, please specify:_____
    88) Don't know
    99) Refused

16. Which of the ENERGY STAR requirements, if any, pose (or would pose) significant challenges to your firm in doing the HVAC and ductwork installation? (probe for ventilation, testing, equipment availability, difficult installation, need to train technicians, need to do mastic sealing of ducts, etc.)

17. IF DUCT TESTING NOT MENTIONED: Are you familiar with duct tightness testing and duct sealing for new homes?

    1) Yes
    2) No (SKIP TO Q26)
    88) Don't Know (SKIP TO Q26)
    99) Refused (SKIP TO Q26)

18. Have duct tightness tests been performed for any of the new homes where you installed HVAC equipment?

    1) Yes (Probe for percentage, types of homes tested)
    2) No (Skip to Q 22)
    3) Do for ENERGY STAR Homes only
    88) Don't know (Skip to Q 22)
    99) Refused (Skip to Q 22)

19. Who performed the duct tightness testing for those homes?

    1) We did (HVAC contractor)
    2) Third Party Consultant
    3) Utility staff
    4) Alliance / program staff
    5) Other, please specify:_____
    88) Don't know
    99) Refused

20. For a new home to qualify for the ENERGY STAR label, the duct tests must conform to the Performance Testing Comfort Systems (PTCS) procedures and some contractors have been officially certified as testers that conform to the PTCS standard. (IF CONTRACTOR DID DUCT TESTS) Is your firm PTCS certified?

    1) Yes, we are PTCS certified
    2) No, we are not officially PTCS certified
    88) Don't know
    99) Refused

21. IF OTHER PARTY DID TESTS: Do you know if the duct testers you work with are officially PTCS certified?

    1) Yes, duct testers are PTCS certified
    2) No, duct testers are not officially PTCS certified
    88) Don't know

99) Refused

22. What do you view as the primary benefits to the home buyer of duct tightness testing? Any disadvantages?
23. What do you view as the primary benefits to the builder of duct tightness testing? Any disadvantages?
24. What do you view as the primary benefits to you as the HVAC contractor of duct tightness testing?
25. What are the problems, if any, with duct testing? (Probe for most important)
    1) Time consuming
    2) Tests inaccurate, do not reflect actual equipment performance
    3) Too expensive
    4) Delays in scheduling testers
    5) Testers not available in area
    6) Lack of competence among testers
    7) Other, please specify:_____
    8) No problems
    88) Don't know
    99) Refused
26. What kinds of assistance would help you more effectively market and/or install ENERGY STAR qualifying HVAC equipment?
    1) training on how to do duct sealing and testing
    2) training on how to sell ENERGY STAR equipment
    3) materials that show dollar savings for ES equipment
    4) materials that show other benefits of ES equipment
    5) advertising to build home buyer awareness and interest in energy efficiency
    6) other _____
27. Would you be interested in attending training that would help you more effectively work with the ENERGY STAR new homes program?
28. Based on your experience, on a system that would otherwise cost $4,000 to install, about how much -- if anything -- would meeting the ENERGY STAR requirements add to the cost of the installation? Why do you say that?
29. Do you have any final comments on the ENERGY STAR new homes program and how it affects HVAC contractors like you?

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