THE BUSINESS CASE FOR ENERGY EFFICIENCY

Do Energy Star® and Guaranteed Performance homes actually save energy? Are homebuyers happy with these homes? Two studies by Advanced Energy shed light and some surprising findings on these important questions.

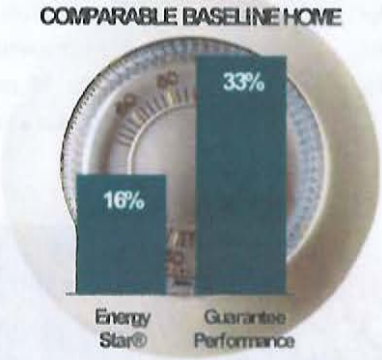
Rising energy prices, coupled with increased public awareness, have fueled demand for more energy-efficient homes. Many builders have responded by qualifying their new homes for the U.S. Environmental Protection Agency's Energy Star® label. Others have gone beyond Energy Star standards and qualified their new homes for Guaranteed Performance [GP] labels, such as the Environments for Living® [EFL] label. But have these programs worked? Has energy consumption actually been reduced? And have homeowners been satisfied with the performance of these program homes?

Advanced Energy addressed these issues in parallel studies published in early 2006. *The Phoenix Home Energy Efficiency Study* was sponsored by the U.S. Environmental Protection Agency [EPA] and studied the actual energy consumption of more than 7,000 new homes in Phoenix. *The Phoenix Homeowner Satisfaction Survey* was sponsored jointly by the U.S. Department of Energy [DOE] and by state based partners and surveyed the satisfaction of over 700 new home buyers. Key findings are presented in this summary, and full results are available from Advanced Energy.

Energy Star® homes consume less energy. In Phoenix, Energy Star homes are up to 16 percent more efficient than comparable baseline, or code-built homes. The accompanying chart shows that the average Energy Star home consumed 16 percent fewer kilowatt-hours per square foot than a comparable baseline, or code-built home. These figures are for the summer cooling load and adjusted for the presence of a swimming pool.

In order to qualify for the Energy Star label, a builder's designs must be independently verified to be at least 30 percent more energy efficient than the same home built to the 1993 Model Energy Code [MEC], or 15 percent more efficient than the state code, whichever is the strictest. However, energy awareness in Phoenix is high and the market was therefore an early adopter of Energy Star and Guaranteed Performance programs. Many builders actually build to Energy Star standards, even if they don't carry the Energy Star label.

IMPROVEMENT IN COOLING EFFICIENCY OVER A COMPARABLE BASELINE HOME



(Reduction in kilowatt-hours per square foot over an average cooling season, compared to a comparable baseline home)

Guaranteed Performance homes use the least amount of energy. In the past five years, private companies and utilities have begun to sponsor GP programs across the country. In Phoenix, Environments for Living® [EFL] is the leading GP program. EFL homes sell with an energy consumption guarantee and a comfort guarantee. EFL homes use more stringent construction and testing techniques. In addition, contractors go through rigorous training.

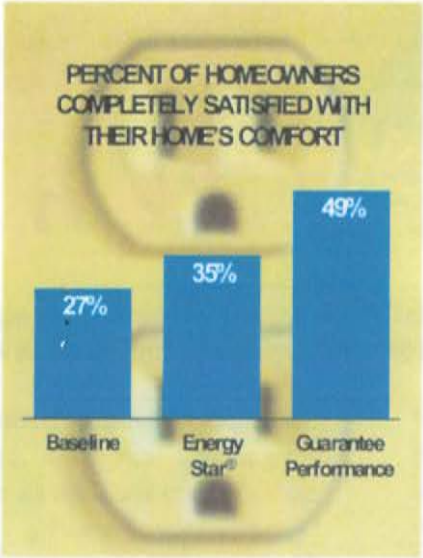
GP homes are the most energy efficient homes in Phoenix. As the chart shows, they consume up to 33 percent less energy than comparable baseline homes and up to 20 percent less than comparable Energy Star homes.

The bottom line is that both Energy Star and GP homes use less energy. The Phoenix studies demonstrate that the investment that builders make in energy-efficiency pays off for the homeowner.

GP homeowners are more satisfied with their new homes. The *Phoenix Homeowner Satisfaction Survey* found that performance isn't just about energy efficiency. Homeowners say it's also about comfort, reliability and healthiness. They compared it to the fuel economy of a car. If they're not going to be comfortable driving the car, why should they worry about fuel economy?

Guaranteed Performance homeowners are more satisfied with each aspect of their home's HVAC performance. For example, the chart on the next page shows that 49 percent of GP homeowners said they were completely satisfied with their home's "ability to keep them comfortable year round" compared to 35 percent of Energy Star homeowners and only 27 percent of baseline homeowners. In fact, the Phoenix survey found that GP homeowners were more satisfied with every aspect of their home's HVAC performance — year round comfort, the freshness of air inside the house, evenness of temperatures from room to room, reliability and cooling cost.

New home buyers are generally unaware of energy programs. Marketers still have a way to go to build awareness of Energy Star and GP programs. The Satisfaction Survey found that 56 percent of homeowners were aware of the Energy Star program, but only 10 percent were aware of any Guaranteed Performance program. Surprisingly, 37 percent were not aware of any special energy program. These statistics all come from a market that was an early adopter of both the Energy Star and Guaranteed Performance programs. Building awareness of these programs is still a necessity.



Making the business case for energy-efficiency. These studies have important implications for the new home market in North America. Specifically, they begin to lay the basis for a business case for energy-efficiency, where energy-efficient homes compete in a market-based environment. Instead of asking people to do something they prefer not to do, such as turn down their thermostats, these studies demonstrate that it's possible to build a home that homeowners prefer because it performs better, not just because it uses less energy.

Implications for builders, utilities and equipment manufacturers. These studies have implications for builders, utilities and equipment manufacturers. For builders, the implication is that buyers will notice the difference in a program home. Energy-efficiency can become a way for builders to differentiate themselves. For utilities, the implication is the possibility that their load profile can be improved without the need for continuing subsidies. And for equipment manufacturers, the payoff is a homeowner that is more satisfied with both the reliability and the cost of operation of their home's heating and cooling systems.

How the studies were conducted.

The Phoenix Home Energy Efficiency Study analyzed data from 7,141 homes built in Phoenix between 1994 and 2004 by six different production building companies. There were 3,336 baseline homes, 2,979 Energy Star homes and 826 Guaranteed Performance homes. Details on the physical design and construction of these homes [such as HVAC ratings, window type, square feet and volume] were obtained from builders, utilities and testing companies. Energy use for the period 1998 through 2004 was obtained from Arizona Public Service and Southwest Gas Corporation. Energy consumption data were statistically adjusted to take into account such factors as degree-days, square footage, whether the house had gas or electric heat and the presence of a swimming pool.

The Phoenix Homeowner Satisfaction Survey was a direct mail survey of 708 homeowners in Phoenix who had bought a new home within the last five years. The survey went to the homes that were studied in the Phoenix Home Energy Efficiency Study. The survey comprised 205 baseline homeowners, 255 Energy Star homeowners, 235 GP homeowners and 13 owners of unknown home types. Within each of the three categories, respondents were randomly chosen; however, GP and Energy Star homeowners were over sampled in order to obtain statistically valid sample sizes. The survey compared the attitudes of the three categories of homeowner. Overall, the survey had a margin of error of ±3.7 percent at a 95 percent confidence level. Within individual categories the survey had a margin of error of up to ±6 percent.

Advanced ENERGY

About Advanced Energy

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Advanced Energy is a non-profit corporation located in Raleigh, N.C. We are dedicated to the search for market-based solutions to energy issues. We serve utilities, builders and manufacturers of building supplies and equipment worldwide.

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