

# ENERGY STAR Homes Northwest Program

## Second Market Evaluation Progress Report

A Report to the  
Northwest Energy  
Efficiency Alliance

**ECON**orthwest

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## **EXECUTIVE SUMMARY**

### **INTRODUCTION AND BACKGROUND**

This report is the second 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 Consumer 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 the ENERGY STAR Homes Northwest specification, which was designed specifically for the states of Washington, Oregon, Idaho, and Montana. Homes built to this specification 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 second evaluation report is to present the findings of the process evaluation conducted on the Alliance's ENERGY STAR Homes Northwest program. This includes findings from multiple interviews with the market actors and agencies involved with the program, including builders, contractors, utilities, and state energy offices. The report also includes current data on the new home market in the Northwest as well as information on program progress toward its goals. The cost effectiveness modeling done by the Alliance for the ENERGY STAR Homes Northwest program is also reviewed in this report.

### **PROGRAM OVERVIEW**

The ENERGY STAR Homes Northwest program officially began in May 2004 and has a goal of achieving a 20 percent market share for ENERGY STAR homes within the residential new construction market by the end of 2009. The ENERGY STAR Homes Northwest program markets the 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 prescriptive specification that includes a package of prescribed conservation measures and is designed to be fuel-neutral.

## 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 Insulation	R-8	Electric: N/A Propane: R-8
Duct Sealing	Mastic	Electric: N/A Propane: Mastic
Duct Tightness	< 0.06 CFM per ft <sup>2</sup> Floor OR 75 CFM Total @ 50 Pa	Electric N/A Propane: same as BOP1
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<sup>1</sup> 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.

TCO #8 allows for trade-offs between hot water heater efficiency and insulation requirements.

TCO #9 provides for hybrid gas unit heaters with electric resistance zonal heating.

TCO #10 allows for hybrid “ductless split” heat pumps with electric resistance zonal heating

TCO #11 provides for propane furnaces (90 AFUE minimum)

These TCOs help the program to include a greater range of equipment options, many of which are driven by alternative construction techniques.

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 performance testers;
- A quality assurance process requiring that:
  - Every central HVAC system be performance tested (unless approval is received from the State Certification Office (SCO) to test only a sample of homes);
  - Every home be inspected by a certified verifier for compliance with ENERGY STAR Northwest project specifications (unless the SCO approves that only a sample of homes need to be verified); and

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<sup>1</sup> 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.

- 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](http://www.northwestenergystar.com) as an additional information resource for builders and potential new homebuyers.
- 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.

## EVALUATION OVERVIEW

As discussed in the previous section, this evaluation report focuses on the process evaluation of the ENERGY STAR Homes Northwest project. This includes in-depth interviews with all of the major entities that are involved in implementing the ENERGY STAR Homes program. In addition, current market data on new home construction and program progress toward goals is presented to provide context for the process evaluation results. The third major component of this report is a review of the underlying assumptions used by the Alliance in its cost effectiveness modeling for the program.

### Market Characterization

One of the primary tasks of the evaluation is to characterize the current new home construction market in the region. In particular, the objectives of the market characterization 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 current progress toward program goals, including the number of ENERGY STAR homes certified and committed and the number of builders and verifiers participating in the program.

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

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.

The following table 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 ENERGY STAR Homes Northwest performance testing 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.

will be updated in the future based on information that will become available upon completion of several other Alliance research projects.

## MARKET CHARACTERIZATION

### Residential New Construction Market Overview

The following table shows the number of new homes built by state since 1998. Single family home construction activity has been strong throughout the region during recent years and for the entire region, new housing increased by 14 percent in 2004 relative to 2003.

#### Single Family New Construction by State (1998-2005)

Year	Washington	Oregon	Idaho	Montana	Total	Percent Change from Prior Year
1998	28,644	16,936	10,277	1,485	57,342	
1999	28,111	16,595	10,497	1,607	56,810	-0.9%
2000	25,471	15,619	9,681	1,565	52,336	-7.9
2001	26,736	16,323	9,738	1,790	54,587	4.3
2002	30,239	17,413	10,845	2,050	60,547	10.9
2003	33,091	17,875	12,601	2,340	65,907	8.9
2004	36,153	20,728	15,106	3,423	75,410	14.4
2005 (Jan - June)	20,168	12,642	9,563	1,898	44,271	

**Source:** US Census, Housing Units Authorized by Building Permit Report

The next table shows the distribution of builders based on home volume throughout the region. The vast majority of builders (78 percent) are small builders constructing four or less homes a year. In contrast, there are just 65 large builders (constructing 100 homes or more) in the program area, which comprise less than 1 percent of the overall builder population and 40 percent of homes constructed.

#### Builders by Region and Volume (2004-2005)

Region	Number of Units Built (Annually)					Total	Average
	1-4	5-9	10-24	25-99	> 100		
Inland Empire	396	64	31	16	8	515	8.9
Portland-Vancouver	1,267	199	127	49	20	1,662	7.8
Puget Sound	1,377	194	140	71	24	1,806	8.8
Southern Idaho	1,324	190	123	47	11	1,695	7.2
Western Montana	1,217	181	67	23	2	1,490	4.6
Total	5,581	828	488	206	65	7,168	7.3

**Source:** *Construction Monitor*.

## Participation

The table below presents the number of builders who have contractually agreed to participate in the ENERGY STAR Homes Northwest program as of July 2005. Results are shown by state and builder volume and include the program's 2005 builder participation goals. Based on participation to date, it appears that the program is on track to meet its region-wide 2005 builder recruitment goals for large-volume and small-volume builders for 2005. At the state level, the program has significantly exceeded its Idaho recruitment goal for small-volume builders but as of July had not yet met goal its of recruiting two large-volume builders in that state. As of July, the program was significantly short of its small-volume builder goal in Washington.

### 2005 Participating Builders (Jan-July 2005)

State	Small-Volume Builders (<100 homes/year)		Large-Volume Builders (100+ homes/year)	
	2005 Actual	205 Goal	2005 Actual	2005 Goal
WA	15	39	4	4
OR	41	47	7	4
ID	45	21	0	2
MT	7	9	0	0
<b>Total</b>	108	115	11	10

**Source:** *PECI Monthly Status Report*. Data as of July 2005.

**Note:** For this table, the 2005 goal in the Spokane / Northern Idaho region is split evenly between ID and WA. Totals may not add up due to rounding.

The following table shows the builder recruitment results and goals since the program began in May 2004. Overall, the program has met its builder recruitment goals to date. For Washington, recruitment of smaller builders is significantly lower than the target while large-volume builder recruitment has exceeded the goal set for that state.

### Cumulative Total of Participating Builders (May 2004-July 2005)

State	Small-Volume Builders (<100 homes/year)		Large-Volume Builders (100+ homes/year)	
	Cumulative Actual	Cumulative Goal	Cumulative Actual	Cumulative Goal
WA	39	81	13	7
OR	70	69	9	7
ID	87	39	1	4
MT	25	16	0	0
<b>Total</b>	221	204	23	17

**Source:** ENERGY STAR Northwest Homes Database, *PECI Monthly Status Report*, data as of July 2005.

**Note:** For this table, the 2005 goal in the Spokane / Northern Idaho region is split evenly between ID and WA. Totals may not add up due to rounding.

The next table shows the combined recruitment totals and goals for 2004 and 2005 for both verifiers and performance testers. As of July, recruitment in Washington, Idaho, and Montana had not yet reached the combined 2004/2005 goals. .

**Cumulative Total of Verifiers and Performance Testers (May 2004-July 2005)**

State	Verifiers		Performance Testers	
	Cumulative Actual	Cumulative Goal	Cumulative Actual	Cumulative Goal
WA	23	33	31	51
OR	25	20	71	42
ID	10	22	8	20
MT	15	18	9	12
<b>Total</b>	73	93	119	124

**Source:** ENERGY STAR Northwest Homes Database, *PECI Monthly Status Report*, data as of July 2005.

**Note:** For this table, the 2005 goal in the Spokane / Northern Idaho region is split evenly between ID and WA. Totals may not add up due to rounding.

The table below shows the construction activity achieved through the ENERGY STAR Homes program as of July 2005. “Certified” homes refer to those that have been constructed and certified as ENERGY STAR-compliant by the program. “Initiated” homes are those that have construction underway but not yet completed and have been entered into the ENERGY STAR Northwest Homes Database. “Total Forecast Completions” as reported in the PEGI monthly status report are estimates from the Builder Outreach Specialists (BOSs) for the number of homes to be certified in 2005 based on their conversations with participating builders. In the table below, we report “Other Forecast Completions” that exclude both “Certified” and “Initiated” homes. In 2005, the average length of time for a home to go from “Initiated” to “Certified” was 87 days, or about 2 months.

## 2005 ENERGY STAR Home Construction Status (Jan-July 2005)

State	Certified	Initiated	Other Forecast Completions	Total Forecast Completions	2005 Goal	Total 2004 Homes (All New Homes)	Forecast Completions as a Share of 2004 Total Homes
WA	56	159	629	844	962	36,153	2.3%
OR	80	206	286	572	538	20,728	2.8%
ID	82	152	91	325	455	15,106	2.2%
MT	8	19	7	34	45	3,423	1.0%
<b>Total</b>	<b>226</b>	<b>536</b>	<b>1013</b>	<b>1,775</b>	<b>2,000</b>	<b>75,410</b>	<b>2.4%</b>

**Source:** ENERGY STAR Northwest Homes Database, US Census, PEGI Monthly Activity Reports, ECONorthwest. Data as of July 31, 2005.

**Note:** "Forecast Completion" figures are the result of BOS discussions with builders about developments in their territory and are therefore the initial builder estimates of the total number of homes to be certified in 2005. Prior to March 2005, these data were not collected under that definition and therefore are not shown in the table above.

At the end of July, the program forecast that 1,775 homes will be certified in 2005. However, as of July 2005 only 226 homes have been certified, with another 536 initiated. If all of the 536 homes that have been initiated are certified by year-end, it would require that an additional 1,013 homes be initiated and completed by year-end to realize the 1,775 forecast. Although the number of homes certified per month has been increasing (as shown in the figure below), it seems unlikely that the most recent 2005 ENERGY STAR homes forecast will be met.

homebuilders in the region. Current participation data were taken from the program tracking database maintained by PECEI. (A summary of results from the market characterization was presented earlier in this executive summary.)

### **In-Depth 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 builders, verifiers, performance testers, realtors, HVAC contractors, electrical distributors and contractors that are involved in the program. Interviews were also conducted with staff for each state’s SCO and their Quality Assurance (QA) specialists. All interviews focused on program implementation issues and were designed to elicit suggestions for improving the current program.

The sample sizes for each interview group are shown in below. All interviews were conducted by phone during April-June of 2005. Note that some of the people interviewed have more than one role in the program; an HVAC contractor or verifier may also be a performance tester, for example. In these cases, the respondent is given a separate set of questions addressing each role and is reflected as two separate interviews in the table below. Additional detail on each sample and on recruitment methods is provided in the following chapters that discuss the interview results.

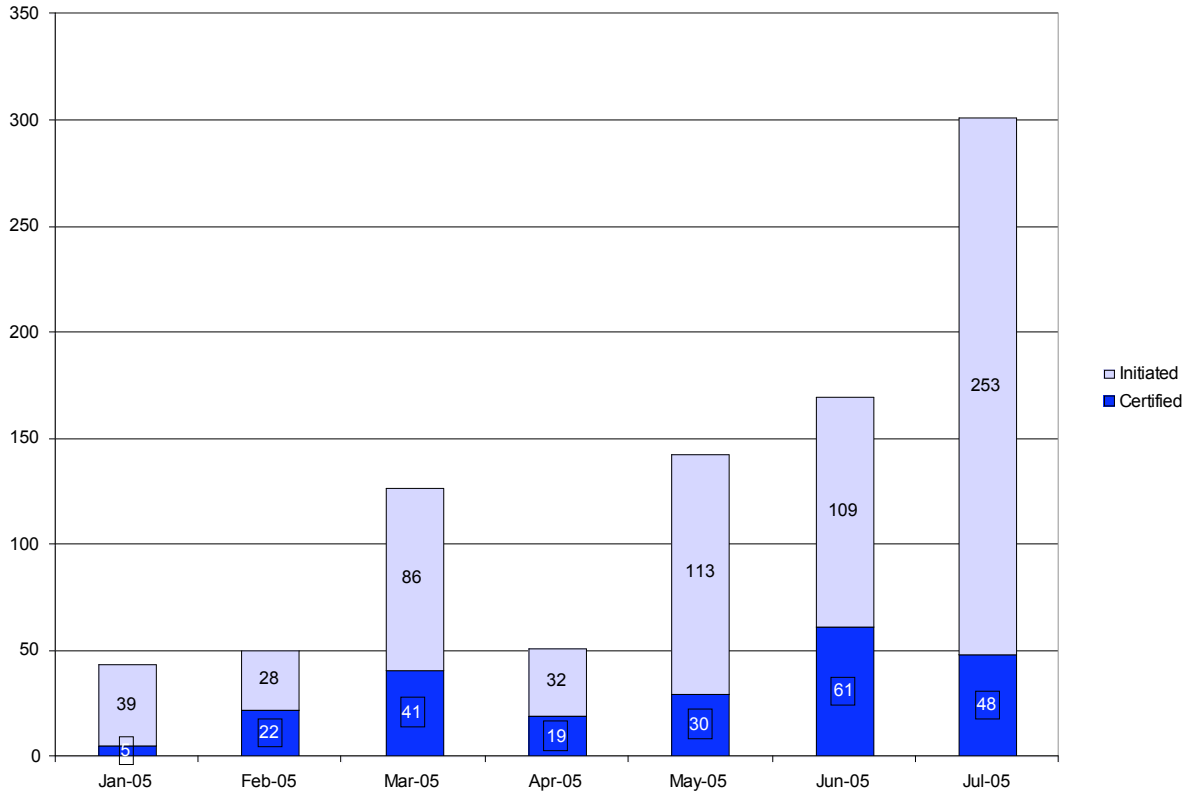
#### **In-Depth Interview Samples**

<b>Interview Group</b>	<b>Sample Size</b>
Participating Builders	25
Nonparticipant Builders	20
Verifiers	15
Performance Testers	17
HVAC Contractors	15
Realtors / Sales Reps	12
Electrical Contractors	4
Electrical Distributors	6
SCO / QA Specialists	9
Utilities	58
<b>Total</b>	<b>181</b>

### **Cost Effectiveness Modeling Review**

The cost effectiveness modeling assumptions are reviewed in detail as part of this evaluation. This includes an assessment of the validity of assumptions regarding program market share, energy savings, incremental equipment costs, and baseline construction activities. Suggestions for modifying some of these assumptions are provided in this report and many of the parameters

## Certified and Initiated Homes (Monthly Totals)



**Source:** ENERGY STAR Northwest Homes Database, Monthly Activity Reports, ECONorthwest.

**Note:** The data shown are based on analysis of the online database extracted on 9/2/05 of totals through July 2005. These results may differ from the monthly reports as the participation database is continuously updated and certification and initiation dates are revised over time.

## EVALUATION CONCLUSIONS AND RECOMMENDATIONS

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

- **The program is on track to meet its overall builder participation goals for both large- and small-volume builders.** At the state level, the program has exceeded its 2005 large-volume builder goal for Oregon. In Idaho, the program has more than doubled its small-builder goal, but has not yet recruited its target of 2 new large-volume builders.
- **The program is on track to meet its overall goal for performance tester recruitment.** At the state level, it has significantly exceeded its recruitment goal in Oregon, but would need to recruit more performance testers in Washington and Idaho to meet its original goals for those states. The program has likewise not yet reached its original 2005 recruitment goal for verifiers in Washington and Idaho. However, the program will likely adjust its 2005 market-specific goals for performance testers and verifiers to better reflect current builder activity in certain Washington and Idaho markets.

- **Participating builders are generally very satisfied with the program.** They know that ENERGY STAR is a widely recognized and respected brand, and they speak highly both of the program's goals and of the individuals associated with the program, including the BOSs as well as verifiers and testers. Those builders who have gone through the whole process of building and certifying an ENERGY STAR home report that both the testing and verification went smoothly, and did not significantly delay the construction process. Builders appear to value duct testing as a means of confirming that the subcontractors are doing the job properly, although some builders question the benefit of testing every home once the contractor learns how to do the installations correctly.

It should be noted that the in-depth builder interviews focused on those participants that have experience certifying ENERGY STAR homes through the program. These builders were early participants in the program and therefore are more likely to be predisposed to the building practices promoted by the program. Many of these builders also had previously participated in other new construction programs such as Earth Advantage. While the interview results presented in this report are encouraging, future participating builders might be more resistant to some of the program requirements and may require additional training. The following conclusions and recommendations should be considered with this in mind.

- **Most builders have limited experience building ENERGY STAR Homes to date.** Builders are still fairly new to the program and are still learning the processes and practices involved in the program. As discussed above, many of the builders interviewed have previous experience with other new construction efficiency programs such as GemStar, Super Good Cents, and Earth Advantage, and this seems to have made them more receptive to the ENERGY STAR Homes program. In part because they are new to the program, some builders are aware that their subcontractors need time to become familiar with duct sealing and other program requirements.
- **It is unlikely that the 2005 goal for certified ENERGY STAR homes will be met, but it is too early to assess the likelihood of achieving the program's long-term goal.** The program goal for 2005 is 2,000 certified ENERGY STAR homes. At the end of July, the program forecast that 1,775 homes would be certified by year-end, which amounts to a market share of about 2 percent assuming 2004 new home construction activity. However, as of July 2005 only 226 homes have been certified, with another 536 initiated. If all of the 536 homes that have been initiated are certified by year-end, it would require that an additional 1,013 homes be initiated and completed by year-end to realize the 1,775 forecast. While the number of new certified homes has been increasing, the maximum number of new certified homes within a single month to date was 61 (June 2005). Without a very large increase in the number of homes initiated, completed, and then certified within the next five months, it seems unlikely that the program will be able to certify an additional 1,775 homes by year-end.

The outlook for 2006 is better as participating builders become more experienced with the program and expect to build more ENERGY STAR homes. At the end of July there were 2,988 ENERGY STAR homes forecasted for completion in 2006 from current participating builders, which is about a 50 percent increase over the number currently

forecasted for 2005 and amounts to about a 4 percent market share. This total should increase as more builders are added to the program next year.

The long-term goal of the program is a market share of 20 percent for ENERGY STAR homes by the end of 2009. Assuming that 2004 new construction levels increase at the Alliance's assumed rate of 3.8 percent annually, achieving this goal will require that over 18,000 homes be ENERGY STAR certified in 2009. While the expected growth in ENERGY STAR homes for 2006 is encouraging, the program is still too early in its implementation phase for us to assess the likelihood of reaching the 20 percent market share goal by 2009. Future evaluation research will continue to track progress in this area.

One of the primary reasons for the shortfall in homes for 2005 is the longer than expected time from new builder recruitment to new ENERGY STAR home construction. Based on the in-depth interview results, it is taking longer than expected for participating builders to begin construction on ENERGY STAR homes; many of the builders we interviewed had yet to finish an ENERGY STAR home even though the program had been operating for over a year. Contributing factors to slower than anticipated throughput include a strong sellers' market in which homes are selling faster than they are built, and the fact that several large builders sign on for new subdivisions that take time to initiate. There has also been a need for the program (BOSs, verifiers, QA specialists) to spend additional time with builders to help them understand and comply with the program requirements, which is also likely contributing to the slower rates of ENERGY STAR home production.

As discussed above, these needs may become more significant for some period of time as the program adds new builders. Future participating builders will likely have less experience with the building practices required for ENERGY STAR certification than those interviewed for this evaluation. These builders will likely need more technical assistance from the program and may require more time between program enrollment and ENERGY STAR home construction.

- **Barriers to participation generally relate to the lack of consumer demand for ENERGY STAR Homes.** A common response among nonparticipating builders was that a lack of consumer demand for ENERGY STAR homes kept them from participating in the program. Other nonparticipating builders cited the extra cost of these homes, which implies that they do not believe consumer demand is high enough to command a higher price. Despite these concerns, a third of the nonparticipating builders were considering participating in the program and another 5 of the 20 builders said that they would consider participating in the program if demand for these homes increased.
- **Duct testing and the lighting requirement are also considered barriers to participation.** In addition to demand issues, nonparticipating builders identified duct testing and the lighting requirement as the most challenging requirements of the program. The utilities stressed that the lighting requirement was a major barrier to program participation. When asked generally about ENERGY STAR lighting issues, electrical contractors and distributors mentioned the availability of decorative fixtures or matched fixtures that could be installed throughout the house. Electrical contractors also

mentioned that brands and styles of CFL lamps and fixtures were constantly changing, making it difficult to maintain a reliable supply.

- **Coordination with builders is critical for successful verification.** While verifiers say that they are able to conduct their visits without disrupting the builder's schedule, they emphasize that frequent communication is required to make this process flow smoothly. Most verifiers say they regularly find some items that fail, but that many of those are small defects that can be rectified on the spot. Several verifiers also said that their goal is to help the builder meet the program requirements by anticipating and correcting potential problems before they happen.

A big concern of verifiers and builders is that the QA specialists sometimes conduct the final inspections after the homeowner has occupied the home, which occurred a few times in Idaho and Washington. Verifiers felt that this was an inconvenience to homebuyers and creates resentment among the builders. This has the potential to become an even bigger problem as the volume of ENERGY STAR homes increases. As with the coordination between the builder and verifiers during the construction process, better coordination to ensure that the final inspection is done prior to occupancy is critical for the long-term success of the program.

- **Participating HVAC contractors are generally accepting toward duct testing.** HVAC contractors overall have responded positively to duct testing. About half of the contractors said that almost all of their installations had passed the tests. The others are working to change their installation practices in order to conform to the demands of the test. None of the contractors that had failed the duct test complained about the testing procedures of the duct testers themselves. The performance testers confirmed these findings, saying that HVAC contractors new to the program generally fail their first few duct tests but then tend to improve rapidly in subsequent tests.
- **More time needed for providing technical assistance to builders and verifiers than originally anticipated.** The QA specialists have found that they are spending more time than planned working with builders and verifiers to help them meet the program requirements. In Washington, QA specialists are inspecting additional homes with new verifiers as a way to train them on the program requirements. In Idaho, one QA specialist has also needed to answer technical questions for builders in order to recruit them to the program, and the lack of more QA staff in Idaho has created a backlog in the final QA process for homes and is resulting in homes having their final inspection after they are occupied. As discussed above, this may become an even greater issue as the program increases its recruitment of builders that have less experience with the building practices required for the ENERGY STAR specification. As more verifiers join the program, however, verifiers rather than QA specialists theoretically will provide this type of support to builders in the long run which will help reduce the demands placed on the QA specialists.
- **Estimates of potential savings will help market ENERGY STAR Homes.** Both utilities and realtors suggested that having more information on the energy savings would

be an effective way to promote these homes. One utility suggested that information on energy savings relative to baseline home designs be provided on the program website.

- **Marketing of ENERGY STAR Homes to consumers needs to be increased.** All of the groups we interviewed emphasized the need to increase awareness and demand of the ENERGY STAR homes among consumers. Realtors also indicated that an ENERGY STAR home could command a higher price, with estimates tending to range from a 5 to 10 percent price premium.
- **Realtors and sales reps should be better informed of the ENERGY STAR home specifications and benefits.** Realtors and sales reps generally understood that ENERGY STAR homes will save consumers money and they promote this fact to their customers. In terms of understanding and promoting specific ENERGY STAR benefits, however, the sellers were less knowledgeable. Currently the realtors and sales reps tend to emphasize the more visible aspects of an ENERGY STAR home, which includes appliances and windows. Realtors also stressed insulation levels when promoting a home's energy saving benefits. Sellers of ENERGY STAR homes should be better informed as to which components drive the savings (primarily heating/cooling and lighting). Other benefits such as improved air quality and comfort, duct testing, and third party certification will likely resonate with homebuyers if promoted by realtors. Better education in this area will be critical for increasing demand for these homes, a need stressed by all of the respondents we interviewed in this evaluation. Realtors indicated that they would be interested in training on how to better sell an ENERGY STAR home.

The following recommendations are based on the above findings:

- **Adjust program goals and forecast for 2005 and 2006 to better reflect the current program status.** Although the program has largely met its builder recruitment goals, ramp-up and throughput have been slower than originally forecast for a variety of reasons. The program should critically assess how many homes it believes will be certified by December 31, 2005 based on realistic estimates of ENERGY HOME housing starts, average time from start to certification, and maximum attainable throughput.
- **Increase builder support.** It appears that builders continue to need support regarding program requirements after they initially join the program. While this need is designed to be met by the BOSs when builders first enroll (and eventually by verifiers once the program matures), it appears that the additional support has been needed and this has been supplied by the QA specialists and verifiers. Given the expected volume of homes and the issues regarding coordinating inspections, this could become a potentially critical issue without more staff available to help builders navigate the program.
- **Program support to participating large-volume builders should be made a priority.** A key to achieving the 20 percent market share goal for ENERGY STAR homes will be the construction activity of large-volume builders participating in the program. The program has already been successful in recruiting 23 of the 65 large-volume builders in the region and should strive to recruit as many of the remainder as possible. Moving forward, the program should have regular contact with the participating large-volume

builders and provide assistance as needed to the individual construction crews within each company as they work to learn the building practices required by the program. Regular calls or visits with these builders should be a priority so that any questions or training needs can be met quickly.

- **More “hands-on” training needed for HVAC contractors and performance testers.** In addition to increased training for builders, additional training was also suggested for HVAC contractors and performance testers so that they are better able to comply with the program requirements. The HVAC contractors and performance testers indicated that “hands-on” training was particularly valuable for the duct sealing and testing aspects of the program. Several BOSs and verifiers also emphasized the importance of providing training to the actual HVAC installation crews, not just the HVAC contracting company’s owner or superintendent.
- **Utilize a standard referral process to match builders and verifiers.** An impartial referral process needs to be used for verifiers to remove any impression of favoritism. Some verifiers in Idaho felt that referrals from the SCO were being directed to only a few verifiers and not distributed equally among all verifiers. Developing a standardized referral process is especially important as building activity increases and more verifications are performed by private verifiers. It may be possible to address this issue by listing all qualified verifiers on the program website and then make sure that utilities and SCOs always refer builders to the website to find a verifier.
- **Promote performance testing to prospective builders as an effective means to ensure quality HVAC installation.** While non-participating builders noted the duct testing requirements as one of the barriers to participation, participating builders have indicated that they value duct testing as a means of confirming that the subcontractors are doing the job properly. Information on aggregate initial test results for participating builders could be a compelling selling point for overcoming this barrier.
- **Continue outreach to builders and contractors to reduce barriers relating to ENERGY STAR lighting.** Suggestions for improving acceptance of ENERGY STAR included having more focus on ENERGY STAR lighting in lighting showrooms. One utility suggested that the program develop a website that shows the available ENERGY STAR fixture options. Contractors also suggested having a simple cost breakdown showing the potential savings with the ENERGY STAR lighting option. Sales calls and one-on-one visits with contractors are also considered important for increasing acceptance of ENERGY STAR lighting. One builder was particularly impressed with the time their BOS dedicated to making sure they found lighting fixtures that would fit their needs. The BOS accompanied the builder’s lighting designer to the store to help select fixtures. This builder cited this action as the most valuable support they received from the program. Continued outreach to builders and contractors and general promotion of new ENERGY STAR lamp and fixture options that the program views as high quality will help reduce some the concern about the quality and availability of these products. In particular, information on new, high quality ENERGY STAR lighting options should be part of the program’s regular contact with large-volume builders recommended above.

- **Increase marketing of the program directly to prospective homebuyers.** Increasing consumer demand will encourage more builders to join the program which in turn will increase demand for supporting sub-contractor services such as performance testing and verification. While the ENERGY STAR Homes program is specifically designed to address the builder side of the market, we recommend that this be done in conjunction with a broader marketing campaign targeting the consumer that emphasizes not only energy savings, but also benefits such as comfort, health and safety, and overall home quality.
- **Coordination of final home inspection / QA review needs to be formalized so that it is completed prior to occupation.** There have been instances in Idaho and Washington in which the final QA inspection process has occurred after the home has been occupied, which has created some conflicts with both the builders and homeowners. This may be due in part to some of the Idaho QA staff needing to spend more time providing builder technical support rather working strictly on QA tasks. As building volumes increase, this may become more of an issue especially if QA staffing levels remain at their current levels. To minimize these occurrences, we recommend that the program develop a formal process for completing the final home inspections to ensure that they are completed prior to occupation. This inspection procedure should be incorporated into the participation agreement and clearly explained to the builder at the start of their participation.
- **Educate realtors on ENERGY STAR home benefits.** In order to increase demand for ENERGY STAR Homes, realtors need to have a better understanding of the program requirements and the associated benefits on an ENERGY STAR Home. This will help ensure that prospective homebuyers are more fully informed about ENERGY STAR home advantages. One concrete step that could be taken would be to encourage the Multiple Listing Services in the four program states to incorporate ENERGY STAR as a selection criterion in their database searches.
- **Revise cost effectiveness modeling assumptions.** We recommend that the cost effectiveness modeling assumptions be revised based on the issues discussed in Chapter 8. In particular, the assumptions regarding baseline market activity should be increased.