

# The Green Home Consumer

Driving Demand for Green Homes

connecting people\_projects\_products



Produced in  
conjunction with the  
U.S. Green Building Council

# Introduction



**Harvey M. Bernstein**  
*Vice President*  
Industry Analytics, Alliances  
& Strategic Initiatives  
McGraw-Hill Construction



**Michele A. Russo**  
*Director*  
Green Content & Research  
Communications  
McGraw-Hill Construction

Once again, we introduce an exciting new issue of the McGraw-Hill Construction SmartMarket Report™ series—*The Green Home Consumer: Driving Demand for Green Homes*, a project completed in conjunction with the U.S. Green Building Council (USGBC). This study delves deeply into the consumer of green homes and products, the end user who is driving the ultimate demand for green homes and motivating both the builder as well as the product manufacturers serving the home consumer market.

What we found supported our previous studies—green building is rapidly expanding. The survey estimates that more than 330,000 homes with green features have been built in the United States, representing a \$36 billion/year industry.

Consumers are particularly attuned to the advantages of green homes in the current economic downturn. For those that are buying homes, an overwhelming 70% of buyers say that they would be more inclined to purchase a green home versus a conventional home in a down market. It is not surprising given the reports that green homes are saving, on average, 18% of both energy and water bills—very important to consumers during tight economic times when short term costs like monthly utility bills are of concern.

Also, we found that income doesn't matter—green homes aren't just for the rich. In fact, the research shows that green homes come in many different sizes and prices, with more than half of the buyers earning less than \$75,000/year and nearly thirty percent earning less than \$50,000. Further, these lower-income buyers have some of the highest satisfaction with their homes, with 78% of those earning \$50,000 a year or less reporting that they are more inclined to buy a green home in the future and that government programs and tax credits are effective at spurring their purchase.

Green is not just an aspect of new home construction—consumers are also buying green products for their home remodeling projects. Nearly half (44%) of homes renovated between 2005 and 2007 used products chosen for their green attributes. This is a 5% increase over what was reported last year (based on homes between 2004 and 2006). Further, when deciding how to spend their money, these home consumers will spend the most on features that make their homes green versus those features that make their homes more comfortable or improve appearance. These findings confirm that the market for home building products is shifting toward green.

Clearly, consumers are becoming savvier about green homes and products, and we hope this research helps the industry better understand and respond to the consumer need in the every expanding green home building marketplace.

As always, we at MHC are committed to continuing to serve as the “voice of the industry,” creating a complete “network” of green building information, resources and expertise through our publications, analytics work, and the MHC Network database of construction projects and products. For details on the methodology behind the analytic research results, see page 25.

.....  
**Harvey M. Bernstein, F.ASCE, LEED AP** has been a leader in the engineering and construction industry for over 30 years. He serves as Vice President of Industry Analytics, Alliances and Strategic Initiatives for McGraw-Hill Construction (MHC), where he has lead responsibility for MHC's green building initiatives including the first-ever landmark series of SmartMarket Reports (SMR's) documenting green market research trends in healthcare, education, corporate America, the residential and commercial sectors, and the global green building marketplace. Bernstein was also instrumental in the launch of MHC's award-winning GreenSource: The Magazine of Sustainable Design and in the creation of MHC's China Green Building and Energy Efficiency International Conferences. He regularly speaks on green building trends in different parts of the globe including China, Australia, India and the United Kingdom. Bernstein is a member of the Princeton University Civil & Environmental Engineering Advisory Council, the Harvard Joint Center for Housing Policy Advisory Board and a visiting Professor with the University of Reading's School of Construction Management and Engineering in England, where he also serves on their Innovative Construction Research Center Advisory Board. Bernstein has an M.B.A in Corporate Marketing from Loyola College, an M.S. in Engineering from Princeton University (National Defense Education Act Fellow) and a B.S. (cum laude) in Civil Engineering from the New Jersey Institute of Technology.

**Michele A. Russo, LEED AP**, has been working in environmental policy for nearly 15 years. She currently serves as MHC's Director of Green Content & Research Communications, where she is responsible for helping direct the green content across MHC's portfolio of products and services, including the management of MHC's SmartMarket Report series. Russo is also a strong contributor to The McGraw-Hill Companies' corporate initiatives around sustainability. Previously, she served as Executive Director of the Clean Beaches Council and Deputy Director of the National Pollution Prevention Roundtable. She has authored several articles concerning pollution prevention and toxics reduction and has spoken at a number of events on green building trends and environmental policy. Russo has a B.S. in Chemical Engineering from Cornell University and a Masters in Public Policy from Harvard University's Kennedy School of Government.

# Table of Contents

## Introduction

### The Green Home Consumer Market Summary..... 2

### The Green Home Building Marketplace..... 4

- The Green Home Building Market Opportunity.....4
- The Rise of the Green Consumer .....5

### Market Intelligence on the Green Home Consumer. 6

- Growing Awareness of Green Homes .....6
- Learning About Green Homes.....7
- The Sale of Green Homes in Today's Marketplace.....8
- Price Premiums for Green Homes .....9
- Cost Savings .....9
- Green Home Consumer Demographics..... 10
- Lifestyle and Values of the Green Home Consumer ..... 13
- Green Home Benefits and Customer Satisfaction ..... 14
- Promotion of Green Homes ..... 15
- Energy Efficiency and Renewable Energy..... 16
- The Role of the Government..... 17
- Reasons Behind Purchase of a Green Home..... 18
- Obstacles to Purchase of a Green Home ..... 19

### Market Intelligence on Green Home Remodeling .... 20

- Green Home Remodeling Market.....20
- Learning About Green Home Products .....21
- HVAC .....22
- Windows .....22
- Doors.....23
- Flooring.....23
- Siding .....24
- Roofing .....24
- Plumbing.....24
- Cabinets and Countertops.....25

### The Green Custom Home..... 26

### The Low-Income Green Home ..... 28

### Green Expert Perspective: Building Green Today..... 30

### USGBC's New LEED for Homes and REGREEN Guidelines..... 31

### Resources ..... 32



Front cover: Esopus Net-Zero Energy Home, courtesy of Country Vision Realty.

Photo: Courtesy of Ferrier Homes

# The Green Home Consumer Market Summary

## Market Opportunity and the Green Home Consumer

The market opportunity for green homes is growing despite the down economy. The results of this latest research from McGraw-Hill Construction indicate that homeowners are rapidly becoming aware of the benefits of green homes and are more inclined to buy and remodel green in today's marketplace.

### Key Findings

- **Seventy percent** of home buyers said they were **more inclined to buy a green home in a down economy** than a non-green home.
- **Awareness of green homes is growing**, with 87% of home buyers at least moderately knowledgeable about green home building.
- Consumers are willing to pay more for green. On average, home buyers are **paying a premium of \$19,300 more** for a green home. This is nearly 6.5% higher than the average home price of \$300,000.
- Homeowners are satisfied with their green homes. **Eighty-seven percent** said they are more satisfied than with their previous non-green homes, and **47% are highly likely to recommend a green home** to their friends and family.
- Homeowners are remodeling with green products. **Forty-four percent** report using green products in their renovation jobs last year.

## Green Homes in the Down Economy

In today's down marketplace, home buyers tend to be more interested in purchasing a green home than a non-green home (see chart at right).

### Market Size:

- Nearly half (49%) are much more inclined to buy green.
- Twenty-one percent are more inclined to buy green.

## Growing Market Awareness

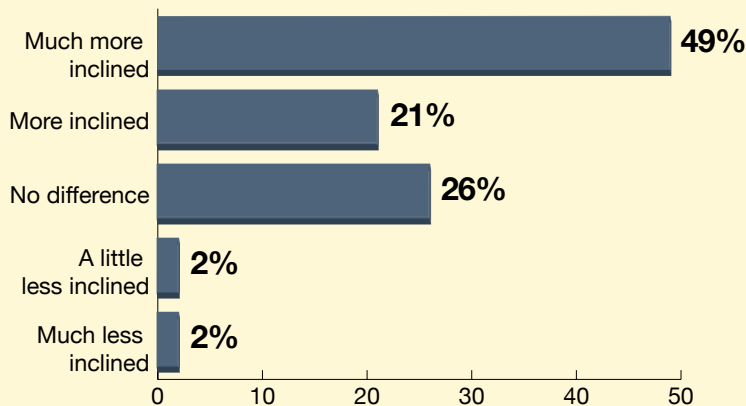
Awareness of green homes is growing dramatically. Over half (59%) of home buyers consider themselves very or extremely knowledgeable, reflecting a clear trend toward a rapidly growing marketplace.

### Learning About Green Homes

As seen in the chart at right, television is the leading source of information on green homes among consumers, cited by 28% of homeowners. Print advertising comes in second (20%), likely due to the growing emphasis on green and conservation in today's media.

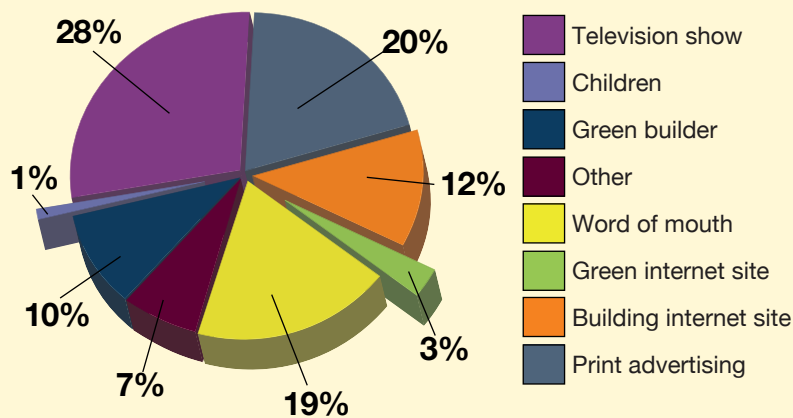
Green home builders are cited by only 10% of home buyers as a top resource for learning about green homes. However, they are considered the most trustworthy source, cited by 20% as fully trustworthy—trumping family and friends.

### Down Economy Impact on Likelihood of Home Buyers to Buy Green



SOURCE: McGraw-Hill Construction, 2008

### How Buyers Hear about Green Homes



SOURCE: McGraw-Hill Construction, 2008

## Green Home Customer Satisfaction

Green homeowners are very satisfied with their green homes. Over one-third (34%) are **much more satisfied**, with a further 53% saying they are more satisfied with their green homes compared to their previous non-green homes.

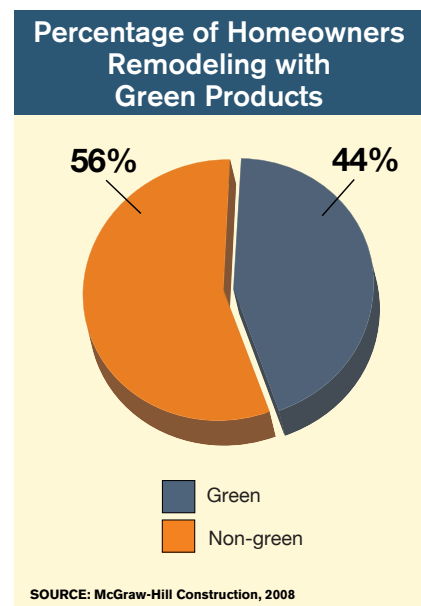
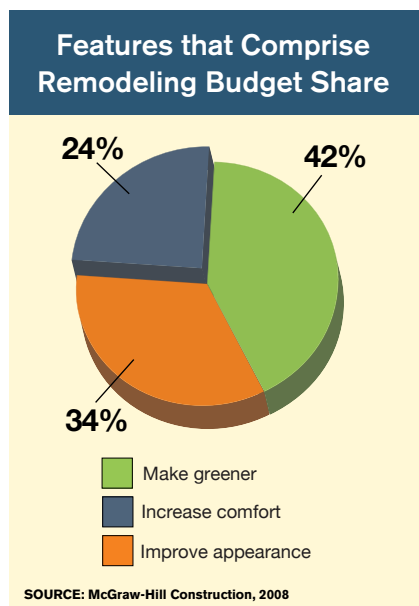
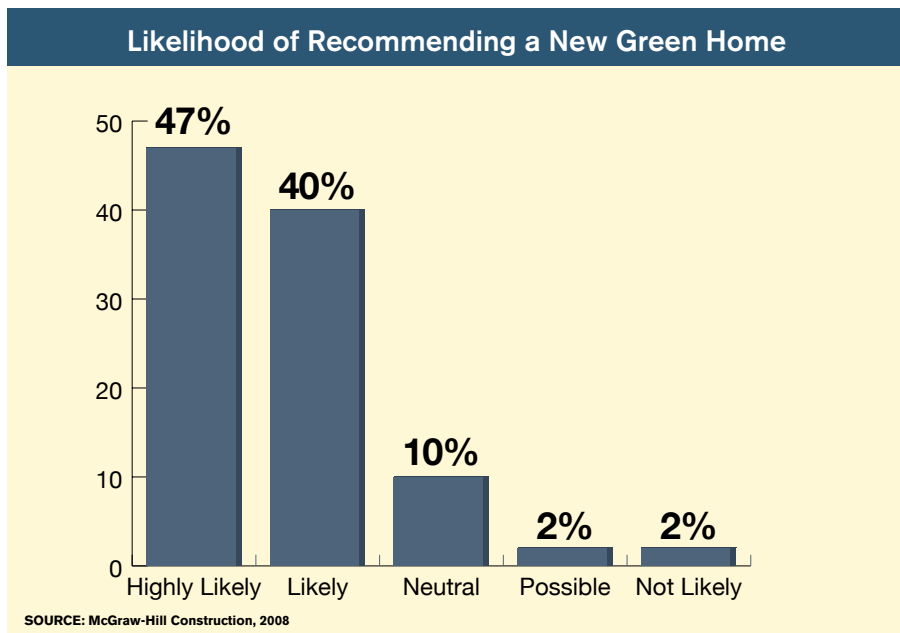
Overall, green homeowners perceive a higher level of home performance. The top three benefits that contribute to their high levels of satisfaction include:

- Healthier place to live
- Lower operating costs (average of 18% savings on energy bills and water bills)
- Part of a more sustainable lifestyle

High satisfaction rates lead high levels of recommendation. Nearly half (47%) of green home buyers say they are highly likely to recommend a green home to their friends and family (see chart at right).

## Remodeling with Green

Green features are becoming more and more important in home remodeling projects. In fact, 44% of consumers are remodeling their homes with green products. Additionally, when asked what they spend the most on when remodeling, home consumers spend the most on features making their homes greener.



## Recommendations

The green home market is rapidly evolving, and the industry should act quickly to support the transforming marketplace.

- Builders: Reach out to consumers and realtors to educate them about the benefits of green homes, emphasizing cost-saving incentives and quality in the down economy. Note the consumer demographics in this report and incorporate this information into your marketing strategies.
- Information Providers: Support education and awareness by providing resources for buyers and builders. Develop reliable green product information and create information that is tailored for different audiences in the marketplace.
- Product Manufacturers: Recognize the market opportunity for green home building products and align product development and marketing accordingly. Provide accessible information about the green features of home building and remodeling products to buyers and builders.

# The Green Home Building Marketplace

## The Green Home Building Market Opportunity

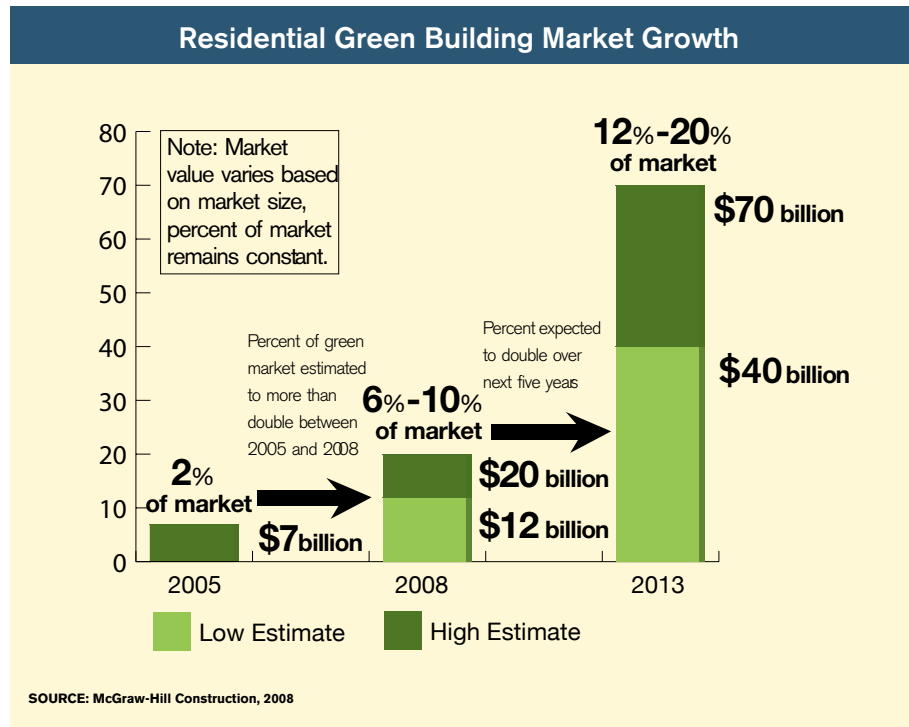
Green homes represent opportunity in the midst of a down marketplace. Despite recent economic turmoil in the U.S., indicators point to an increasing share of green homes in residential construction.

In 2005, green homes represented 2% of the residential market, yielding a \$7 billion industry. This figure is anticipated to grow dramatically by the end of 2008, when green building is expected to make up 6% to 10% of all new residential construction. This equates to a market size of approximately \$12 billion to \$20 billion (see chart at right).

Over the next five years, as overall construction is expected to improve, the green residential market will become even stronger. Green home building is expected to at least double to make up 12% to 20% of all residential construction, which means green homes could represent a market value between \$40 billion and \$70 billion by 2013.

## Impact of Economic Downturn on Green Home Building

In the context of today's down economy, green home building represents an important opportunity. According to MHC's Housing Starts data, the residential construction market has slowed considerably. Single-family housing starts fell 30% in 2007 from 2006 levels. By region, the most severe declines were reported in the South Atlantic and Pacific Southwest, followed by the East North Central and West South Central regions.



During 2008, single-family housing is projected to decline 38%, to 582,000 new units. Declines in new home construction will continue into 2009, but are projected to be moderate, declining 4% from 2008.

For home consumers, green homes offer an opportunity for cost savings on energy and water expenditures at a critical time. For home builders, green can become a market differentiator, offering a competitive edge despite the slow economy.

## Terminology

As the green building market continues to evolve, so does the definition of what constitutes a truly green home. Despite much debate, the industry has come to recognize certain key elements that are common to green homes.

These include:

- Energy efficiency
- Improved indoor air quality
- Water efficiency
- Resource conservation
- Responsible construction processes and home maintenance

For the purposes of the research presented in this report, survey respondents were instructed to consider a green home one that contains at least one specific green building element in three of the following five categories: energy efficiency, resource efficiency, indoor environment quality, responsible site management and water efficiency.

## The Rise of the Green Consumer

The growth of the green home marketplace has been bolstered by recent changes in consumer preferences and behaviors. There is increasing evidence of this shift, which is driven largely by changes in ethics and sensitivities to cost in the current economy. These new consumer patterns are visible throughout the economy, and are likely to impact the growth of green homes in the U.S.<sup>1</sup>

### Organic Food

Shifting consumer ethics are demonstrated by the dramatic growth of the organic food market in recent years. Between 2002 and 2004, worldwide sales of organic food jumped from \$23 billion to \$40 billion, and in the U.S. the market is expected to represent 10% of U.S. agriculture by the year 2010.

Demand for organic food products has grown despite price premiums associated with higher production and distribution costs.<sup>2</sup> This demonstrates a strong consumer willingness to pay more for organic products, which is also visible in the growing availability of organic food at conventional grocery stores throughout the country.<sup>3</sup> This suggests that the consumer is motivated by other factors than cost: improved health and well-being and social responsibility.

### Hybrid Cars

Another reflection of the shift in buying habits is the rapid growth of the hybrid car market. Hybrid vehicles offer consumers the chance to save on rising fuel costs while also reducing their carbon footprint. Globally, sales are expected to grow at a rate of 12% per year between 2008 and 2015, while U.S. hybrid car sales will likely surpass \$1 billion by 2012.



Esopus Net-Zero Home

Courtesy of Country Vision Realty

Companies such as Toyota and Honda have demonstrated the positive business impacts of investing in fuel-efficient and consumer-friendly products such as the Prius.

Similar to organic food products, consumers are willing to pay more for environmentally friendly vehicles, encouraged further by federal and local tax incentives that increase affordability.

Growing consumer demand is also evident in the car rental market. According to a survey conducted by priceline.com in 2007, nearly three-quarters (72%) of rental-car customers said they would like to have a hybrid car option when renting a car. Further, 48% of travelers today are willing to pay a premium for a green car rental option.<sup>4</sup>

### Generational Trends

The growing preference for green is visible across demographic sectors. Consumers in the baby boomer generation are known to consider price and health when making purchases, leading to a growing demand for products with improved control of the environment and lower costs. With 42% of baby boomers planning to retire in a single-family home, they are likely to seek options that can meet their need for cost savings and environmental quality, such as green homes.

Meanwhile, younger consumers are characterized by historically high levels of education, frequent use of new technologies and a growing concern with saving money. These tendencies fit the emerging profile of the "green home consumer," depicted on pages 10-13.

# Market Intelligence on the Green Home Consumer

## Growing Awareness of Green Homes

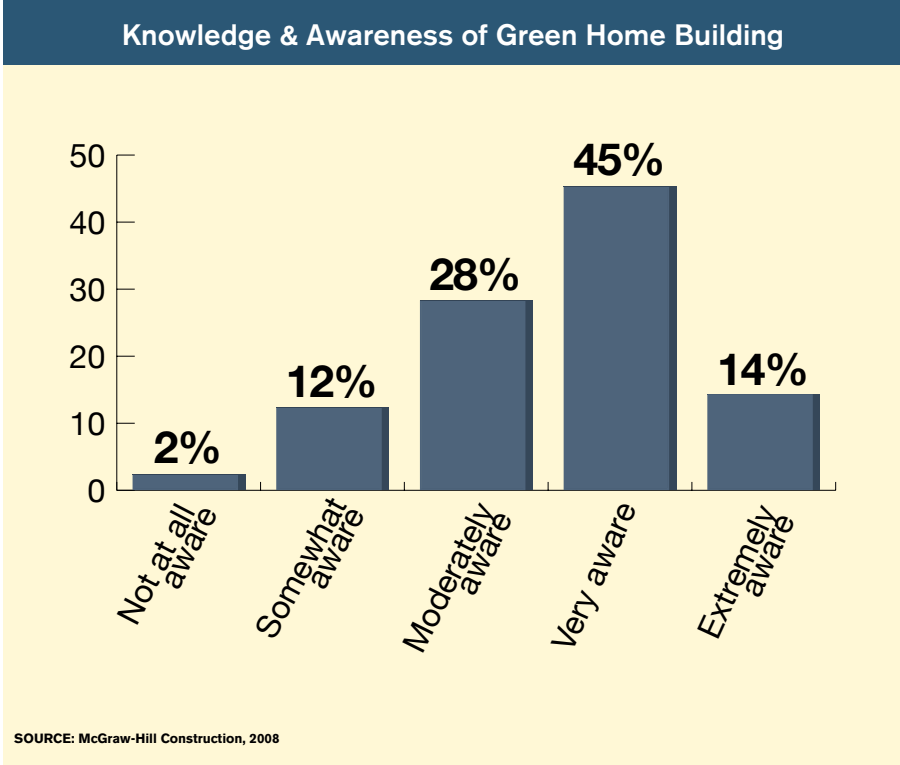
In today's residential marketplace, homeowners are widely aware of green homes. Over half (59%) consider themselves very or extremely knowledgeable, reflecting a clear trend toward increased awareness of green homes. Meanwhile, those with little or no awareness of green homes are now in the minority.

It is clear that green home awareness is rapidly approaching a critical mass. Compared with data reported in the MHC 2007 SmartMarket Report *The Green Homeowner*, the base of homeowners demonstrating moderate to extremely high levels of awareness has jumped from 75% to 87% in just one year. Conversely, the population of homeowners reporting little or no knowledge of green homes has decreased from 24% in 2007 to only 14% today.

## Demographic Differences

Though awareness is growing steadily across all demographic groups, knowledge levels are highest among the following demographics:

- College graduates
- People with incomes above \$100,000 per year



## Learning About Green Homes

Among homeowners, television serves as the leading source of learning about green homes. Television is cited by 28% of homeowners as their primary source of information, followed by print advertising (20%) and word of mouth (19%). This represents a shift over the past year, when word of mouth was the leading source, followed by television and the Internet, according to the MHC 2007 SmartMarket Report The Green Homeowner.

Print advertising has demonstrated the largest growth as a green home resource, likely reflecting a general increase in publications reporting on the emerging market trend.

### Demographic Variations

- Print resources are most used among homeowners aged 55 or older.
- Conversely, those with annual incomes less than \$25,000/year relied much less on print sources and television and more on word of mouth and internet.

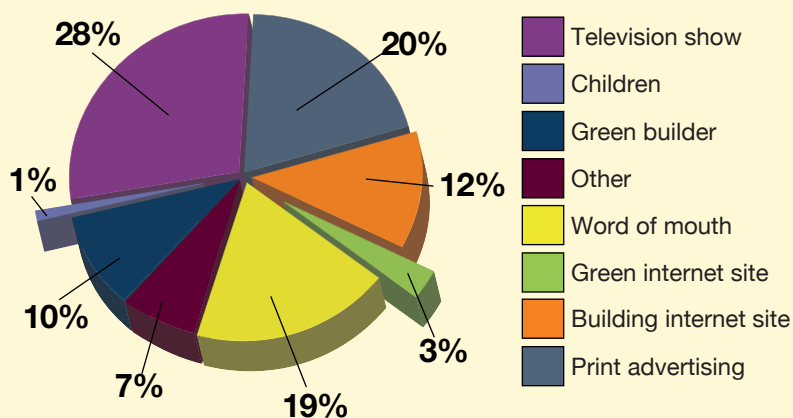
## Trusted Sources of Green Home Information

Interestingly, the most used information sources differ from those that are most trusted among homeowners. While television is the most common source of information, it is among the least trusted. Meanwhile, green home builders are among the least used resources, but they are the second most trusted (73%), following only friends and family (77%).

### Demographic Variations

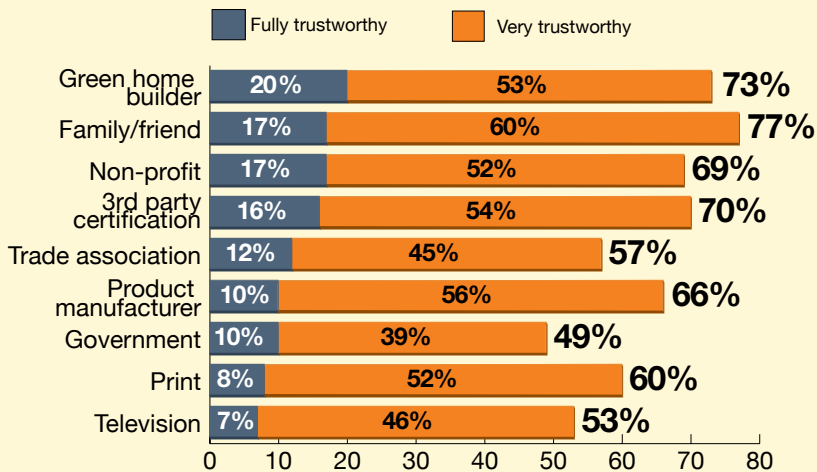
- Those with annual incomes less than \$50,000/year were more inclined to trust a green home builder compared to their counterparts.
- Home buyers in the youngest age group (18–34) tend to show a higher level of trust for all sources of information than those in the older age ranges.
- Meanwhile, college graduates and those with advanced degrees place greater trust in friends and family than those with less education.

## How Buyers Hear about Green Homes



SOURCE: McGraw-Hill Construction, 2008

## Trustworthy Sources for Information on a Green Home



SOURCE: McGraw-Hill Construction, 2008

# Market Intelligence on the Green Home Consumer

## The Sale of Green Homes in Today's Marketplace

### Green is More Attractive

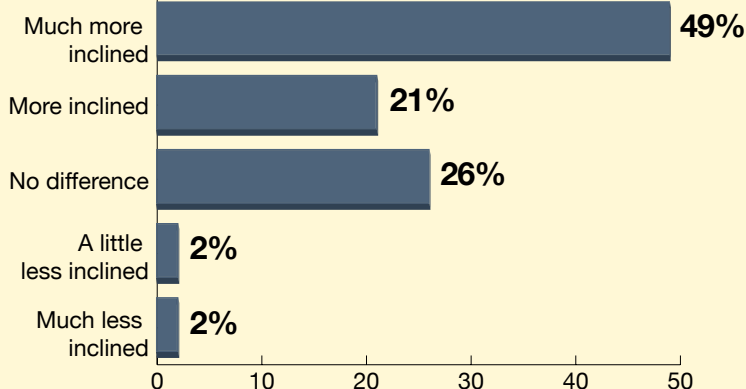
In this down market, home consumers tend to be more interested in purchasing a green home than a non-green home. Nearly half (49%) said they were much more interested in buying green, and a further 21% said they were more inclined (see chart at right). This trend is likely due to the cost savings associated with green homes, as consumers are looking to save on operational costs wherever possible.

Home builders should recognize this as an indicator of how green can serve as a market differentiator in difficult economic conditions. According to the recent 2008 MHC SmartMarket Report *The Green Home Builder: Navigating for Success in a Down Economy*, 40% of green home builders find green homes easier to market in the current economic conditions. As market uncertainty continues, this trend will likely lead to continued growth in the green home marketplace.

### The Economics of a Green Home

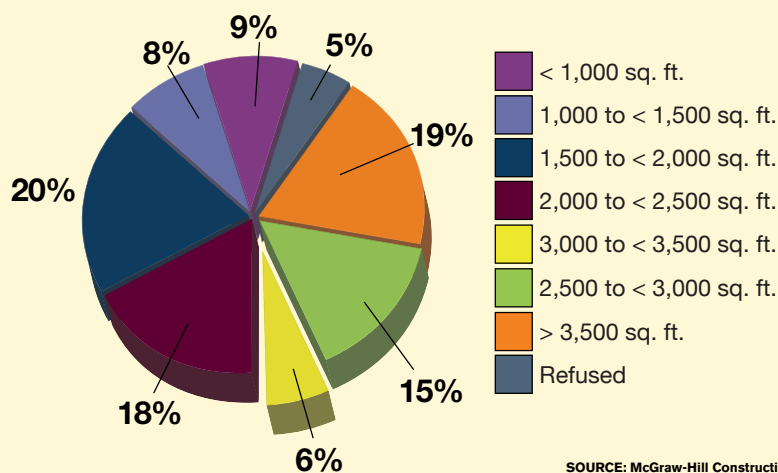
Green homes are no longer a luxury for the wealthy. The average new green home is a standard 2,477 square feet and costs \$296,600. Most buyers (52%) are paying "about the same" for their green homes as for a comparable non-green home (see chart at right).

## Influence of Down Economy on Green Home Purchases



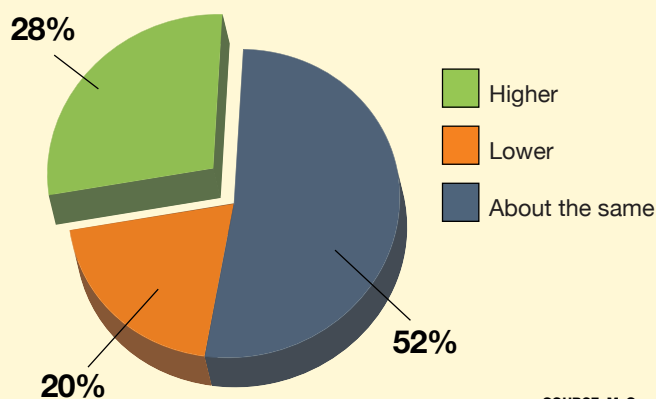
SOURCE: McGraw-Hill Construction, 2008

## Size of Green Homes



SOURCE: McGraw-Hill Construction, 2008

## Price of Green Home vs. Comparable Non-Green Home



SOURCE: McGraw-Hill Construction, 2008

## Price Premiums for Green Homes

Despite the increasing affordability of green homes, consumers demonstrate that they are willing to pay a premium for green features. As can be seen in the chart at right, one-third (33%) of home buyers are willing to pay a premium of \$20,000 or more for a green home. This yields an overall average premium of \$19,300 (mean) or \$11,300 (median).

The groups willing to pay the highest premium for green are:

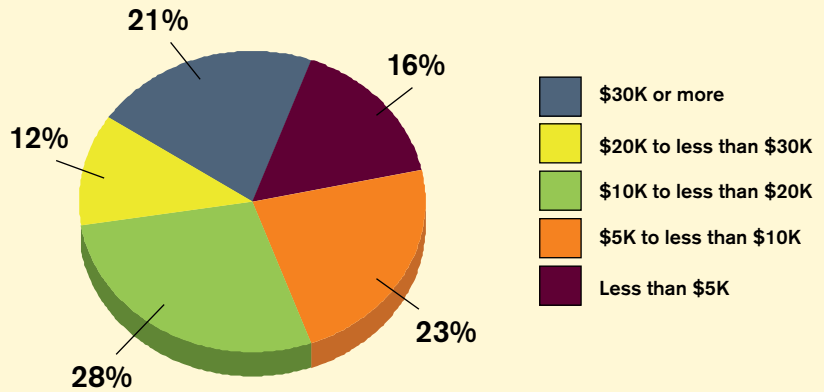
- 35–54 years old
- College degree holder
- Male
- Earning between \$75,000 and \$100,000 per year

## Cost Savings

A key factor to the growing willingness to pay a price premium for green homes is the promise of reduced operational costs. On average, green homeowners are seeing an 18% reduction in both their energy and water bills in their new green homes.

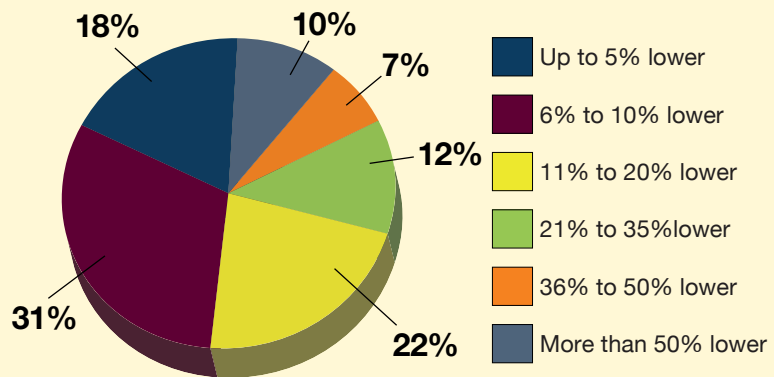
There was very little variation by different demographic and geographic comparisons. These kinds of savings are clearly seen by all green home owners and often can translate into tremendous savings over the life of the home. This finding is extremely important since one of the often cited obstacles to green home building is due to costs (see page 19).

Price Premium Paid for Green Home (Percent Higher)



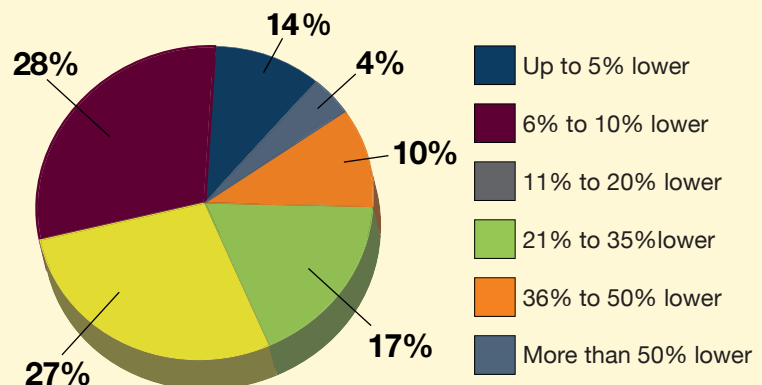
SOURCE: McGraw-Hill Construction, 2008

Reduction in Water Bills



SOURCE: McGraw-Hill Construction, 2008

Reduction in Energy Bills



SOURCE: McGraw-Hill Construction, 2008

# Market Intelligence on the Green Home Consumer

## Green Home Consumer Demographics

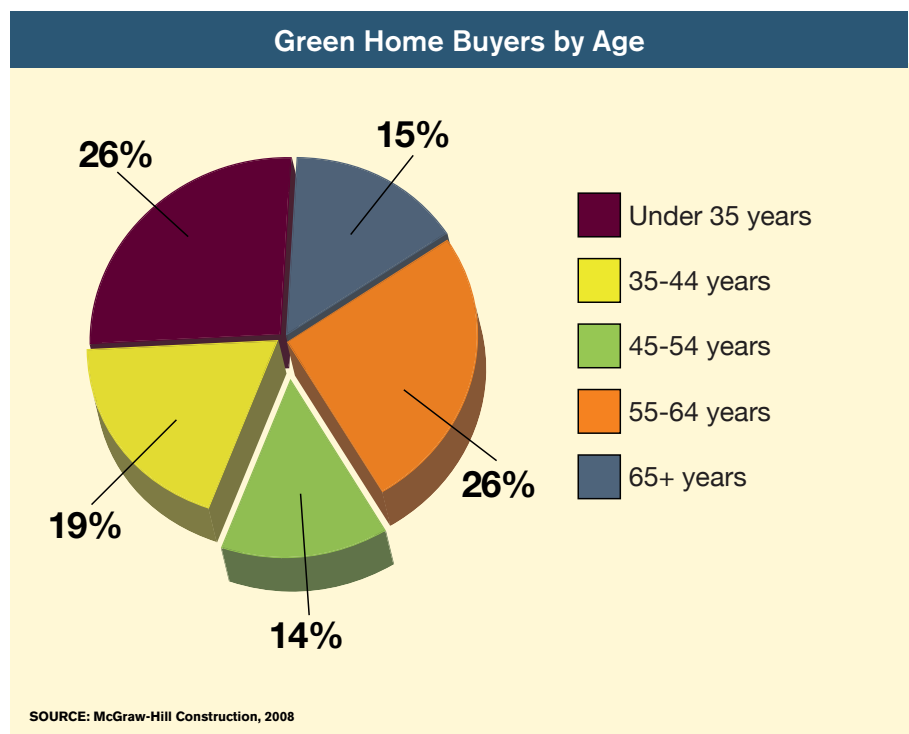
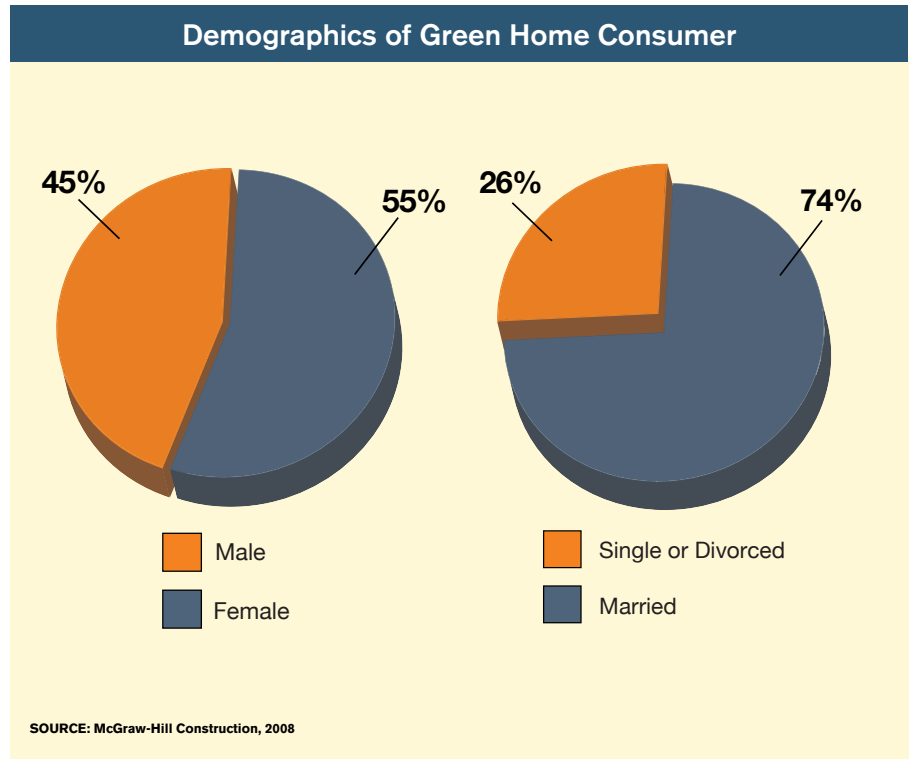
### The Average Green Home Buyer

The study identifies the profile of an average green home buyer:

- Female (55%)
- Married (74%)
- College degree holder
- Average age of 49, though research shows a wide distribution, indicating age is not a differentiator
- Average annual income of \$76,000
- Located in the South or West, specifically Texas or California.

### Changes Over Time

This profile represents some shifts from the average homeowner demographics reported in the MHC 2007 SmartMarket Report *The Green Homeowner*. In 2007, 71% of green home buyers were female, versus 55% in 2008. Other indicators, such as regional location and education level, remain relatively unchanged.



### Income and Education Level

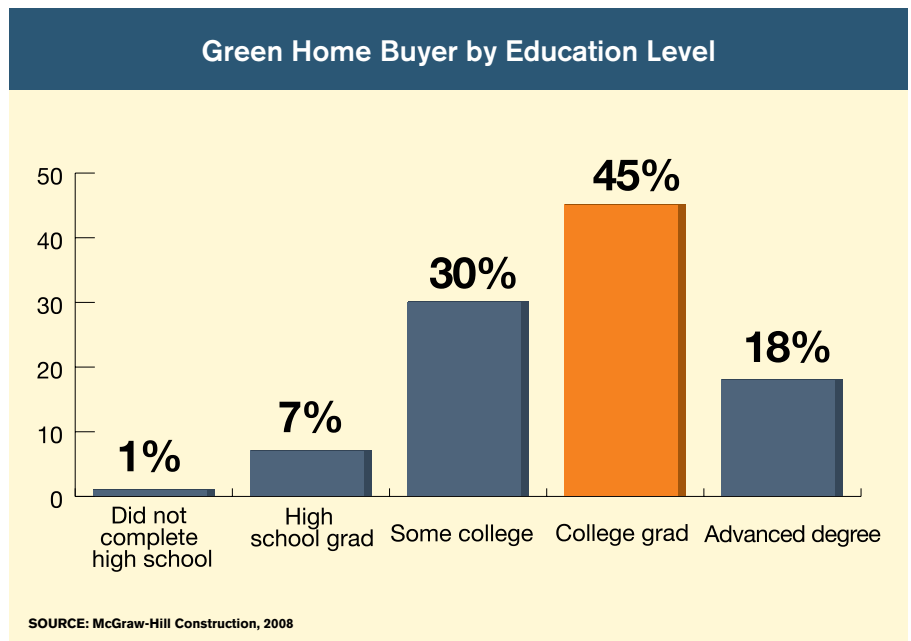
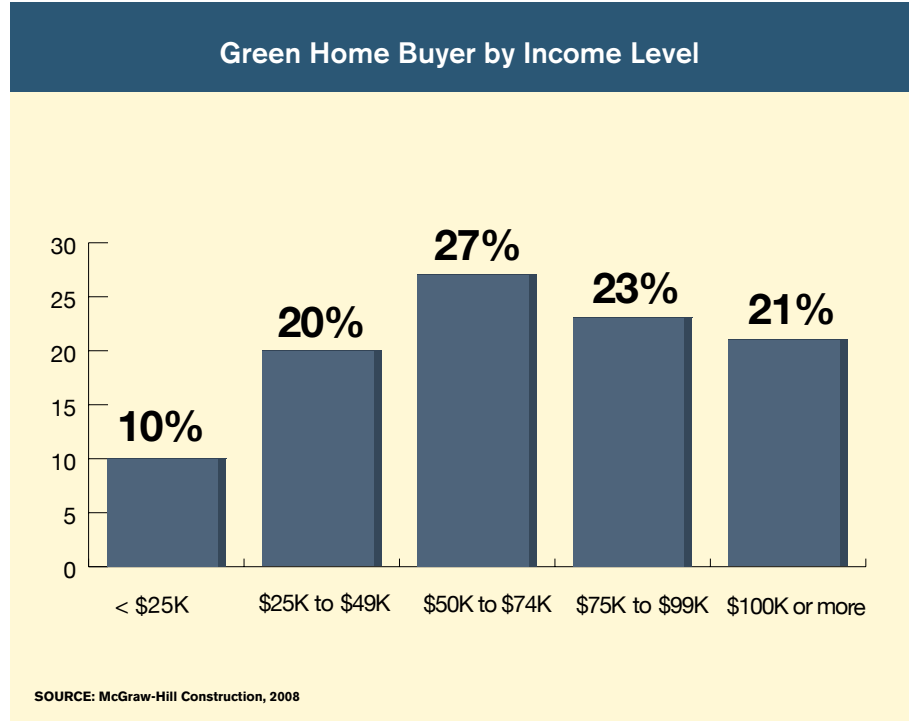
As can be seen in the charts at right, the distribution of income level is relatively level with 57% earning less than \$75,000/year and nearly a third earning less than \$50,000. However, the broad distribution indicates that green homes are not just for the wealthy but rather available for all income levels.

There is more variation by education level. Green homeowners are likely to have college degrees or higher—representing 63% of green home consumers.

### Changes Over Time

Indicators of wealth and income among green home buyers have gone up over the past year, likely reflecting the fallout from the mortgage crisis and increased difficulty of securing home loans. The distribution of income has shifted toward the higher end of the spectrum, with 44% of green home buyers earning at least \$75,000 in 2008, versus 32% in 2007. However, it should be noted that green homes can still be very affordable.

With regard to education, the green home consumer continues to be highly educated. Over half (63%) are at the college graduate level or higher, which remains consistent with findings in the 2007 study, in which this group represented 57%. Home builders and other industry players should note these demographic trends and tailor marketing to this audience in the future.



# Market Intelligence on the Green Home Consumer

## Green Home Consumer Demographics

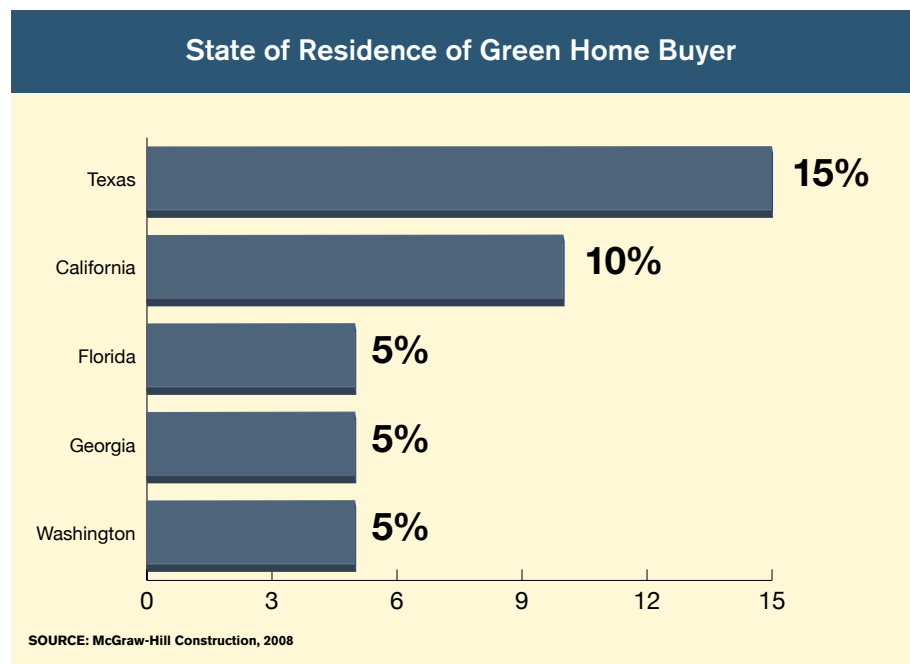
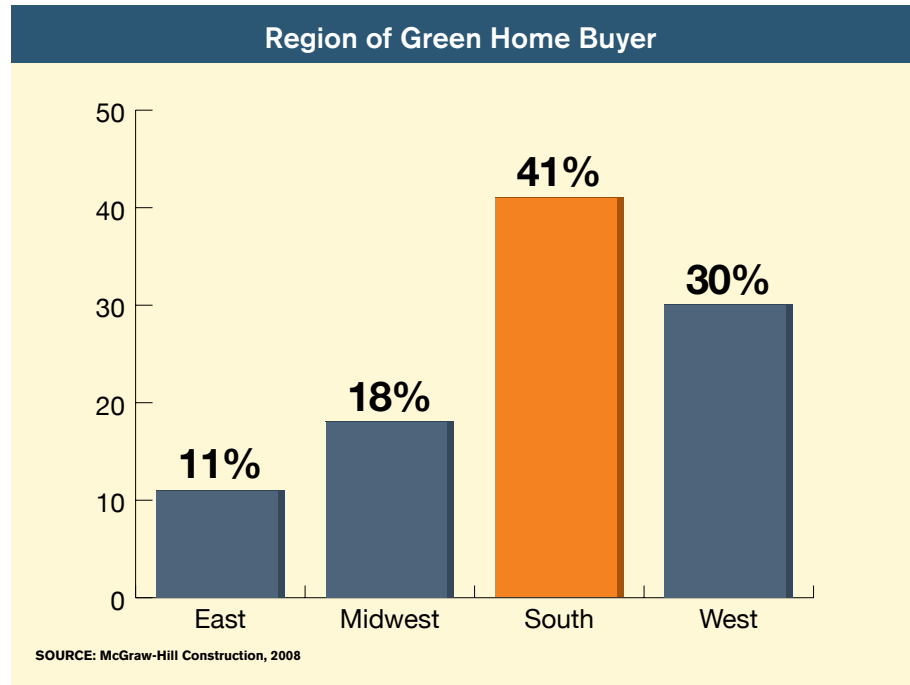
### Regional Demographics

The majority of green home buyers tend to be located in the South or West (71%). Specifically, Texas and California are the most common states of residence (see charts at right). However, given the higher populations in these states, the results are not wholly surprising, though having Texas overtake California is notable.

On the other hand, home builders are not necessarily concentrating their green building activity in these same regions. According to results from the MHC 2008 SmartMarket Report *The Green Home Builder: Navigating for Success in a Down Economy*, home builders see the greatest potential for green home growth in the Pacific, South Atlantic and Northwest regions.

### Changes Over Time

Regional trends in green home buying remain constant from the results in MHC's 2007 *The Green Homeowner SmartMarket Report*. However, the high concentration of green home builder activity in the Pacific and Northwest regions indicates that some shifts may be on the horizon.



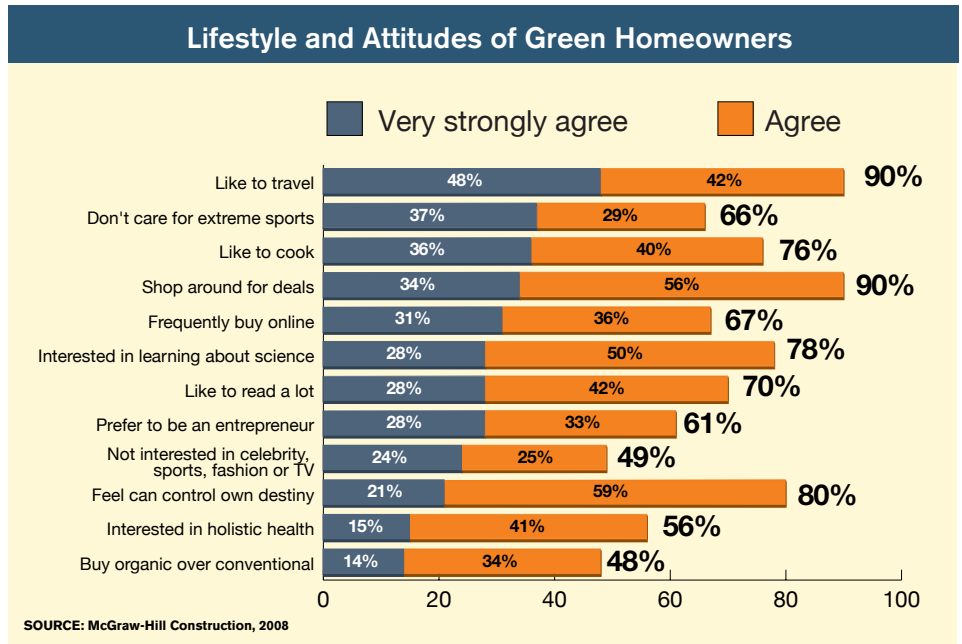
## Lifestyle and Values of the Green Home Consumer

### Personal Attitudes and Preferences

Green home consumers are most likely to have the following interests and traits (see chart at right):

- Comparative shopper (90%)
- Enjoys traveling (90%)
- Feels in control of his/her own destiny (80%)
- Interested in learning about advancements in science and technology (78%)
- Enjoys cooking (76%)

Additionally, 67% of green homeowners tend to make frequent purchases online and 66% do not care for extreme sports.



### Values and Ethics

Green home consumers are most concerned with relationships, citing protecting the family (96%) and maintaining stable personal relationships (95%) as their top values. Health and well-being and a sense of duty are also key concerns.

Meanwhile, wealth and status are not major concerns among this population. However, ambition and status are much more important to the younger demographics (ages 18–34 and 35–54) than to those over 55 years old.

### Demographic Differences

- Gender: Female home buyers tend to be more concerned about holistic health and social responsibility.
- Age: Younger home buyers are more likely to buy organic products and have a higher interest in sports, celebrity, status, ambition and adventure than those above the age of 55.
- Income: Those groups with household income greater than \$100,000 express a greater interest in celebrities, sports, fashion and TV culture than those in the lower income groups.

# Market Intelligence on the Green Home Consumer

## Green Home Benefits and Consumer Satisfaction

### Satisfaction with Green Home

Green home consumers demonstrate a very high level of satisfaction with their green homes. Nearly all (87%) are either more satisfied or much more satisfied than with their previous non-green homes.

### Demographic trends in green home satisfaction:

The highest levels of satisfaction are among the following demographic groups:

- 18–34 years old
- Lower income levels

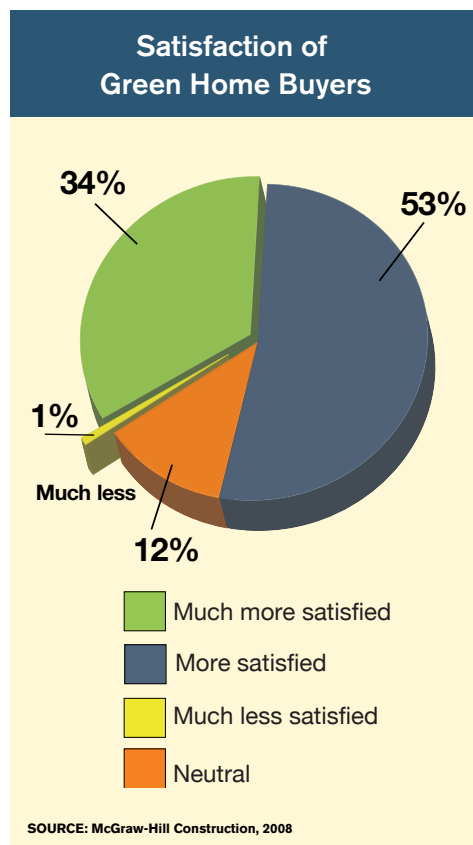
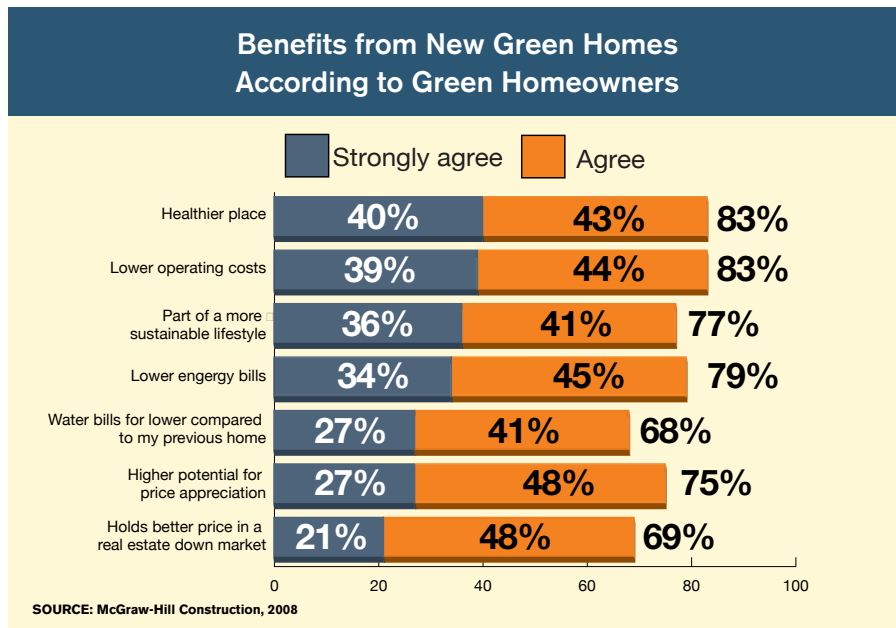
These findings represent a major departure from the MHC 2007 SmartMarket Report *The Green Homeowner*, where consumers with incomes over \$50,000 per year had higher satisfaction rates compared to others.

It is noteworthy that the highest level of satisfaction is seen among the lower income levels. Among those earning less than \$50,000 per year, 98% express satisfaction with their green home, versus 73% among those earning \$100,000 or more. This may be influenced by the rising costs of energy, which are more keenly felt among lower-income households.

### Satisfaction with Green Home Benefits

In general, green home consumers perceive a higher level of home performance. The top five benefits that contribute to green homeowner satisfaction include:

- Healthier place to live
- Lower operating costs
- Part of more sustainable lifestyle
- Lower energy bills in first year
- Lower water bills in first year



### Trends among Younger Demographic

Not surprisingly, home buyers in the younger age groups (18–34 and 35–54) have a stronger perception that their new green home will have a greater price appreciation over time than those over 55 years old. Those in the youngest bracket (18–34) in particular express a strong belief that owning a green home is part of living a more sustainable lifestyle.

These concerns provide interesting insights for home builders into how best to reach and market green homes to younger age groups.

## Promotion of Green Homes

Nearly nine in 10 green homeowners (87%) are likely to recommend a green home to friends and family. This reflects the high levels of satisfaction demonstrated on page 20, and is particularly important when considering that word of mouth is one of the most common ways for homeowners to learn about green homes (see page 7).

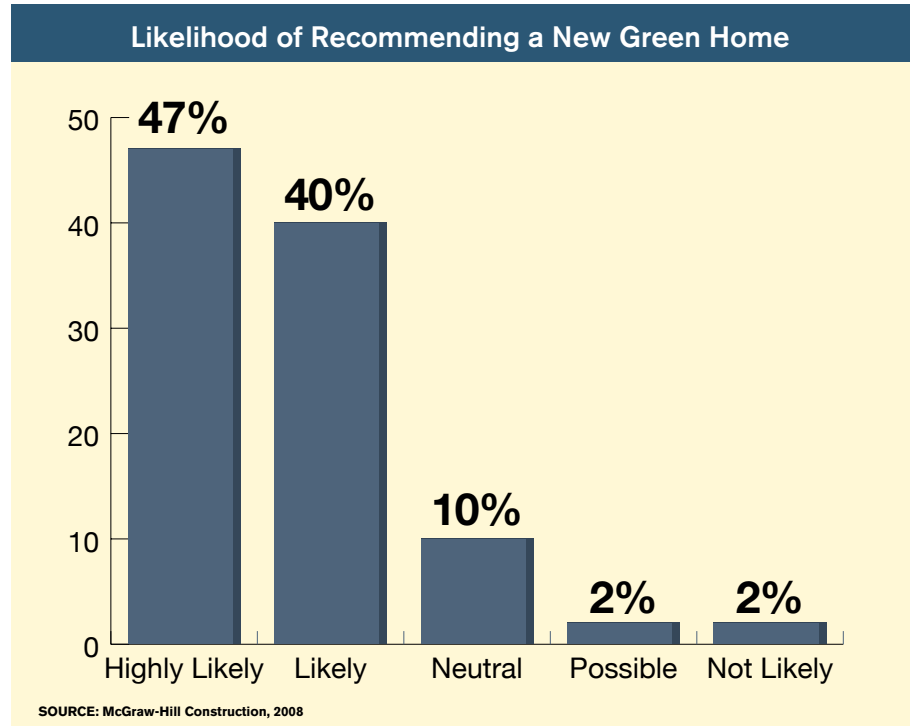
Nearly half (47%) of green homeowners are highly likely to promote green homes, with a further 40% likely to discuss their homes. Comparatively, only 2% are not likely to do any promotion.

### Recommendations by Demographic

Consistent with customer satisfaction trends (see page 14), homeowners in the lower income brackets are more likely to promote green homes. The profile of a green homeowner most likely to recommend a green home includes the following characteristics:

- Aged 18–34
- Some college or less
- Male
- Earns less than \$50,000
- Located in the Midwest

Green homeowners in the South and with college education are also comparatively more likely to promote green homes. Importantly, these high overall recommendation rates indicate a strong base for future market and sales growth in green homes. Given the young age demographic of those most willing to recommend green homes, the pipeline for these homes may be more significant as these buyers age and buy more homes.



# Market Intelligence on the Green Home Consumer

## Energy Efficiency and Renewable Energy

Green homeowners are very satisfied with the energy efficiency features of their green homes, with 90% either very or extremely satisfied (see chart at right). Health/indoor air quality and overall home quality also have high levels of satisfaction. Buyers in the 18–34 age range indicate a greater degree of satisfaction with these three features than those in older age groups.

Nearly one-quarter (23%) of green homeowners are using renewable energy. Of this group, 95% report satisfaction with the feature. Solar power is by far the most commonly used form of renewable energy, followed by geothermal heating and wind energy. Geographically, the highest percentage of renewable energy use in homes is in the West and the East, while the Midwest and South show relatively less use.

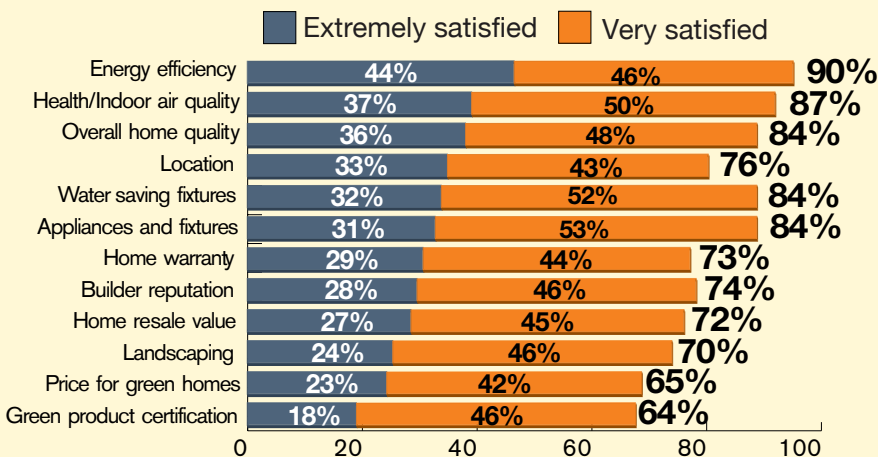
Homeowners perceive a range of benefits from using renewable energy, including:

- Lower environmental impact (80%)
- Less noise (70%)
- More reliable service (69%)

### Use of Renewable Energy

Energy efficiency and renewable energy are rapidly growing trends across the construction industry. The MHC 2008 SmartMarket Report *The Green Home Builder: Navigating for Success in a Down Economy* showed that green home builders are very concerned with energy efficiency. Of builders surveyed, 98% are using some energy-efficient features in their homes. Interestingly, though, only 8% of these builders report using renewable energy, compared to the 23% of homeowners shown in the chart at right suggesting there may be more of a market for these products than builders realize.

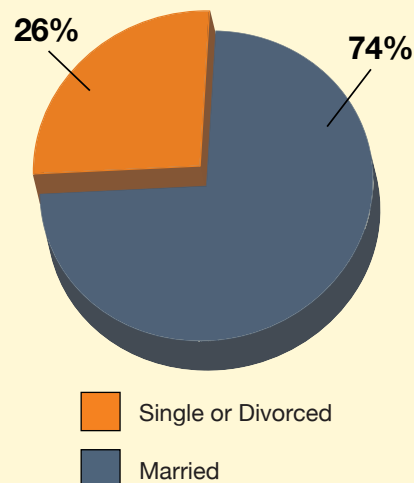
### Satisfaction with Green Home Features



SOURCE: McGraw-Hill Construction, 2008

Globally, renewable energy use is increasingly common. In the MHC 2008 report *Global Green Building Trends: Market Growth and Perspectives from Around the World*, construction industry professionals cited use of renewable energy in every region of the world. Global usage trends are similar to the findings in this report, with solar power the most commonly used form of renewable energy, followed by geothermal and wind. However, respondents in the global study expected that wind power will show the most growth over the next five years, surpassing geothermal to become the second most common form of renewable energy.

### Use of Renewable Energy in Green Homes



SOURCE: McGraw-Hill Construction, 2008

## The Role of Government

Government initiatives are playing a significant role in promoting the growth of the green home building marketplace. Many state governments are mandating that new state government facilities meet green standards, but government guidelines for residential green building are primarily coming from federal agencies and local municipalities rather than states.

### Federal Programs

The two most wide-ranging federal programs devoted to improving the environmental impact of homes are ENERGY STAR and Building America. To earn the Energy Star label, homes must exceed the energy efficiency standards in the 2004 International Residential Code (IRC) by at least 15%. Energy Star homes also include additional features that typically make them 20-30% more efficient than standard homes. To date, more than 840,000 qualified Energy Star homes have been built.<sup>5</sup> Energy Star homes are typically 20 to 30 percent more energy-efficient than standard homes. To date, 62,000 homes have earned the Energy Star certification.

The Building America program, sponsored by the DOE, promotes the development of energy- and material-saving technologies by three federal laboratories, and the adoption of those technologies by residential builders.

### Solar Energy Tax Credit Extended

The three-year-old tax credits for solar energy systems, set to expire on December 31, 2008 were renewed as part of the U.S. Congressional banking bailout bill passed in early October.

The bill extends and expands federal tax credits for a variety of renewable-energy systems, benefiting contractors, homeowners and manufacturers. Under the terms of the plan, homeowners can qualify for a tax credit that equals 30% of a photovoltaic system's cost beginning on January 1, 2009.



The current cap of \$2,000 is removed. According to the Associated Press, solar installers say the tax credits will save an additional \$7,000 for a homeowner installing an average-size photovoltaic system.

### State and Local Efforts

State and local governments are involved in their own voluntary initiatives and incentive programs. Although many of these programs focus on commercial construction, a growing number apply to home building.

Some localities are starting to mandate green building. Though most regulations pertain to government-owned buildings, there are increasing efforts aimed at mandating green for private commercial and residential multifamily, high-rise construction. A few of the cities that have already moved in this direction include Boston, Mass., Washington, D.C., Babylon, NY, Pleasanton, Calif., and Pasadena, Calif.

In some cases, regulations apply to government-funded housing. Washington, DC and Baltimore, Md. both have such mandates.

Dallas, Tex. and San Francisco, Calif. have recently passed fairly sweeping green ordinances. Dallas' law, passed

in April 2008, requires improvements in energy and water efficiency for new residential and commercial buildings, and offers expedited permitting to such projects. The San Francisco green building ordinance, passed in August 2008, requires proof of green building practices and LEED certification for all residential and commercial buildings.

### Local Incentive Programs

Financial incentives: Cincinnati, Ohio (100% property tax exemption for buildings meeting certain green standards); Mecklenburg County, N.C. (permit fee rebates); Miami Lakes, Fla. (grants available for eligible homeowners).

Expedited permitting: Gainesville, Fla.; Hillsborough County, Fla.; Santa Monica, Calif.; Sarasota County, Fla.; Washington, D.C. (under development).

Density bonuses: Acton, Mass.; Bar Harbor, Maine; Nashville, Tenn.

Builder recognition: Arlington, Va.

Development requirements: Annapolis, Md. (more than five houses per lot).

# Market Intelligence on the Green Home Consumer

## Reasons Behind Purchase of a Green Home

The three leading reasons for purchasing green homes are **operational cost savings, improved health and environmental concerns**. More than nine in 10 green home buyers are motivated by operational costs; this remains consistent with the findings from the MHC SmartMarket Report *The Green Homeowner*. Also similar to 2007 findings, most homeowners share the top three concerns, indicating that cost, health and environmental concerns are all driving market growth.

However, it is interesting to note that occupant health has become a bigger influence since 2007, surpassing environmental concerns to become the second most important factor. This trend possibly reflects an overall growth in awareness of the benefits of green home features.

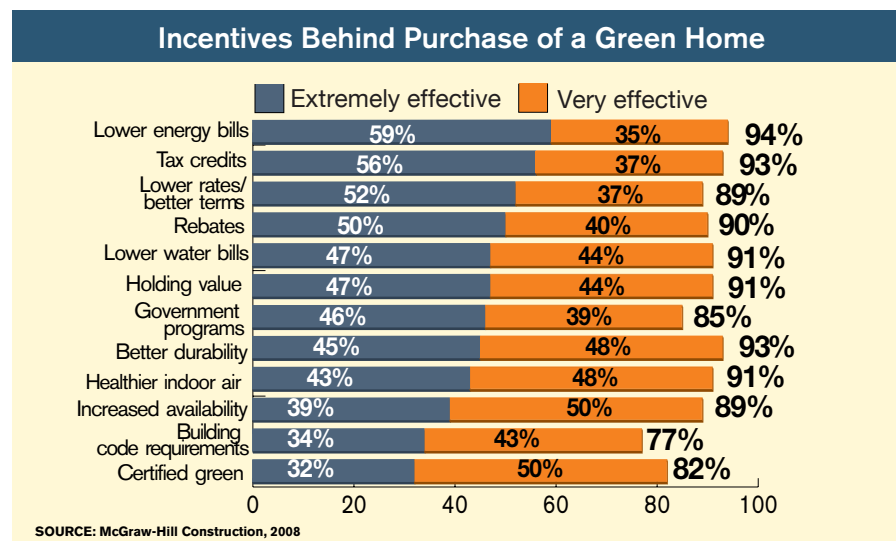
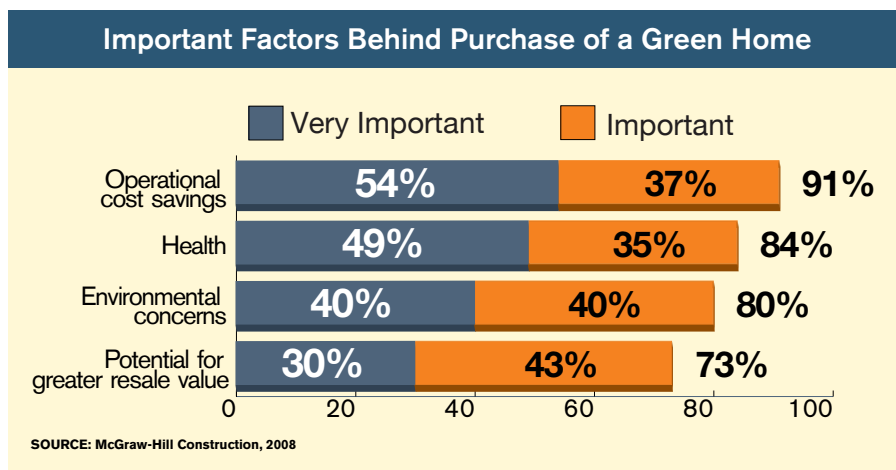
## Financial Incentives for Buying a Green Home

Cost-saving measures are very effective drivers to the sale of green homes. More than half (59%) of green home consumers cite lower energy bills as an extremely effective incentive, followed closely by tax credits (56%), and lower rates and/or better terms for green home loans (52%).

Other incentives include rebates, lower water bills and green homes holding their value during a down market. It is clear that there are many steps that government and banking officials can take to help drive the continued growth of the green home market.

## Incentives by Demographic

Not surprisingly, incentives like lower energy bills, rebates, and lower rates and/or better terms for green home loans resonate more strongly with home buyers in the lower income brackets than those earning more than \$100,000. Women are also more interested in lower energy bills than men.

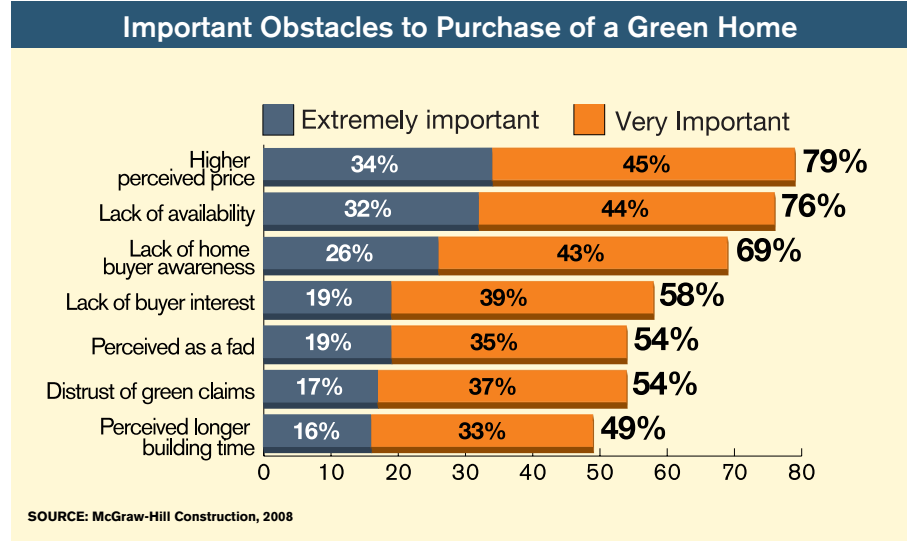


## Obstacles to Purchase of a Green Home

Higher perceived price and lack of availability top the list of challenges to buying a green home. More than three quarters of green home consumers cite these concerns as the top challenges, though lack of buyer awareness and interest are major obstacles as well.

Lack of awareness is most keenly felt by consumers in the lowest income group, while lack of availability is cited much more by those earning \$100,000 or more.

These findings represent a major departure from those in the MHC SmartMarket Report *The Green Homeowner*, where lack of buyer education and awareness was seen as the most important obstacle. Once again, these trends reflect the widely growing awareness among consumers about the benefits of green homes.



# Market Intelligence on Green Home Remodeling

## Green Home Remodeling Market

Almost half (44%) of home remodeling projects today are using green products, reflecting the growing consumer awareness of the benefits of green, and likely also due to increased availability of green home products in the marketplace. In fact, according to MHC research, this number has increased by 5% from just a year ago.

Another indicator of the penetration of green in the remodeling market is how consumers are spending their home improvement dollars. When asked what they would spend the majority of their money on during a renovation, consumers reported they would spend the most—42%—of their money on green features.

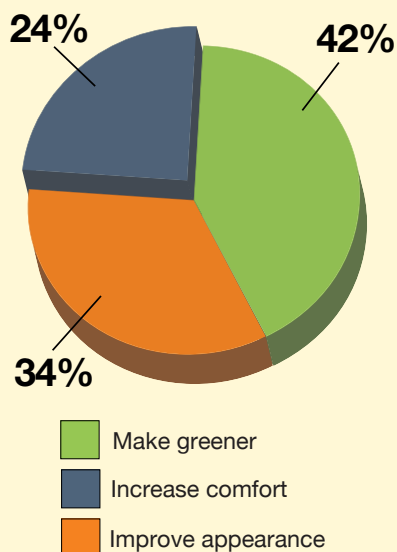
Consumers are more and more using green products in their remodeling projects. In fact, they report increasing their use of green in every product category over the last year.

## Green Remodeling Features

The most common green home products used in remodeling are heating and cooling (HVAC) products and new/replacement windows, each used by nearly half of green home remodelers. In fact, the use of green HVAC systems increased most in the last two years, increasing from 44% in 2007 to 49% in 2008.

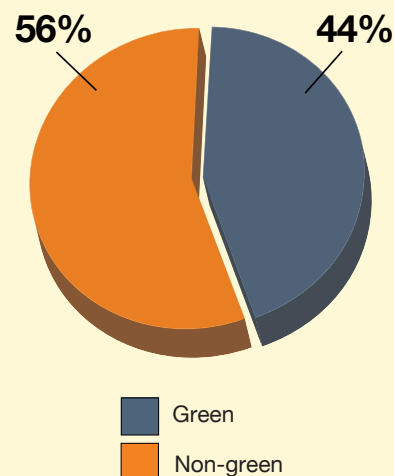
Most consumers have not purchased renewable energy products for their renovation projects, with only 9% reporting use. This is smaller than the 23% of new home buyers reporting renewable energy in their homes.

Features that Comprise Remodeling Budget Share



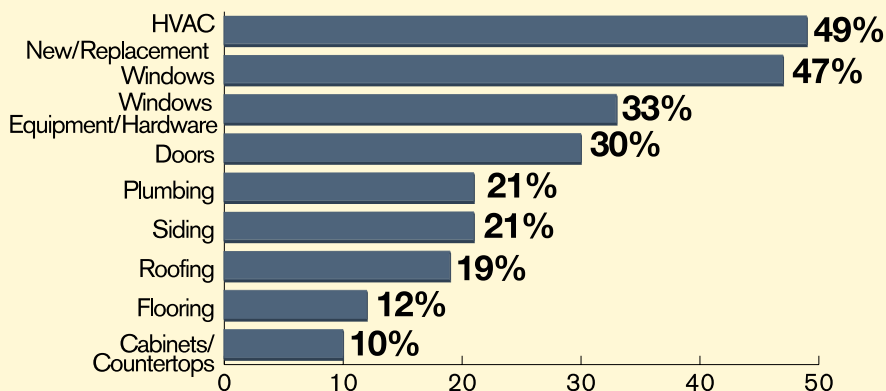
SOURCE: McGraw-Hill Construction, 2008

Homeowners Remodeling with Green Products



SOURCE: McGraw-Hill Construction, 2008

Features Most Often Replaced in Green Home Remodeling



SOURCE: McGraw-Hill Construction, 2008

## Learning About Green Home Products

Similar to trends in learning about green homes (see page 7), most consumers trust family and friends when learning about green home products. As the marketplace grows, this reflects a common concern about qualifying claims by manufacturers that their products are truly green.

## Green Product Certification Programs

Most green product certifications were not well known even to these home consumers. The only program having widespread consumer awareness penetration was the Energy Star program, with 87% being knowledgeable about them.

Green Seal was the next highest with awareness by 59% of the consumers. The fact that these programs are not reaching a larger share of the market is indicative that these programs are not effectively marketed to the public or easily understood.

Regardless, some consumers did use green product certifications in the selection of products, with about a third selecting products that were identified as green by a certification or identification program. In particular, 49% of consumers selected certified floors and 43% selected certified siding.

## Making Green Product Decisions

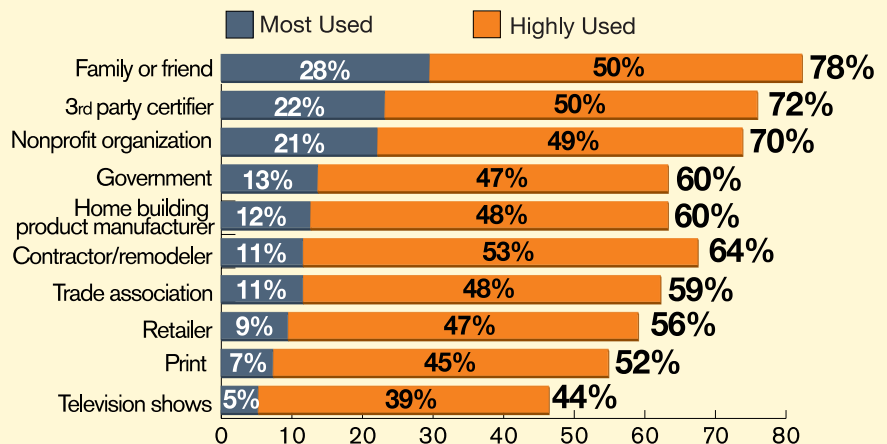
Ultimately, most consumers are making decisions about purchasing green home products on their own, without the input of a contractor, retailer or trusted acquaintance. Key factors influencing these decisions include finding products that fit the following characteristics:

- Sustainable/better for the environment
- Enhance health and well-being

Incentives have the most impact on the purchase of windows, doors, plumbing and siding. When purchasing heating

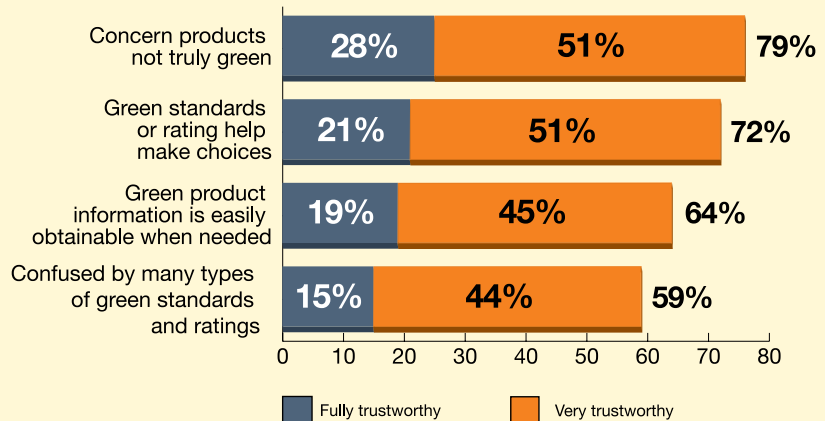
and cooling products and window equipment and hardware, consumers are considering the lifecycle cost incentives, while pricing is an important factor in roofing, flooring and cabinet purchase decisions.

### Top Sources for Information on Green Home Products



SOURCE: McGraw-Hill Construction, 2008

### Perceptions about Green Product Information



SOURCE: McGraw-Hill Construction, 2008

# Market Intelligence on Green Home Remodeling

## HVAC

Heating and cooling systems top the list of products consumers are replacing with greener choices. This is not surprising, given the amount of energy consumed by HVAC equipment and the strong emphasis on operation and cost savings among today's homeowners.

As indicated on page 20, use of green HVAC systems has increased over the years. In terms of decision making, 59% of consumers make their own decisions though many (39%) also use a contractor/installer to help them make their HVAC purchasing decision.

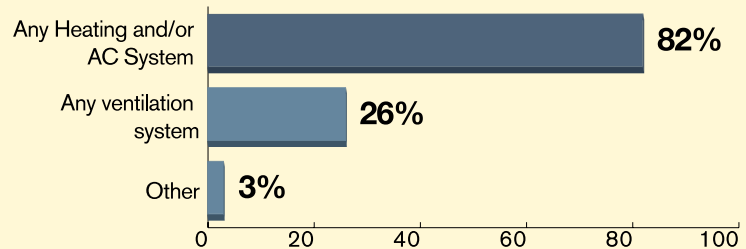
## Windows

Also a major contributor to energy efficiency, windows are among the most common products to be replaced by greener choices. Home consumers are replacing several types of windows, with vinyl, wood and aluminum topping the list.

Over half the consumers for new windows (52%) and 46% of window equipment and hardware make their own purchasing decisions.

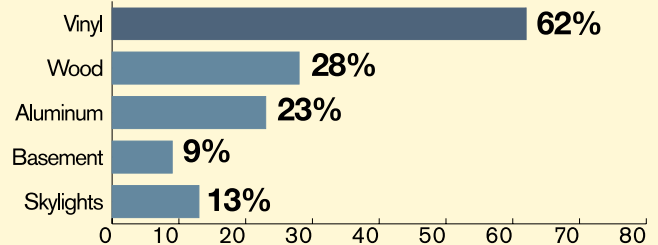
A third also report using green certified windows, though it is also notable that over half do not even know about any green product certification programs for windows.

### HVAC Product Types Most Likely to be Replaced with Green



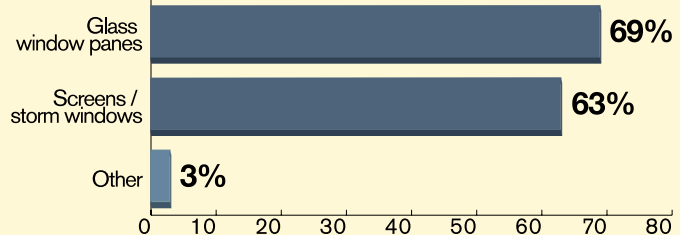
SOURCE: McGraw-Hill Construction, 2008

### Windows Most Often Replaced with Green



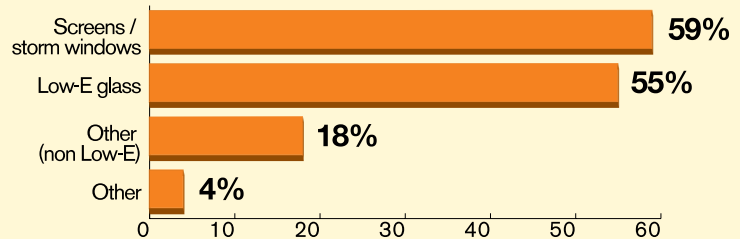
SOURCE: McGraw-Hill Construction, 2008

### Window Equipment/Hardware Products Replaced with Green



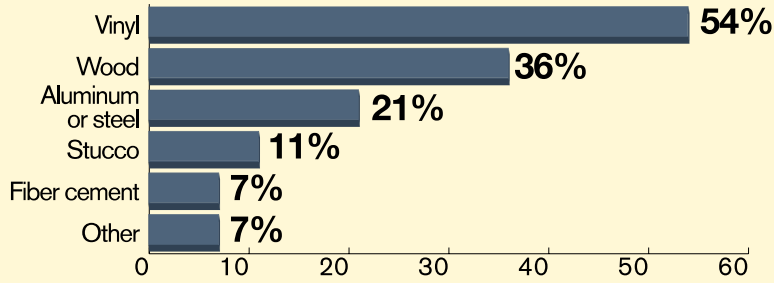
SOURCE: McGraw-Hill Construction, 2008

### Window Equipment/Hardware Green Products for Replacement



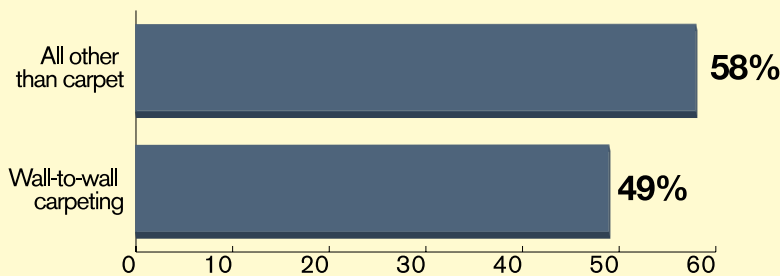
SOURCE: McGraw-Hill Construction, 2008

### Door Types Most Likely to be Replaced with Green



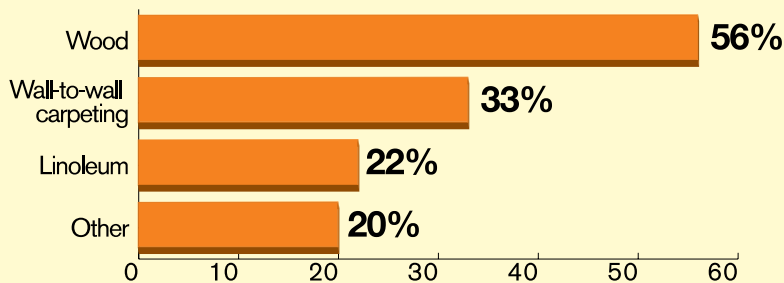
SOURCE: McGraw-Hill Construction, 2008

### Flooring Products Most Likely to be Replaced with Green



SOURCE: McGraw-Hill Construction, 2008

### Flooring Products Used for Replacement



SOURCE: McGraw-Hill Construction, 2008

## Doors

Several different door types are being replaced by greener alternatives. Screen/storm doors represent a majority of door replacements, with over half (54%) of green home remodeling projects including replacements in this product category. This is likely due to the impact that exterior doors have on energy use. Replacement with a green alternative can help lead to cost savings for homeowners.

The use of a greener door alternative also increased over the past year with approximately 5% more reporting use.

For the most part, consumers are making their own purchasing decisions for their new green doors. However, it is notable that 18% also rely on retailers to help make purchasing decisions. This is the product category that had the highest use of a retailer for assistance in the decision-making process.

## Flooring

Home remodelers are most likely to replace non-carpet flooring with green alternatives. More than half are turning to wood products, and one-third are using wall-to-wall carpeting.

Flooring is an area where an overwhelming number are making their own green purchasing decisions, with nearly a third (65%) reporting so.

Flooring is also one of the product categories where green certification programs are being used, with 49% reporting use of green certified floors. This is most likely due to the prevalence of green product programs for both carpet and wood flooring and because of the flooring industry's broad marketing around green alternatives.

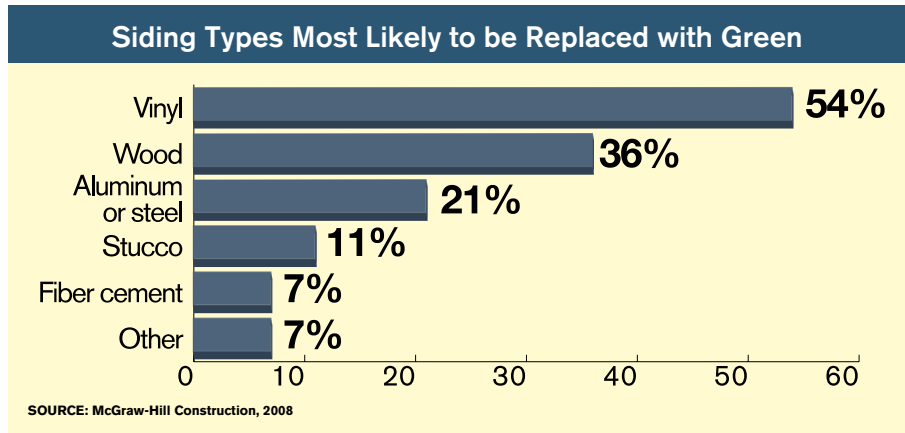
# Market Intelligence on Green Home Remodeling

## Siding

Vinyl is the most common siding to be replaced by a greener alternative.

In terms of decision making, 43% of home consumers owners make their own decisions though many (39%) also use a contractor/ installer to help them.

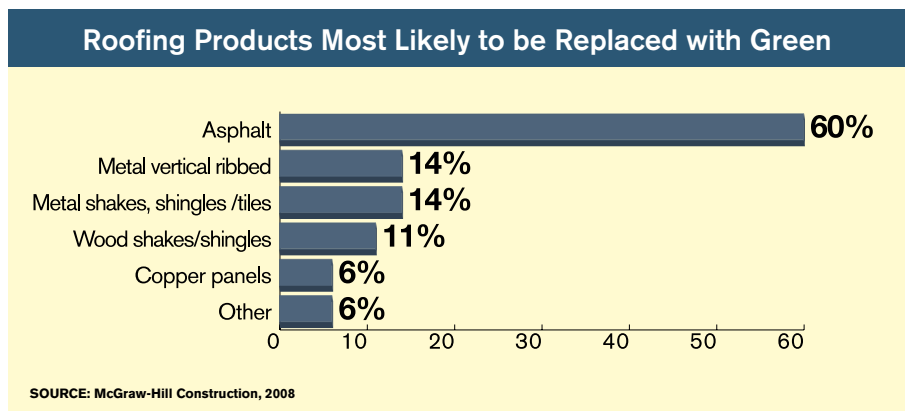
Siding is also one of the product categories where green certification programs are being used, with 43% reporting use of green certified siding. However, it is also notable that half of consumers are not aware of any green product certification programs.



## Roofing

Among consumers doing home remodeling 60% are replacing asphalt with greener alternatives.

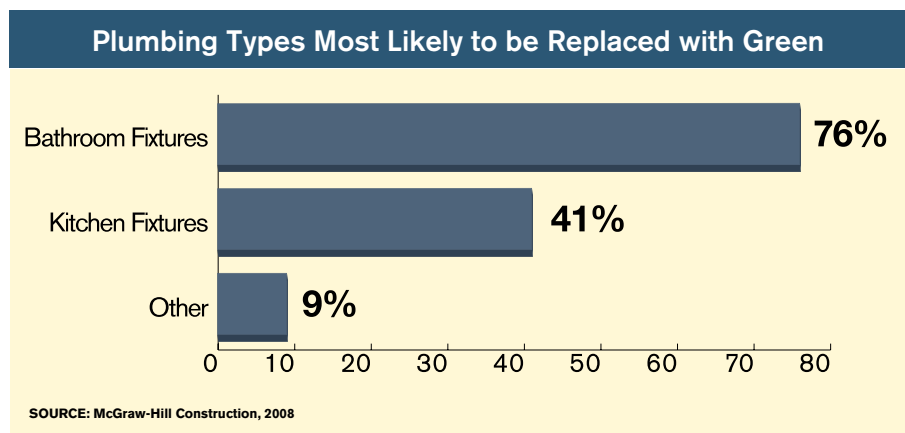
Roofing is the only product category where consumers are relying more on the advice of others—in this case contractors and installers—to make their green product decisions.



## Plumbing

With the growing focus on water conservation, plumbing has become a higher priority in green home renovation. When remodeling, 21% of home consumers are using green plumbing fixtures, the majority of which are in the bathroom.

Consumers are making their own decisions on their green plumbing/ appliance purchases, and 39% are doing so with green certified products.

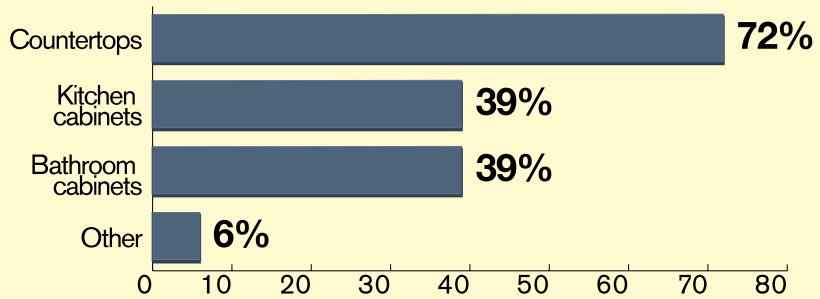


## Cabinets and Countertops

The most popular cabinet and countertop replacements are countertops in the kitchen, bathroom and other parts of the home. Countertops have become a stronger focus over the past year in green remodeling.

An overwhelming number of consumers are selecting their own green countertops. This is not surprising given the aesthetic importance of these products. What is more surprising is the heavy use (67%) of cabinets that are certified or identified as green.

### Cabinets and Countertops Types Most Likely to be Replaced



SOURCE: McGraw-Hill Construction, 2008

## Methodology

The research in this report was conducted under the direction and management of John DiStefano, Director of Market Research under MHC Research & Analytics. In this research, MHC sought to gain insight into the green homeowner and remodeler.

McGraw-Hill Construction conducted data collection between December and January 2008. The total sample size benchmarks to an accuracy of +/- 7.9% at 95% confidence interval for the homeowner part of the study. For the green remodeler study the margin of error is +/- 5.6% at 95% the confidence interval.

The sample for green homeowner investigation was obtained using the following procedure: A screener was

sent to 360,000 randomly selected households (mapping to 116 million households in the U.S.) to identify those individuals that currently live in a green home or have made green renovation to their existing home. A total of 97,526 responses were received (a response rate of 27%). From the total sample of 97,526 cited above, a total of 269 individuals indicated they had purchased a green home between 2005 and 2007. A follow-up questionnaire was sent to these 269 respondents, from which a total of 155 completes were received, a response rate of 58%.

The green home was defined as one containing at least one specific green building element in three of the following five categories: energy efficiency, resource efficiency, indoor

environment quality, responsible site management and water efficiency.

The sample of the green renovator investigation was obtained using the following procedure: From the sample of 97,526 cited above, a total of 52,267 respondents indicated they had undertaken one or more types of renovations or replacements in their home in 2007. Of these, 22,901 said at least one of these renovations or replacements had been "green". A follow-up survey was sent to a randomly selected sample of 600 of these 22,901 respondents, from which a total of 306 completes were obtained, a response rate of 51%. Products covered included windows, doors, plumbing, flooring, siding, roofing, cabinets/countertops and HVAC.

## References:

- 1 Ruiz-Marrero, Carmelo, "Is Bigger Better? Corporate Clouds on the Organic Horizon," CorpWatch.org, 25 November 2004.
- 2 Oberholtzer, Lydia, Carolyn Dmitri and Catherine Greene, Price Premiums Hold as U.S. Organic Produce Market Expands, VGS-308-01, USDA, Economic Research Service, May 2005.
- 3 Global Hybrid Car Market Forecast to 2010, Bharat Book Bureau, August 2008. Accessed online 13 October 2008 at ([www.bharatbook.com/productdetail.asp?id=81116](http://www.bharatbook.com/productdetail.asp?id=81116))
- 4 Priceline.com, "New Priceline.com Survey Finds Almost Three-Quarters Of Travelers Want To See Hybrid Vehicles Added To Rental Car Fleets," 20 April 2007.
- 5 "Features of Energy Star Qualified New Homes," Energy Star Website, 2008. Accessed 4 November 2008 at "[www.energystar.gov](http://www.energystar.gov)"

# The Green Custom Home

## Esopus House Esopus, New York

“[Homeowners] this winter are going to make the decision: Am I going to pay my mortgage or am I going to pay my oil bill?”

When it comes to green building, Anthony Aebi, owner of Greenhill Contracting, Inc., looks beyond the “around green” labels to focus on the heart of sustainable homes—building practical, affordable housing that is going to last. Aebi says he became involved in green building because, “I wanted to make things that are more permanent,” adding that “America was built on disposable housing and it’s a shame that when you build all these houses, 50 years down the line they need to be torn down and started over.” In an effort to build lasting, environmentally friendly homes, Aebi began incorporating insulating concrete forms (ICFs) into his plans, and then added geothermal heating and solar panels.

Aebi recently completed an exemplary home in Esopus, N.Y. The 4,000-square-foot house was built in 2007. When Aebi first began construction on the project, his main goal was to make a mansion-size house that was also a zero-energy home. Despite initial doubts from the project team, after

working with the architect on the design and incorporating 15 acres of wooded landscape, Aebi’s house, “ended up being the first and only house to receive a zero score in New York State from Energy Star.”

Aebi’s zero-energy house offers consumers a fresh perspective on how they can afford a new home despite the weakened economy. “When people look at a new house like this one, they can take into account [the fact that] they won’t have to worry about energy costs for at least 25 years,” Aebi explains.

The green, or as Aebi prefers to say, “practical,” features in the Esopus house can offer numerous benefits to homeowners. The solar panels on the home help save on the mounting electricity bills most Americans are facing. “Solar panels are instantly great for many reasons. In the wintertime, they’re making enough heat from solar [energy] to gain heat. All that power is going back out on the grid. [Homeowners] don’t have to fire up the coal plants, they don’t have to fire up the gas.”



Esopus Net-Zero House

Courtesy of Country Vision Realty

The home also uses geothermal heating and cooling. Aebi touches on the cost myth of geothermal by stating, "Everyone thinks geothermal costs a lot more to install, but really a geothermal system does not cost much more than a conventional hydro-air system." Aebi also makes use of local materials and vendors. "In the Northeast, oak floors [are] the most green wood you can use. It's locally grown, with the local people doing everything."

A key innovation in the Esopus home is the use of ICFs. ICFs are forms for poured concrete walls that stay in place as a permanent part of the wall assembly. The forms not only offer continuous insulation and a sound barrier, but also provide backing for drywall on the inside. "Once we reached the roof, we sprayed in 12 inches of open-cell foam, went up through the concrete walls, through the roof, down the sides, and it basically insulated the whole house, encapsulated it," explains Aebi, adding, "That is the key for all buildings." This translates to lower energy costs and better insulated homes for buyers. "Imagine in an attic that can sometimes reach over 100 degrees, your insulation and heating are trying to play off this temperature. [With ICF], the heat that is shining on the roof only penetrates one inch of the foam, basically not allowing the heat past the shingles in the roof."

Looking toward the future, Aebi is well aware of the hardships Americans are facing with their current homes. "People this winter are actually going to make the decision: Am I going to pay my mortgage or am I going to pay my oil bill?" With his new project of constructing smaller homes in village-style communities, Aebi emphasizes the need for a smarter, more sustainable approach to home construction. "This is a place for all of our children to live in and somebody has to do this. It should have started yesterday."

## Home Facts & Features

**Location:** Esopus, N.Y.  
**Home size:** 4,000 square feet  
**Lot size:** 15 acres  
**Date completed:** 2007

### Awards:

- LEED for Home Gold Certification anticipated
- Energy Star zero score

### Green Building Practices:

- On a landscape of red cedar, pine and oak woods, clearing was kept to a minimum. The site was opened up to sunlight. If wood was trimmed or cleared, it became landscape mulch.
- Culled trees were retrieved and milled for pine floors in the bedrooms and cedar highlights in the bathrooms.
- All construction debris was sorted for recycling.

- The house was set to face south, with numerous high-quality windows to maximize natural light.
- The walls were filled and reinforced with integrated steel. The completed, high R-value shell was sealed with [environmentally safe] expanding foam.
- Electricity is generated by a grid of photovoltaic cells on the roof. The house draws power from the grid and net metering keeps track of the balance.
- Heating and cooling both start at a base of 52 degrees by using geothermal energy.
- Heat recovery ventilation surrenders energy to incoming fresh air in a heat exchanging process.
- All air circulating throughout the house is filtered to remove pollutants, easing allergy pains.
- Insulating Concrete Forms (ICF).

# The Low-Income Green Home

## Edes Avenue Project Oakland, California

“[We want] to make homes that have a high level of dignity so that people are going to want to live there.”

As the market expands, green homes are becoming available to home buyers in all demographics. Recognizing the value of sustainable features, Habitat for Humanity has become committed to finding innovative ways to bring green to low-income families.

Working with a two-acre abandoned auto salvage yard and a volunteer workforce, Habitat for Humanity's East Bay Chapter has managed to develop 26 new green homes which will be sold at affordable prices in Oakland, Calif. The two-acre brownfield redevelopment site is adjacent to a residential neighborhood, and was selected by Habitat for Humanity eight years ago.

Architect Gary Struthers, who has been active with Habitat's East Bay chapter for many years, volunteered his design services. He explains, "It was a very long [design] process because we went through feasibility studies and community workshops."

"Habitat is not only the owner and developer, but also the general contractor, and uses volunteers to

do the construction tasks," Struthers says, adding that, "they control a lot of things that developers normally do not get to control, so they have a lot of input on material use, and complete control of the construction site. So they push green from conception through completion."

Struthers proposed building 26 homes in 13 attached dwellings, ranging from two-bedroom homes of 960 square feet to four-bedroom homes of 1,400 square feet. "By development standards, [this was] on the small side. That is another challenge of making a good design—making the most of the square footage that you have. The mandate from Habitat is small and efficient, and the challenge as a designer is still to make a development that has a high level of dignity so that people are going to want to live there."

In addition to affordability, the volunteer construction force also influenced the design choices. As Struthers says, "You have to keep things simple enough so that volunteers can build them. For the sustainable design, we keep the floor plans pretty simple. [The key]



Edes Avenue Development

Courtesy of Gary Struthers

is not what you build; it is what you don't build." Struthers says he takes deliberate steps to enable volunteer teams to build sustainably, such as the use of cement board sidings. "This is a very sustainable material [that is] user friendly and durable for homeowners. We keep things pretty simple and clean, which helps with construction and keeps it environmentally sensitive."

There is also an effort to provide individuality among the homes in Habitat's developments. "Fortunately, the makers [of cement board sidings] now produce a plethora of styles, so you start mixing in sidings and mixing up colors. Because everything is done with roof trusses, you can very easily change roof lines across the development [without] adding material or labor." Individuality can also be achieved through attention to simple items, such as giving each house different detailing on porches. "It helps break up the monotony and repetition," says Struthers, adding, "It keeps the projects volunteer-friendly but also makes it a fairly elegant design, where all 26 houses are not identical."

Habitat applied green design principles throughout the Edes Avenue project, from monitoring fly ash content in concrete to incorporating basic elements of passive solar design. "The concrete absorbs the sunlight and the heat all day long, and at night when the sun goes down, it releases the heat." Also, by building duplexes in this development, the project team was able to achieve a higher density and conserve green space for the residents. "We also saved at least 25% of exterior exposure because [the houses] have a shared property line instead of four outside walls per house. Three outside walls per house saves a lot of material, from the foundation all the way up to the roof."

Finally, the project enjoys the benefits

## Home Facts & Features

<b>Location:</b>	Oakland, California
<b>Lot Size:</b>	1.92 acres, 26 single-family homes
<b>Cost:</b>	\$300,000 (average phase one cost per home). Sale price is well below this level, and set variable by family with the help of local government subsidies
<b>Start Date:</b>	2006
<b>Completion:</b>	December 2008
<b>Green Building Practices</b>	
■	Brownfield redevelopment
■	Efficient framing, reducing lumber use by 30%
■	Fast-growing engineered lumber

- 30% fly-ash concrete to reduce landfill
- Water-efficient landscaping with draught-tolerant plants
- Solar panels
- Cement board siding
- Low-VOC paints and finishes
- High development density
- Fly-ash concrete
- Permeable strips on driveways
- BGE gas and electric appliances
- Energy-efficient fixtures and appliances in each home

of location. The Bay Area climate does not require air conditioning, which automatically provides energy savings. Struthers also credits California's building code with encouraging green

building. Three of the homes in the development are expected to earn certification under LEED for Homes, to demonstrate the sustainable levels achieved throughout the development.



Edes Avenue Development

Courtesy of Gary Struthers

# Green Expert Perspective: Building Green Today

**Don Ferrier**  
**Ferrier Custom Homes**



**Don Ferrier**  
President  
Ferrier Custom Homes

*Don Ferrier is a third-generation builder, who has focused on energy-efficient construction with structural insulated panels since 1984. In 2006, MHC profiled Ferrier's landmark project, Heather's Home, in the Residential Green Building SmartMarket Report. This fall, Scott Lewis, director of editorial research at McGraw-Hill Construction checked in with Don to get his insights on best practices in green residential construction and to see how his green custom home business has evolved.*

**What have you been up to since we interviewed you in 2006?**

We finished Heather's home two years ago. It was a prototype with LEED-H guidelines and NAHB green building guidelines as they were being developed and as a part of the DOE Building America program. [We also completed] the Vaught Home, west of Fort Worth." We were honored to win our fourth Energy Value Housing Award—the most energy-efficient home in a hot climate.

**How many energy efficient homes have you built over the past ten years?**

My guess would be about 100.

**As the market grows, do you see changes in your interactions with home buyers today?**

Well, our typical homeowner is very educated about green features, and is usually involved with the process. It all starts in the design and conversations with the homeowners—goals and budget. There is usually a disconnect where goals cost more than budget, so we have to work with people to find that balance. We like to start with thoughts, ideas and a blank sheet of paper, and incorporate proper design and orientation.

**Are you trying to achieve net-zero energy in any of your homes?**

The only way to do that is with photovoltaics or wind—you have to have some way to produce energy. So what we try to do is get the home as close to zero as we can, and then if the client decides to make that investment, we will. We will start three homes this year that will either get to zero or very close.

**What are some of the most important elements of green homes today?**

Insulation is key. We're using structural insulated panels (SIPs) for the exterior envelope of the house in 95% of our projects. One of the great things about SIPs is that your air infiltration has drastically diminished, so your house is airtight.

**What is your take on the green building market today?**

I think that it is alive, well and thriving. [At Ferrier], we have more design clients than we have ever had. [MHC's] SmartMarket Reports do the best job in capturing where we are. A few years ago, I remember one saying this will be a tidal wave of change in the way that builders will build, and some builders don't even realize it is there. [Green] continues to grow at a more rapid rate. Building across the U.S. is suffering unless you're a green builder.

**“Building across the U.S. is suffering unless you are a green builder.”**

# USGBC's New LEED for Homes and REGREEN Guidelines

## LEED for Homes

Developed as a residential counterpart to the U.S. Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) Green Building Rating System™, LEED for Homes was officially launched in February of 2008. This green home certification program measures how well homes are designed and built to be energy- and resource-efficient and healthy for occupants. As of November 2008, 1,084 homes had received LEED for Homes certification, and 13,651 homes had registered their intent to seek certification.

LEED for Homes offers a rigorous home-certification system with clearly defined and established benchmarks for green homes nationwide. The rating system measures the overall performance of a home in eight categories:

- Sustainable sites
- Water efficiency
- Energy and atmosphere
- Materials and resources
- Indoor environmental quality
- Innovation
- Location and linkages
- Awareness and education

The categories add up to a total of 136 available points with four related certification levels: Certified (45–59 points), Silver (60–74), Gold (75–89) and Platinum (90–136).

In establishing a LEED system for homes, USGBC hopes to help create a national benchmark among the more than 70 existing local and regional green home building programs.



Edes Avenue Development

Courtesy of Gary Struthers

According to USGBC, the average home rated at the LEED-Certified level is predicted to have potential energy savings of up to 30% over homes built to the International Energy Conservation Code (a widely used standard). Homes built to LEED benchmarks have better ventilation, use paints and products that emit few or no dangerous volatile organic compounds (VOCs), and utilize advanced moisture-control strategies. For the average home buyer looking to buy green, recognized certification systems like LEED for Homes can help provide resources and education.

## REGREEN

REGREEN represents the first national guidelines for green home remodeling projects in the U.S. Developed in partnership by the American Society of Interior Designers (ASID) and USGBC, the program provides resources for greening existing homes and was designed to assist both builders and homeowners looking to green their home-improvement projects.

REGREEN was launched in the fall of 2007 and the final version was released in March 2008. The program addresses the major elements of 10 types of remodeling projects including: kitchen, bathroom, bedroom, living and working space, finished basement, weatherization, major addition, gut rehab, deep energy retrofit and outdoor living. For each project type, REGREEN delves into such matters as integrated predesign issues, the project's scope and strategies for each building system, and also provides case studies.

*Author Note: The above is taken mostly from USGBC-sourced content. Other than some assessment statements matching content throughout the report, the facts and examples in this section are not products of McGraw-Hill Construction.*

# Resources

Organizations, Websites and publications that can help you get smarter about green homes



- Main Website: [construction.com](http://construction.com)
- GreenSource: [greensourcemag.com](http://greensourcemag.com)
- Research & Analytics: [construction.com/marketresearch](http://construction.com/marketresearch)
- Architectural Record: [archrecord.com](http://archrecord.com)
- Engineering News-Record: [enr.com](http://enr.com)
- Sweets: [sweets.com](http://sweets.com)
- Green Reports: [greensource.construction.com/resources/SmartMarket.asp](http://greensource.construction.com/resources/SmartMarket.asp)



- Main Website: [usgbc.org](http://usgbc.org)
- Residential Resources: [greenhomeguide.org](http://greenhomeguide.org)
- LEED for Homes: [usgbc.org/LEED/homes](http://usgbc.org/LEED/homes)
- Green Home Renovations Guide: [regreenprogram.org](http://regreenprogram.org)

## Other Resources for Green Home Information (listed alphabetically by category)

### Federal Government

- U.S. Department of Commerce, National Institute of Standards and Technology (NIST):  
Main website: [www.nist.gov](http://www.nist.gov)
- BEES software: [bfrl.nist.gov/oa/software/bees](http://bfrl.nist.gov/oa/software/bees)
- U.S. Department of Energy: [energy.gov](http://energy.gov)
- Office of Energy Efficiency and Renewable Energy (EERE): [eere.energy.gov](http://eere.energy.gov)
- National Renewable Energy Lab: [nrel.gov](http://nrel.gov)
- U.S. Department of Housing and Urban Development: [hud.gov](http://hud.gov)
- U.S. Environmental Protection Agency: [epa.gov](http://epa.gov)
- Energy Star: [energystar.gov](http://energystar.gov)

### Nonprofit Organizations

- Alliance to Save Energy: [ase.org](http://ase.org)
- American Council for an Energy-Efficient Economy: [aceee.org](http://aceee.org)
- American Institute of Architects (AIA): [aia.org](http://aia.org)
- Global Green USA: [globalgreen.org](http://globalgreen.org)
- Green Building Initiative: [thegbi.org](http://thegbi.org)
- National Association of Counties: [naco.org](http://naco.org)
- National Association of Home Builders: [nahbgreen.org](http://nahbgreen.org)
- The Partnership for Advancing Technology in Housing (PATH): [pathnet.org](http://pathnet.org)
- Southface Energy Institute: [southface.org](http://southface.org)
- Sustainable Buildings Industry Council (SBIC): [sbicouncil.org](http://sbicouncil.org)
- U.S. Conference of Mayors: [mayors.org](http://mayors.org)

### Other

- Building Green, Inc.: [buildinggreen.com](http://buildinggreen.com)
- Green Builder Magazine: [greenbuildermag.com](http://greenbuildermag.com)

**Acknowledgements:** The authors wish to thank our partners at the USGBC for their support. Specifically, we would like to thank Michelle Moore, Nate Kredich, Taryn Holowka, Doug Smeath, Tom Flanagan and Ashley Katz.

We would also like to thank Gary Struthers from Struthers/Dias Architects and Habitat for Humanity East Bay Chapter, Don Ferrier of Ferrier Custom Homes, and Anthony Aebi from Green Hill Contracting for talking about their green home projects and helping to secure images to supplement their project information. Thanks also to Donna Russell, Country Visions Realty and Heather Ferrier, Ferrier Custom Homes, who also provided images for the report.

Finally, we would like to thank the MHC staff who contributed to the report, including Valerie Beard, Angela Haliski, Scott Lewis and Julie Miltner.



# SmartMarket Report

*Design & Construction Intelligence*

McGraw-Hill Construction

**President:** Norbert W. Young, Jr., FAIA

McGraw-Hill Construction Research & Analytics/Alliances

**Vice President, Industry Analytics, Alliances & Strategic Initiatives:**

Harvey M. Bernstein, F. ASCE, LEED AP

**Senior Director, Research & Analytics:** Burleigh Morton

**Director, Green Content & Research Communications and Editorial Director,**

**SmartMarket Reports:** Michele A. Russo, LEED AP

**Director, Market Research:** John DiStefano, MRA, PRC

**Director, Industry Alliances:** John Gudgel

The Green Home Consumer SmartMarket Report

**Editor-in-Chief:** Catlin O'Shaughnessy, LEED AP

**Research Project Manager:** Manisha Sharma, MRA, PRC

Reproduction or dissemination of any information contained herein is granted only by contract or prior written permission from McGraw-Hill Construction.

For further information on this SmartMarket Report or for any in the series, please contact McGraw-Hill Construction Research and Analytics.

1-800-591-4462, 34 Crosby Drive, Suite 201, Bedford, MA 01730

[www.construction.com/marketresearch](http://www.construction.com/marketresearch)

MHC\_Analytics@mcgraw-hill.com

Copyright © 2008, McGraw-Hill Construction, ALL RIGHTS RESERVED

McGraw-Hill Construction SmartMarket Reports™

[greenSource.construction.com/resources/smartmarket.asp](http://greenSource.construction.com/resources/smartmarket.asp)



**SmartMarket Reports**  
[greensource.construction.com/resources/smartmarket.asp](http://greensource.construction.com/resources/smartmarket.asp)

**Executive Offices**

**McGraw-Hill Construction**

**2 Penn Plaza**

**New York, NY 10121-2298**

**McGraw-Hill Construction—One Name for Industry-Leading Information and Intelligence**

McGraw-Hill Construction, North America's leading provider of information and intelligence solutions to the \$4.8 trillion global construction industry, makes it easy for design and construction professionals to cut through the clutter, make better decisions and grow their business.

A trusted source for more than a century, McGraw-Hill Construction continues to transform the global construction industry by setting new standards through connecting people, projects and products.

McGraw-Hill Construction drives industry growth with critical sales and marketing solutions:

- McGraw-Hill Construction Network®: Online, integrated information solutions to find work, do work and manage opportunities
- McGraw-Hill Construction Network for products: Online, integrated solution to find building products, specs and more
- McGraw-Hill Construction Media/Marketplace: Connecting buyers and sellers through the McGraw-Hill Construction magazines—GreenSource, Architectural Record, ENR and the Regional Publications—and online resources
- McGraw-Hill Construction Research and Analytics: Gaining Insight and Intelligence

This report is printed using soy-based inks on New Leaf Reincarnation Matte, made with 100% recycled fiber, 50% post-consumer waste, processed chlorine-free with a cover on New Leaf Primavera Gloss, made with 80% recycled fiber, 40% post-consumer waste, processed chlorine free. By using this environmentally-friendly paper, McGraw-Hill Construction saved the following resources (calculations provided by New Leaf Paper, based on research conducted by Environmental Defense and other members of the Paper Task Force)

- 21 fully grown trees
- 6,184 gallons of water
- 11 million BTUs of energy
- 1,025 pounds of solid waste
- 1,901 pounds of greenhouse gases

**\$149**

ISBN: 978-1-934926-18-5



9 781934 926185

