



Green Multifamily and Single Family Homes:

Growth in a Recovering Market

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SmartMarket Report

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Green Multifamily and Single Family Homes: Growth in a Recovering Market SmartMarket Report

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About McGraw Hill Construction

McGraw Hill Construction's data, analytics, and media businesses—*Dodge*, *Sweets*, *Architectural Record*, and *Engineering News-Record*—create opportunities for owners, architects, engineers, contractors, building product manufacturers, and distributors to strengthen their market position, size their markets, prioritize prospects, and target and build relationships that will win more business. McGraw Hill Construction serves more than one million customers through its trends and forecasts, industry news, and leading platform of construction data, benchmarks, and analytics.

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Introduction

GREEN MULTIFAMILY AND SINGLE FAMILY HOMES: GROWTH IN A RECOVERING MARKET

In 2014, McGraw Hill Construction Dodge estimates that single family and multifamily housing projects will account for about 45% of the value of construction projects started in the United States, with single family housing making up the lion's share of the residential projects. For green building to transform the construction industry fully, the housing market must be a core part of its growth.

Since 2006, McGraw Hill Construction has been researching green building activity in the residential market and continually expanding the scope of the research based on the way the market has evolved. In the 2012 *New and Remodeled Green Homes SmartMarket Report*, we included remodelers because of their increased share of home building activity during the recession. And now, given the explosive growth in the last couple of years in the multifamily sector, the research includes a look at the multifamily market.

The findings in this report demonstrate that green building is increasingly important in the single family and multifamily sectors.

- **62% of those building new single family homes report that they are doing more than 15% of their projects green. By 2018, that percentage increases to 84%.**
- **54% of those building new multifamily projects report that they are doing more than 15% of their projects green. There is also growth expected—with that percentage rising to 79% by 2018.**
- **In the single family market, the most striking shift is in those dedicated to green (doing**

more than 90% of their projects green). That percentage is already at 19%, and by 2018, it is expected to double (to 38%).

Home builders and remodelers in both the single family and multifamily sectors report that the market is recognizing the value of green: **73% of single family builders (up from 61% since the last report) and 68% of multifamily builders say consumers will pay more for green homes.**

Greater consumer interest has contributed to the ongoing growth, leading us to anticipate that **by 2016, the green single family housing market alone will represent 26%–33% of the market, translating to a \$80 billion to \$101 billion opportunity based on current forecasts.** The findings also suggest that the lack of recognition of the value of green by lenders and appraisers may be decreasing as an obstacle due to more documentation of the value of green homes.

The study also reveals a vigorous and growing renewables market in the residential sector. **65% of the respondents—both single family and multifamily—currently use renewables on at least some of their projects,** and the percentage that incorporate them in all of their projects is expected to grow from 8% in 2013 to 20% by 2016.

We are thrilled to be partnering again on this important research with the National Association of Home Builders, and we thank Waste Management and Menck Windows for their support as well, enabling us to continue to inform the industry about this crucial market.



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covering innovation and sustainability and currently serves as a member of the Princeton University Civil and Environmental Engineering Advisory Council and the National Building Museum Board of Trustees. He is a visiting professor with the University of Reading's School of Construction Management and Engineering in England. Bernstein has an M.B.A. from Loyola College, an M.S. in engineering from Princeton University and a B.S. in civil engineering from the New Jersey Institute of Technology.

Michele A. Russo, LEED AP, has been working in environmental policy and communications for more than 18 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 McGraw Hill Financial's 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 around pollution prevention and toxics reduction, and has spoken at a number of events on green building trends and environmental policy. Russo has a Masters in public policy from Harvard University's Kennedy School of Government and a B.S. in chemical engineering from Cornell University.

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Front Cover and Left:
This affordable green multifamily project in New York City includes a focus on health and occupant well-being and features a 10,000 sq.ft. roof-top greenhouse that provides produce year-round, 40% of which is consumed locally.

Below: A green renovation project in North Carolina seeks to emphasize daylighting in the home.



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Executive Summary

GREEN MULTIFAMILY AND SINGLE FAMILY HOMES: GROWTH IN A RECOVERING MARKET

Green residential construction continues to grow during the recovery but the entry of new firms into the market has led to a bifurcation in green experience.

The findings of this study reveal the evolution of green building for single family homes from boom to bust to recovery through comparisons with previous studies from 2006 through 2011. Also, the addition of multifamily housing in this study paints a fuller portrait of residential green building and the crucial ways in which multifamily firms differ from those doing single family housing in terms of their drivers, marketing efforts and general approach to green building.

Builders, Developers and Remodelers in the Single Family and Multifamily Sectors Take Different Paths Toward Becoming Increasingly Green

SINGLE FAMILY

Over one third (34%) of those building new single family homes are currently doing 60% or more of their projects green, and by 2018, 62% anticipate being at that level of green involvement. By 2018, the biggest shift is expected in those reporting more than 90% of their work as green.

The biggest change from the findings of the 2011 study is how many single family remodelers are also reporting high levels of green engagement—18% are currently doing more than 60% of their work green, and half of that percentage are already at the 90% level of green building.

These findings demonstrate that among home builders, and increasingly among single family remodelers, green is becoming the standard way to build. This wider adoption of green may help push the single family home market to become even greener in the future, with homes increasingly needing to be green to be competitive.

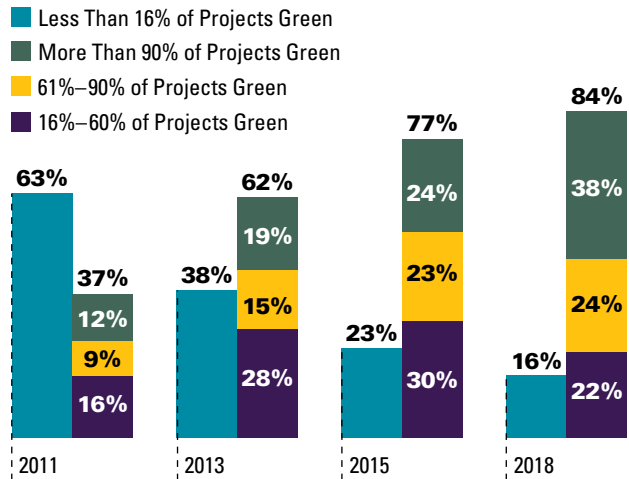
MULTIFAMILY

A dramatic shift in the number of companies doing at least a moderate level of green building is reported by multifamily builders—from 69% doing less than 16% of their projects green in 2011 to only 21% who expect to be at that level by 2015. Though only 6% of multifamily builders report being dedicated to green (more than 90% of their projects green) in 2013, 18% expect to be at that level by 2018. This suggests that knowledge of and some experience with green building is becoming more widespread in the multifamily sector and is expected to increase, but that multifamily builders in general are not specializing in green.

In this study, a green home was defined as one that incorporates environmentally sensitive site planning; resource efficiency; energy and water efficiency; improved indoor air quality; and homeowner education or projects that would comply with the ICC 700 National Green Building Standard or other credible rating system.

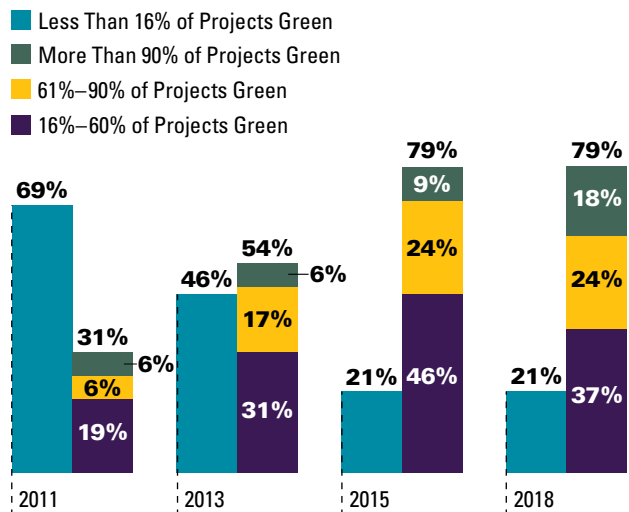
Involvement in Green Activity Over Time (Builders of New Single Family Homes)

Source: McGraw Hill Construction, 2014



Involvement in Green Activity Over Time (Builders of New Multifamily Projects)

Source: McGraw Hill Construction, 2014



Triggers for Green Building Activity
 Across the residential marketplace, single family and multifamily builders, developers and remodelers report being influenced by three main triggers in their decision to build green in the future: energy cost increases; code, ordinance and regulation changes; and green product availability/affordability. However, differences by sector are also apparent.

- **Single Family:** High quality and customer demand are important triggers motivating green building activity.
- **Multifamily:** More driven by factors that impact the cost of building green, such as the availability of government or utility incentives, as well as enhancing their competitive position and corporate image.

Market Recognizes the Value of Green

More single family builders and remodelers find that customers will pay more for a green home in 2013 than in 2011, though the percent premium stayed consistent at an average of 3% for new homes and 5% for remodels.

- **Single Family Builders:** 73% report customers will pay more in 2013, compared with 61% in 2011.
- **Single Family Remodelers:** 79% in 2013 vs. 66% in 2011

With customer demand being a critical trigger for higher levels of green building by most single family builders, the willingness of customers to pay for green is clearly impacting the growing share of green in the marketplace.

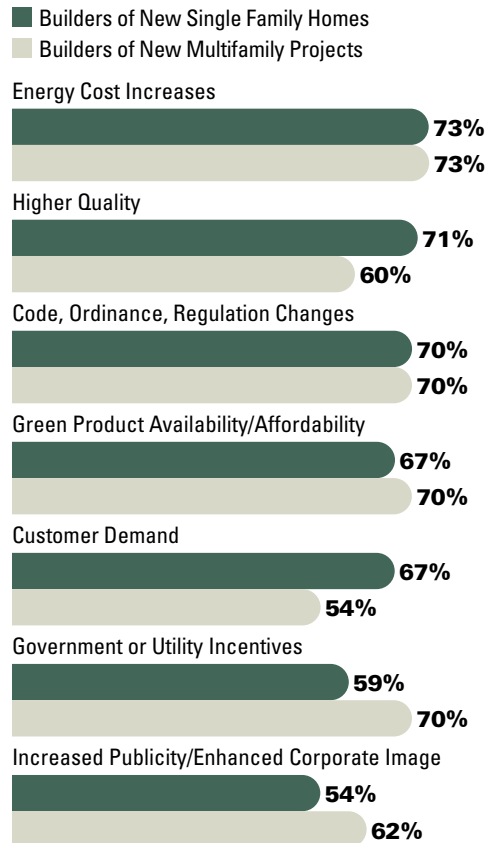
A high percentage of multifamily builders (68%) also find that customers are willing to pay more for green apartments/condos than traditional ones, including 38% that report increases of over 5%. No doubt, this openness to paying more for green contributes to why 59% of multifamily builders and developers find green homes easier to market than traditional ones.

Use of Renewable Energy Expected to Grow in Residential Projects by 2016

Almost two thirds of single family and multifamily builders and developers offer renewables on their projects in 2013. While only 8% incorporate them into all their projects, 20% expect to do so by 2016. While the two markets are relatively consistent in their overall interest in the use of renewables, they are very different in the intensity with which specific technologies are used. Most of those using photovoltaic panels and groundsource heat exchange on single family homes are doing so on more than 25% of their projects, but for multifamily projects, the majority are putting them on 25% or fewer buildings.

Triggers for Green Building
 (According to Single and Multifamily Builders)

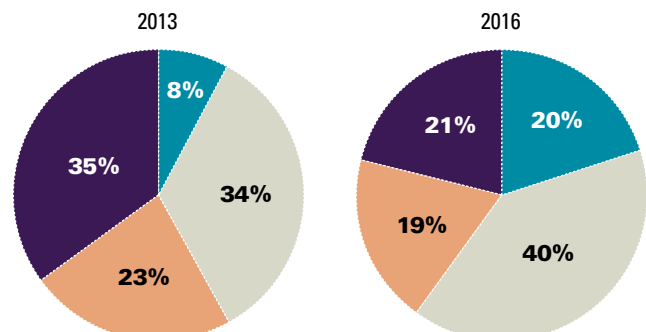
Source: McGraw Hill Construction, 2014



Current Use and Estimated Future Use of Renewables on Projects

Source: McGraw Hill Construction, 2014

- Renewable Energy Incorporated Into All Projects
- Offer Renewable Energy as an Option
- Do Not Offer Renewable Energy as an Option Except on Owner Request
- Do Not Offer Renewable Energy



Recommendations

Both the single family and multifamily markets for green are evolving as the recovery takes hold. While the two sectors do share many green priorities, there are also significant differences in what their customers request and the importance they place on specific green strategies.

Single Family Recommendations

■ CREATE A STRATEGY TO DEAL WITH THE INCREASING EXPECTATION OF GREEN HOMES AMONG CONSUMERS

The data demonstrate that many single family builders, remodelers and developers are increasingly specializing in green building, with 34% already building more than 60% of their new homes green and 62% expecting to be at that level of green by 2018. This shift demonstrates that green is already becoming common in the market.

Greater experience also leads more builders to find that customers are willing to pay more for green, reported by 73% in 2013, a notable jump over the 61% reporting the same in 2011. The increase in green homes in the marketplace will make it increasingly more challenging for firms that are not offering green homes to remain competitive. This is especially important for those that have reentered the marketplace that may not have honed their green building approach during the recession.

■ PREPARE FOR INCREASED HOME BUYING ACTIVITY FROM GENERATION Y

Many studies indicate that the younger generation currently in their twenties consider environmental concerns of high importance. In fact, twice the percentage of multifamily builders (35%) than single family builders (17%) find that their customers request green homes because they are better for the environment, which suggests that multifamily firms are already dealing with a younger buyer demographic. Single family builders also need to accommodate this emerging market in their sector.

Multifamily Recommendations

■ GAIN MORE GREEN EXPERIENCE TO STAY COMPETITIVE AS THE MARKET BECOMES GREENER

In addition to the builders, who need to account for an increasing expectation that high-end, high-quality units will also be green, remodelers particularly stand to benefit from the increasing rise in green

multifamily building.

They must be able to demonstrate to their clients the importance of remodeling existing multifamily projects to keep them competitive in an increasingly tight market with the many new, green units that are coming on line.

Building Product Manufacturer and Service Provider Recommendations

■ ACROSS THE SINGLE AND MULTIFAMILY SECTORS, EMPHASIZE THE COMBINATION OF ENERGY PERFORMANCE AND AFFORDABILITY

Energy performance and concerns about the cost of green are top triggers and obstacles, respectively, across both the multifamily and single family residential sectors. Firms seeking to sell to a broad market need to be able to address concerns effectively.

■ BE PREPARED TO MARKET TO BOTH HIGHLY EXPERIENCED AND INEXPERIENCED GREEN BUILDERS IN THE SINGLE FAMILY SECTOR

Building product manufacturers and service providers must be prepared to market their products and services to both highly experienced green builders—including many that relied on green building as a strategy to help make it through the recession—and firms with less green residential experience that have entered or reentered the market with the recovery in housing activity.

A one-size-fits-all approach may not be effective to address these very different markets.

■ EMPHASIZE OVERALL SUSTAINABILITY AND WAYS YOUR PRODUCTS CAN DIFFERENTIATE BUILDERS IN THE MULTIFAMILY MARKET

Those working in the multifamily sector are more concerned about being able to demonstrate a broad, sustainable impact than specific performance factors. Marketing of products and services must take this key difference from the single family market into account. ■

Data: Introduction

The housing market is finally seeing growth after years of declines that have taken their toll on the industry. McGraw Hill Construction has conducted three previous studies of green residential building: in 2006, at the height of the market; in 2008, early in the decline; and in 2011, when the ravages of the extended recession were evident but recovery appeared imminent. Because activity in new housing construction was so low after 2009, the 2011 study expanded to investigate the green building practices by firms doing home remodeling work, which this study continues, allowing for comparative analysis.

One conclusion that emerged from this series of studies is that, as the recession deepened, green building became an increasingly important strategy for builders to attract buyers in a challenging market and differentiate their homes at a time when sales were sluggish. The findings consistently demonstrated that green building is associated with higher-quality homes and that home buyers, even when the housing surplus gave them an advantage, were willing to pay a premium for green. As green expertise grew among home builders that worked during the downturn and as the overall green market grew making green building products more available and affordable, the additional cost of building green also decreased.

In 2013, the residential market emerged from its slump. Multifamily housing also grew in 2013, making it one of the most robust sectors in the general building market. The rigor and vitality of multifamily building has led to its inclusion in this *SmartMarket Report*.

This report reveals several things about residential green building during the recovery. First, green building continues to gain in its share of the residential market, creating opportunities for builders, building product manufacturers, distributors and suppliers. However, while the data demonstrate that many firms continue to expand their level of green building, the rising demand has encouraged an influx of companies into the residential sector that were driven out when the market bottomed out. These firms still recognize the value of green building, but they lack the experience and knowledge of the firms that have seen the green share of their work steadily increase during the recession. This impacts the findings throughout this study.

The findings also reveal how the multifamily market, while also embracing green building, has different drivers for green and different benefits compared with the single family market. Understanding these differences is critical for those seeking inroads into this sector.

Note About the Data

The data in this report are based on an online survey of 116 single family home builders, developers and remodelers and 38 multifamily builders, developers and remodelers. The survey was conducted from December 2013 to March 2014.

There are several terms used in analyzing the data in order to compare with previous studies, including the 2011 study, published in the 2012 *New and Remodeled Green Homes SmartMarket Report*:

- **Single family and multifamily firms:** Though this is not a term used in the industry, the word “firms” is used to reference builders, developers and remodelers in the aggregate. When there are different results between those working in the single family and multifamily sectors, the analysis reflects those differences. However, when there are minimal differences, the data are analyzed together to reflect that correspondence.
- **Builders of single family homes/multifamily projects:** Refers only to those building new single family homes or multifamily projects. It does not include those doing only remodeling work.
- **Remodelers of single family homes:** Refers only to those doing remodeling projects in the sector. It does not include those that exclusively work on new projects.
- **Multifamily remodelers are referenced, though only on a trending basis due to the small sample size of these respondents.** When mentioned, the term multifamily remodelers includes anyone doing remodeling work in the sector.

Respondents in this report are also analyzed based on their level of green work, with comparisons drawn between those that do more than 30% of all their projects as green ones, compared with those that do 30% or less of their overall projects green.

For the definition of a green building or more information on the study participants and approach, see the full methodology on page 60.

GREEN MULTIFAMILY AND SINGLE FAMILY HOMES: GROWTH IN A RECOVERING MARKET

Green Growth Remains Steady During Single Family Market Boom

Single family housing starts are forecasted to reach a peak in the next four years, with dramatic growth that is likely to have strong implications on the growth of green building in that market. On the other hand, the multifamily market is expected to increase more gradually.

Single Family Housing Market

According to McGraw Hill Construction's *Construction Market Forecasting Service*, in 2005, construction starts in the single family housing market totaled \$315 billion. The first study of green homes conducted at that time by McGraw Hill Construction demonstrated that green building accounted for a very small share of that market (2%). By 2011, the overall market had dropped to \$97 billion and was at the end of a long trough of depressed home building since 2009. However, green building totaled 18% of that market, nearly tripling in total value, from \$6 billion in 2005 to \$17 billion by 2011.

By 2013, the picture had shifted. Single family housing starts have grown 64% in value since 2011, to a total of \$159 billion. While the 2013 market was still far below the heights achieved in 2005, growth at this rapid rate creates opportunities for construction companies to join or reenter the housing market after the prolonged recession. The growth of new single family home building activity is expected to continue, with McGraw Hill Construction forecasting double-digit growth through 2016.

Green Single Family Homes Market

The ongoing transformation of the single family homes market reflected in the shift from a highly depressed market to one that is expected to grow aggressively for several years has strong implications for the green

homes market. The share of green is expected to continue to grow, with green building expecting to total 26%–33% of the market value by 2016. One factor that is expected to be influential in this more temperate level of growth is the influx of firms with less green experience, counterbalancing the increasingly intensive use of green by firms that have honed their green building approaches through the recession.

However, because of the overall growth in the market, even smaller gains in the share of green mean large increases in the size of the green market, expanding from \$37 billion in 2013 to \$80–\$101 billion by 2016 (based on current forecast). This dramatic increase in size creates opportunities for contractors, service providers and product manufacturers in the green sector.

Multifamily Building Market

The multifamily building market has followed a very different pattern than single family home building. It was one of the earliest sectors to recover after the 2009 downturn, with 23% growth in 2010. A high level of growth has been sustained since, with the market rising steadily from \$18 billion in 2009 to \$48 billion in 2013.

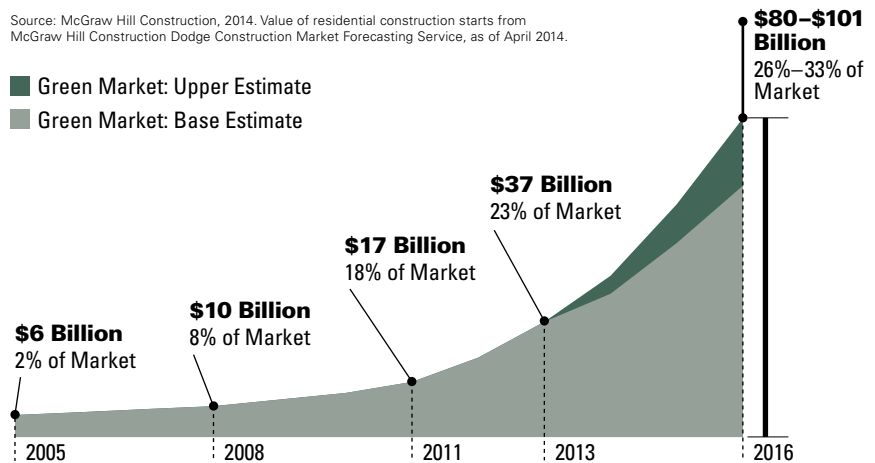
While this sector is expected to grow through 2016, the levels of growth are lower than the dramatic gains of the last few years and at a more gradual level than the sharp increases expected in the next four years in single family home starts.

Similarly, green in this market is more reserved in its growth, with respondents in this survey (see page 9) more measured in the pace of their reported future green activity. ■

U.S. Single Family Housing Green Residential* Market (Billions of Dollars)

Source: McGraw Hill Construction, 2014. Value of residential construction starts from McGraw Hill Construction Dodge Construction Market Forecasting Service, as of April 2014.

■ Green Market: Upper Estimate
■ Green Market: Base Estimate



*MHC defines a green home as one that is either built to a recognized green building standard or an energy- and water-efficient home that also addresses indoor air quality and/or resource efficiency.

Data: Green Residential Building Market

Level of New Green Home Building and Multifamily Project Activity

GREEN MULTIFAMILY AND SINGLE FAMILY HOMES: GROWTH IN A RECOVERING MARKET DATA

Single Family

Throughout the recession, new green homes have accounted for an increasingly larger share of the overall new construction market. Now that the recovery has reached the single family home market, the green share of that market continues to increase and the overall size of the market is expanding significantly, leading to substantial opportunities in residential green building.

The self-reported activity by survey respondents in the single family market demonstrates this trend, with a clear shift from less involvement in green to greater involvement in green over the next few years. This shift is demonstrated in the steady decline in those with low involvement in green (16% or less) and a dramatic increase in those with medium to large green involvement (more than 16%).

In addition, there is a sizable segment of the market dedicated to doing green projects.

- In 2013, 19% of builders of new single family homes already report doing 90% or more of their projects green.
- By 2015, nearly one quarter (24%) expect to be at this dedicated level.
- By 2018, that grows to 38%.

This supports the findings from the 2011 study published in the 2012 *New and Remodeled Green Homes SmartMarket Report*, and the steady growth indicated in both studies is no doubt influenced by the business advantages of building green for single family firms.

Multifamily

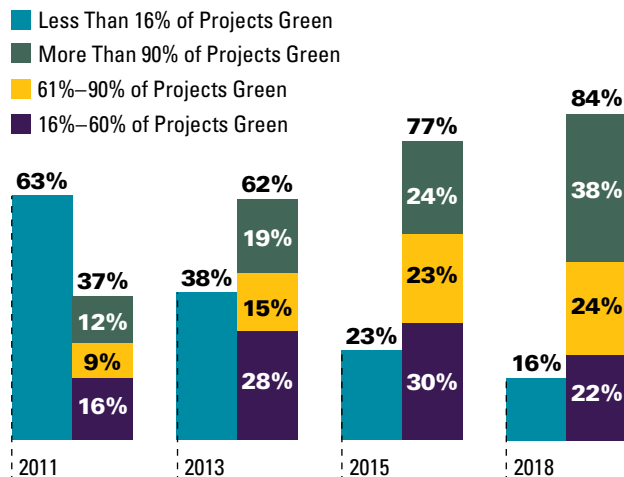
Multifamily builders and developers also indicate an ongoing shift to green building, but the pattern of green growth evident in their responses is very different from that of single family firms. Key differences include:

- **A dramatic shift to doing at least a moderate amount of green in the multifamily market:** Those with little involvement shrink from 69% in 2011 to 21% by 2015.
- **A more gradual shift by multifamily firms to being dedicated to green:** The overall market shifts rapidly to doing more than 16% of their projects green, and those dedicated to green grows more gradually—from 6% in 2013 to 9% in 2015 to 18% by 2018.

The pattern of green adoption by multifamily builders, with strong growth in green engagement but less dedicated commitment, is more typical of companies doing work in commercial and institutional sectors, and it

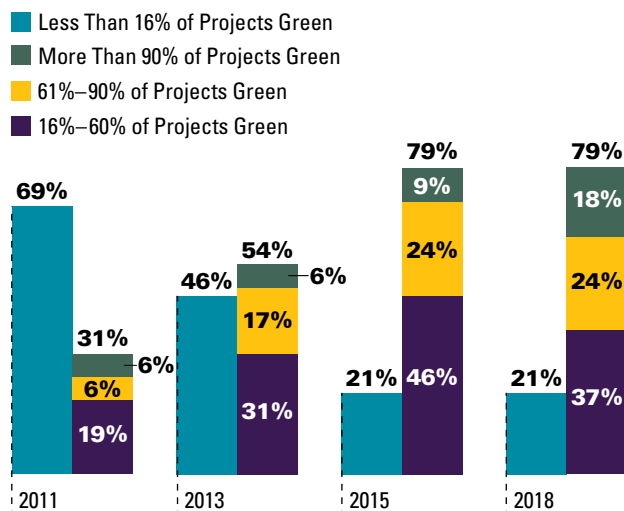
Involvement in Green Activity Over Time (Builders of New Single Family Homes)

Source: McGraw Hill Construction, 2014



Involvement in Green Activity Over Time (Builders of New Multifamily Projects)

Source: McGraw Hill Construction, 2014



is likely that many multifamily builders work in one or more of those sectors as well, unlike single family firms, who are more likely to specialize in residential construction.

Level of Green Remodeling Activity

Single Family Remodelers

Remodelers of single family homes show a commitment to green that corresponds with the findings of the 2011 study.

- **Already, in 2013, nearly half of the respondents (49%) doing remodeling projects are at least moderately committed to green, doing at least 16% green projects.**
- **By 2018, the percentage that expect to be doing at least that level of green work grows to 79%.**

As in 2011, remodelers lag behind new home builders in their adoption of green, but that difference is notably reduced in their estimates of the amount of green work they will be doing in five years.

However, unlike in 2011, when the number of remodelers dedicated to green was nominal, currently, there is a clear trend for firms to expect the majority of their work to be green.

- **In 2013, 9% report that they are dedicated green remodelers, with over 90% of their projects being green.**
- **The expected growth of that group is steep, with 16% expecting to be doing that level of work by 2015 and 25% by 2018.**

This shift is very revealing because of the way in which remodelers are more driven by specific customer demands than new home builders. Therefore, a significant percentage of remodelers believe that consumers will be actively seeking to green their homes in the future.

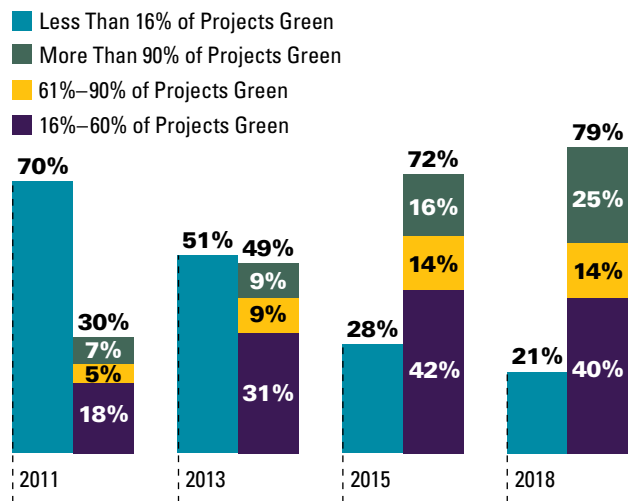
Several factors may be driving consumers to consider green remodeling projects. For example, the increased awareness of the benefits of green practices, such as energy efficiency, are more understood and appeal to homeowners expecting to stay in their homes and looking to reduce their monthly bills and increase comfort. Additionally, with more single family construction occurring, green renovations may allow older homes to be more competitive in the market with new homes where green and high efficiency has become more standard.

Multifamily Remodelers

While the number of respondents that do remodeling projects is relatively small, it is clear that they are doing a lower share of green projects currently than multifamily builders, and they are conservative about the anticipated share of green projects in the future. While the growth in

Involvement in Green Activity Over Time (According to Firms Doing Single Family Remodeling Projects)

Source: McGraw Hill Construction, 2014



those expecting to do some green work is steep, most of that growth is confined to those that anticipate doing 16% to 60% of their projects green, even in their expectations for 2018, which also lag behind those of single family remodelers.

This finding suggests that the need to make buildings green to be competitive may not be as big of a driver in the multifamily sector, which could be due to the fact that in rental properties, especially, many of the efficiencies from green renovations benefit the apartment building owner if they charge tenants a flat rate for utilities. However, as green becomes more common in new multifamily buildings, market pressure may grow more intense and cost savings more understood, suggesting that this may be a stronger area for growth in the future than current expectations suggest—for both buyers and building owners.

Green Affordable Housing

While nearly two-thirds of multifamily builders and developers (64%) report constructing affordable housing, a much smaller—but still notable—percentage of single family builders and developers (27%) do the same.

Among the firms that construct affordable multifamily housing projects, about one quarter specialize in it, with affordable housing accounting for over 60% of their projects in 2012. Another 38% are doing a small amount of affordable housing, with it accounting for only 15% or less of their projects.

Multifamily Share of Green Affordable Housing Constructed

Green has penetrated the multifamily affordable housing market, with 86% of the multifamily firms reporting that at least some of their affordable housing projects were green in 2012. The levels of green affordable housing are relatively evenly distributed across all categories, with the percentage of those doing green building on fewer than 30% of their affordable projects equal to those doing more than 30% of their affordable projects green.

These findings are notable because they demonstrate that green building is widely considered viable even in projects with strict and limited budgets. In addition, with its emphasis on energy and water savings, and the potential to create a healthier indoor environment, green affordable housing can save money for households that are in greatest need of those savings.

Single Family Share of Green Affordable Housing

While the number of single family builders and developers doing affordable housing is too small to yield statistically significant results, there is a clear trend of fewer single family firms doing green affordable housing projects compared with multifamily firms—about two thirds of the single family firms report building any green affordable homes.

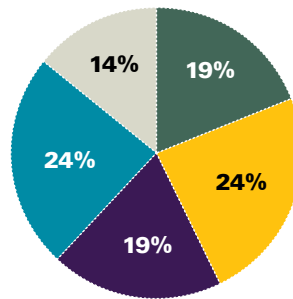
The lower adoption of green work among those building single family affordable homes may be due to a few factors. It may be more cost effective to incorporate green features like better performing HVAC systems in multifamily buildings than in individual homes. Also, cities across the United States have explicit green goals, and multifamily builders may be more likely to be building in these urban areas than single family builders.

There is also a striking difference between the intensity of green affordable projects between single

Green Affordable Housing Projects by Multifamily Firms in 2012

Source: McGraw Hill Construction, 2014

- More Than 60% Green Projects
- 31%–60% Green Projects
- 16%–30% Green Projects
- 1%–15% Green Projects
- No Green Projects



family and multifamily firms. **Almost half of all the single family firms that are doing any green at all are doing over 60% of their affordable projects green, compared with 22% of multifamily firms.**

This finding may suggest that single family firms that are incorporating green into their projects in general are incorporating green into their affordable housing projects. It may demonstrate that, among a significant segment of the single family building market, green has become their fundamental approach to building homes, rather than it being dictated by cost restrictions, marketing considerations or other factors.

Improving Health in an Affordable Green Multifamily Project

Arbor House

SOUTH BRONX, NEW YORK

GREEN MULTIFAMILY AND SINGLE FAMILY HOMES: GROWTH IN A RECOVERING MARKET

The Arbor House affordable housing project in the South Bronx of New York, proves that green homes can bring much more to its occupants than energy-, water- and resource-efficiency, it can also lead to a healthier life.

Blue Sea Development has a long history of building green and healthy homes. “Back in 1998, Energy Star was still kind of new for homes and buildings, but we thought it made sense and [asked ourselves] ‘Why not try it?’ and after we did, the results were great,” says Les Bluestone, partner and co-founder of Blue Sea Development Company. “We never looked back, and everything we have done since then has been Energy Star and National Green Building Standard at a minimum.”

Built through a public-private partnership between the New York City Housing Authority (NYCHA), the Department of Housing Preservation and Development (HPD) and Blue Sea Development, the apartments

are designated for low-income households earning less than 60% of the median income of the area (just shy of \$50,000 for a family of four). Blue Sea also agreed to set aside 31 units for NYCHA residents and 25 units for formerly homeless families—45% of the total units.

This award-winning project boasts certification at the Gold level under the ICC 700 National Green Building Standard and at the Platinum level under the LEED for Homes program, as well as recognition as a “Healthy High-Rise” from the American Cancer Society.

Attention to Health and Well-Being

The Arbor House project takes this concept of health to heart throughout its design and construction decisions. Located in a part of New York City that has a disproportionate number of low-income residents with obesity, heart disease and asthma, the building takes into account all these factors

and includes attention to details that help to address these concerns.

With regard to indoor air environment, the building’s smoke-free environment, individualized exhaust systems, continuous ventilation, use of low- and zero-VOC materials, and 20-foot-long living green wall all combine to create a space with healthier indoor air quality.

The building also focuses on helping residents improve physical fitness by being built to Active Design Guidelines. For example, it contains a free fully equipped fitness center that includes features for both adult and child residents. For example, the exercise bikes are in both kid and adult sizes, and have video screens attached to the internet so that the rider can select his or her terrain and setting. “You can ride and compete with other people on bikes in the room or anywhere in the country. It’s like giving a kid a video game to play while they’re riding a bike, which is just genius,” says Bluestone.

The focus on fitness also extends to the design of the stairwell, elevator and grounds. The stairwell, located at the entryway of the building, was widened by 20% and does not include dark steel doors. It also features artwork and music to make it more appealing. In contrast, the elevators were located in less convenient locations and slowed to make them less appealing.

The project’s 10,000-square-foot grounds were also transformed into a landscaped fitness plaza with different exercise stations.

Feeding the Community

Perhaps Arbor House’s most unique feature is the 10,000-square-foot



The eight-story, 124 unit apartment building in the South Bronx of New York is a green affordable housing project that includes energy- and water-efficiency, but also brings a new level of attention to health and well-being in its design and construction, including a 10,000-square-foot rooftop farm.

Photo courtesy of Bernstein Associates

CONTINUED

Arbor House SOUTH BRONX, NEW YORK

GREEN MULTIFAMILY AND SINGLE FAMILY HOMES: GROWTH IN A RECOVERING MARKET

greenhouse on its roof that contains a hydroponic farm. The South Bronx is known as a “food desert” without easy access to fresh produce, and Arbor House helps fill that need. “We made a deal with the operator that we charge them no rent for the space, but they had to guarantee that 40% of the produce they grew would stay in the community,” says Bluestone.

Engaging Residents

Bluestone notes that he was impressed with the number of residents who had knowledge about green and sustainability. “They were aware and very excited about it,” he says, and notes that they made efforts to engage residents in maintaining the green building.



The living green wall in the building lobby helps to remove carbon dioxide and provide fresh oxygen to the indoor environment.

“The rooms are all individually zoned for heating and cooling, and they have NEST thermostats that are programmable and allow residents to connect to them on the internet and see how much they’re

saving,” Bluestone reports. With these low-income residents paying their own electric bills, this feature not only provides them with the ability to control the comfort of their spaces, but also to control their energy costs. ■

Project Facts and Figures

Developer

Blue Sea Development Company

Builder

Blue Sea Construction Co., LLC

Architect/Interior Designer

Danois Architects

Type of Project

New Multifamily Project

Size/Number of Units

8 stories; 120,000 sq. ft.; 124 units: 16 studios, 33 one-bedroom, 75 two-bedroom

Completed

February 2013

Green Practices and Features

High efficiency 90%–98% AFUE sealed combustion condensing boilers providing hydronic heat

- mCHP cogeneration for electric and 100% of hot water supply
- Precast concrete and brick panelized wall system
- Rooftop urban farm to grow fresh hydroponic pesticide-free produce

- Rainwater harvesting system
- Formaldehyde-free insulation
- HEPA MERV-8 filtering in corridor and individual AC units
- NEST programmable thermostats in each room
- USB charging stations that automatically turn off
- Low- and zero-VOC paints, adhesives, finishes, sealants
- 95.7% construction waste diversion through recycling
- Energy Star LED and fluorescent fixtures, appliances and laundry machines
- Occupancy & daylight sensors
- Energy Star fiberglass windows with Low-E coatings and argon gas
- Dual-flush toilets
- Integrated pest management program and native plants
- Advanced stormwater management system

stats

Green Senior Housing

Senior Housing Activity

While 67% of multifamily builders and developers report doing at least some senior housing in 2012, only 20% of single family home builders and developers report the same. Even more than affordable housing (see page 11), most of the firms doing senior housing fall into the multifamily category.

However, most of these firms are not specializing in senior housing. For over three quarters of the multifamily firms doing senior housing projects, those projects only account for 25% or less of their 2012 work.

Share of Green Senior Housing Constructed in the Multifamily Sector

Multifamily builders and developers doing senior housing projects are lagging slightly behind the general trend toward green activity reported by those building new multifamily projects (see page 9).

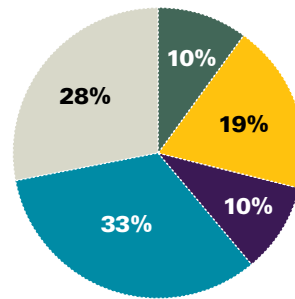
- **Those doing less than 16% of their projects green:**
 - General multifamily: Reduced from 69% in 2011 to 46% in 2013.
 - Senior multifamily: 61% report that less than 16% of their projects were green in 2012.
- **Those doing between 16% and 60% of their projects green:**
 - General multifamily: Increased from 19% in 2011 to 31% in 2013.
 - Senior multifamily: 29% report that 16% to 60% of their projects were green in 2012.

While green is growing increasingly important in the U.S., there is still a generational divide on the weight it is given, so green senior housing may have lower market demand than other multifamily housing segments, such as market rate apartments and condominiums. Also, the perception that green is more expensive may be off-putting to people retiring on a fixed budget. However, the savings that green projects can offer in reduced utility bills could be very important to this group, suggesting that the potential appeal of green to retiring adults is greater than these findings may suggest.

Green Share of Senior Housing Projects (According to Multifamily Firms)

Source: McGraw Hill Construction, 2014

- More Than 60% Green Projects
- 31%–60% Green Projects
- 16%–30% Green Projects
- 1%–15% Green Projects
- No Green Projects



Average Cost to Incorporate Green Features and Practices in New Homes, Multifamily Buildings and Remodeling Projects

As they did in 2011, most single family firms in 2013 report an increased cost to build green. **The incremental cost increase reported by builders of new homes is 8% on average and by remodelers is 9% on average.** These averages both represent a 1% increase over the findings reported in the 2011 study. However, McGraw Hill Construction has been tracking data on new home builders' response to the incremental cost of green since 2006, and 8% is still substantially lower than the average of 11% in 2006 and 10% in 2008.

One factor that may be contributing to the slight shift upward in cost is the recovery of the housing market after a prolonged period of little activity. With the market remaining so low for such an extended period, many firms left this sector or were forced out of business. The 2011 study found that many of the firms that remained found green building to be a way to remain competitive and attract home buyers in a challenging environment. The recovery may now be bringing firms back into the market with less experience with green. Lack of familiarity with green technologies can result in higher costs.

Multifamily builders, developers and remodelers, reported for the first time in this study, fall into roughly the same range, but with a very different distribution. They see an average increase of 9% for green in both new and remodeled projects. It will be interesting to see if costs also trend downward in this sector over time.

Variation by Level of Green Involvement

NEW CONSTRUCTION

Single family builders and developers with more than 30% green projects report an average cost of 5.7% to incorporate green features in new homes—significantly less than the 8.0% reported by those doing fewer green projects. This reinforces that as a firm becomes experienced with green, their costs go down.

In contrast, there is little difference between multifamily builders and developers doing a larger or smaller percentage of green projects, with greener firms reporting an increase of 8.3% and less green firms of 8.5% on their new projects. This lack of a difference does not align with previous McGraw Hill Construction studies in the residential, commercial and institutional sectors; all demonstrate that firms that do more green projects typically experience lower costs to implement green.

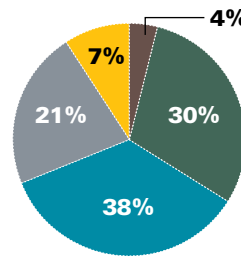
One factor that may contribute to this finding is the explosion in multifamily projects in recent years. More

Incremental Cost of Incorporating Green Features and Practices

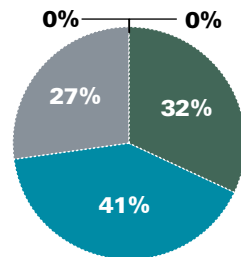
Source: McGraw Hill Construction, 2014

■ No Additional Cost ■ 1% to 4% ■ 5% to 10%
■ Greater Than 10% ■ Don't Know

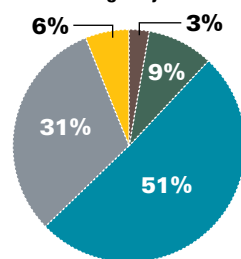
New Construction According to Builders of New Single Family Homes



New Construction According to Builders of New Multifamily Projects



Remodeling Projects According to Remodelers of Single Family Homes



firms may be entering the market that are trying to leap into green to be competitive, but do not yet have as much experience with green building.

REMODELING PROJECTS

Single family remodelers that do more than 30% of their projects green find that the average cost to add green features is 7.5%, compared with remodelers doing fewer green projects, whose average is 9.5%. Remodelers of multifamily buildings that do more green projects are comparable, with an average increase of 7.9% reported by those doing more than 30% green projects, compared with an increase of 9.3% for those doing less green work.

Willingness of Customers to Pay for Green

New Buildings

SINGLE FAMILY

73% of those building new single family homes report that customers will pay more for a green home. This percentage is notably higher than the percentage of single family home builders (61%) that reported that their customers were willing to pay more for green in 2011. **This increase falls largely among those who believe that customers are willing to pay 5% to 10% extra, rather than just a small percent more.**

It is also a very positive finding that the percentage of customers that builders say will not pay more has gone down dramatically, by more than a third. This suggests that there is more consumer awareness of the value of a green home.

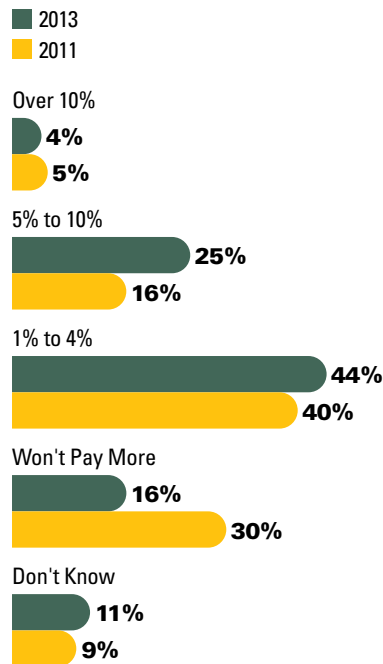
These findings suggest that the market has more widely recognized the value of green. Greater attention to green from appraisers and lenders (see sidebar on page 27) may be helping the market to shift, as may wider awareness of green in the general public. Another factor that could have an influence is the growing number of millennial/generation Y home buyers, who typically value green more than preceding generations. The recovering economy may be allowing more of these buyers into the residential home market as the job market improves.

MULTIFAMILY

More than two thirds (68%) of those building new multifamily projects believe that their customers are willing to pay more for a new green condominium/apartment than a traditional one. Again, this relatively high percentage demonstrates widespread market acknowledgement of the value of green. As with single family homes, the millennial/generation Y buyers may have some influence. **The gap between single family and multifamily builder expectations largely lies in a higher percentage of multifamily builders that do not know whether customers will pay more for green condominiums/apartments.** This finding is consistent with the fact that fewer multifamily builders currently do a high percentage of green projects (see page 9), so they may not be as aware of how the market responds to green units.

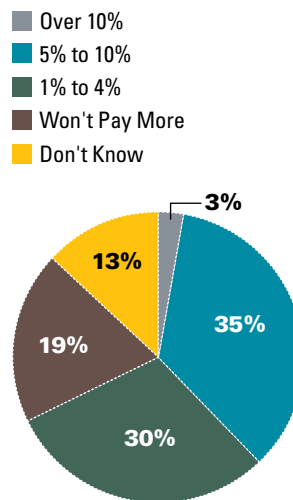
Additional Amount Customers Are Willing to Pay for Green (According to Firms Building New Single Family Homes)

Source: McGraw Hill Construction, 2014



Additional Amount Customers Are Willing to Pay for Green (According to Firms Building New Multifamily Projects)

Source: McGraw Hill Construction, 2014



However, over one third of multifamily builders (35%) find that customers are willing to pay 5% to 10% extra, a much higher percentage at that level than single family builders. One factor that may contribute to this finding is the association of green with high-end, luxury units, which may have a notable impact in the condominium advertising market.

In addition, depending on the lease terms, multifamily developers may profit directly from the operating cost savings of green buildings and may be more likely to factor building performance into the amount they are willing to pay for projects.

Remodeling Projects

SINGLE FAMILY

79% of single family remodelers report that their customers will pay more for a green remodeling project.

This is a significant increase over the findings of the 2011 study reported in the 2012 *New and Remodeled Green Homes SmartMarket Report*, where only 66% of single family remodelers reported this difference.

The shift among remodelers is largely due to an increase in those who can estimate what amount their customers are willing to pay for green. Those who replied that they don't know shrunk from 16% in 2011 to just 5% in the current data. This suggests that the difference itself is due to increased experience with green building on the part of the single family remodelers. One factor supporting this is the increased number of remodelers who are doing a high percentage of their work green, compared with the 2011 study (see page 10 on the level of green remodeling activity over time).

The findings from remodelers about the extra amount that customers are willing to pay, on the other hand, remain relatively steady compared with two years ago.

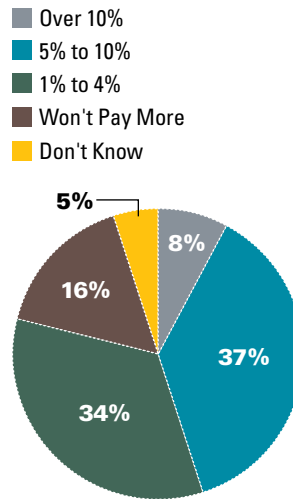
MULTIFAMILY

While the number of respondents who do multifamily remodeling projects is relatively small, there are still some trends that emerge from their responses, especially when compared with the responses of those doing new multifamily construction.

Remodelers are more inclined to expect customers to be willing to pay more for green than new builders in the multifamily market.

Additional Amount Customers Are Willing to Pay for Green (According to Firms Remodeling Single Family Homes)

Source: McGraw Hill Construction, 2014



- **12% of remodelers reporting that their customers won't pay more compared with 19% of new builders.**
- **On the other hand, nearly half (48%) of multifamily remodelers expect that increase to fall in the 1% to 4% additional cost range, a marked difference from the multifamily builders, more of whom report in the 5% to 10% range.**

This difference between the new and remodeling multifamily markets may be due to the limitations of remodeling individual units within a building to be green versus the gains possible when the entire new building is designed and constructed to be high performing. The more limited ability to impact key factors like reduced energy costs may also dampen the amount customers are willing to pay for green improvements.

Ease in the Marketing of Green Homes

Single Family

47% of single family builders, developers and remodelers find marketing green homes easier than marketing non-green ones. This finding is consistent within one percentage point with the findings of the 2011 study and is in contrast to the six percentage point shift reported between the findings in 2008 and 2011.

One factor that may account for the way in which the ease of marketing these homes has stabilized is the greater experience of a significant percentage of respondents with green homes, both in 2011 and in 2013 (see page 9), than in 2008. As firms do more green building, most find that marketing is either easier or harder, with fewer firms noting no difference.

Multifamily

59% of multifamily builders, developers and remodelers find that green homes are easier to market than traditional homes, compared with 17% that find them more difficult to market.

Several factors likely contribute to why such a high percentage of multifamily firms find marketing easier. One factor that may influence this finding is the greater prevalence of multifamily units in urban areas compared with single family homes. Urban populations may be more sensitive, not only to green issues, but also to the appeal of luxury units, where green is just one component.

Additionally, some multifamily builders are larger firms that do very large projects, and therefore, have more substantial marketing budgets and dedicated marketing staff to enable them to capitalize on marketing messages and campaigns more than smaller builders.

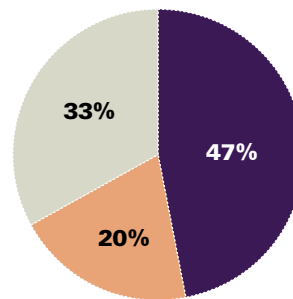
Variation by Level of Green Involvement

A significantly higher percentage of both single family and multifamily firms that construct more than 30% green projects (65%) find green homes easier to market than firms that do fewer green projects (38%). This finding corresponds to the findings in the 2011 study, and it continues to demonstrate that more experience with green through a larger percentage of green work allows firms to capitalize better on their investments. This may be in part because their experience allows these firms to have smaller additional costs associated with green (see page 15).

Level of Ease in Marketing Green Homes (According to Single Family Firms)

Source: McGraw Hill Construction, 2014

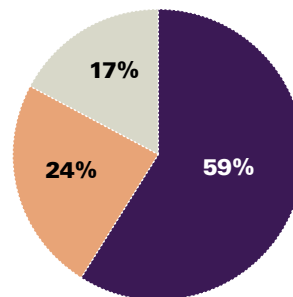
- Easier/Much Easier
- No Difference
- Difficult/More Difficult



Level of Ease in Marketing Green Homes (According to Multifamily Firms)

Source: McGraw Hill Construction, 2014

- Easier/Much Easier
- No Difference
- Difficult/More Difficult



The greater ease in marketing green homes compared with non-green ones by firms doing more green work also suggests that making their homes green is a way to differentiate them in the market and attract buyers.

Data: Triggers and Obstacles for Green Residential Projects

Why Customers Request Green Homes, Condominiums and Apartments

GREEN MULTIFAMILY AND SINGLE FAMILY HOMES: GROWTH IN A RECOVERING MARKET DATA

Lower energy use and saving money are the top reasons that customers request green homes, condominiums, apartments and remodeling projects. This finding is consistent with previous studies conducted by McGraw Hill Construction, not only in the residential market, but also on green building across the commercial and institutional sectors.

Single Family

Similar to the findings of the 2011 study, roughly equivalent numbers of single family builders and remodelers select the same factors influencing their customers, with a slightly higher percentage of remodelers noting that their customers are influenced by comfort.

Multifamily

Multifamily builders, developers and remodelers find that their customers are less influenced by issues of health and comfort than single family builders and remodelers report. **In fact, the only influential factor for more than 20% of multifamily builders other than energy and cost savings is that the buildings are better for the environment (reported by 35% as seen in chart at right).**

One factor that may influence these differences between the responses of single family and multifamily firms is that people in multifamily apartments and condominiums may believe they have less control over factors that impact comfort than single family homeowners. For example, it is harder to make changes to the envelope or to HVAC systems for dwellers in multifamily units than for those in a single family home. Therefore, they may not be as likely to view comfort as an important factor since they cannot do as much to impact it.

The only significant difference between multifamily builders and remodelers is in regard to the influence of green as an investment decision on their customers.

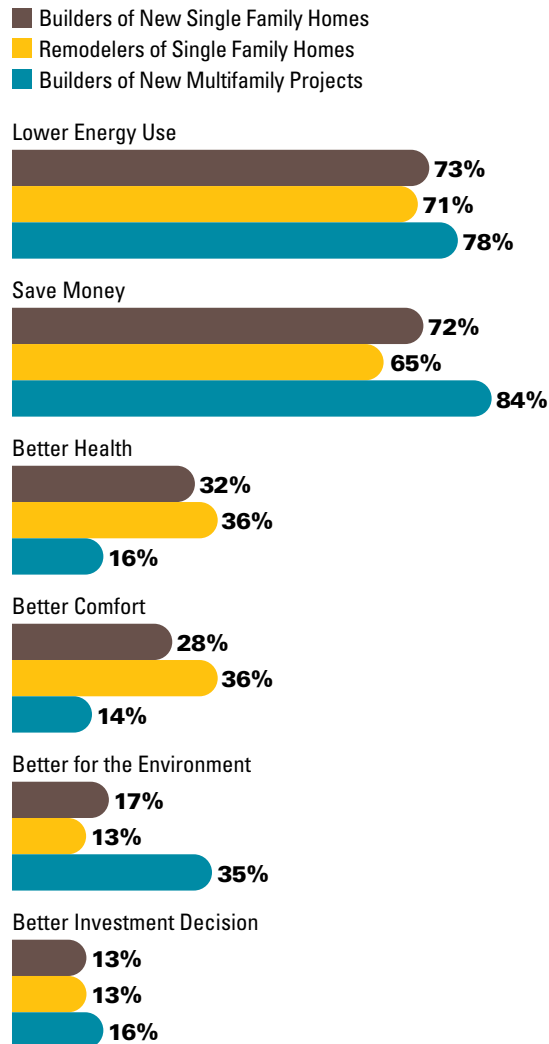
While only 16% of multifamily builders regard this as a reason their customers request green, one third of the multifamily remodelers believe this is an important factor, also more than the single family builders or remodelers. As the housing market accelerates, multifamily unit owners may need to invest in green to keep their units competitive.

Variation by Level of Green Involvement

A higher percentage of firms doing more than 30% of their projects green find customers request green homes for

Reasons Why Customers Request Green Homes, Condominiums/ Apartments or Remodels

Source: McGraw Hill Construction, 2014



better comfort (35%) and as a better investment decision (25%). In fact, 47% of single family firms doing more than 30% of their projects green report better comfort is a reason customers are seeking green homes.

While most people associate green with lower energy use and saving money, consumers with more knowledge about green are more likely to consider improved comfort and return on investment than typical consumers, and they may be more inclined to seek builders and remodelers with a broader green portfolio.

Triggers for Green Building Activity

Three factors rise above the rest in their ability to drive respondents—single family builders, single family remodelers and multifamily builders alike—to increase their level of green building activity.

- **Energy Cost Increases:** Consistent with the findings reported in the 2011 study, energy cost increases are a critical trigger to increased levels of green building (reported as important by 73% builders of new single family homes and multifamily projects). While the percentage of single family remodelers that find this factor to have an impact in the current study (65%) is relatively consistent with the 2011 study, the percentage that consider it *highly impactful* ranks third among all of the triggers, an increase from 2011, where it ranked fourth. This demonstrates that concerns about energy costs continue to be critical in the decisions to build or remodel green.
- **Code, Ordinance, Regulation Changes:** The trend in many regions, especially at the local level, has been to increase the performance requirements for residential buildings. These findings demonstrate the importance of those changes in driving the market to enhance green building.
- **Green Product Availability/Affordability:** The continuing importance of green product availability and affordability demonstrates that residential builders/remodelers are still highly cost conscious. The importance of affordability as a trigger for future activity suggests that there are still opportunities for building product manufacturers to develop and market green residential products by emphasizing their performance and their affordability.

The importance of other triggers, however, varies widely between the single family and multifamily markets.

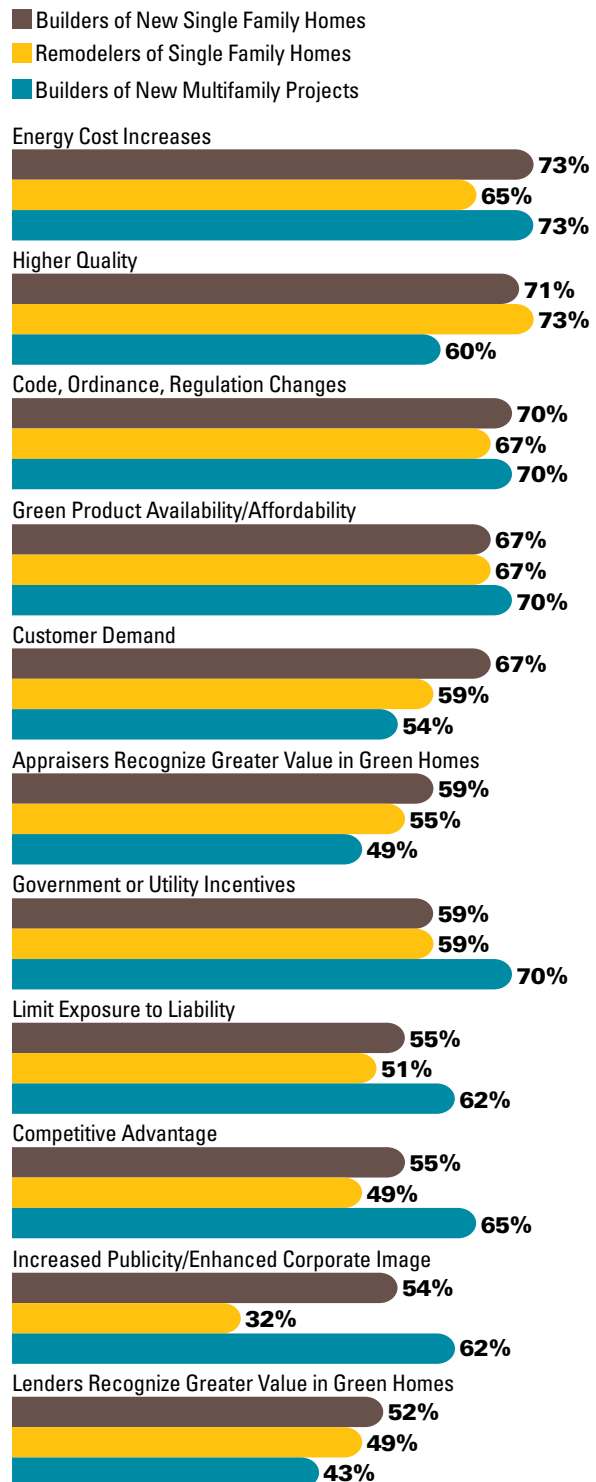
Single Family

Similar to the findings in the 2011 study, there are many different triggers that have a high level of impact on future green building activities. Specifically, over half of single family builders report 11 different important triggers, and over half of single family remodelers report 9 different important triggers. The high number of triggers suggest that this market is driven in a variety of different ways.

There are two factors in particular that are more influential in the single family than the multifamily market for triggering future green building activity.

Triggers for Green Building/Remodeling

Source: McGraw Hill Construction, 2014



- **Higher Quality:** The association of green and higher-quality buildings has been consistent since McGraw Hill Construction's first survey of green residential builders in 2006. No doubt, this factor is a critical part of other triggers such as customer demand and competitive advantage. Builders and remodelers who are still expanding their green residential portfolios would benefit from emphasizing this factor in their marketing efforts.
- **Customer Demand:** Customer demand is selected as highly impactful by a significant percentage of single family builders and remodelers, at 67% and 59%, respectively. This is consistent with its position in the 2011 study for single family builders (reported by 66%) and a drop from its first ranking for remodelers (reported by 70% in 2011). While customer demand will always be critical to drive green for remodelers, this drop among remodelers aligns with the increasing percentage of remodelers who are dedicated to green work (see page 10), who are more likely to take a green approach to all projects than rely solely on customer requirements to make their projects green.

VARIATION OVER TIME

For the most part, the importance of the triggers driving the single family builders and remodelers to pursue green in the future is similar to the findings in the 2012 report. However, there are a few key differences.

- **Single Family Builders: Fewer firms in the current study consider competitive advantage an important trigger for building green.**
 - 2013: 55% selected competitive advantage as an important trigger.
 - 2011: 63% selected it.
- **Single Family Remodelers:** In addition to the increase among those who consider code, ordinance, regulation changes a trigger and the decrease among those who report customer demand (already noted above), **higher quality is also becoming a more important trigger for single family remodelers.** Again, this finding is most likely influenced by the increased percentage of remodeling firms dedicated to green, who understand the importance of the association of green with higher quality in driving the market and improving their reputations.
 - 2013: 73% selected higher quality as an important trigger.
 - 2011: 69% selected it.

Multifamily Builders

Future green building by multifamily builders will be more strongly influenced by financial factors and by the desire to enhance competitiveness and corporate image than in the single family market.

CONCERNS ABOUT COST/AFFORDABILITY

70% of multifamily builders expect to be as highly impacted in their future green building activity by the availability of government or utility incentives as they expect to be by code changes. Combined with universally high rankings for widely available and affordable green building products, this finding suggests that the multifamily market is strongly influenced by factors that reduce the cost of green building.

ENHANCE CORPORATE IMAGE AND IMPROVED COMPETITIVENESS

■ Increased Publicity/Enhanced Corporate Image:

There is a notable difference in the estimation of the impact of increased publicity/enhanced corporate image, identified by 62% of multifamily builders as an important trigger, compared with only 54% of single family builders and 32% of home remodelers.

- **Competitive Advantage:** The percentage of multifamily respondents (65%) who consider competitive advantage an important trigger is notably higher than single family builders (55%), and it ranks fifth among all the factors for this group, compared with a ninth ranking for single family builders.

The importance of green as an image enhancement/marketing technique in the multifamily marketplace is further supported by the significantly higher impact of the term sustainability for multifamily builders when they discuss green features with their customers, compared with single family builders (see page 30).

Combined, these findings demonstrate that, while codes and regulations continue to be important, those seeking to market green products and services to multifamily builders must emphasize issues of affordability and the overall sustainability of these products. They must demonstrate how their products and services can help these builders differentiate themselves and their products in the marketplace, rather than focusing solely on specific performance results.

Variation by Level of Green Involvement

There are four triggers considered important by a significantly higher percentage of single family and multifamily firms doing more than 30% of their projects green, compared with firms doing fewer green projects.

- **Higher Quality:** Firms that do more green are likely to see the positive impact on the quality of their buildings, making green investments in the future more compelling.
- **Customer Demand:** This trigger is particularly notable because it suggests that builders doing more green projects also see higher demand for green residential projects among their customers, suggesting that the market is looking for green expertise when they want green homes.
- **More Professional Education and Awareness About Building Green:** Firms that do more green work also recognize that having a workforce that is well informed about green building approaches can expand the volume of green projects they undertake.
- **Availability of a Voluntary Green Building Standard:** Firms doing more green building understand the value that using a voluntary, third-party standard offers to demonstrate that their projects are green and establish their credentials to consumers.

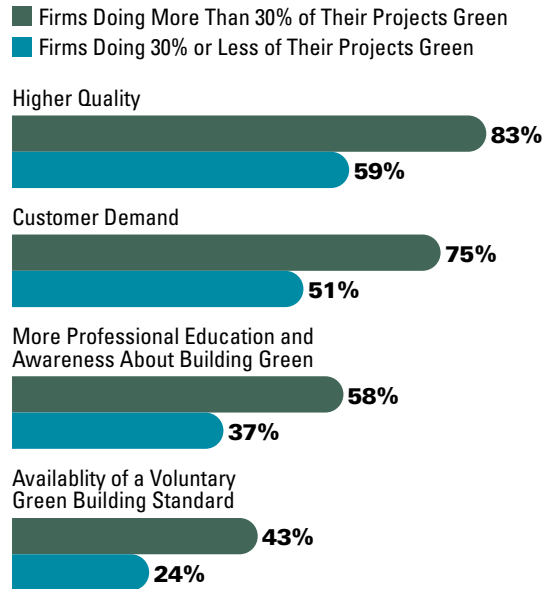
DIFFERENCES FOR SINGLE FAMILY FIRMS

Lenders recognizing greater value in green homes is a significantly more important trigger for single family firms doing more than 30% of their projects green versus those doing fewer green projects. These greener single family firms are likely more experienced and familiar with green lenders and therefore, able to capitalize on that knowledge with their customers. (See page 27 for information on how appraisers are being educated about the value of green homes.)

Financing the purchase of a condominium/apartment is different from single family home buying, and many multifamily projects are rented versus owned. Both of these likely explain why this is not notably different for greener multifamily builders compared with all multifamily builders.

Triggers With Greater Influence on Firms Doing More Green Projects

Source: McGraw Hill Construction, 2014



Impact of Incentives and Regulations

on Increasing Green Building Activity

GREEN MULTIFAMILY AND SINGLE FAMILY HOMES: GROWTH IN A RECOVERING MARKET DATA

A majority of single family builders (59%), single family remodelers (59%) and multifamily builders (70%) agree that government or utility incentives have a high impact on their future green activity (see page 20). These respondents were asked about the importance of specific incentives.

While different incentives clearly target and impact different players, some general conclusions can be drawn from the overall responses.

- **Energy code increases have the greatest impact in driving green throughout the residential market.**
- **In general, local incentives, through utilities and local markets, are deemed as more effective than federal incentives.** The one exception is the federal credit for developers producing energy-efficient homes. Builders may find local incentives easier to take advantage of as well as more robust.

Single Family Differences

Overall, the incentives and codes are comparable in impact on single family builders and remodelers. The exception is the energy-efficient homes tax credit, but since remodeling projects are less likely to qualify for this, it is an expected difference.

Utility rebates are a slightly stronger trigger for single family remodelers than they are for builders, but not at a significant level, which is notable considering the small percentage of the cost of constructing a new home that can be impacted by utility rebates.

Multifamily Builders

The gap between the percentage of multifamily builders that consider energy code increases important compared with the other triggers is much wider than that of single family builders, pointing to its importance in this sector.

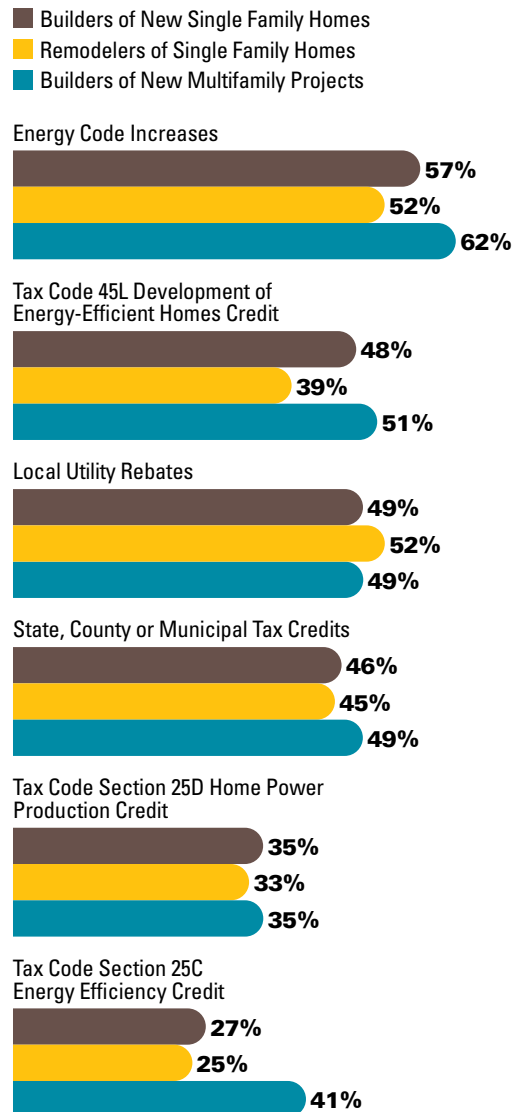
Variation by Level of Green Building

Firms doing more green building projects find federal tax credits more influential than those doing fewer:

- **Tax credits to homeowners for energy-efficient homes: Reported by 38% of all firms doing 30% of their projects green, compared with 22% of those doing fewer.**
- **Credits for home power production: 45% for greener firms versus 29%.**
- **Tax credits for energy-efficient homes for developers: 62% of the greener single family firms versus 35% of those that are less green.**

Incentives and Codes That Have a High Impact on Increasing Green Building

Source: McGraw Hill Construction, 2014



Obstacles to Increased Green Building Activity

For single family builders, single family remodelers and multifamily builders alike, the top two obstacles to increased green building activity are consumer unwillingness to pay for green and perceived higher first costs.

Concerns about the higher cost of green correspond to the strong performance of widely available and more affordable green building products as a trigger for green (see pages 20–22). **Companies that can make the case to residential builders and remodelers that their products and services yield green benefits at a competitive cost are likely to have an advantage.**

Single Family

BUILDERS

The remaining five obstacles included in the survey are considered to have a high impact on green building activity by roughly the same percentage of single family builders, with only eight percentage points between them. This demonstrates that single family builders recognize the need, not just for lower costs, but for better industry and consumer education in green and for codes that do not interfere with green approaches.

REMODELERS

Single family remodelers are largely in agreement with builders on the impact of the lack of green knowledge for both the industry and the consumers. However, they are less concerned about codes as an obstacle. This is not surprising since home remodeling projects are far less likely to have codes be an obstacle to trying new green technologies and approaches than in new homes or housing developments.

VARIATION OVER TIME

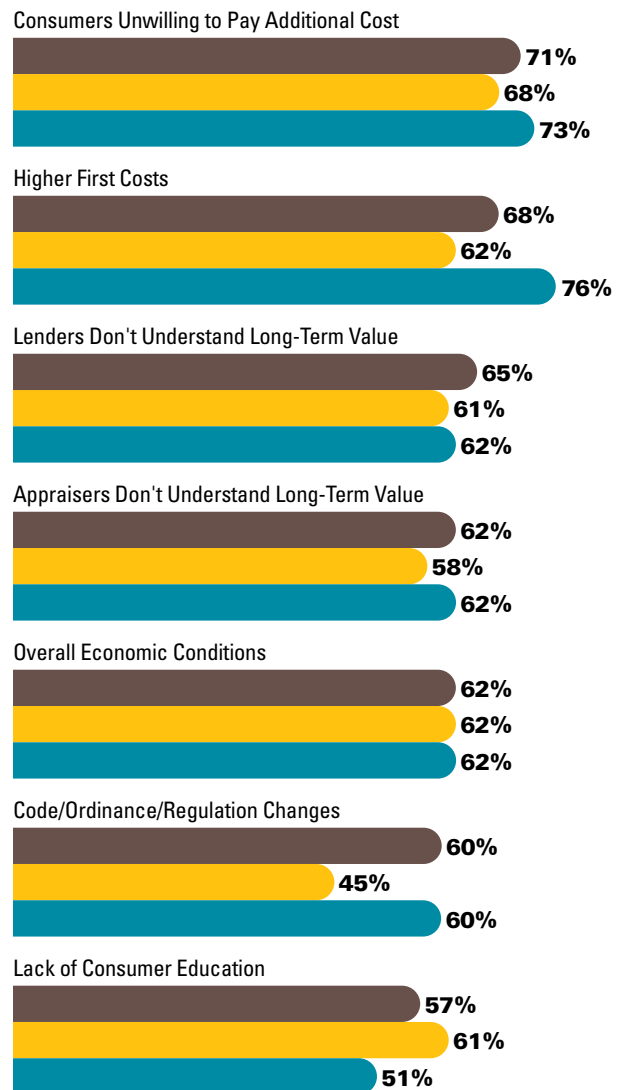
■ **CURRENT ECONOMIC CONDITIONS** are an obstacle considered impactful by a much smaller percentage of single family builders and remodelers currently compared with the 2011 study. The general improvement of the economy and its positive impact on the single family home market has led to less emphasis on this point.

- **Single Family Home Builders Who Consider Current Economic Conditions to Have a High Impact:** 62% in 2013 versus 77% in 2011
- **Single Family Remodelers:** 62% in 2013 versus 76% in 2011

Top Obstacles to Green Residential Building/Remodeling

Source: McGraw Hill Construction, 2014

- Single Family Builders
- Single Family Remodelers
- Multifamily Builders



Triggers and Obstacles for Green Residential Projects

Obstacles to Increased Green Building Activity CONTINUED

GREEN MULTIFAMILY AND SINGLE FAMILY HOMES: GROWTH IN A RECOVERING MARKET DATA

For builders, improved economic conditions may create a stronger market for more premium green homes. For remodelers, the improved housing market may create more pressure on those with homes to sell to make sure their units are competitive with others on the market.

■ **WIDER RECOGNITION OF THE LONG-TERM VALUE OF GREEN BY LENDERS AND APPRAISERS is one change that may help drive more green in the marketplace.**

Three quarters of single family home builders in 2011 reported that lenders and appraisers did not understand the long-term value of green, but in 2013, 65% of builders find lack of lender knowledge an obstacle and 62% report the same for lack of appraiser knowledge. This change bodes well, not only for the funding of new green projects, but for encouraging existing home owners to recognize that improving the performance of their home is an investment in its long-term value.

■ **HIGHER FIRST COSTS is an obstacle noted by a higher percentage of single family builders and remodelers in 2013 than in 2011.** While concern about this is still far less than was reported in the 2008 *Green Residential SmartMarket Report*, it has increased since 2011.

One factor that may be influencing its increase is the recovering economy. While it is clear that economic conditions are no longer a direct drawback, the improving market is likely to encourage builders to enter (or reenter) the residential market that were not

there through the worst of the recession. The steady growth in the share of green residential building during the recession suggests that green played an important role for companies that worked through the recession. Newer companies may be less familiar with green and thus more likely to be concerned about higher first costs. McGraw Hill Construction’s green research in multiple sectors over the last seven years—residential, commercial and institutional—consistently demonstrates that greater experience with green building reduces the concern about the higher first costs associated with it. Further research will reveal whether, as the firms returning to the residential market continue to gain green experience, concerns about higher first costs will again drop.

Multifamily Builders

Multifamily builders, for the most part, correspond with single family builders on the key obstacles in the market. **The key difference is that they are less concerned about the need for consumers who are better educated about green, with only 51% of multifamily builders seeing this obstacle having a significant impact compared with 57% of home builders and 61% of home remodelers.**

These findings are particularly interesting when considered in light of the fact that green multifamily projects are triggered more frequently by the ability to

Top Obstacles to Green Over Time for Home Builders and Remodelers

Source: McGraw Hill Construction, 2014

	Single Family Builders		Single Family Remodelers	
	2013	2011	2013	2011
Consumers Unwilling to Pay Additional Cost	71%	80%	68%	70%
Higher First Costs	68%	66%	62%	66%
Lenders Don't Understand Long-Term Value	65%	75%*	61%	67%*
Appraisers Don't Understand Long-Term Value	62%	75%*	58%	67%*
Overall Economic Conditions	62%	77%	62%	76%
Code/Ordinance/Regulation Changes	60%	55%	45%	54%
Lack of Consumer Education	57%	63%	61%	64%

*In 2011, the lack of understanding by lenders and appraisers were combined in one question.

market their products as green than by specific building performance measures (see page 21). It suggests that multifamily builders consider their consumers to be more generally interested in green. This may be due, in part, to the higher percentage of millennial generation/Generation Y occupants of multifamily units compared with single family homeowners. Since many of the people in the multifamily market may become single family homeowners in the future, this finding may serve as a bellwether for a shift in the single family home consumer market, suggesting that green may become even more important in that sector to remain competitive in the future.

Variation by Level of Green Involvement

Only one obstacle—higher first costs—is regarded as having a different impact on the green building activity of firms based on their level of green involvement. **Only 53% of firms doing more than 30% of their projects green consider this an obstacle, compared with 77% of firms doing fewer green projects.**

This finding is consistent with the fact that firms that do more green work tend to find the additional cost of green to be smaller and tend to note that customers are willing to pay more for green residences. (See pages 15–17 for more information.)

However, it is notable that this is the only obstacle with a statistically significant difference between firms doing more green projects and those doing fewer. When considered in light of the previous finding that there is relatively broad correspondence between single family firms and multifamily firms about the obstacles to green they face, it becomes clear that the industry needs to address the main obstacles highlighted in these findings to increase the adoption of green in the residential sector.

Companies, regardless of their level of green involvement, regard the lack of full recognition of the value of green in the industry—from consumers who are unwilling to pay more, to appraisers and lenders who don't understand the long-term value of green—as the most critical factors dampening the overall market for green building.

Capturing the Value of Green

Better data and more education across the industry are needed to help appraisers and lenders capture the value of green homes. While steps have been made, more commitment is needed.

In recent years, appraisers have gained tools to identify and report green features in homes, but adoption of these practices has been uneven. In light of increased sustainability efforts in residential homes, Sandra Adomatis of Adomatis Appraisal Service in Punta Gorda, Fla., sees increased need for appraisers to have skills in green valuation and has authored a book on the subject, titled *Residential Green Valuation Tools*.

However, appraisers only represent part of the process. “We really need to unveil the process,” Adomatis says. “It’s not just the appraiser — it’s the real estate agent, the lender, the homeowner and the builder. Everyone needs to understand the process for it to work well.”

This interrelationship can help drive or halt efforts to pursue the valuation of green features in homes. For example, a lender that orders an appraisal would need to know in advance that green features should be considered in order for a qualified appraiser to be assigned to the job.

Matt Belcher, director of the High Performance Buildings Research Center at the University of Missouri–Columbia and a home builder, agrees, and has added a lender specification on all his homes that not only lets the lender know the home is green but also requires the home be appraised by someone with sufficient knowledge to fairly assess it.

Belcher provides one example that illustrates why having a knowledgeable appraiser is critical.

He had a home appraised at a comparable level to homes in the area despite its higher-performing systems. When notified of this, the lender sent another appraiser who understood the home’s systems. That second appraisal came in at 10% over contract value. “This meant the owner had equity in his house automatically, and that’s magic,” says Belcher.

Demand for Better Data

One key concern is the need for improved market data. Appraisers rely on comparable data—or “comps”—to help justify their valuations. Adomatis says that of the nearly 850 multiple listing services (MLS) nationwide that provide comps for appraisers, only about 185 offer fields where information can be entered about green features. And even when an MLS offers it, Adomatis says the fields are rarely populated and, even then, they could have incorrect information.

“When I’m evaluating a green home, I spend a lot of time calling installers and pulling builder permits,” Adomatis says. “Often, if it’s the second owner of the home, they don’t know how old the system is.” Belcher agrees and says home builders or designers should list the green features of the home when it’s built.

Need for Education

Appraisal Institute (AI) offers instruction to its nearly 22,000 members and others in the appraisal community through its Valuation of Sustainable Buildings Professional Development

Program, but adoption has been limited. Although the program isn’t officially designated as a “certification,” it is intended to designate professionals who have successfully completed courses in the program. By mid-April, 257 appraisers were listed as having completed courses in the program.

Don Davis, president of Capital City Bank in Gainesville, Fla., says he sees limited interest among most appraisers. “The main thing that happens with green is that it forces everyone out of their comfort zone.”

For example, he says many appraisers don’t want to fill out the Green Energy Efficient Addendum to Fannie Mae’s Uniform Residential Appraisal Report, which was introduced by AI in 2011. “Appraisers either don’t want to learn it or they aren’t comfortable filling it out because they don’t want to take on the liability,” he reports.

Advantage for Investors

Equity Residential, a real estate investment trust that owns and operates multifamily residential developments, is taking a significant interest in green valuation. Lou Schotsky, vice president of investments and sustainability at Equity Residential, says the company relies on its own resources to determine value. “It raises the bar on due diligence because it’s a new set of technologies that you need to be up to speed on,” he says, adding that, “if you have that capability then you’re in better shape to protect yourself. It becomes a competitive advantage.” ■

Data: Green Residential Building Practices and Features

Most Important Green Practices

For New Homes, Multifamily Buildings and Remodeling Projects

GREEN MULTIFAMILY AND SINGLE FAMILY HOMES: GROWTH IN A RECOVERING MARKET DATA

More than 90% of new home builders, remodelers and multifamily builders select energy efficiency as one of their choices when asked to identify the three most important green practices on their projects. This finding is consistent with the findings of previous *SmartMarket Reports* on residential building as well as McGraw Hill Construction's research on green building across all building types.

While 95% of builders of new single family homes and 93% of single family home remodelers named energy efficiency as one of their top three practices in 2013, those numbers declined slightly from 2011, when they stood at 97% and 96%, respectively. Though the decline is minor, it suggests that some builders are prioritizing other green practices for their homes.

For the rest of the practices, the findings reveal important differences by sector. In addition, for all practices, there are no statistically significant differences in responses based on the level of the respondent's green building involvement.

Single Family

BUILDERS

Other than energy efficiency, roughly the same percentage of new home builders consider durable materials (48%), water efficiency (45%) and low VOC-emitting materials/improved indoor air quality (44%) important. These findings are consistent with the 2011 findings though they demonstrate a slight increase in the percentage that select low VOC-emitting materials/improved indoor air quality as one of the top three practices, as only 40% of the respondents selected this feature in 2011.

REMODELERS

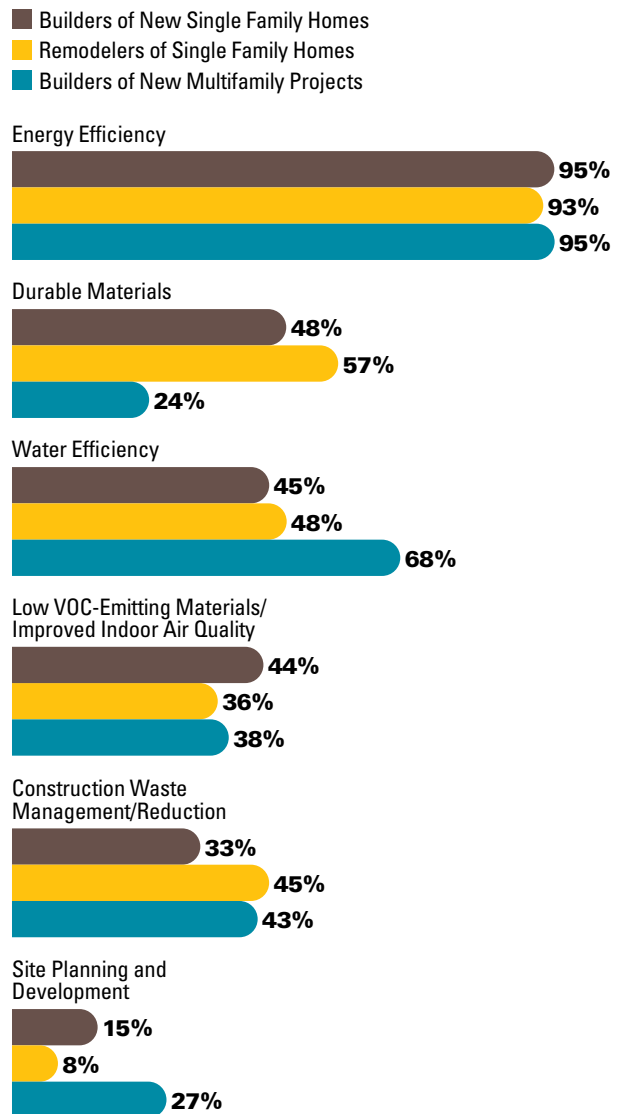
As in the 2011 study, remodelers place much greater emphasis on durable materials (57%) compared with builders of new homes (48%). However, for several other green practices, the percentage of remodelers that select the option differs notably from the 2011 findings.

- Water efficiency and construction waste management both rose in importance with remodelers, to 48% in 2013 versus 39% in 2011.
- Low VOC-emitting materials/improved indoor air quality declined in importance, to 36% in 2013 versus 40% in 2011.

It is noteworthy that new home builders are placing more emphasis on indoor air quality, while home remodelers are placing less emphasis on it.

Most Important Green Practices (According to Single Family Home Builders and Remodelers and Multifamily Builders)

Source: McGraw Hill Construction, 2014



Multifamily Builders

Multifamily builders place more importance on water efficiency and less importance on durable materials compared with single family home builders and remodelers. One factor that could be influencing this result is the greater use of LEED-NC by multifamily firms (see page 58), where water conservation can earn many more points than durable materials can.

Features That Make Residential Buildings Greener Than They Were Two Years Ago

GREEN MULTIFAMILY AND SINGLE FAMILY HOMES: GROWTH IN A RECOVERING MARKET DATA

Single Family—2013 Versus 2011

While only 11% of the new single family builders and remodelers say that the homes they construct or remodel today are greener than they were two years ago, in general, the percentage that find green features make their homes greener has slightly declined from the findings of the 2011 study.

- **A Focus on Energy Efficiency: 75% of 2013's respondents find this makes their homes greener, compared with 83% in 2011.**
- **Improved Indoor Air Quality: 58% in 2013, compared with 61% in 2011.**
- **A Focus on Material Conservation and Recycling: 42% in 2013, compared with 49% in 2011.**
- **Sited on More Environmentally Sensitive Lots: 13% in 2011, compared with 19% in 2013**

The only factor which grew was water conserving practices, which had only a nominal increase, from 43% in 2011 to 45% in 2013.

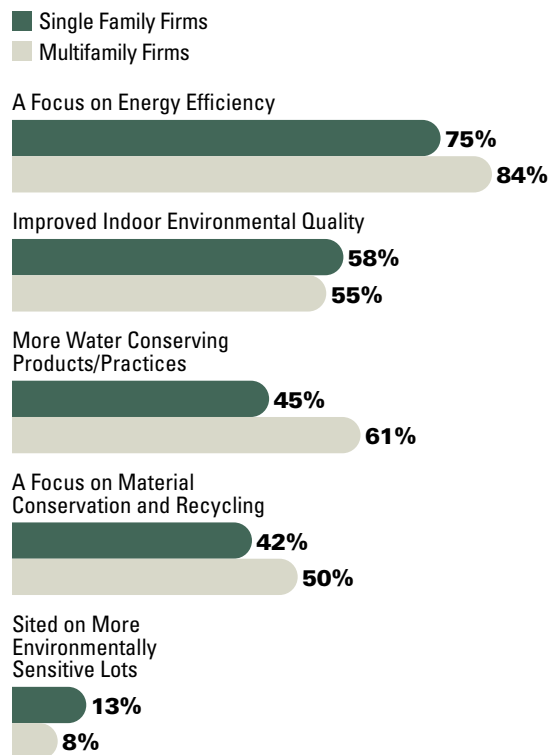
While none of the declines are steep, the trend toward single family home builders and remodelers noting fewer specific features making their projects greener may be due to two factors. For the firms that did residential green building during the recession, the evolution and maturation of their methods may minimize the number of specific green features they employed between 2011 and 2013. On the other hand, firms that are just entering (or re-entering) the housing market may not have a large portfolio of homes from two years ago on which to make comparisons.

Multifamily

A higher percentage of multifamily builders, developers and remodelers note that their projects are greener than they were two years ago because of a focus on energy efficiency (84%), use of more water conserving products/practices (61%) and a focus on material conservation and recycling (50%). This may suggest that the greening of multifamily projects is in an earlier phase than the greening of single family homes, which is supported by the smaller percentage of multifamily firms dedicated to green building (see page 9). As the market matures, these factors may level off.

Features That Contribute to Making Residential Projects Built Today More Green Than Two Years Ago (According to 2013 Respondents)

Source: McGraw Hill Construction, 2014



Variation by Level of Green Involvement

The only statistically significant difference between firms that build more than 30% of their projects green versus those that build fewer green projects is that a higher percentage of the firms doing a larger share of green building report that their projects are sited on environmentally sensitive lots (20%, compared with 8%). While lot design is consistently the lowest performing green practice in the survey, this finding suggests that awareness of its importance may be growing among those with some green expertise, and wider adoption of this practice could eventually result.

Most Effective Terminology

When Communicating With Customers About Green Features

GREEN MULTIFAMILY AND SINGLE FAMILY HOMES: GROWTH IN A RECOVERING MARKET DATA

The highest percentage of single family and multifamily respondents agree that referencing long-term utility cost savings is the most effective terminology that they use when discussing green features with their customers. Cost savings continue to be one of the most powerful arguments for greening buildings, whether residences, commercial spaces or institutional buildings.

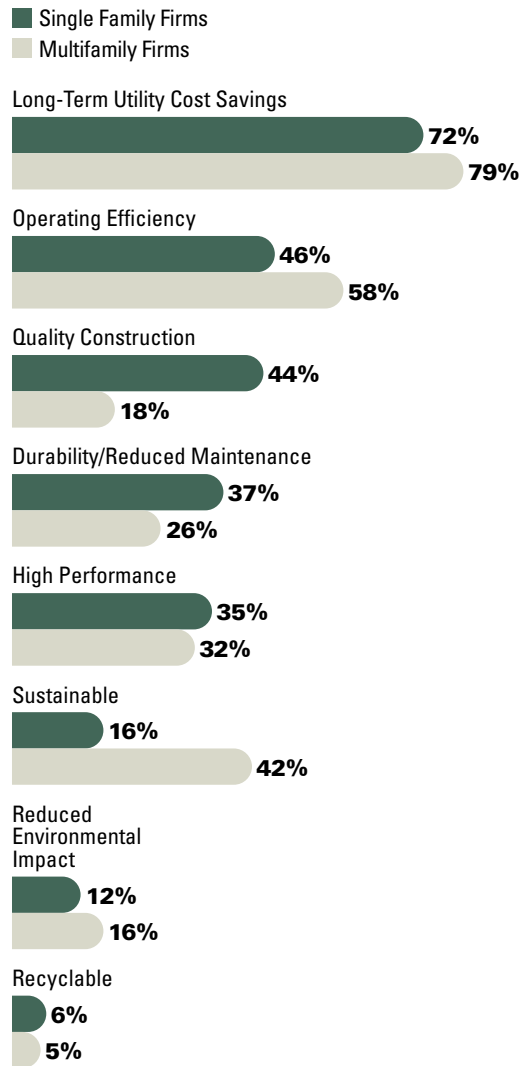
However, highlighting operating efficiency is also very effective. Owners of both single family homes and multifamily units clearly value the notion of operating efficiently, far more than they value the notion of reducing environmental impact. Avoiding wastefulness appears to have great sway, especially among multifamily customers.

Other terminologies for green features resonate differently with single family versus multifamily customers.

- **Quality, and to a lesser extent durability, are considered more effective terms by single family firms compared with multifamily firms.** This finding is consistent with the 2011 study and suggests that single family home buyers associate green feature with higher-quality homes. The difference in response regarding durability might be explained by the fact that single family home buyers likely expect to stay in a home longer than those who live in a multifamily building, and thus, are more likely to be drawn to homes that are described as durable.
- **The term sustainable is considered highly effective by multifamily firms, far more than by single family ones.** Multifamily units and buildings are often marketed based on terms that appeal to potential renters' or owners' lifestyle and values. They are also typically marketed to a younger, more urban audience. Thus, sustainable features may resonate more than the use of terms that are more specific, such as reduced environmental impact.

Most Effective Terms When Communicating With Customers About Green Features

Source: McGraw Hill Construction, 2014



Creating an Energy-Efficient and Affordable Home After Hurricane Katrina

Affordable Coastal Cottage

BAY SAINT LOUIS, MISSISSIPPI

GREEN MULTIFAMILY AND SINGLE FAMILY HOMES: GROWTH IN A RECOVERING MARKET



Exterior of the Affordable Coastal Cottage project of Habitat for Humanity Bay-Waveland Area, Inc. Named the 2014 Project of the Year, Single Family—Affordable by the National Association of Home Builders, this energy-efficient and resilient home features native landscaping and attention to indoor air quality and comfort

At the heart of Hurricane Katrina in 2005, Bay Saint Louis, Mississippi, lost 200 historic homes and had significant damage to over 70% of all housing. Armed with a mission to build affordable homes as quickly as possible, Habitat for Humanity Bay-Waveland Area, Inc. also reinforced its commitment to green building. A significant factor in this commitment was the desire to create homes that would be more affordable for the homeowners. “We produce homes for middle- to low-income families,” says Holly Neuharth, construction assistant at Bay-Waveland Habitat, “so affordability is very important, and energy efficiency can lower the monthly bills for homeowners.”

The Affordable Coastal Cottage home is one example of the kind of

exemplary green home being built by Bay-Waveland Habitat. Certified to the Emerald level of the ICC 700 National Green Building Standard, the home focuses on energy efficiency, while also addressing resiliency, water- and resource-efficiency, and improved indoor air quality and comfort.

Energy-Efficiency and Improved Indoor Comfort

With an eye on improving efficiency and reducing monthly bills, much of the focus of the building decisions were around creating the most efficient home possible. One practice the team found that contributed greatly to that was the use of spray foam insulation throughout the home.

“It was the most expensive change we made to the home,”

says Neuharth, “but the R-Value made it a no-brainer.” Neuharth cites energy bill reductions of 30%–40% over the use of batt insulation.

The insulation was just one practice that was used in the home to increase efficiency. The commitment also extended to programmable thermostats, appliances, lighting, and a high efficiency HVAC and water heating system.

Neuharth (who is also the homeowner) also points to the increased comfort of the home, noting how good the air feels in the home. The insulation contributes to that as does the continuous ventilation and use of low-VOC paints, sealants and adhesives used throughout the home.

Improved Resiliency and Water Conservation

The home focuses on more than energy efficiency and indoor air quality. Built on the Gulf Coast the home was also built beyond code with an eye on the structure being able to withstand high winds to make it as resistant as possible to future disasters.

The home also focused on water conservation and indoor air comfort. In particular, exterior features, like rain barrels, native landscaping and pervious pavements, and interior features, such as WaterSense fixtures, combine to conserve water.

Overcoming Challenges

Bay-Waveland Habitat has been building green homes since 2009, and in the early days, Neuharth says, there was a learning curve. “Initially, a challenge was the amount of time [it took to build the green home] because you are researching every

CONTINUED

Affordable Coastal Cottage

BAY SAINT LOUIS, MISSISSIPPI

product and having to find materials that meet the guidelines." As an example, she notes the challenge to find lumber that was FSC-certified but also locally manufactured.

She also points to the initial challenge of finding raters qualified to do the ICC 700 certification assessment given their location in southern Mississippi. However, she notes that the commitment to certification is strong and includes projects certified to the ICC 700 as well as to the LEED for Homes and the Enterprise Green Communities programs.

Educating Homeowners and the Industry

Habitat for Humanity uses volunteers to build their homes, and all homeowners have to contribute toward the building of their homes. This gives them a unique opportunity to help educate the public—as well as the electrical subcontractors they use on the homes—about green building.

"Green building is a great teaching tool," Neuharth says, not only at the public level, but also for their subs, where they have helped the trades understand that what might work on a high-end home could also apply to smaller, affordable houses as well.

However, Neuharth also emphasizes that "a lot more education is needed." Like many green home builders, Bay-Waveland Habitat provides each homeowner with a handbook that details the green features of the home, why each feature was chosen and how to maintain them properly. They also add information on recycling and other green tips.



Interior living and dining room

Bringing Benefits to the Region

The commitment to green home building by Bay-Waveland Habitat not only benefits homeowners through lower bills, improved comfort and increased sustainability in their home, but the organization also believes its work benefits their entire community as they contribute toward the revitalization of the region.

Similarly, the homeowner of each of the green homes produced by Bay-Waveland Habitat, benefits from knowing they, too, are contributing to improving their communities. And they still get the benefit of living in a home that is affordable and comfortable.

One of those homeowners herself, Neuharth says that it wasn't just the big green investments that paid off, "Little things added up to the greatness of this home." ■

Project Facts and Figures

Builder

Habitat for Humanity
Bay-Waveland Area, Inc.

Type of Project/Size

1,212 sq. ft. New Detached Single Family Home

NGBS Green Certified,
Emerald Level, ICC 700
National Green Building
Standard

Green Practices and Features

- Homeowners manual explaining each green feature and maintenance procedures
- Energy Star appliances and lighting fixtures; 95% CFLs
- Spray foam insulation on walls, floor and attic roof line; sill seal; caulk bottom plates
- Low-E windows: Single-hung vinyl; dual-glazed insulated glass
- Permanently fixed pine hurricane shutters
- Low-VOC paints (interior and exterior), sealants and adhesives
- 60-gallon hybrid heat pump (Energy Star)
- Continuous ventilation
- Flooring: OSB (FSC-certified), covered with 3/4" solid oak
- Heat pump—17 SEER, 9.1 HSPF
- Programmable thermostat
- WaterSense faucets and showerheads; dual-flush toilet
- Pervious concrete driveway and walkway
- Landscaping with native plants

Green Products and Practices Overview

This report includes a review of several green products, practices and features currently in use, and information on how builders and remodelers using the specific green products and practices rate them in importance for helping to achieving greener projects.

To allow for direct comparisons to the 2011 study findings, which are reported in the *New and Remodeled Green Homes SmartMarket Report*, the level of use of green products and practices by single family firms is analyzed by dividing these firms into two categories: those solely practicing new home construction and those solely practicing home remodeling. This approach helps inform the industry of key differences between home builders and home remodelers in their use of green products, practices and features.

However, given the lower number of multifamily firms that responded compared with single family firms (see the methodology on page 60), a similar breakdown of multifamily firms is not possible. Therefore, this subset of respondents is analyzed for general trends in product and practice usage, and the analysis focuses on notable differences between multifamily and single family firms.

Since the only firms included in measuring the importance of specific green products, practices and features are those that report using them, a similar division of the importance of these elements is not statistically viable. Thus, the analysis largely focuses on the differences between single family and multifamily firms regarding the importance of these elements.

Variation Over Time in Use of Green Products and Practices

While specific variations over time are reported in every product data section, it is worth noting that there is a general trend for all respondents to report slightly less use of many of the green products and practices in this study compared with the 2011 study. Typically, these reductions are small and not universal, and therefore, the general usage trends from 2011 are still evident in the current findings.

This pattern, however, is pervasive enough to warrant consideration. One factor that may be influencing these findings is the influx of firms with relatively little green building experience into the rapidly expanding market for green homes, which could be watering down the results from 2011, which had respondents who were using green building to improve their businesses during the recession. The data suggest that these new entrants to the market are still becoming conversant in green buildings (see pages 9 and 10), so a slight reduction in the level of use of some green products and practices may be part of that learning curve. As these firms gain experience, it is likely that the use of many of these products and practices will again increase. Further research is needed to determine which products and practices are finding less general interest in the market and which are being influenced by the influx of builders into this market.

Use of Energy Efficiency

Single Family

Highly efficient HVAC and/or water heater systems are the most widely adopted energy-efficient products/practices by both new single family builders and remodelers. In addition, these systems have seen notable increases in usage since the 2011 study, with 86% of single family builders who solely build new homes reporting the use of these systems in the current study compared with 78% in 2011. One factor that may account for this rise is the prevalence of tax and utility incentives that encourage the installation of more efficient systems.

For single family builders of new homes, the other energy-efficient products/practices remained within six percentage points of the findings in 2011, with two exceptions.

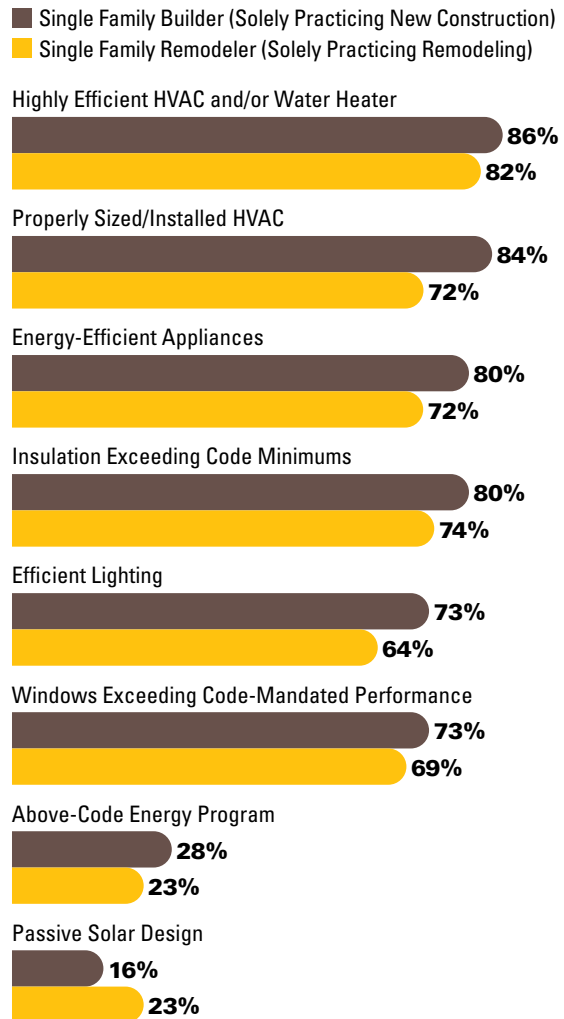
- **Energy Efficient Lighting: A greater percentage of respondents say they used efficient lighting in the current study (73%) versus the 2011 study (65%).**
- **Above-Code Energy Program: Use of an above-code energy program dropped dramatically, from 48% in 2011 to 28% in 2013.** This drop brings the usage reported by these respondents in line with those of single family remodelers.

Single family remodelers have remained even more consistent than those that build new homes over the last two years. Only two categories—use of energy-efficient appliances and properly sized/installed HVAC—experienced a percentage point difference higher than 5%, and both differences stood at 7% between the 2011 study and the current one.

Despite these differences, the findings overall demonstrate a relatively steady use of energy-efficient products and practices by both new single family builders and remodelers. This is consistent with small but steady increases in the level of green building activity on the part of these firms (see pages 8 and 9 for more information).

Top Products and Practices Used: ENERGY EFFICIENCY

Source: McGraw Hill Construction, 2014



Multifamily

Responses by firms that build new multifamily projects about the use of energy-efficient practices largely parallel those of single family firms, with one exception. Only a little over half of multifamily firms report using insulation exceeding code minimums, compared with 80% of builders of new single family homes. This result is surprising given the relatively low cost and significant contribution to performance that insulation offers. But it does correspond to a lower emphasis on building performance and higher interest in visible, marketable features which are prevalent in the multifamily findings throughout this study.

Variation by Level of Green Involvement

For the most part, firms that do 30% of their projects green reported similar percentages of using green products and practices as firms that did fewer green projects. The only exception to this result was efficient lighting. **Efficient lighting is used by 85% of both the single and family and multifamily firms that do more than 30% of their projects green, in contrast to 61% of firms that do fewer green projects.**

For single family and multifamily remodelers, there are more differences apparent between those that do a higher versus lower percentage of green work.

Remodelers doing more than 30% of their projects green report significantly higher use of the following:

- **Insulation that exceeds code mandates: 32%, versus 14% for remodelers doing a lower percentage of green projects**
- **Windows exceeding code-mandated performance: 72% versus 54%**
- **Efficient lighting: 79% versus 50%**

While builders may consider energy efficiency whether they are pursuing an overall green approach for a project or not, remodelers are more likely to be focused on specific issues raised by their customers. Therefore, it makes sense that firms doing more green remodeling projects are more likely to be using energy-efficient products and practices than those with remodeling projects focused on other types of improvements that aren't necessarily green.

Importance of Energy Efficiency

Single Family

All of the energy efficient practices/products included in the study were selected as important by over 70% of the single family firms using them—and six of them by over 80%. Clearly, firms continue to value energy efficiency highly as a way to make homes greener.

Respondents report that the top three factors they believe to have a large impact on the energy demand of homes are insulation exceeding code minimums, properly sized/installed HVAC and highly efficient HVAC/water heater. These were also the top three reported in the 2011 study, although in a slightly different order, demonstrating a consistent recognition of their impact on a home’s energy use.

Interestingly, highly efficient HVAC and/or water heaters were rated as most important in the 2011 study, and that category shifted from the third highest used in 2011 to the most frequently used in 2013. With utility and tax incentives helping to reduce the capital cost of installing this equipment, both builders and remodelers of single family homes appear to be using them more frequently on their projects.

SINGLE FAMILY BUILDER VERSUS REMODELER

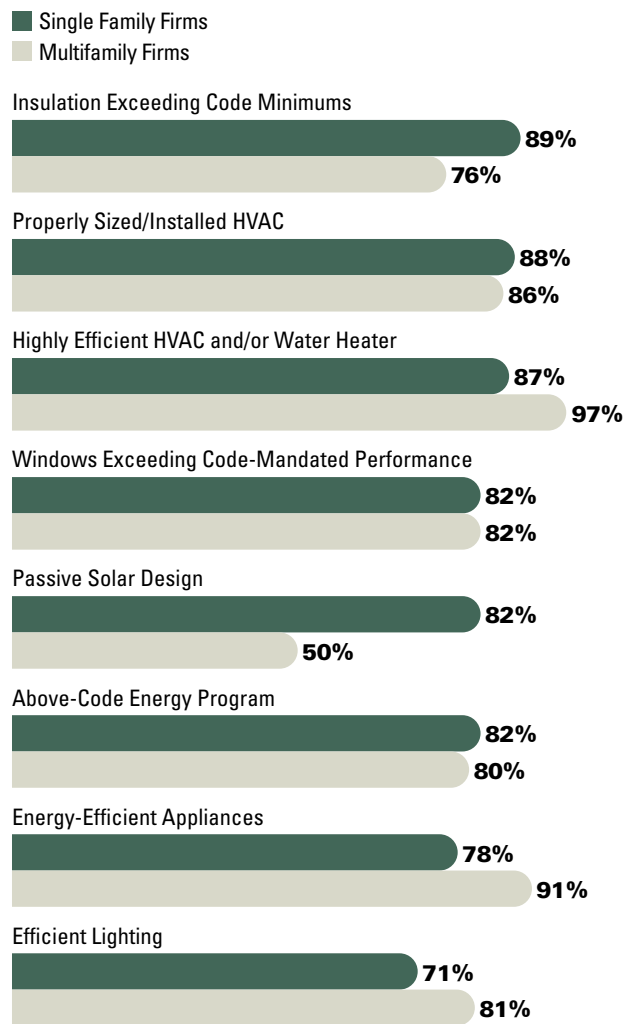
For the most part, there is no statistically significant difference between the percentage of builders and remodelers that consider the energy efficient products and practices included in the survey important. There are two exceptions:

- **Passive Solar Design: Not surprisingly, a higher percentage of firms that build new homes (91%) value passive solar design as an important strategy compared to firms that remodel single family homes (67%).**
- **Windows Exceeding Code-Mandated Energy Performance: Windows are considered important by a higher percentage of home remodelers (85%), compared with firms that build new homes (76%).** This is probably due to the greater likelihood that windows in older homes are often inefficient, so replacing windows during remodeling projects may have a much bigger impact on a home’s energy use than installing a window with superior performance in a new home.

Agreement on the importance of the rest of the products and practices demonstrates the high value placed on strategies to improve a home’s energy performance across the single family home market.

Importance of Products and Practices in Achieving Greener Homes: ENERGY EFFICIENCY (According to Firms Using Energy-Efficient Products and Practices)

Source: McGraw Hill Construction, 2014



Multifamily

There is less agreement in the responses by multifamily firms about the importance of energy-efficient products and practices in achieving a greener home compared with single family firms.

- **Two products—highly efficient HVAC and/or water heaters and energy-efficient appliances—were selected by over 90% of the multifamily firms.** While HVAC systems are considered very important by single family firms as well, the difference in ranking for appliances is striking. It is likely that in a multifamily building, the impact of multiple appliances on water and energy usage is magnified compared with the impact in a single family home. Additionally, efficient appliances are a highly marketable feature that likely appeals to multifamily builders and developers.
- **Efficient lighting is considered more important by multifamily firms than by single family firms.** Again, the impact of lighting compounded across many units is likely to have a bigger impact. Also, the buyers and renters of multifamily units may be more conscious of appliances and lighting than less visible systems within the building, so these features are also important to demonstrate a building's greenness to attract customers.
- **Two additional products/practices—insulation exceeding code minimums and passive solar design—are selected as important by a much lower percentage of multifamily firms than single family firms.** Passive solar design may be easier to accomplish and may have a greater impact on energy consumption in single family homes versus multifamily buildings. However, the finding about insulation is surprising since insulation is widely perceived as a valuable means of lowering energy use by respondents in other green building studies conducted by McGraw Hill Construction. This finding reinforces the importance of highly visible green strategies in the multifamily sector since consumers don't see and haven't historically been accustomed to asking questions about the level of insulation in a multifamily building.
- **The percentage of multifamily firms that consider the remaining products and practices important are largely in line with single family firms.**

Variation by Level of Green Involvement

Three products and practices are more widely recognized as important by respondents doing more than 30% of their projects green compared to those doing fewer green projects.

- **Passive Solar Design: 91% of firms doing 30% or more of their projects green consider this an important strategy, compared with 63% of firms doing fewer green projects.**
- **Insulation Exceeding Code Minimums: 94% of firms doing more green projects find this important, compared to 81% of firms doing fewer green projects.**
- **Appliances: 96% of firms doing more green projects find this important, compared to 72% doing fewer green projects.**

Among single family firms, it is also worth noting that 100% of the companies doing 30% or more green projects believe that a properly sized and installed HVAC system is important to achieve a greener home, compared to 81% of those doing fewer green projects. This again reinforces the importance of HVAC systems in homes as a critical element to improve energy performance.

Use of Materials and Resource Conservation

Single Family

Firms that solely remodel single family homes are consistently using practices and products that conserve materials and resources more frequently than firms that only build new homes. These findings are different than those from the 2011 study, in which builders that only build new homes reported significantly higher use of prefabricated components and/or engineered wood and were roughly equivalent with remodelers in their use of construction waste reduction.

More research is necessary to determine whether this pattern of higher interest in materials and resource conservation among remodelers remains consistent going forward. Even in the previous study, remodelers were using more durable materials, recycled products and recyclable/rapidly renewable materials versus builders of new homes. One factor that may be influencing the emphasis on material/resource conservation by remodelers compared with builders is the likelihood that homeowners are requesting these products and/or practices for their green remodeling projects; for many consumers, recycling and resource conservation are highly associated with being green.

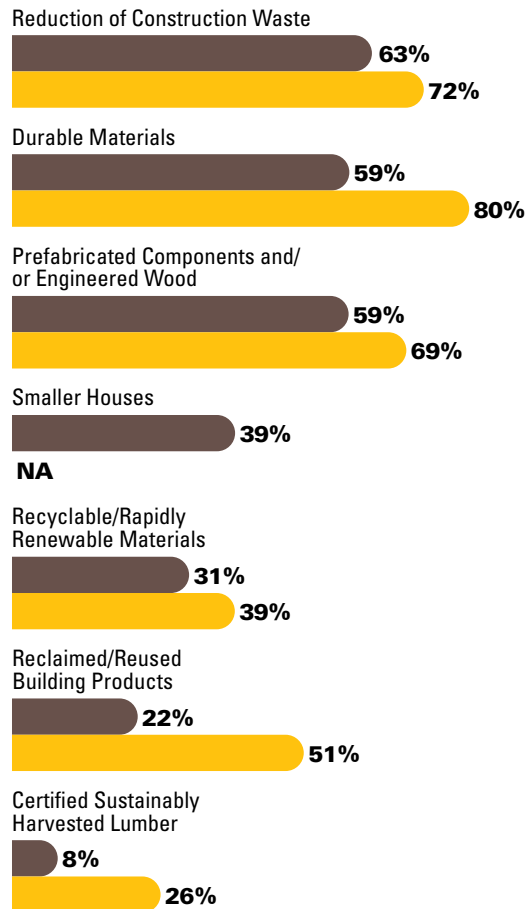
While the order that respondents ranked these practices/products is slightly different between new single family home builders and remodelers, **the top three practices/products used by more than half of builders and more than 60% of remodelers to conserve materials and resources are reduction of construction waste, durable materials and use of prefabricated components and/or engineered wood.** These three practices were also the most widely used ones in the 2011 study.

Since 2011, there is a notable rise in the use of prefabricated components/engineered wood by remodelers, increasing from 55% in 2011 to 69% in 2013. This suggests that wider applications for prefabrication and/or engineered wood in their projects.

Top Products and Practices Used: MATERIALS AND RESOURCES

Source: McGraw Hill Construction, 2014

- Single Family Builder (Solely Practicing New Construction)
- Single Family Remodeler (Solely Practicing Remodeling)



Multifamily Firms

The use of products and practices that conserve materials and resources by multifamily builders differs significantly from that of single family builders in two areas:

- **One quarter of multifamily builders report using sustainably harvested lumber, compared with just 8% of the single family builders.** One factor that may be influencing this result is the higher use of LEED certification among multifamily firms, which offers points for sustainably harvested lumber (see page 58).
- **As expected, single family builders are much more likely to be building small houses, compared with multifamily builders.**

Variation by Level of Green Involvement

DURABLE MATERIALS

For newly constructed buildings, single family and multifamily firms doing more than 30% of their projects green are using durable materials more widely (76%) compared with those doing fewer green projects (49%).

Firms doing more green building may be more likely to recognize and effectively promote how these materials improve the building's sustainability across its lifecycle.

SMALLER HOMES

Single family and multifamily firms doing more than 30% green projects report doing more small homes than those doing less green work. Again, this may again be due to firms that have more green experience recognizing the wider impact of home size on materials and resource conservation.

PREFABRICATED/ENGINEERED WOOD

Among single family builders of new homes only, there is also a notable difference in the use of prefabrication/engineered wood between firms with more versus less green involvement. **70% of firms doing more than 30% of their projects green report using prefabrication/engineered wood compared with 52% of the firms fewer green projects.** This may indicate that firms doing more green work are more aware of the possibilities of prefabrication/engineered wood as a means of greening their projects.

RECYCLABLE/RAPIDLY RENEWABLE MATERIALS

For remodeling projects, the only significant difference between firms with more or less green involvement is in the use of recyclable/rapidly renewable materials, with 52% of those doing more than 30% green projects reporting their use versus 24% of those doing fewer green projects.

Importance of Materials and Resource Conservation

There are no significant differences in the percentages of multifamily versus single family firms that place importance on specific practices and products used to conserve materials and resources.

- **All consider durable materials to be the most important product or practice**, with an 11-point spread between the percentage that consider durable materials important and the percentage of the next highest product or practice. The high regard for the importance of durable materials is consistent with the findings in 2011, demonstrating the ongoing interest in this factor within the residential sector. Given that homes are typically the largest investment made by most consumers, the importance of durability in this market is not surprising.
- The next two factors—**reduction of construction waste and use of prefabricated components and/or engineered wood**—are tied in importance, and they were also considered roughly comparable in the 2011 study.
- **The factor with the largest change since 2011 is the importance of using smaller houses. The percentage of respondents that consider smaller homes important dropped from 66% in 2011 to 41% in 2013.** Responses from multifamily firms pulled this number down, as only 24% of such firms rate it as important, but only 49% of single family firms rated it as important in 2013, a major change from 2011. This finding may be partly explained by the recovering economy. Homeowners may be more interested in larger homes again, and many builders that left this market during the recession and have just returned to it may still see the market favoring larger homes as it did before the recession. Further research is necessary to see how this trend plays out in the future.

Variation by Level of Green Involvement

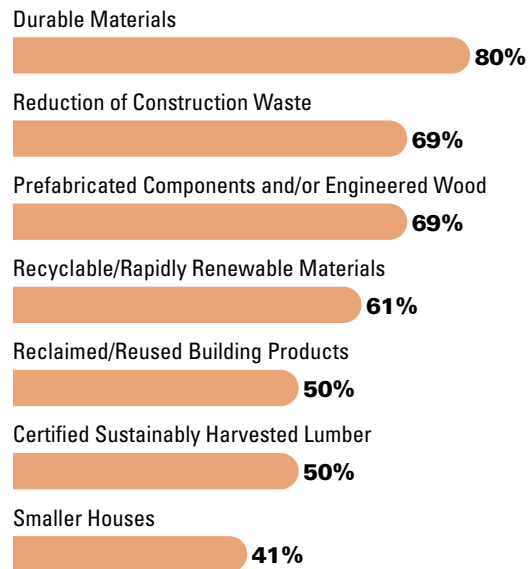
For single family firms, one difference is evident between those that build more green projects and those that build fewer. **81% of the single family firms that do more than 30% green projects consider construction waste reduction important, compared with 61% doing fewer green projects.**

McGraw Hill Construction’s research on green building in the commercial and institutional sectors has indicated that construction waste reduction is becoming a common green practice in these sectors, and it is important to building certification systems as well, which may contribute to why residential firms doing green work are more conscious of the importance of this factor.

Importance of Products and Practices in Achieving Green Homes/Buildings: MATERIALS AND RESOURCES

(According to Firms Using Products and Practices That Conserve Materials and Resources)

Source: McGraw Hill Construction, 2014



Use of Water Conservation Practices

Single Family

Single family home builders and remodelers report a higher use of water-conserving fixtures and water-conserving appliances compared with the other water conservation products and practices included in the survey. These were also the most widely used products in this category in the 2011 study. However, there are notable differences between the 2011 findings and the findings of the current study.

- In 2011, water conserving fixtures and appliances were both used by roughly three quarters of both builders of new homes and remodelers.
- In 2013, a much higher percentage of builders (86%) and a slightly higher percentage of remodelers (82%) report using water-conserving fixtures.
- The gap between the percentage of firms reporting the use of water-conserving fixtures is also notably larger in this study than those using water-conserving appliances, with a 14 to 20 percentage point gap, compared with a four to five point gap in 2011.

One reason for the greater use of water-conserving fixtures versus appliances may be that a significantly higher percentage of single family firms that do more than 30% green projects use water-conserving appliances (87%) compared with firms doing fewer green projects (59%). As previously noted, the recovery of the housing market may have led more firms with less green experience to enter (or reenter) the residential marketplace. A lack of green expertise among some single family firms may also be evident in the drop in the use of more efficient plumbing techniques by builders of new single family homes since 2011, from 42% to 31%.

More research is necessary to determine if this finding is just a temporary slackening of interest among single family firms in water-conserving appliances or is the beginning of a longer-term trend.

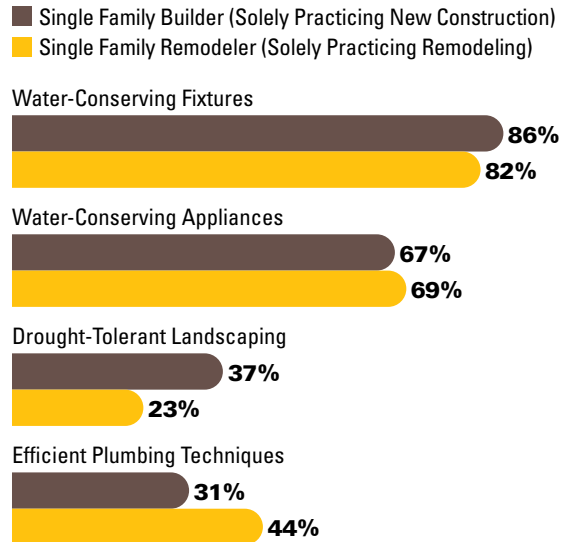
Multifamily Builders

As with single family firms, a higher percentage of multifamily firms report using water-conserving fixtures versus water-conserving appliances. But in this case, the gap is even larger. **All of the multifamily builders use water-conserving fixtures, but only roughly half of them use water-conserving appliances.**

The percentage of firms using efficient plumbing techniques and drought-tolerant landscaping corresponds to the level of use reported by single family

Top Products and Practices Used: WATER CONSERVATION

Source: McGraw Hill Construction, 2014



builders, suggesting that water conservation strategies in these two sectors are similar.

These findings are surprising, given the higher emphasis placed on water conservation by multifamily firms (see page 29). The results also seem incongruous when compared to the increased emphasis placed on energy-conserving appliances (see page 36). The relatively low consumer awareness of water conservation labels like WaterSense, compared to energy-saving labels like Energy Star, may contribute to this finding. Consumers purchasing or leasing a green unit in a multifamily building would certainly expect it to have Energy Star appliances, but they may not notice if their fixtures and appliances are rated by WaterSense.

Importance of Water Conservation

While the level of use of the top water-conserving products has changed since the 2011 study, the level of importance selected by those using the products is ranked relatively the same. Water-conserving fixtures have edged out water-conserving appliances as the most favored practice, with the highest percentage of single family firms reporting it as important. Still, both percentages are separated by less than 5 points and hover around the mid-70s.

The level of consistency in the importance of these products reveals that even if the level of use varies, firms that begin using them consistently find them to be of value.

The gap between the importance and use of water-conserving appliances is even more evident among the multifamily firms. Even though only half of multifamily builders use them on projects, over 90% of those that do use them consider them important.

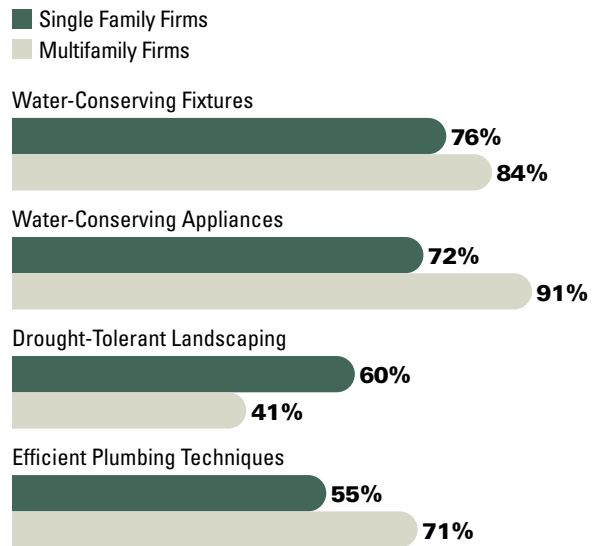
These gaps represent a good opportunity for the manufacturers of these products. It suggests that greater familiarity with such products could lead to a better understanding of how they can contribute to the green performance of a home or multifamily building.

In addition, a relatively high percentage of single family and multifamily firms report that use drought-tolerant landscaping find it to be important for water conservation. This is notable given the low level of use of this approach on projects, with only 37% of new single family home builders reporting use of it (see page 41). Here, though, perceived consumer preferences may also be a factor. While builders may believe drought-tolerant landscaping is effective for saving water, it is possible that they may be concerned that clients will find traditional landscaping more attractive, which could lead them to avoid using this method to save water for fear of harming the appeal of their buildings.

Importance of Products and Practices in Achieving Greener Homes: WATER CONSERVATION

(According to Firms Using Water-Conserving Products and Practices)

Source: McGraw Hill Construction, 2014



Use of Practices That Improve Indoor Environmental Quality

The use of products and practices that improve indoor environmental quality (IEQ) largely corresponds to that reported in 2011, and it is largely consistent between single family and multifamily firms. **Increased moisture control and ventilation is the most widely used strategy**, with 82% of single family builders of only new homes reporting its use, compared with 75% in 2011, and 77% of single family home remodelers, compared with 81% in 2011.

Variation by Level of Green Involvement

Firms doing more green projects use low VOC materials and MERV 8+ filtration/air cleaning systems more than firms doing fewer green projects, with the differences being even wider between single family firms than among respondents as a whole.

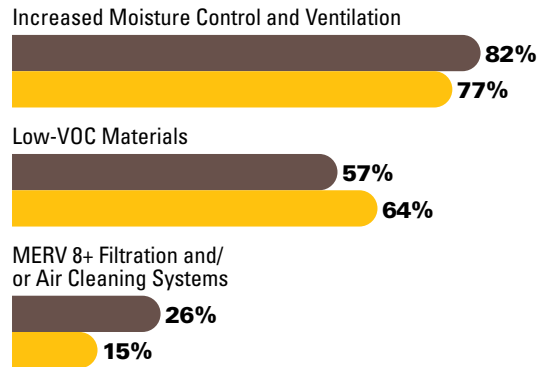
- **48% of single family firms doing more than 30% green projects use MERV 8+ filtration on new projects and 31% on remodeling projects, compared with 7% and 10%, respectively, of firms doing less green work.**
- **70% or more of single family and multifamily firms doing more than 30% green projects use low-VOC materials on new homes and remodeling projects, compared with just over half of firms doing less green work.**

These findings are significant, especially given the increasing interest in healthy homes (see page 46). It suggests that as builders entering the residential market gain green experience, wider adoption of products and practices improving IEQ is likely.

Top Products and Practices Used: INDOOR ENVIRONMENTAL QUALITY

Source: McGraw Hill Construction, 2014

- Single Family Builder (Solely Practicing New Construction)
- Single Family Remodeler (Solely Practicing Remodeling)



Importance of Indoor Environmental Quality

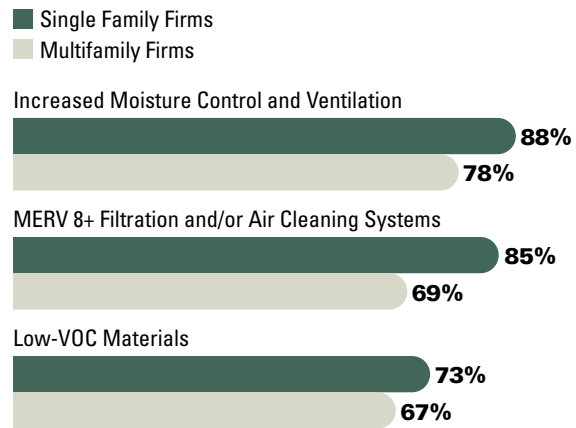
Most of the single family and multifamily firms using products/practices that impact indoor environmental quality (IEQ) rate them as important. The single family findings are consistent with the 2011 study. Therefore, the gap reported in 2011 between the evaluation of the importance of these products/practices by firms that use them and their level of adoption across the industry as a whole is still clearly evident.

A significantly higher percentage of firms that do more than 30% green work, versus those that do less, consider all IEQ products and practices to be important. The one difference that is statistically significant is for low-VOC products, with 82% of firms doing more green compared with 60% of those doing less.

Greater attention to issues of IEQ is often a hallmark of a more developed green building program, especially since the impacts are harder to measure directly compared with reductions in energy or water use, or material conservation. As builders continue to use green rating systems for their projects (see page 58) and do more green work, it is likely that the use of IEQ products and practices will grow.

Importance of Products and Practices in Achieving Greener Homes: INDOOR ENVIRONMENTAL QUALITY (According to Firms Using Products and Practice That Improve Indoor Environmental Quality)

Source: McGraw Hill Construction, 2014



Use of Lot Design and Development

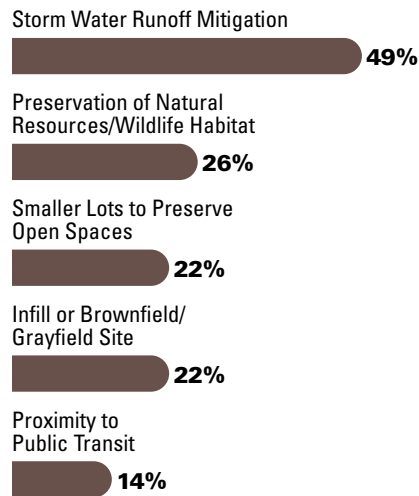
Nearly twice the percentage of single family builders that only build new homes use storm water runoff mitigation compared with the percentage that use any of the other practices. This finding is consistent with the 2011 study, in which single family builders were also far more likely to use this practice than any of the others. The presence of building codes about stormwater runoff in many areas may help drive wider use of this practice. Runoff mitigation is also used by over three quarters of multifamily firms, an expected finding as their large buildings are more likely to trigger code requirements.

In 2011, the preservation of natural resources/wildlife habitat was a practice used by 37% of single family builders solely building new homes and was ten percentage points above the next most popular practice. However, in 2013, interest in this practice is less evident, with 26% using it, only four percentage points above the use of smaller lots and infill/brownfield sites. The use of smaller lots is also more widely used by single family firms doing more than 30% green projects (36%), versus those doing fewer green projects (21%), which suggests that interest in this practice may grow as more builders adopt green practices and methods.

For multifamily builders and developers, on the other hand, preservation of natural resources/wildlife habitat and infill/brownfield sites are used by more than a third of respondents, demonstrating greater sensitivity to these issues compared with single family builders.

Top Products and Practices Used By Single Family Builders That Only Build New Homes: LOT DESIGN, PREPARATION AND DEVELOPMENT

Source: McGraw Hill Construction, 2014



Importance of Lot Design and Development

While the small number of respondents using green lot design and development practices makes it difficult to provide a detailed analysis of the importance of individual practices, a few key trends are evident.

- **USE OF SMALLER LOTS:** By far, the practice considered most important is the use of smaller lots to preserve open space. Well over three-quarters of respondents using this practice consider smaller lots critical to creating greener projects. Since this practice is only used by approximately one quarter of single family and multifamily builders, greater industry awareness of its importance is needed.
- **STORMWATER RUNOFF MITIGATION AND PRESERVATION OF NATURAL RESOURCES/WILDLIFE:**

About two thirds of firms that use these practices consider them important to achieve greener homes.

Mandates about stormwater help raise the importance of this practice in the industry.

- **INFILL/BROWNFIELD SITES AND PROXIMITY TO PUBLIC TRANSIT:** About half of the firms that use infill/brownfield sites or place their projects in proximity to public transit believe that these practices are important to achieve greener homes. It is not surprising that these are considered less important than other factors, as they are entirely dependent on the availability of these sites and thus may be harder to incorporate as part of these firms' core green practices.

Growing Public Awareness and Industry Resources Increase the Potential for More Healthy Homes

Greater public awareness of the impact of buildings on health, as well as growing research and industry tools, are creating the potential for wider industry production of healthy homes.

In downtown Manhattan, a recently completed residential building takes indoor environmental quality to new heights. Integrated blue-spectrum lighting boosts occupants' morning cortisol production; a special floating-floor system minimizes skeletal impact; ultraviolet light and high-tech surfaces kill bacteria in the kitchen; low-VOC paints are a given. These features would seem custom made for a health-nut celebrity, but not so. The townhouse actually comprises five residences built on spec by the five-year-old development company Delos.

This new Greenwich Village condominium gives off an air of only-in-New-York luxury. Yet Delos is banking on the convergence of sustainable design and construction, and occupant health more generally. Across the economic spectrum, homeowners are becoming increasingly aware of air pollution inside a residence and of exposure to toxins from building materials. Indoor environmental quality is arguably the successor movement to organic food.

Health Mandates

The sustainability movement has long recognized that a building's environmental healthiness is not measured in gallons and kilowatt-hours alone. While Rachel Carson's famous 1962 book *Silent Spring* was aimed directly at pesticides' negative impact on animal and human life, phasing out lead-based paint took place shortly thereafter. More recent federal regulations,

such as the 1989 ban on asbestos, 1998 National Volatile Organic Compound Emissions Standard for Architectural Coatings and the four-year-old formaldehyde standards for composite-wood products, validate the connection between building materials' chemical content and occupant health.

Growing Public Awareness

The consumers' learning curve about building impact on health is also speeding up. Consider the case of the New York-based nonprofit Mothers & Others for a Livable Planet: The 35,000-member group's "The Green Guide" newsletter did not investigate formaldehyde in composite-wood products until almost 20 years after it was identified as a possible carcinogen. Yet by the 2010 publication of "Formaldehyde in the Indoor Environment" in the scientific journal *Chemical Reviews*, a group of scientists called formaldehyde "the most common and the best-known indoor air pollutant."

Awareness of indoor building-based contaminants is poised to increase, thanks in part to actions like the December 2013 revision of California's TB-117 standard, which frees furniture manufacturers from using flame retardants in foam.

Industry Resources for Healthy Buildings

To cultivate further awareness of building-based contaminants, health organizations are leading

the charge. A significant part of the American Lung Association's Healthy Air campaign educates consumers about indoor pollution sources and prevention methods for homes. And a team from the Mount Sinai School of Medicine found that residents' asthma rates in LEED-certified green homes in the South Bronx went down even prior to the implementation of a green cleaning program, which strongly suggested to researchers a link between respiratory health and exposure to building materials.

Advocates within the building industry are participating in the knowledge gathering, tailoring their information precisely for professionals. Since its launch in late 2012, the online database Declare has allowed manufacturers to voluntarily publish ingredients, sources and manufacturing locations for their products. And, sparking further discussion about asthma, last December the nonprofit Healthy Building Network identified asthmagens in the products marketplace in its report "Full Disclosure Required."

Perhaps because correspondences between building toxins and health are still solidifying, the residential market on the whole is more slowly aligning with homeowners or progressive investors like Delos. According to Calvert Investments' most recent study of the 10 largest publicly traded U.S. home builders, only two have standardized low-VOC paint. ■

Data: Use of Renewable Energy

Use of Renewable Energy in Residential Projects

GREEN MULTIFAMILY AND SINGLE FAMILY HOMES: GROWTH IN A RECOVERING MARKET DATA

Use of Renewable Energy on All Projects

Many firms doing residential projects, whether single family or multifamily, expect to see an increase in their use of renewables in the next three years. The percentage of firms that expect to use it on all projects more than doubles from 8% to 20%, while those who do not expect to use renewables at all is also reduced sharply, from 35% to 21%. This finding demonstrates that builders, remodelers and developers still expect to see the industry shift toward greater use of renewables, and it suggests that renewables are still considered an important part of a builder's strategy for achieving high-performing homes.

The only notable difference in the overall use of renewables between single family and multifamily firms is between those that use renewables on all projects and those that offer them as an option.

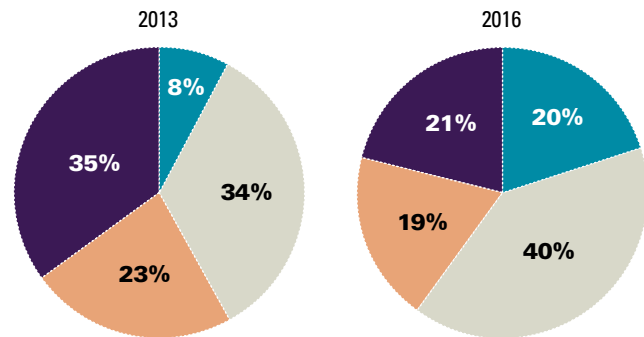
- 10% of single family firms currently offer renewables on all their projects, compared with 3% of multifamily firms.
- On the other hand, 42% of multifamily firms offer renewables as an option, compared with 31% of single family firms.

However, the level of awareness and interest in using renewables remains the same across both groups. The higher percentage of single family firms using renewables on all projects corresponds to the higher percentage of those firms that are dedicated to green (doing 90% or more of their projects green), compared with multifamily firms (see page 9).

Current Use and Estimated Future Use of Renewables on Projects

Source: McGraw Hill Construction, 2014

- Renewable Energy Incorporated Into All Projects
- Offer Renewable Energy as an Option
- Do Not Offer Renewable Energy as an Option Except on Request From Owner
- Do Not Offer Renewable Energy



Use of Specific Renewable Technologies

While multifamily builders, remodelers and developers are more widely employing specific renewable energy technologies in some of their projects, single family builders, remodelers and developers are the more intensive users of some of these technologies, in terms of the overall percentage of their projects in which these technologies are incorporated.

A higher percentage of multifamily firms report use of all renewable technologies included in the survey—solar photovoltaic panels, solar thermal, groundsource heat exchange and even wind—on at least one of their projects. This consistency suggests a relatively high level of awareness of the benefits and challenges of using renewables among multifamily firms.

INTENSITY OF USE

The differences in the intensity of use of solar photovoltaic panels and groundsource heat exchange are striking.

■ Single Family Firms: More Intensive Use

- Over half using photovoltaic panels do so on **more than 25%** of their projects.
- Over three quarters using groundsource heat exchange do so on **more than 25%** of their projects.

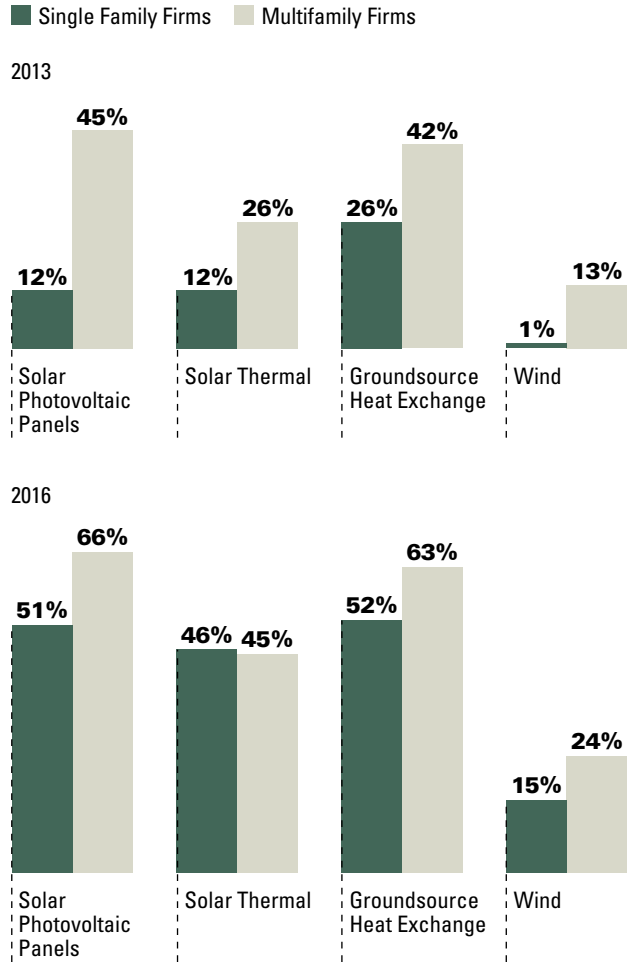
■ Multifamily Firms: Less Intensive Use

- Over three quarters using photovoltaic panels do so on **25% or fewer** projects.
- Nearly all using groundsource heat exchange do so on **25% or fewer** projects.

These findings suggest that the markets are both moving toward higher renewables use, but in very different ways. For single family firms, use of renewables is more likely to be part of an overall green approach. For multifamily firms, decisions are more likely to be made on a project-by-project basis, but they have a wider familiarity with different technologies. Utilities and renewable energy service providers should consider these differences when seeking to engage these firms in the use of renewable technologies.

Current Use and Estimated Future Use of Specific Renewable Technologies

Source: McGraw-Hill Construction, 2014



Most Effective Messages

When Marketing Residential Renewable Energy Features

The effectiveness of messages considered for marketing renewable energy features of residential projects depends on whether the residential project is a single family home or unit in a multifamily building.

Single Family

In the single family home market, there is not a single message that clearly influences the market, with only a slight difference in the percentage that consider energy independence and resilience a highly effective message compared with utility savings.

When it comes to those who find the message at least somewhat effective, the positive impact on the environment has roughly the same percentage of respondents as energy independence and utility savings. Also, the percentage that finds any of these messages highly effective is under 20%, suggesting that this sector is still struggling to make the case to the home buyer to invest in the renewable energy technologies.

Multifamily

A much higher percentage of multifamily firms report that all these messages are at least somewhat effective.

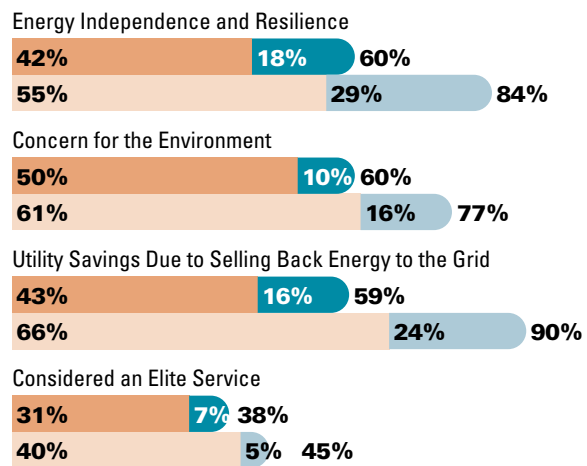
- **Energy independence and resilience** has the most enthusiastic support, with 29% finding that message to be a very effective way to market renewables.
- Nearly all (90%) of the multifamily firms find discussion of **utilities savings** at least somewhat effective in making the case for renewables, with nearly one quarter finding it very effective.

These findings are clearly correlated with the findings about the approach to adding renewables to their projects. Single family home builders are more likely to include renewables generally on their projects (when they use them), while multifamily firms appear to more frequently make the case on a project-by-project basis (see pages 47–48 for more information). Therefore, it is not surprising that multifamily firms are more attuned to and need specific messages that will appeal to their audiences.

Effectiveness of Marketing Messages for Renewable Energy Features in Residential Projects

Source: McGraw Hill Construction, 2014

- Single Family—Somewhat Effective
- Single Family—Very Effective
- Multifamily—Somewhat Effective
- Multifamily—Very Effective



Net-Zero Homes

Net-zero homes are evolving from a custom concept to a mainstream offering, thanks to efforts in recent years by national home builders to roll out high-performance residential homes on a large scale.

In February 2014, KB Homes unveiled its first “Double ZeroHouse” with a dual emphasis on energy and water efficiency. The house, built at its Dawn Creek community in Lancaster, Calif., is designed to achieve net zero energy consumption through a combination of solar, high-performance systems and other efficiencies. KB Homes began offering net-zero energy in homes in 2010. The Double ZeroHouse is its eleventh property to achieve that standard.

With the ZeroHouse, KB is now extending that effort into water efficiency. Its water recycling system treats greywater from bathroom showers, tubs, sinks and washing machines to near-potable quality. The greywater can be reused on landscaping.

Transforming the Industry

Jacob Atalla, corporate vice president of sustainability at KB Homes, says that KB Homes looks for consistent proven technologies that it can offer to home buyers nationwide. As a large home builder, KB recognizes it has a broad impact.

“This is about transforming our product line over the next several years, but it is also transformational for our trade partners, our suppliers and the people in the communities we build in,” he says.

In aiming for net-zero energy, Atalla says the company is in a

continuous process of improvement, adding new technologies “as they prove themselves.” KB decided to aim for high-performance water efficiency after finding a system that required consistent installation practices and comes with a warranty.

Although its net-zero concepts have been limited to date, Atalla says these are the next steps in the company’s evolution toward higher-efficiency homes. Since 2000, the company has built more than 82,000 Energy Star-certified homes.

Cost-Benefit Concerns

As with other national home builders, Meritage Homes, has been expanding its high-performance offerings in recent years. It was the first to build a net-zero energy home and uses Energy Star’s performance criteria as the minimum standard in all of its homes. It was also the first national home builder to offer EPA triple-certified homes for Energy Star, Indoor airPLUS and WaterSense.

Brent Anderson, spokesperson for Meritage Homes, says the company sees prices continuing to drop on high-efficiency systems. It recently partnered with a new solar provider that provides a more economical system, and Anderson reports that the company ultimately plans to offer net-zero homes nationwide. However, he still sees a significant cost gap when trying to achieve that level of energy performance. “Let’s say you have [an energy-efficient] \$300,000 home,” he says. “If it costs

an extra \$20,000 to get to net zero and that saves you \$50 to \$100 per month, the buyer’s motivation is more than just economics,” he says. “They are doing it for other reasons.”

Rebates, tax credits and other incentives also play into the future viability of net zero among major home builders. The recent rise in interest in high-efficiency systems among major home builders coincided with a range of incentives offered by government entities nationwide. As incentives expire, the cost-benefit analysis of net-zero homes could change.

Shea Homes began offering net-zero energy as a standard in some of its Trilogy communities in 2012 under the brand SheaXero. The company expects to complete its 2,000th net-zero energy home in 2014.

Shauna Farmer, vice president of marketing and sales at Shea Homes Active Lifestyle Communities, says that although the company has produced more net-zero energy homes than any other national home builder, it is still evaluating the product.

“At this point, we say it’s available for a limited time,” she says. “We closely monitor our customers and the marketplace; what the competition is doing; what municipalities and governments are doing in terms of regulations; and the various credits and incentives available. We want to make sure that’s what customers want to have in their homes.” ■

Data: Green Building Products

GREEN MULTIFAMILY AND SINGLE FAMILY HOMES: GROWTH IN A RECOVERING MARKET DATA

Trusted Sources of Information on Green Building Practices and Products

Trade shows and trade organizations are highly trusted sources of information on green building practices and products for both single family firms and multifamily firms. In addition, there is no significant difference in the percentage of single family builders and remodelers in the trust level for these sources of information. This demonstrates that a presence in trade shows and relationships with trade organizations should be a high priority for any firm's marketing division seeking to cut across the single family and multifamily markets—and to reach builders and remodelers alike.

Single Family

Colleagues and other builders is the other top-trusted source of information for single family firms, reported by 65%, significantly higher than that reported by multifamily firms. Combined with their affinity for print literature, single family firms are relatively traditional in terms of how they gather green building information.

To reach this audience, product manufacturers and service providers may benefit from finding inventive ways to use builders' and developers' peers and other colleagues to create interest, including social media.

Multifamily

Home building websites and product manufacturers are the other top-trusted sources for a significant number of multifamily firms, reported by 66% and 58%, respectively. On the other hand, general websites are trusted much lower as is print literature. These findings suggests that manufacturers already have a direct conduit to this sector and should capitalize on that through continued direct activities and by focusing on specialized digital communication methods.

Variation by Level of Green Involvement

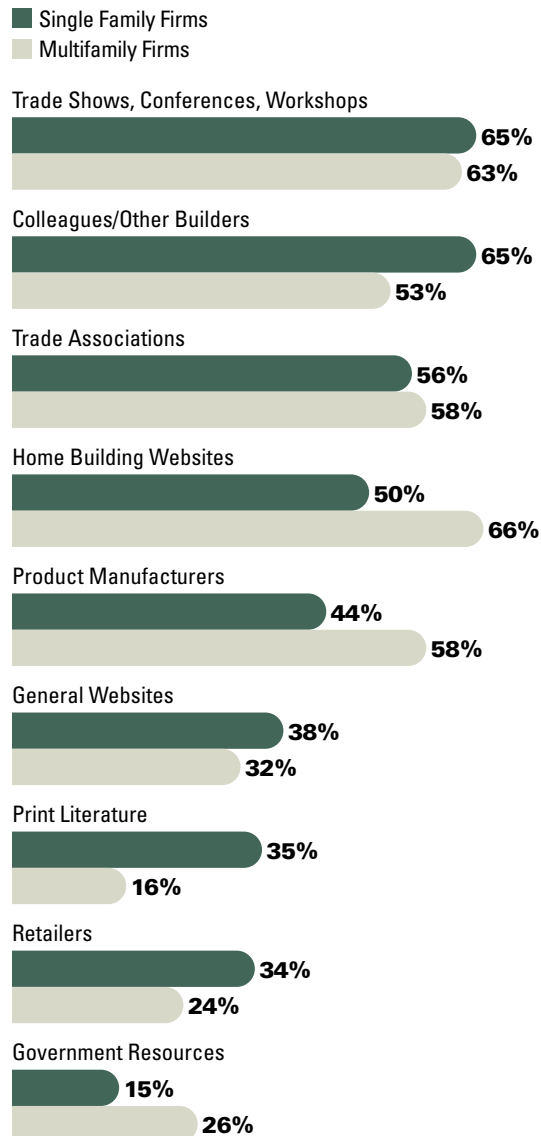
A higher percentage of single family and multifamily firms with more than 30% of their projects green report that they trust the following sources for information on green products and practices more than do those with fewer green projects:

- Trade Shows: 75%, compared with 59%
- Print Literature: 42%, compared with 24%
- Government Resources: 24%, compared with 12%

Firms doing more green work are more likely to go to trade shows featuring information about green building

Most Trusted Sources of Information About Green Building Practices and Products

Source: McGraw Hill Construction, 2014



and to know about government resources. Further, the greater trust of print literature suggests manufacturers and others should have detailed materials in print form.

For greener single family firms, home building websites are highly trusted, reported by 67% of those doing more than 30% of their projects green, compared with 40% of those doing fewer green projects.

Ability to Name a Top-of-Mind Green Product Manufacturer or Brand

Over 70% of respondents can name a green brand or manufacturer for building products in seven different product categories, comparable with the findings from 2011. The findings are also consistent across firms working in both the single family and multifamily sectors, with a couple of notable exceptions.

- **Appliances:** 89% of multifamily firms can name a green appliance brand/manufacturer, compared with 74% of single family firms. This averages to the 78% shown on the chart at right.
- **Flooring:** 76% of multifamily firms can name a green flooring brand/manufacturer, compared with 51% of single family firms. This averages to the 56% shown on the chart at right.

Flooring and appliances have brands that would be more likely to be used in marketing materials to demonstrate sustainability than insulation, exterior framing, HVAC or other, more technical building products. The familiarity with brands that consumers relate to may help explain the greater ease found by multifamily firms in marketing their green residences (see page 18).

Variation by Single Family Builders Versus Remodelers

There is limited variation between single family builders and single family remodelers in terms of the brands or manufacturers they can name. Single family builders are more familiar with green brands in the following categories:

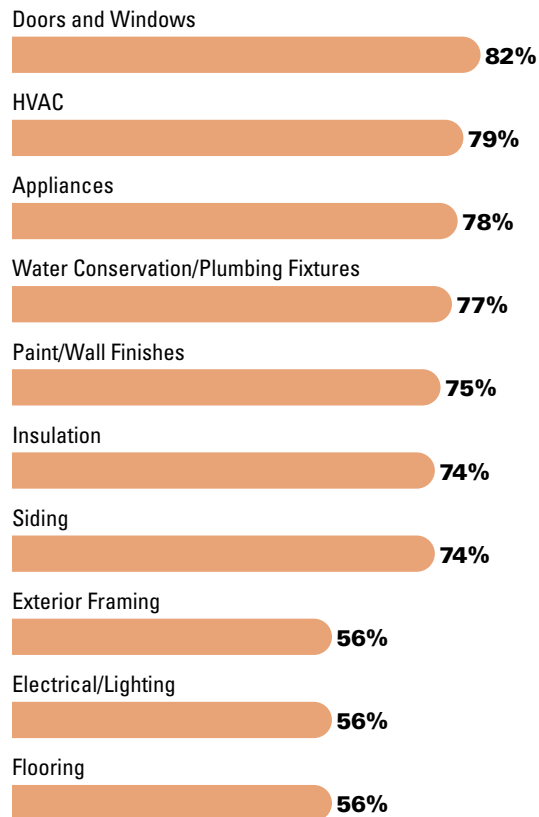
- **Appliances:** 83% of single family builders compared with 63% of remodelers
- **Water conservation/plumbing fixture:** 85% of single family builders compared with 70% of remodelers. Since water bills are a relatively small portion of household payments, unless U.S. consumers are in drought-prone areas, they would likely not prioritize water conservation, which may lead to less emphasis on including water conservation in their remodeling projects.

Variation by Level of Green Involvement

There is also little variation with overall green brand familiarity between respondents doing 30% or less of their projects green compared with those doing more than 30% green projects. There were two categories where there was significantly more familiarity with a green brand for firms with higher green involvement.

Ability to Name a Top-of-Mind Green Company/Brand by Product Type (According to All Respondents)

Source: McGraw Hill Construction, 2014



- **Insulation:** 82% of the firms doing more than 30% green projects can name a green brand, compared with 69% of those doing fewer green projects.
- **Water Conservation/Plumbing Fixtures:** 83% of those doing a higher percentage of green projects, compared with 73% of those doing fewer.

The similarity in the responses by those doing more than 30% of their projects green and those doing fewer green projects across the rest of the product categories demonstrates that green brands are becoming widely known in the industry, not solely confined to those that specialize in green work.

Top-of-Mind Green Brands

While many green brands are recognized across the single family and multifamily sectors, there are several that have much wider recognition in one sector than another. Though there is consistency between the number of brands recognized in 2011 and 2013, there are more brands that were cited as green in the areas of insulation, HVAC and exterior framing in 2013.

The number of brands recognized in the electrical/lighting category by multifamily builders also outnumbers those recognized by single family builders

this year, the first year that category has been included in the study. This difference suggests that some marketing strategies for green products in these lines may be better suited for one sector than another. The current study's findings clearly demonstrate that single family and multifamily firms seek product information from disparate sources (see page 51), and manufacturers that want to increase their profile with a specific sector may need to adjust their strategies to account for those differences.

Top-of-Mind Green Product Brands Reported by More Than 5% of Respondents

Source: McGraw Hill Construction, 2014

Product Category	2006*	2008*	2011	2014 Single Family	2014 Multifamily
Doors & Windows	<ul style="list-style-type: none"> Andersen (15%) Pella (11%) 	<ul style="list-style-type: none"> Andersen (17%) Pella (12%) Marvin (8%) 	<ul style="list-style-type: none"> Andersen (18%) Pella (14%) Marvin (12%) Therma-Tru (6%) 	<ul style="list-style-type: none"> Andersen (16%) Marvin (14%) Jeld Wen (13%) Pella (12%) 	<ul style="list-style-type: none"> Pella (26%) Andersen (13%) Jeld Wen (11%) Marvin (8%)
Insulation	<ul style="list-style-type: none"> Owens Corning (29%) 	<ul style="list-style-type: none"> Owens Corning (26%) 	<ul style="list-style-type: none"> Owens Corning (25%) Icynene (9%) CertainTeed (6%) 	<ul style="list-style-type: none"> Owens Corning (22%) Icynene (7%) Certain Teed (6%) Dow (5%) Johns Manville (5%) 	<ul style="list-style-type: none"> Owens Corning (24%) Certain Teed (13%) Dow (11%) Icynene (5%) Johns Manville (5%)
Water Conservation/ Plumbing	<ul style="list-style-type: none"> Kohler (22%) 	<ul style="list-style-type: none"> Kohler (21%) Delta (14%) 	<ul style="list-style-type: none"> Kohler (32%) Delta (16%) Moen (14%) Toto (6%) 	<ul style="list-style-type: none"> Kohler (29%) Delta (18%) Moen (17%) American Standard (3%) 	<ul style="list-style-type: none"> Kohler (37%) Moen (13%) American Standard (10%) Toto (8%)
HVAC	<ul style="list-style-type: none"> Trane (17%) Carrier (12%) Lennox (10%) 	<ul style="list-style-type: none"> Trane (17%) Carrier (14%) Lennox (13%) 	<ul style="list-style-type: none"> Trane (20%) Carrier (12%) Lennox (8%) 	<ul style="list-style-type: none"> Carrier (20%) Trane (16%) Lennox (9%) 	<ul style="list-style-type: none"> Carrier (32%) Trane (16%) Goodman (5%) Mitsubishi (5%)
Paint/ Wall Finishes	<ul style="list-style-type: none"> Sherwin-Williams (21%) 	<ul style="list-style-type: none"> Sherwin-Williams (32%) Benjamin Moore (8%) 	<ul style="list-style-type: none"> Sherwin-Williams (39%) Benjamin Moore (12%) 	<ul style="list-style-type: none"> Sherwin-Williams (37%) Benjamin Moore (10%) 	<ul style="list-style-type: none"> Sherwin-Williams (53%) Benjamin Moore (5%) Duron (5%)
Appliances	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> GE (34%) Whirlpool (13%) 	<ul style="list-style-type: none"> GE (26%) Whirlpool (15%) Bosch (7%) KitchenAid (6%) 	<ul style="list-style-type: none"> GE (33%) Whirlpool (11%) Bosch (7%) Kenmore (6%) 	<ul style="list-style-type: none"> GE (45%) Whirlpool (18%) Frigidaire (8%)
Siding	<ul style="list-style-type: none"> James Hardie (11%) 	<ul style="list-style-type: none"> James Hardie (19%) 	<ul style="list-style-type: none"> James Hardie (38%) CertainTeed (11%) 	<ul style="list-style-type: none"> James Hardie (42%) CertainTeed (12%) 	<ul style="list-style-type: none"> James Hardie (55%) CertainTeed (8%)
Ext. Framing	<ul style="list-style-type: none"> Trex (31%) 	<ul style="list-style-type: none"> Trex (27%) 	<ul style="list-style-type: none"> Trex (24%) 	<ul style="list-style-type: none"> Trex (18%) Azek (7%) 	<ul style="list-style-type: none"> Trex (18%) LP (5%)
Flooring	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Shaw (9%) Armstrong (7%) Bamboo (6%) 	<ul style="list-style-type: none"> Armstrong (10%) Shaw (6%) Bamboo (5%) 	<ul style="list-style-type: none"> Shaw (24%) Bamboo (13%) Armstrong (11%)
Electrical/Lighting	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Progress (9%) LED (8%) GE (6%) 	<ul style="list-style-type: none"> GE (8%) Lithonia (8%) Lutron (5%) Square D (5%) Sylvania (5%)

*Respondents in 2006 and 2008 include builders and developers only. Responses in 2011 and 2014 include builders, remodelers and developers.

Improving Homeowner Quality of Life Through Green Remodeling

Heritage Hills Whole-House Remodeling Project

CHAPEL HILL, NORTH CAROLINA

GREEN MULTIFAMILY AND SINGLE FAMILY HOMES: GROWTH IN A RECOVERING MARKET

For Jeff Wiblitzhouser at Paradise Found Construction, a firm that specializes in residential remodeling work, green retrofits of existing homes are about more than cost reductions and energy savings. “Comfort and healthiness are very, very important. Not only are we making these homes more affordable, we’re really adding to the quality of life of the occupants.” This overarching approach to doing sustainable remodeling projects has led Wiblitzhouser to win the National Association of Home Builders (NAHB) green remodeling project of the year for two years in a row, including most recently for the Heritage Hills whole-house remodeling project.

Role of Green Certification

The Heritage Hills project clients were seeking to make their home more comfortable in many ways, but they were also very interested in making it greener. Wiblitzhouser explains that his clients were “oriented toward the value of indoor air quality, resource efficiency, energy, water, etc. ... but they didn’t come in saying, ‘I want it green certified.’” However, he convinced them that “green certification was a way to document and verify what was done.”

In addition to the value of the NGBS rating, one certification that he considers particularly important to obtain is a HERS rating. Wiblitzhouser compares getting a HERS rating for a home to the miles per gallon ratings consumers use when purchasing a car. He mentions an ongoing national effort to green the multiple listing service (MLS) by



Adding more natural light was a high priority to the clients, and it included the addition of a new three-season space represented above, which also helped bring more daylight into the living spaces in the home.

adding the HERS rating to the characteristics of a home being listed. “In our area, we have been able to have those performance data fields added to the MLS, so now that information is available to consumers to gauge the performance of the homes they are contemplating buying. If they are looking at two homes that are similar, and one has a HERS of 98 and the other has a HERS of 70, they can see real value and what it is going to cost to operate that home.”

His explanation of what the objective data points gained from NGBS and HERS would mean to his clients persuaded them to agree to pursue green certification for their home.

Emphasis on Indoor Air Quality

One factor that distinguished this project was its aggressive approach to indoor air quality concerns. Wiblitzhouser notes that the clients were

particularly concerned about this issue, and not just because of the mold remediation needed—the husband has worked for the U.S. Environmental Protection Agency for over 30 years. Wiblitzhouser finds that the interest that they had in improved indoor air quality was important to getting the NGBS rating.

Many of the choices they made to improve energy performance, including replacing windows, sealing the fireplace and inserting a vented, gas-fired fireplace, and replacing all HVAC duct work with insulated and sealed ducts, returns, and plenums, were also cited by Wiblitzhouser as critical strategies for improving the indoor air quality. He clarifies that controlling the sources of air coming into the home is critical to controlling its quality, as well as saving energy. As an example, he states, “If you’ve got duct work in a crawl space, and you are pulling air

Photographs Courtesy of Bob Fortner Photography

CONTINUED

Heritage Hills Whole-House Remodeling Project

CHAPEL HILL, NORTH CAROLINA

into the home from the crawl space, there are opportunities to bring in mold and other contaminants." Thus, he was able to achieve the goals of improving the energy performance and the indoor air quality with many of the same measures.

Importance of Durability

Another critical element for Wiblitzhouser for a successful green retrofit is making the home more durable and decreasing the cost of maintenance. In fact, he is particularly enthusiastic about making green investments in homes like this one, which was built in 1979, because the homes themselves typically are built with more durable structural materials. "This home was built from yellow pine, which is structurally stronger than the type of lumber that is being used in today's home building, which is spruce or white pine."

There were several changes that

they made to improve durability. The roof needed replacing, so they opted for lifetime, architectural asphalt shingles. They also replaced vinyl flooring with solid oak flooring. Wiblitzhouser reports that replacing the deteriorated wood windows with PVC/vinyl and composite double hung, very low-E windows not only helps with energy performance but with the goal to improve durability, given that these new windows do not require painting or repairs as frequently as the original windows.

Saving Homes in Older Neighborhoods

For this project, a significant motivation for the clients' investment in renovation was their desire to stay in their neighborhood. Wiblitzhouser finds that these older neighborhoods offer a great opportunity for updating because they are highly desirable, being "close to urban areas and mass transportation. They have all

the things that help folks control their cost of living." He finds that many people, like the clients on this project, want to make aesthetic improvements to bring them up to current trends, and that this creates the opportunity to also "drastically reduce the cost of homeownership and energy usage."

Improving Quality of Life

Wiblitzhouser's renovation efforts are driven by the recognition that the improvements associated with a green retrofit help improve the quality of life for the homeowners. In particular, the time and money savings are crucial. Wiblitzhouser points out that reduced costs for maintenance and energy translate into more money that doesn't have to be spent on the home. This recognition pushes the green projects beyond just water, energy and resource conservation to address issues of comfort and durability. ■

Project Facts and Figures

Home Remodeling Company
Paradise Found Construction

Type of Project
Retrofit of existing home originally constructed in 1979

Green Practices and Features

Increased Energy Efficiency:

- Reduced HERS Rating from 98 to 59

- 40% Energy Use Reduction

- Features: New PVC/Vinyl double-pane windows; Replace electric water heater with tankless natural gas water heater; Add dual zone controller on existing HVAC and replace oversized AC compressor and coil; Replace lighting with LED can lights and CFLs; Install insulation in attic to R-38+, and seal and insulate pull-down stairs; Insulate and seal crawl space; Replace

and seal HVAC ductwork; Remove whole-house fan; Air sealing around windows, doors, floors and ceilings; Seal wood burning fireplace with direct-vent natural gas fireplace insert.

Increased Water Efficiency:

- Over 40% Water Use Reduction

- Features: Replace existing toilets with 1.0 gpf dual-flush WaterSense-rated toilets; Replace existing faucets and showerheads with WaterSense fixtures; Replace aging clothes washer with more efficient unit.

Healthier Indoor Air Quality:

- Features: Install HVAC supply and pressure balanced exhaust into crawl space; Remove mold; Replace kitchen cabinets with KCMA Certified formaldehyde-free cabinetry; Use no VOC paints and finishes; Energy efficiency features with air quality benefits, such as HVAC duct sealing.

stats

Data: Green Ratings

GREEN MULTIFAMILY AND SINGLE FAMILY HOMES: GROWTH IN A RECOVERING MARKET DATA

Awareness and Use of Green Building Product Ratings

There are many green building product labels and ratings systems, and the respondents awareness and use of them is widely disparate.

- **Energy Star** is at one end of the spectrum, recognized by virtually all of the industry and used by three quarters of the respondents to make their product decisions.
- At the other end are systems such as **Cradle to Cradle, GreenSpec, EPDs/HPDs and Green Seal**, that are still unfamiliar to about two thirds of single family and multifamily firms. If they can increase awareness overall, the potential for growth in their use is strong. However, a few of these product and rating systems have been in place for over a decade. Findings on how companies learn about green building products and practices (see page 51) may offer insights into how to better reach the larger industry.

Variation Over Time

One system that has seen strong growth in recognition since the 2011 study is UL Environment. Currently, 84% of respondents report being at least aware of this system, with 38% reporting that they use it to make decisions on building products. In comparison, only 46% in 2011 reported having a high level of awareness/knowledge of this system.

While the current findings include both single family and multifamily firms and all of the 84% may not be at the high level reported in 2011, it is nonetheless clear that this system has become one of the most well established in the industry.

Multifamily Compared With Single Family

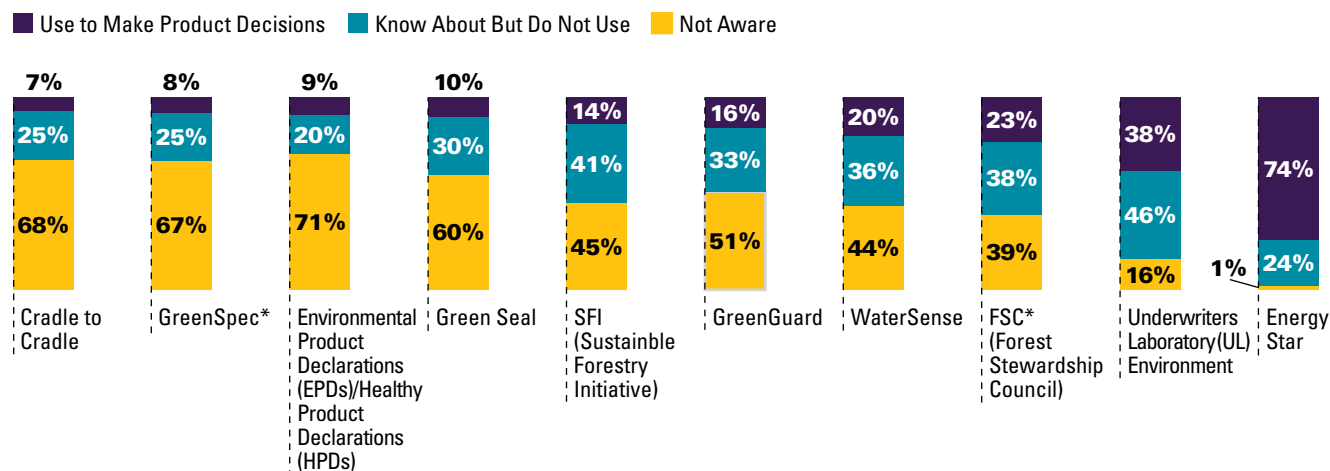
Two product rating systems are used by a significantly higher percentage of multifamily firms than single family firms.

- **Forest Stewardship Council (FSC): More than twice as many multifamily firms (40%) use this for product decisions than single family firms (18%).**
- **GreenSpec: More than three times as many multifamily firms (18%) use this for product decisions than single family firms (5%).**

One factor that may influence wider use of product rating systems by multifamily firms is that they are more likely than single family firms to work in other building sectors, like commercial or institutional construction. This may give them wider knowledge of some systems more popular in those sectors areas.

Awareness and Use of Green Product Certification and Rating Programs

Source: McGraw-Hill Construction, 2014



* Reported at significantly higher rates by those working in the multifamily sector versus single family.

Single Family Remodelers Compared With Single Family Builders

The only significant difference between single family remodelers and builders is that twice as many firms that do only remodeling work use Sustainable Forestry Initiative (SFI) (16%) as those that do only new home building (8%).

Variation by Level of Green Involvement

A higher percentage of firms doing more than 30% of their projects green use each of the green product rating systems included in the survey more often and more intensely than do firms performing less green work. While the difference is notable on rating systems like Energy Star and UL Environment with a high level of recognition across the residential housing sector, it is particularly striking in the lesser-known systems, where use can be at three, four or five times the level of those doing less green work, or even higher.

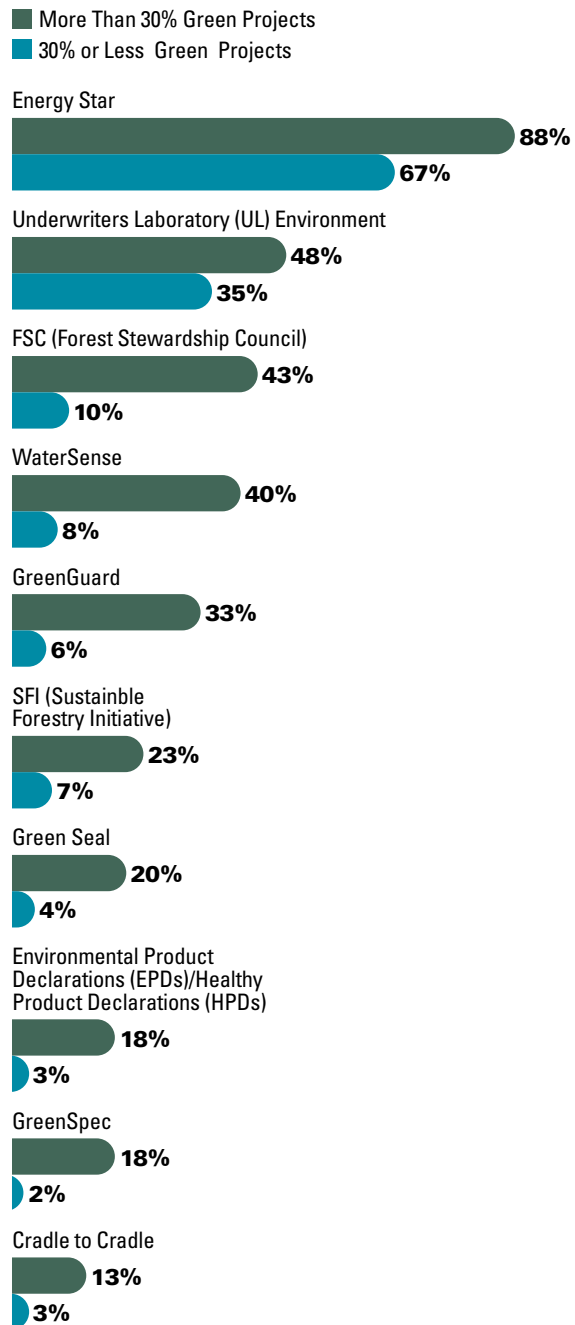
While wider use of green product rating systems by firms that do more green projects is not surprising, the degree of difference is nonetheless notable, and it suggests that the continued growth of green will help increase the use of many of these systems.

However, even among the firms doing more green work, less than one quarter are using several of these labels and rating systems. These findings demonstrate that, even among greener firms, work still needs to be done to increase awareness and use of some product labels/rating systems, and that as long as such a wide range of labels and systems exists and no widely acknowledged industry product standard exists, adoption levels of many may remain relatively low.

Use of Green Product Certification and Rating Programs

(By Level of Green Involvement of All Respondents)

Source: McGraw Hill Construction, 2014



Awareness and Use of Green Building Certification

The single family and multifamily markets have very different levels of awareness and use of green building certification systems. These differences are likely driven by the different needs of occupants in the two building types.

■ **Single family firms report much wider awareness and use of the ICC 700 National Green Building Standard, compared with multifamily firms.**

- The percentage of single family firms using the standard has grown over the last two years from 21% in 2011 to 30% in 2013.
- More than 50% of the single family firms that are familiar with it are also using it.

■ **A much higher share of multifamily firms that are aware of LEED standards also report using them, compared with single family firms.**

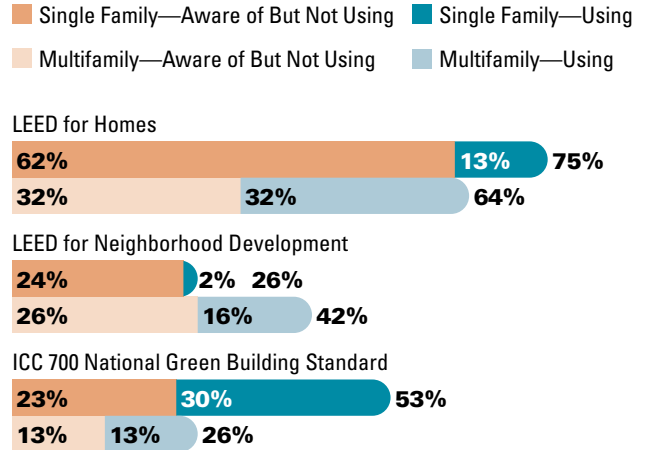
- Multifamily firms are also much more aware of LEED for New Construction, with nearly all (97%) having some awareness of this system, compared with about half (55%) of single family firms.
- The findings on the level of awareness and use of the two residential LEED certification systems by single family firms are consistent with the findings in the 2011 study reported in the *New and Remodeled Green Homes SmartMarket Report*.

Single family homeowners may need to be more attuned to building performance than occupants of multifamily units since they have direct influence as to how those systems perform. Recognizing this, the ICC 700 rating system includes a section on operations, maintenance and owner education. These factors may contribute to the popularity of this standard among single family firms.

Occupants of multifamily units, whether they are renters or buyers, may be seeking to be generally green, but they may be less sensitive to the specific impact on utility bills, especially since factors like water savings may not apply directly to them. LEED certification is widely recognized outside the residential space and thus provides attractive content for marketing materials.

Awareness and Use of Green Building Standards and Certifications

Source: McGraw Hill Construction, 2014



Variation by Level of Green Involvement

A higher number of firms with more than 30% green projects are both aware of and using the ICC 700 National Green Building Standard than those doing fewer green projects. While this is true across the board, it is particularly true of single family firms, where 62% of those doing 30% or more green work report being aware of the standard, and over three quarters of those that are aware of ICC 700 are also using it.

A significantly higher percentage (40%) of all the respondents doing over 30% green projects report being aware of LEED ND than those doing less green work (25%). Among single family home builders, no firm doing less than 30% green projects reports using LEED ND.

National Green Home Building Rating Systems

While there are a few regional rating systems that have sway in some markets, there are two comprehensive national green building rating systems widely in use in the residential sector: ICC-700 National Green Building Standard (ICC-700 NGBS) and LEED for Homes. Each has distinct requirements, and each has recently undergone an upgrade.

The new 2012 version of the ICC 700 NGBS is the first update since the standard was first issued in 2008. Approved by the American National Standards Institute, the 2012 ICC 700 NGBS has six main categories that builders must address:

- Lot Design/Preparation and Development
- Resource Efficiency
- Energy Efficiency
- Water Efficiency

- Indoor Environmental Quality
- Operation, Maintenance and Building Owner Education

Rankings range from bronze to emerald, and the range of discretionary points in the system are intended to address the need for regional approaches to sustainability.

Changes to this system from the 2008 version include the use of the 2009 International Energy Conservation Code (IECC) as a basis for measuring performance rather than the 2006 version. This more rigorous standard is expected to increase the energy performance in the homes achieving certification.

In addition, the 2012 ICC 700 NGBS has improved the scoring for renovation/remodeling projects, reflecting the rising importance of that market and its green efforts. It also has

added points for using lots in green communities.

LEED for Homes was also updated in 2013, along with the rest of the LEED rating systems, with version V4. It still includes six main categories in which buildings can earn points: location and transportation, sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental air quality, along with additional points possible for innovation and regional priority issues.

General improvement with V4 across all the LEED platforms include easier submission tools, a focus on building outcomes and new impact categories for important factors like climate change and human health to expand the definition of green building.

Green Professional Credentials Held

Among single family respondents, 39% have earned a CGP (Certified Green Professional) credential. This is by far the most popular credential among the single family respondents. In contrast, less than 5% have MCGP (Master Certified Green Professional), LEED AP or LEED Green Associate accreditation.

LEED accreditation is more popular than CGP among multifamily respondents, with only 3% having earned CGP credentials, compared with 16% that are LEED Green Associates, 3% that are LEED APs for Homes and

13% that are LEED APs in categories other than Homes. This is no doubt due to the fact that these projects are in many ways more similar to nonresidential projects than single family houses. Additionally, many of these firms build commercial projects. However, the relatively low percentage reporting any green accreditation among multifamily respondents suggests that this sector is still in the early stages of considering green an important part of building projects, a finding supported by the small percentage of builders dedicated to green in this sector.

Methodology:

Single and Multifamily Green Homes Research

The research findings in this report are based on an online survey of the U.S. home builder and remodeler community as represented by the National Association of Home Builders (NAHB) membership database and McGraw Hill Construction (MHC) Contractor Panel.

- **An e-mail invitation with a link to the online survey was sent by NAHB to their members.**
- **227 invitations were sent to the MHC Contractor Panel to obtain multifamily builder responses.**

The survey was conducted from December 16, 2013 to March 3, 2014, with a total of 154 responses included in the final analysis. The total sample size used in this survey benchmarks at a 95% confidence interval, with a margin of error of 7.7%. Because of the smaller sample size, the margin of error for some of the sub-groups listed below may exceed 10%; However, the groups are rigorous enough to allow for trending.

Type of Firms

The majority of the analysis in this report looks at the responses of firms that listed their principal operation as engaged in single family home construction—as a builder, remodeler or land developer—and those engaged in multifamily building construction in the same categories. When rolled up into these broad divisions, they are referred to in the analysis as single family firms and multifamily firms.

- **Single family firms:**
116 respondents
- **Multifamily firms:**
38 respondents

In order to conduct meaningful comparisons with previous studies (see below for more details), occasionally, the analysis includes a further breakdown of single family and multifamily firms that do new projects and those that do remodeling work. Multifamily remodelers are referenced only on a trending basis due to the small sample size.

The list of firms above include all that engage in building or remodeling. In the analysis of the use of products and services, the single family firms were also analyzed in terms of those that solely practice new construction and those that solely practice remodeling.

- Single Family Firms Solely Practicing New Construction: 51 respondents
- Single Family Firms Solely Practicing Remodeling: 39
- Single Family Firms Practicing Both New Construction and Remodeling: 21

Definition of Green Building

In the survey, green building was defined as referring specifically to home building, home remodeling/renovating and land development that incorporate environmentally sensitive site planning, resource efficiency, energy and water efficiency; improved indoor environment quality; and home owner education or projects that would comply with the ICC 700 National Green Building Standard or other credible rating systems.

Level of Green Involvement

An analytic variable widely used in the report is the level of green involvement, which is based on the level of green building activity that the firms were engaged in.

A full representation of the level of green activity for single family builders and remodelers and multifamily builders and remodelers are available on pages 9 and 10.

Comparisons to Previous Studies

Three previous studies of home builders referenced in this report were conducted by McGraw Hill Construction and also drawn from the NAHB membership.

- In 2006, 353 builders completed a survey conducted and analyzed between December 2005 and March 2006.
- In 2008, 400 builders completed a survey conducted between February and March 2008.
- In 2011/2012, 416 builders completed a survey conducted between November 2011 and January 2012. ■

Resources

Organizations and websites that can help you get smarter about green homes.



McGraw Hill Construction

Main Website: [construction.com](http://www.construction.com)

Dodge: [construction.com/dodge](http://www.construction.com/dodge)

Research & Analytics:

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

[dodge-market-research.asp](http://www.dodge-market-research.asp)

Architectural Record: [archrecord.com](http://www.archrecord.com)

Engineering News-Record: [enr.com](http://www.enr.com)

Sweets and SNAP: [sweets.com](http://www.sweets.com)

SmartMarket Reports:

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

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We also thank all the organizations that talked to us about their projects and shared photos so that we could highlight a few exemplary examples of green homes in practice.



National Association of Home Builders

www.nahb.org

Contributing Partners

Menck Windows: www.menckwindows.com

Waste Management: www.wm.com

Federal Government

U.S. Department of Commerce, National Institute of Standards and Technology (NIST): www.nist.gov

U.S. Department of Energy

- Main website: www.energy.gov
- Office of Energy Efficiency and Renewable Energy (EERE): www.eere.energy.gov
- Building America Program: www.buildingamerica.gov
- Lawrence Berkeley National Lab: www.lbl.gov
- National Renewable Energy Lab: www.nrel.gov
- Pacific Northwest National Lab: www.pnl.gov

U.S. Department of Housing and Urban

Development: www.hud.gov

U.S. Environmental Protection Agency: www.epa.gov

Energy Star: www.energystar.gov

WaterSense: www.epa.gov/watersense

Nonprofit Organizations

Alliance to Save Energy: www.ase.org

American Council for an Energy-Efficient

Economy: www.aceee.org

The American Institute of Architects: www.aia.org

ASHRAE: www.ashrae.org

Database of State Initiatives for Renewables

and Efficiency: www.dsireusa.org

Global Green USA: www.globalgreen.org

Green Building Initiative: www.thegbi.org

International Code Council: www.iccsafe.org

National Institute of Building Sciences: www.nibs.org

New Buildings Institute: www.newbuildings.org

Southface Energy Institute: www.southface.org

U.S. Green Building Council: www.usgbc.org

Other Resources:

Building Green, Inc.: www.buildinggreen.com

Green Builder Magazine: www.greenbuildermag.com

Home Innovation Research Labs:

www.homeinnovation.com

■ Design and Construction Intelligence

SmartMarket Report

www.construction.com

McGraw Hill Construction SmartMarket Reports™

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www.construction.com/market_research

