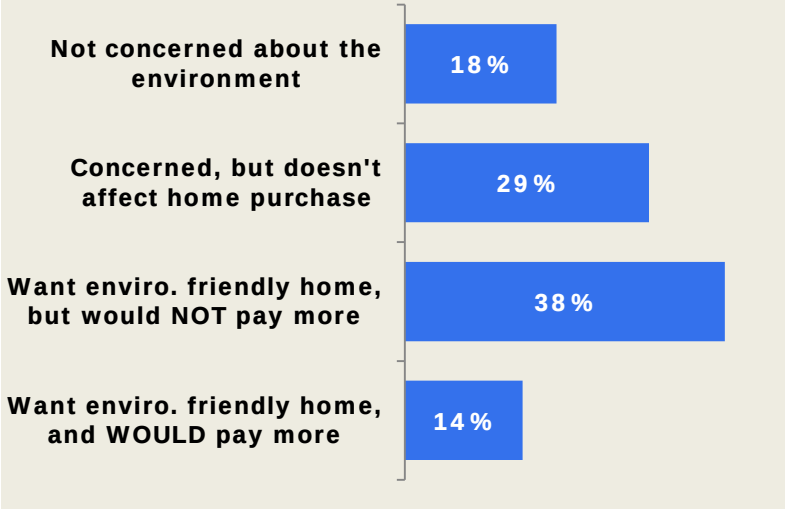
Chapter 10
Impact on the Environment, Utility Costs & Energy Efficiency

Builders, architects, and product manufacturers, among other housing industry professionals, often want to know if home buyers are concerned about the impact of building their home on the environment, and if so, what is the level of their concern. The answers have important, practical implications on how a home is built and what products and materials are used in its construction.

Questions about the environment can be asked in several forms. The 2012 NAHB survey asked buyers about their general attitude toward the environment and how it impacts their purchase decision, how important low utility costs are and have been to them, how much they would be willing to pay up-front for lower utility costs in the future; and, finally, how desirable they find particular environment-friendly amenities.

Exhibit 10-1 Buyer Concern About Impact of Their Homes on the Environment
(Percent of Respondents)



Concern About the Environment Doesn't Mean Home Can Cost More

As Exhibit 10-1 shows, although the majority of home buyers are concerned about the environment in general, most are not willing to pay more for a "greener" house. In fact, 38 percent of home buyers report wanting an environment friendly home, but would not pay more for it. Another 29 percent are concerned about the environment, but don't take this into consideration when buying a home. On either side are relatively small shares of buyers at the extremes: 18 percent who are not at all concerned about the impact of building their home on the environment and 14 percent who are not only concerned but would actually pay more for the house to reduce its impact on the environment. Home buyers have rather similar attitudes about the environment irrespective of their age, geography or race.

However, more buyers—24 percent—expecting to pay at least $500,000 would be willing to spend more for a home that is environmentally friendly. Appendix A shows a detailed demographic breakdown of the question on environmental concern, beginning on page A-34.

History shows that there has been a noticeable shift away from taking environmental impacts into account when buying a home. In 2004, 36 percent of buyers said either that they

Exhibit 10-2 Concern About Impact of Home on the Environment - History
(Percent of Respondents)

	2004	2007	2012
Not concerned about the environment	10	13	18
Concerned about the environment, but not a consideration in house purchase	26	24	29
Want environment friendly home, but would NOT pay more	48	45	38
WOULD pay more for environment friendly home	16	17	14

were not concerned at all about the environment, or that it was not a consideration in their choice of a home. By 2012, this share had increased from 36 to 47 percent (Exhibit 10-2).

Buyers Do Want to Know the Home's Projected Utility Costs

Demand for energy saving features can be driven not only by general concern about the environment, but also by a desire to achieve lower ongoing utility costs. The "What Home Buyers Really Want" survey included a question that asked buyers the extent to which they agreed with three statements about utility costs on a scale of 1 to 5, where 1 is "strongly disagree" and 5 is "strongly agree."

A little over three-quarters of buyers agree to strongly agree (rating it 4 or 5) with the general statement that "knowing the projected utility costs of a home is very important (Exhibit 10-3). Only 5 percent rate this statement as low as a 1 or 2 (Appendix A-40).

For nearly as many buyers, projected utility costs are important enough to influence their purchase decision (73 percent agreeing with the statement enough to rate it a 4 or 5). Just over 70 percent of buyers agree or strongly agree that they would prefer to purchase a home from a builder who provides energy ratings. (The question explained that a home energy rating gauges the energy efficiency of a home much like a miles-per-gallon reading measures gas efficiency for a car.)

Exhibit 10-3 Home Buyer Opinions About Home Energy Consumption
(Percent of Respondents)

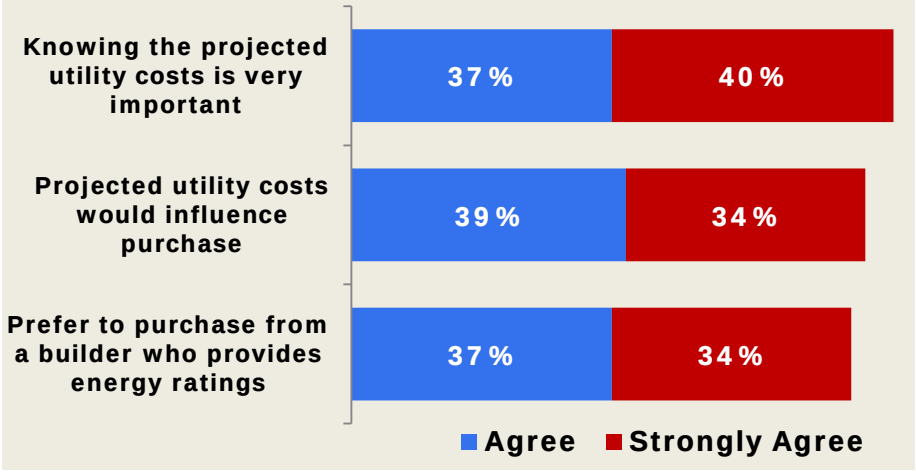
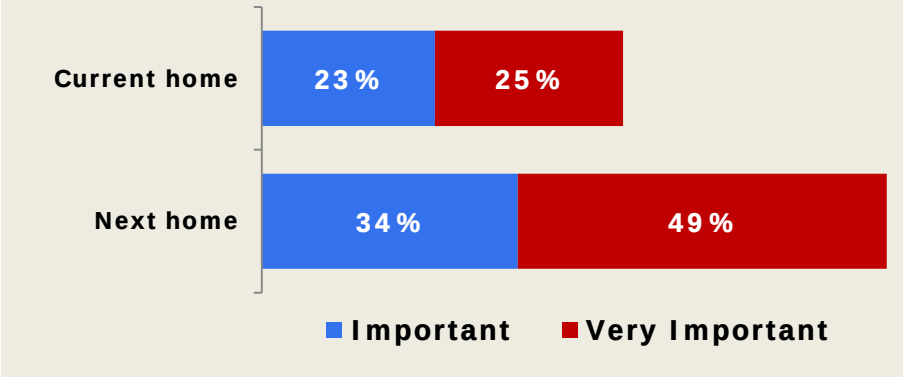


Exhibit 10-4 Importance of Low Utility Costs When Buying Home
(Percent of Respondents)



Buyers of different ages, geographic areas, income, and racial groups all provided rather similar responses to this multi-part question (Appendix A, pages A37-A42).

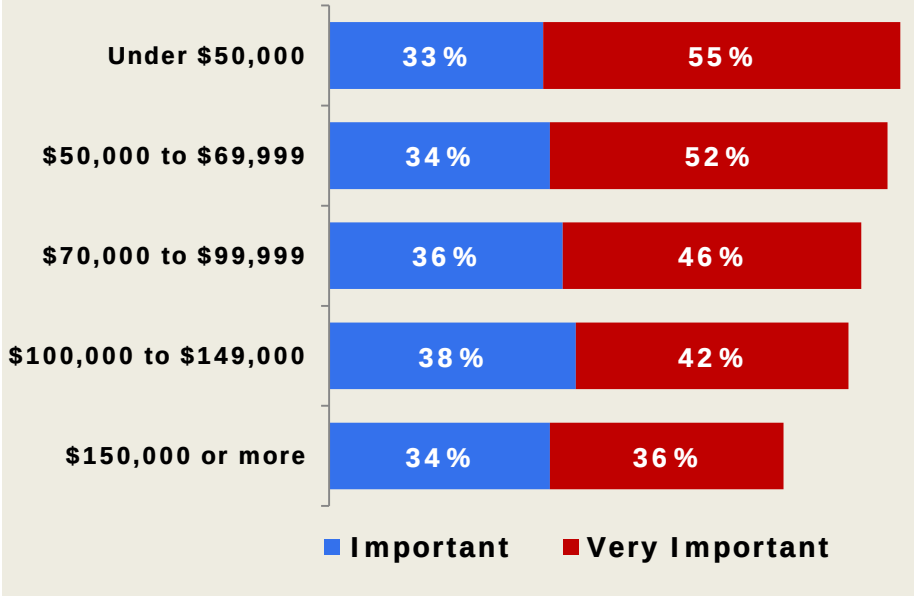
The survey also investigated if attitudes toward utility costs have changed since the last time owners bought a home, asking them to rate how important low utility costs *were* at the time they bought their current home, and *will be* when they buy their next one. Again, the rating was done on a scale of 1 to 5. In this question, 1 was defined as "not at all important" and 5 as "very important."

The results show that home buyers attach much more importance to having low utility costs in their next home than

they did when choosing their current one. More than 8 out of 10 buyers (83 percent) rate having low utility costs in their next home important to very important (i.e., a rating of 4 or 5), compared to only 48 percent who consider low utility costs this important when buying their current home (Exhibit 10-4). On average, home buyers rate the importance of low utility costs when choosing their current home a 3.4, while for their next home the average rating is 4.3.

There are significant differences in how much importance buyers attach to low utility bills, depending on their income level. Among buyers who earn less than $50,000 a year, 88 percent rate low utility costs a 4 or 5 on the importance scale when buying their next home, with 55 percent giving it the maximum rating of 5. The very important share declines steadily as income rises, however, to 36 percent among those earning $150,000 or more (Exhibit 10-5).

Exhibit 10-5 Importance of Low Utility Costs When Buying Next Home by Household Income
(Percent of Respondents)



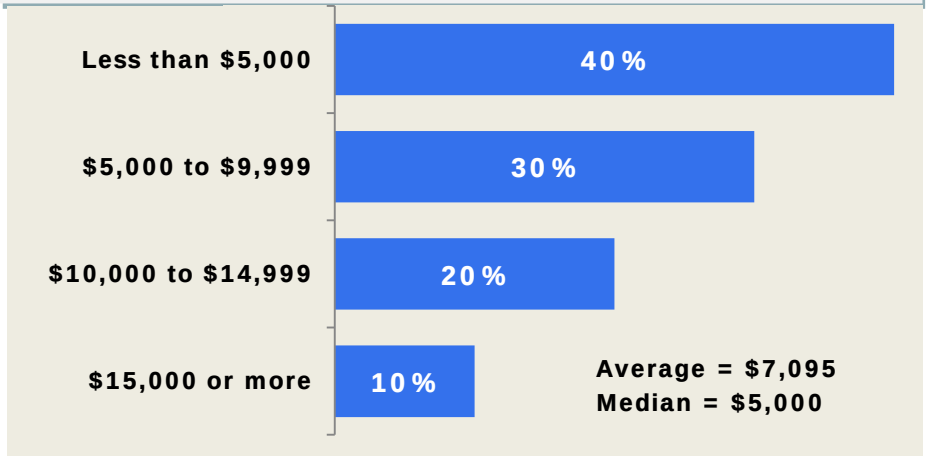
More breakdowns on the importance of low utility costs to various types of buyers are shown in Appendix A, starting on page A-37.

Buyers Will Pay More for Lower Utility Costs, but Want a 14 Percent Return

So far in this chapter, we've seen that most buyers are quite concerned about the cost of utilities in the homes they intend to purchase—often to the point of agreeing that they prefer to buy from a builder providing home energy ratings. In the previous chapter, we've seen that a large majority of buyers are, in fact, willing to pay more for a home to achieve an unspecified reduction in utility bills over the life of the home (Exhibit 9-6).

This still leaves the question of how much more buyers will pay up front in the cost of the home to achieve a specific dollar reduction in annual utility bills. For many years, a standard feature of NAHB consumer surveys has been a question on how much extra buyers would pay up

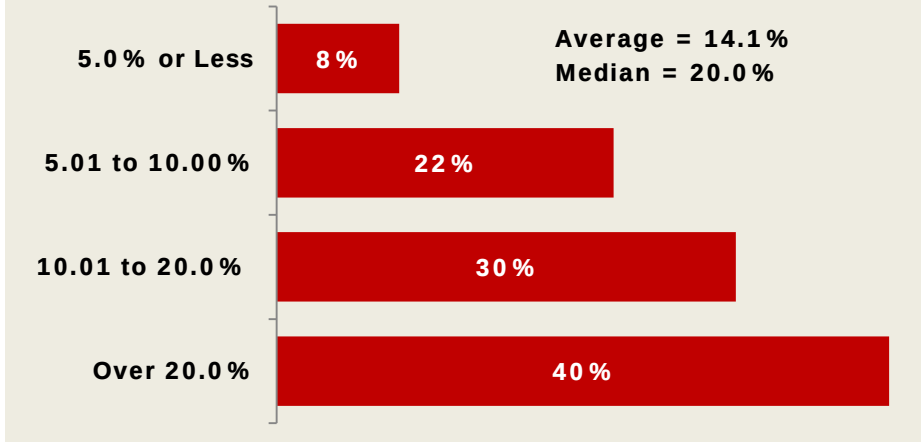
Exhibit 10-6 How Much More Buyers Would Pay for Home to Save $1,000 Per Year in Utility Costs
(Percent of Respondents)



front, in the purchase price of their next home, if it would save $1,000 every year in utility costs. That question was included again in the 2012 survey.

Answers show that, in 2012, 40 percent of buyers would pay less than $5,000 extra for a home to save $1,000 per year in utility bills, 30 percent would pay between $5,000 and $9,999, and another 30 percent would pay $10,000 or more (Exhibit 10-6).

Exhibit 10-7 Rate of Return Needed on an Up-front Investment that Reduces Utility Costs
(Percent of Respondents)



On average, home buyers would pay an average of $7,095, and a median of $5,000, to save $1,000 annually in utility costs. On the survey, this is phrased as an open ended question that allows buyers to write in any dollar amount they want. Although some write in specific numbers with a perhaps odd looking combination of digits (e.g., $4,762), there is a tendency to answer in round numbers. Over a quarter of respondents wrote in $5,000 and nearly 20 percent wrote in $10,000. The relatively high share writing in $5,000 tends to make the median stable (unlikely to vary much across subgroups in the population) at that level.

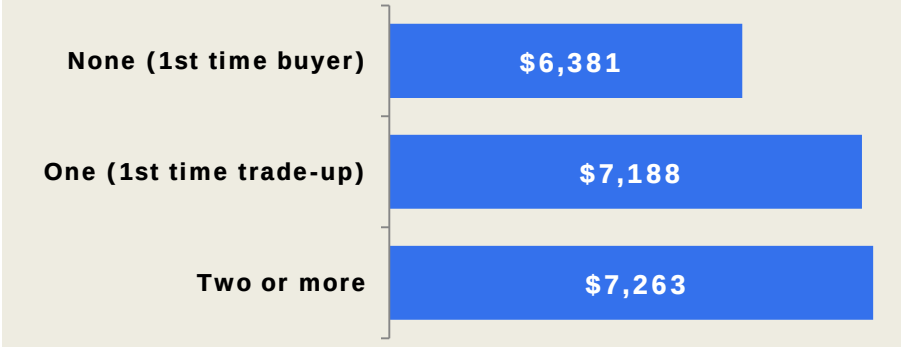
Some buyers said they were willing to pay a lot to achieve a $1,000 reduction in utility bills, all the way up to $100,000 more for the home (a few cases where buyers said they were willing to pay more than that were deleted as unrealistic, possibly signaling respondent error in counting the number of zeros in their answers). Buyers like these pull the average of $7,095 above the median of $5,000.

Some may find it more convenient to flip the question and answer around and evaluate the information in terms of a rate of return on the upfront investment. If a buyer is willing to pay less than $5,000 up front to save $1,000 per year, it means the buyer needs a return of over 20 percent on the investment. The average rate of return buyers need on an investment in energy efficiency (or something else that reduces utility bills) is 14.1 percent, and the median is 20 percent (Exhibit 10-7).

First-time, Lower-income Buyers Will Pay Less to Reduce Utility Costs

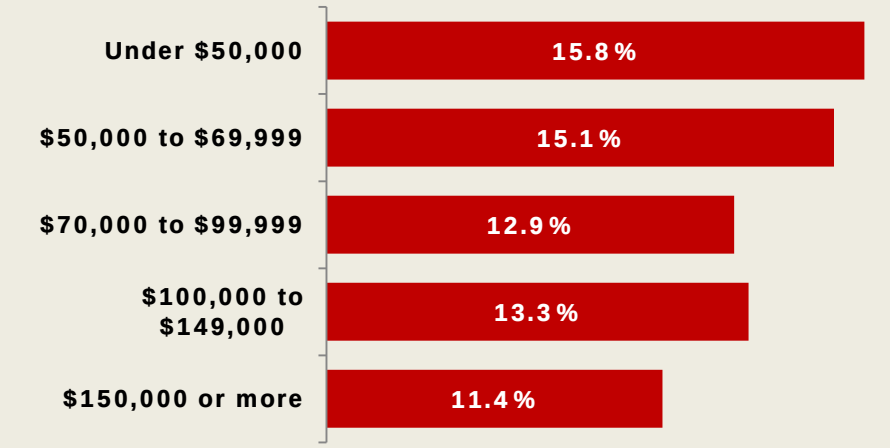
The survey results also show that first-time home buyers are willing to spend less up front for lower utility bills. Buyers who have never owned a home before are willing to pay

Exhibit 10-8 Amount Buyers Would Pay to Save $1,000/Year in Utility Costs by No. Homes Owned
(Average of Responses)



$6,381 on average for a $1,000 per year reduction in utility bills, compared to over $7,000 for those who have owned a home before (Exhibit 10-8). This result is not surprising, given that first-time buyers lack equity in a previously owned home that they can use for a down payment, and tend to have a more difficult time qualifying for a mortgage, making the up-front increase in cost difficult to withstand.

Exhibit 10-9 Rate of Return Buyers Need on a Utility Cost Saving Investment by Household Income
(Average of Responses)



Homes buyers with lower incomes are also likely to have a more difficult time qualifying for a mortgage, and consequently a lower tolerance for higher up-front costs. This shows up in a higher rate of return needed on an investment that will save $1,000 a year in future utility costs. Buyers earning less than $70,000 a year need over 15 percent on average; buyers with incomes in the range of $70,000 to $149,999 range need about 13 percent; and buyers with incomes of at least $150,000 need 11.4 percent (Exhibit 10-9).

The Appendix contains additional breakdowns on pages A-34 to A-36. The average amount buyers are willing to pay up front to save $1,000 in annual utility costs is under $10,000 for every Division, age or income bracket, household type, house price, generation, or racial/ethnic category considered in the appendix—with the single exception of buyers expecting to pay half a million dollars or more for the home, who are willing to pay an average of $10,343. The median is exactly $5,000 for every one of these groups, except for the West South Central Census Division, where it is $4,000.

Between 2004 and 2007, the average amount buyers were willing to pay up front for energy efficiency (or other utility cost reducing measures) increased from just over $7,000 to almost $9,000, but this trend reversed itself in 2012 (Exhibit 10-10). Generally, the only group willing to accept less than a 10 percent return on an energy efficiency

Exhibit 10-10 How Much Buyers Are Willing to Pay for Reduced Utility Costs – History
(Average of Responses)

	2004	2007	2012
A. Price they'd pay up front to save $1,000 per year ($)			
All buyers	**7,073**	**8,964**	**7,095**
First-time buyers	6,588	10,081	6,381
First-time move-up buyers	6,935	9,506	7,188
2nd-time+ move-up buyers	7,304	8,308	7,263
By price buyers expect to pay for the home:			
Less than $150,000	5,925	8,274	6,423
$150,000 to $249,999	7,234	7,234	6,171
$250,000 to $499,999	7,877	9,964	8,036
$500,000 or more	7,742	11,477	10,343
B. Annual return needed on the up-front investment (%)			
All buyers	**14.1**	**11.2**	**14.1**
First-time buyers	15.2	9.9	15.7
First-time move-up buyers	14.4	10.5	13.9
2nd-time+ move-up buyers	13.7	12.0	13.8
By price buyers expect to pay for the home:			
Less than $150,000	16.9	12.1	15.6
$150,000 to $249,999	13.8	13.8	16.2
$250,000 to $499,999	12.7	10.0	12.4
$500,000 or more	12.9	8.7	9.7

investment is the one expecting to pay $500,000 or more for a home. In 2007, first-time buyers were willing to invest in energy efficiency for a return of just under 10 percent, but this appears to be an anomaly and was not confirmed by more recent data.

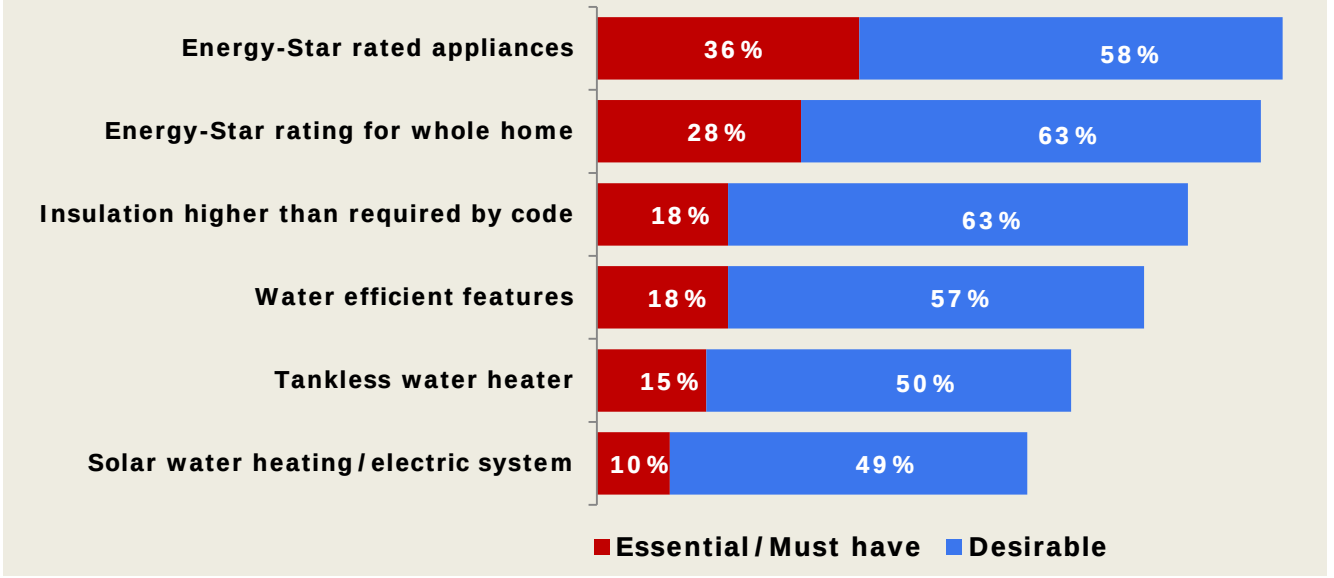
Home Buyers Give Energy-Star High Marks, Especially for Appliances

So far, we've seen that most buyers want an energy efficient home, and on average would pay an additional $7,100 up front if it would save them $1,000 a year in utility costs. In other words, buyers want energy efficiency, but apply a fairly stringent cost-effectiveness requirement when deciding on specific energy efficiency investments. A related question is what specific characteristics home buyers believe will tend to deliver energy efficiency in this cost-effective fashion.

To investigate this, the survey asked home buyers to rate six energy-saving or green features on a scale of essential, desirable, indifferent, or "do not want." As first described back in Chapter 3, essential means the buyer is unlikely to buy a home without feature; desirable implies buyer would be seriously influenced to buy because feature is included; indifferent means feature would not influence purchase decision; and "do not want" means the buyer is not likely to buy a home if it has this particular feature.

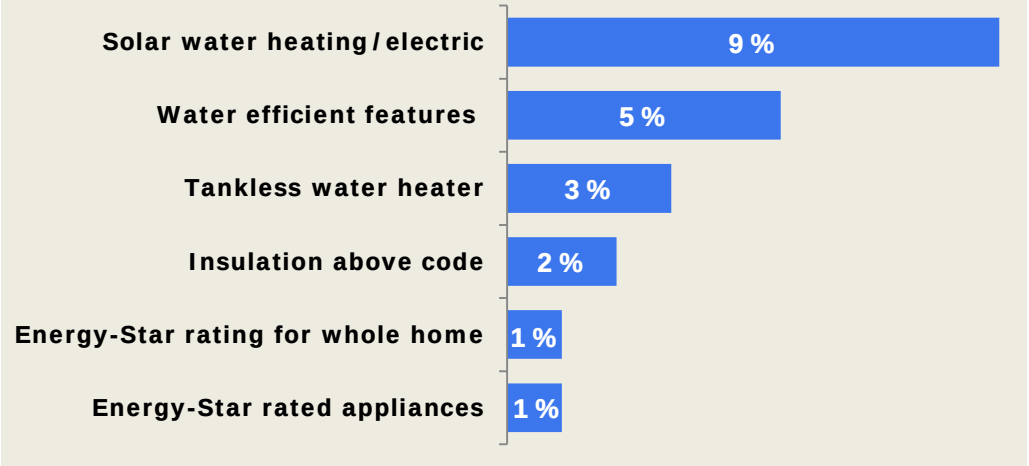
Energy-Star rated appliances came in at the top of the list (Exhibit 10-11). A full 94 percent of home buyers said that Energy-star appliances are at least desirable, and of these 36 percent consider them essential. Next on buyers' wish list is an energy-star rating for the whole home, with 91 percent rating it as desirable or essential. All energy-saving features on the list are rated as desirable or better by well over half of buyers. Insulation higher than required by code is rated this highly by 81 percent of buyers, followed by water-efficient features (75 percent), a tankless water heater (65 percent), and a solar water heating/electric system (59 percent). There are no significant preference differences for these features among buyers of different ages, incomes, or any of the other variables shown in Appendix A (pages A-88 to A-90).

Exhibit 10-11 Home Buyers' Rating of Energy Saving Features
(Percent of Respondents)



As noted in earlier chapters, it is important for builders to know about features that buyers say will prevent them from purchasing a home. When it comes to energy saving features, however, few buyers show this level of antipathy. Fewer than 10 percent of buyers are willing to say they will expressly reject a home simply because it has one of the green or energy-saving features in the survey. At the extreme, 9 percent say they do not want a home with a solar water heating/electric system. For the other five energy saving features, the "do not want" percentages are even smaller than this (Exhibit 10-12).

Exhibit 10-12 Energy Saving Features NOT Wanted by Homes Buyers
(Percent of Respondents)



In conclusion, to summarize a few of the more important points in this chapter:

- In 2012, only 14 percent of home buyers are willing to pay more for a home out of pure concern for the environment
- However, a large majority of buyers think low utility costs are important and are willing to pay more up front to achieve lower utility costs in the future.
- To persuade them to make these utility cost saving investments, most buyers require a substantial rate of return—an average of 14 percent and a median of 20 percent across all buyers, the same in 2012 as it was in 2004.
- Home buyers with lower incomes are more likely to say low utility costs are important, but are willing to pay less up front to achieve the ongoing, annual savings.
- Among specific energy saving features, buyers see Energy-star ratings as highly desirable, especially for appliances.