McGraw Hill CONSTRUCTION

SmartMarket Report

Design & Construction Intelligence

Commercial & Institutional Green Building

Green Trends Driving Market Change

connecting people_projects_products

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

Introduction

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

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

What a difference three years makes! We are very excited to introduce this latest issue of the McGraw-Hill Construction SmartMarket Report™ series—*Commercial and Institutional Green Building: Green Trends Driving Market Change*—a project completed in conjunction with the U.S. Green Building Council (USGBC). This study revisits our landmark *Green Building SmartMarket Report* released with USGBC at the end of 2005. Now, three years later, the market has fundamentally shifted—green building is no longer a trend, but has become an accepted way of designing and constructing buildings.

We interviewed a representative sample of the entire construction market—architects, engineering firms, contractors and owners—to get their perspectives, opinions and level of activity in green building. Based on this, coupled with our Network Dodge Project Data and cutting edge *Green Outlook Trends Driving Change* report released the end of November 2008, we were able to discern that the market has surpassed the expectation we had in 2005. Already, we are well past the 5% mark, and estimate that five years from now, green building will be 20% to 25% of commercial and institutional building by value or an approximate marketplace of $56–$70 billion. We expect the share of the education market to be even bigger, with a growth potentially up to 30% in five years.

> **"Owners are reporting real business benefits across the board."**

The business benefits are also evident. Despite skepticism in the market, the industry is reporting stronger perceived benefits from green building—the expected decrease in operating costs grew by 60% (from 8.5% to 13.6%), and an expected increase of 3 percentage points for other bottom line advantages, including increases in building value, ROI, occupancy and rents. Clearly, green buildings are being equated with good business as well as responsible social practices.

Green building products are also becoming more common in use, which is further proof of the widespread adoption of green and the emergence of new products to serve this growing market.

Of course, research is never done. We wonder how this economic downturn will shift the market. Based on the trends we are seeing, we expect green building to be a shining beacon in the construction market, but only future research will bear that out.

As always, we at MHC are committed to continuing to serve as the "voice of the industry," creating a complete "network" of green building information, resources and expertise through our publications, analytics work, and the MHC Network database of construction projects and products. For details on the methodology, see page 35.

Harvey M. Bernstein, F.ASCE, LEED AP has been a leader in the engineering and construction industry for over 30 years. He serves as Vice President of Industry Analytics, Alliances and Strategic Initiatives for MHC, where he has lead responsibility for MHC's green building initiatives, including the first-ever landmark studies on green construction and key market trends in the U.S. and globally. Bernstein was also one of the team members involved in launching MHC's *GreenSource* magazine. Previously, Bernstein served as the President and CEO of the Civil Engineering Research Foundation. He has written numerous papers covering innovation and sustainability in the built environment, and currently serves as a member of the Princeton University Civil and Environmental Engineering Advisory Council, the Harvard Joint Center for Housing Studies Policy Advisory Board, and as a visiting Professor with the University of Reading's School of Construction Management and Engineering in England where he also serves on their Innovative Construction Research Centre Advisory Board. Bernstein has an M.B.A. from Loyola College, a 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 for nearly 15 years. She currently serves as MHC's Director of Green Content & Research Communications where she is responsible for helping direct the green content across MHC's portfolio of products and services, including the management of MHC's SmartMarket Report series. Russo is also a strong contributor to The McGraw-Hill Companies' corporate initiatives around sustainability. Previously, she served as Executive Director of the Clean Beaches Council and Deputy Director of the National Pollution Prevention Roundtable. She has authored several articles around pollution prevention and toxics reduction and has spoken at a number of events on green building trends and environmental policy. Russo has a B.S. in Chemical Engineering from Cornell University and a Masters in Public Policy from Harvard University's Kennedy School of Government.

Table of Contents

Introduction

Photo: Christopher Barrett, courtesy of Gensler

Center on Halstead, Chicago, Illinois

Front cover photo:
Nic Lehoux, courtesy of Busby Perkins+Will

Commercial & Institutional Green Building Market Summary

Green Building Market Size Expands and Business Benefits Grow

The results of this latest research, combined with McGraw-Hill Construction proprietary data, indicate that green building has grown dramatically over the last three years. Furthermore, owners are reporting tremendous benefits from green building, an indicator of further expansion of the market.

Market Opportunity is Growing:

- The Commercial and Institutional Green Building Market size is expected to be **10% to 12% of construction value in 2008, translating to a $24–$29 billion marketplace.**
- By 2013, the **market is expected to grow to 20% to 25% of new construction starts by value. This equates to a $56–$70 billion marketplace.**
- The **education sector is estimated to have a larger share of green building than average** at an estimated at 15%–20% of new construction by value in 2008 and growing to as much as 30% by 2013.

Business Benefits are Increasing:

- Perceived **benefits all increased substantially over the last three years.** Specifically, the industry believes green building will cause operating costs to decrease by 13.6% and building values to increase by 10.9%.
- In the short term, **77% of the industry believes green building will increase their revenues steadily,** of which nearly 19% think revenues will increase rapidly.

Market Activity

The percent of green building grew dramatically between 2005 and 2008.

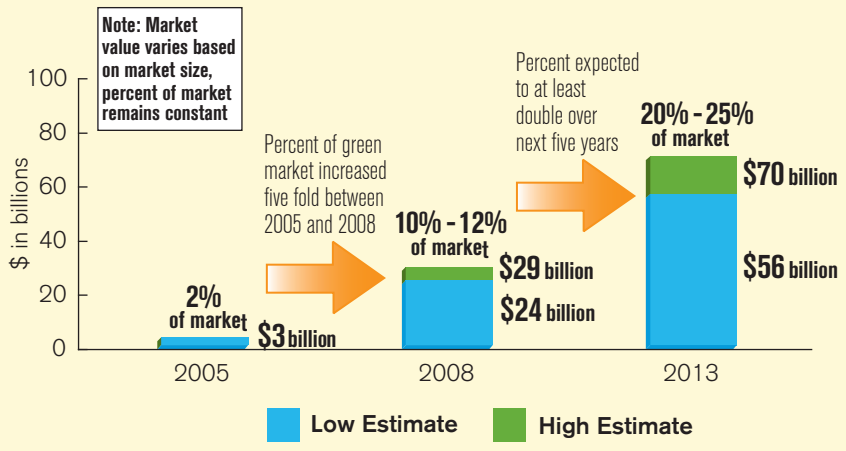
Activity by Construction Sector

Institutional buildings are consistently strong markets for green building. Education, in particular, poses tremendous opportunity with respect to green building.

- A/E firms report a greater share of their education work—both K-12 and higher education—is being built green.
- Contractors report that a larger percentage of their work in higher education is green compared to their other projects.

Offices are the commercial construction sector posing the greatest green building market opportunity. Contractors in particular report a disproportionate share of their office work as green.

Commercial & Institutional Green Building Market Opportunity
(for new projects and major renovations)



Source: 2005 figures from the McGraw-Hill Construction *Green Building SmartMarket Report*; 2008 figures from McGraw-Hill Construction's *Green Outlook: Trends Driving Change* report, 2008 and calculated based on MHC Dodge project data, forecasts and market research.

Share of Green Business Increasing

42% of the industry expects at least 40% of their work to be green in 2013.

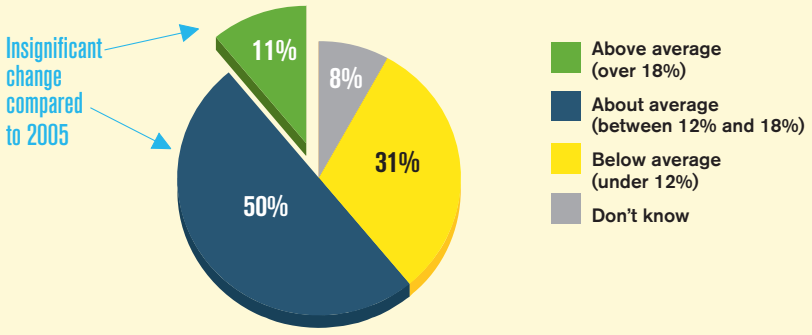
- A/E firms are increasing their green activity dramatically: By 2013, 51% expect more than 40% of their projects will be green.
- Contractors: 36% expect at least 40% of their projects will be green.
- Owners: 38% expect at least 40% of their projects will be green.

Perceived Benefits of Green Building Over Time according to Total AEC/O Community

	2005	2008
▪ Decreased Operating Costs:	8-9%	13.6%
▪ Increased Building Values:	7.5%	10.9%
▪ Improvement in ROI:	6.6%	9.9%
▪ Increased Occupancy:	3.5%	6.4%
▪ Rent Rise:	3.0%	6.1%

Source: McGraw-Hill Construction, 2008

Profit Level Associated with Green Building in the Short Term according to Total AEC/O Community



Source: McGraw-Hill Construction, 2008

Rapid Expansion of Business Benefits from Green Building

Industry players are increasing their perceptions about the business paybacks from green buildings—as can be seen at left.

- For the most part, A/E firms have the most optimistic view on the benefits of green buildings.
- The exception is increases in building values and rents when contractors report the highest increases.

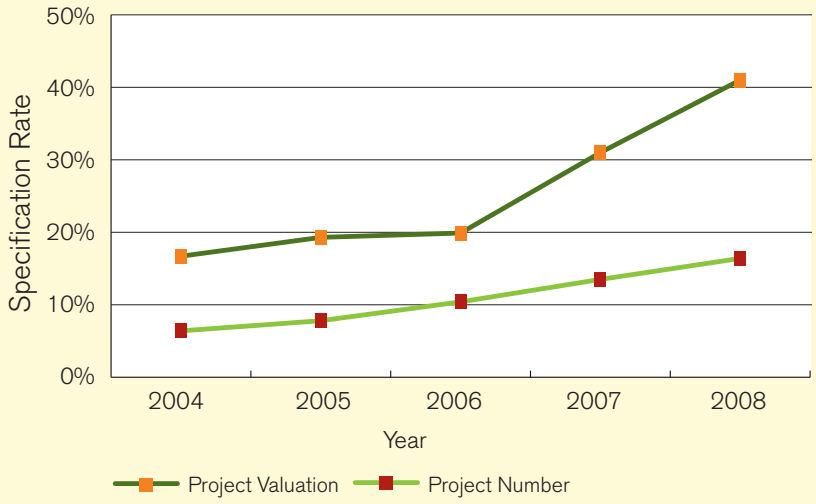
Green building is expected to improve both sales and profits over time.

- Over three-fourths of the industry expect sales growth.
- Nearly a fifth expect rapid growth.
- Opinion on profits are more conservative, with 11% perceiving increased profits from green, and half estimating average profits.

Mention of LEED in Project Specifications

The chart at right shows how mention of LEED is growing in higher valued projects. Between 2006 and 2008, the number of projects in which LEED was specified grew by 50% whereas the **growth by value doubled to comprise 40%** of MHC's 60,000 digitized project plans and specs by value.

LEED Found in Project Specifications



Source: McGraw-Hill Construction, 2008

Commercial & Institutional Green Building Market Summary

Motivations Behind Building Green

The most important motives behind the decision to go green are lowering lifecycle costs (76%) and increasing publicity (65%).

- A/E firms are particularly motivated by market shifts, finding lower lifecycle costs and increased market demand most important.
- Contractors are more motivated by factors that improve their own business like client retention and business expansion opportunities created by green building.
- Owners are motivated by their bottom line building performance.

Triggers and Obstacles

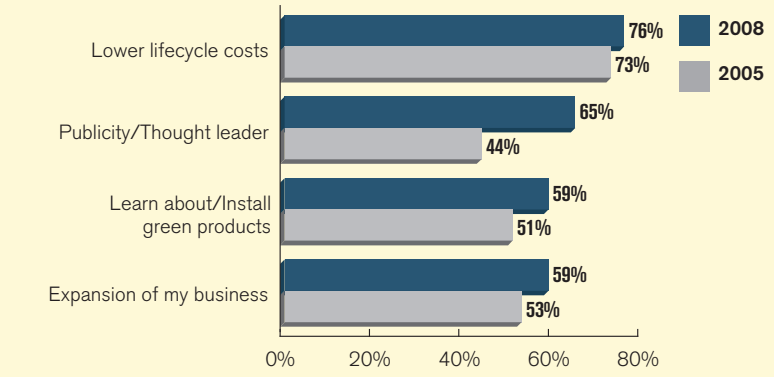
Triggers with Highest Overall Impact

- Energy cost increases (77%)
- Client demand (71%)
- Improved Performance (68%)

Obstacles with Heaviest Impact

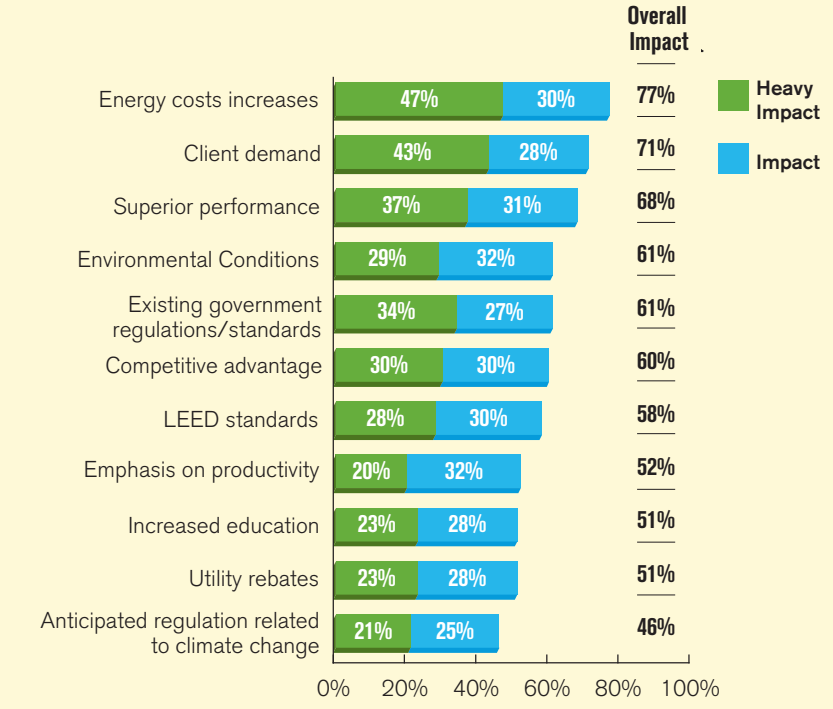
- Higher first costs (61%)
- Politics (49%)

Important Motivations Behind Building Green from 2005 to 2008



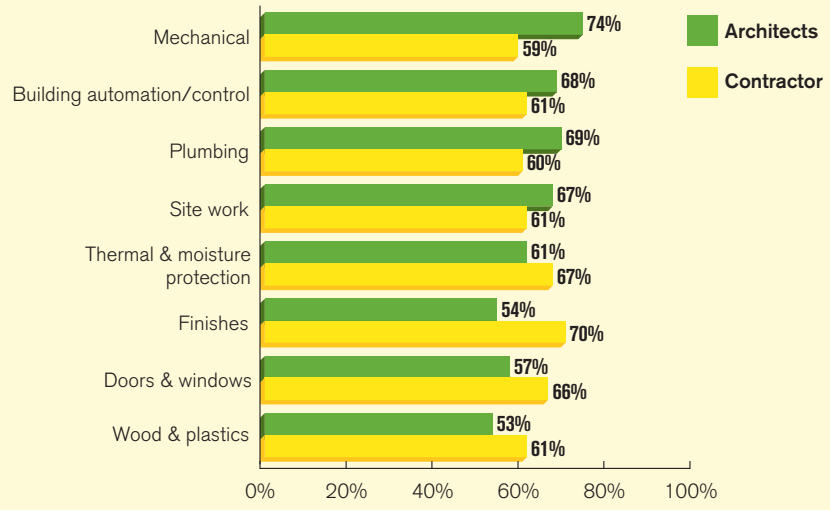
Source: McGraw-Hill Construction, 2008

Triggers Impacting Expansion of Green Building



Source: McGraw-Hill Construction, 2008

Percent of Green Building Product Specified by Industry Player



Source: McGraw-Hill Construction, 2008

Recommendations

With rapid growth expected for green building in the next five years—particularly in institutional construction sectors—the industry should look for ways to capitalize on the intelligence presented in this report.

- **A/E firms:** Since A/E firms are expanding their involvement in green building rapidly, stay up on new techniques and expand activities if not yet oriented toward delivering green projects. Use business benefits to drive customers toward green. With the greatest opportunity in education and healthcare projects, continue to foster relationships with owners in these sectors. With emerging sectors such as retail, gain an early edge by establishing strong connections with these owners.
- **Contractors:** With owners investing in green building and finding business value, use these facts to help differentiate yourself and gain market advantage. Diversify expertise in green building to include education and healthcare buildings as well as offices and retail facilities in order to maximize market opportunity.
- **Product manufacturers:** Opportunity still exists to create a "green brand" since in most product categories, the market is still open with very few brands being named by 5% of the industry as "green." Respond to market trends and prepare for new product development opportunities. Also, note the fears the industry is having about greenwashing and provide detailed product information documenting performance. Since relationships matter to architects, establish closer relationships with them in order to improve specification rates.
- **Information providers:** Continue to invest in both tangible information but also effective communication strategies since the market is hungry for credible information.

Products & Practices

Use of Green Building Products

Use of green building products has increased in nearly every product category over the last three years.

- Architects are using and specifying green in products such as mechanical systems, building automation and plumbing.
- Contractors are focusing their green product use more on finishes, thermal moisture protection, and windows and doors.

Green Building Product Brands

There was an increase in green brand recognition between 2005 and 2008. In 2005, mechanical systems were the only product type where more than 5% of the industry could name a specific green brand.

However, in 2008, there were several categories where the industry named a single firm as a "green" brand more than 5% of the time.

Mechanical still had the strongest green brand recognition, followed by 'green' plumbing and building automation systems. However, for the most part, the percentages are relatively low, and there are still product types that do not have a recognized green brand.

This suggests there is still tremendous opportunity for product manufacturers to gain market awareness.

Green Certification and Product Identification Programs

The industry still expresses both the desire to use third-party green building and green product certification programs. However, confusion about these programs still exists, demonstrated by a lack of awareness of nearly all programs. The exception is Energy Star which has strong market recognition.

Green Building Market Size

Green Building Market Opportunity

In 2005, green building was a small, burgeoning market, approximately 2% of nonresidential (commercial and institutional) construction, valued at $3 billion.

With the limited data available at that time and only a handful of government policies and incentives around green building, we projected a conservative growth to 5%–10% of the market. However, green building has increased dramatically over the past three years.

In 2008. we project that the commercial and institutional **green building market size will be 10% to 12% of new starts by value.** This equates to a **$24–$29 billion marketplace.** These calculations are based on MHC proprietary project data and economic analysis.

These numbers are higher than the 5%–10% estimated in 2005. In part what accounted for the rapid expansion between 2005 and 2008 has been the growth in government requirements and policies encouraging green building. Another significant driver has been the adoption of green building in the largest construction projects by value.

The chart at right shows how mention of LEED is growing in higher valued projects. Between 2006 and 2008, the number of projects in which LEED was specified grew by 50% whereas the **growth by value doubled to comprise 40%** of MHC's 60,000 project plans and specs by value.

Commercial & Institutional Green Building Market Opportunity
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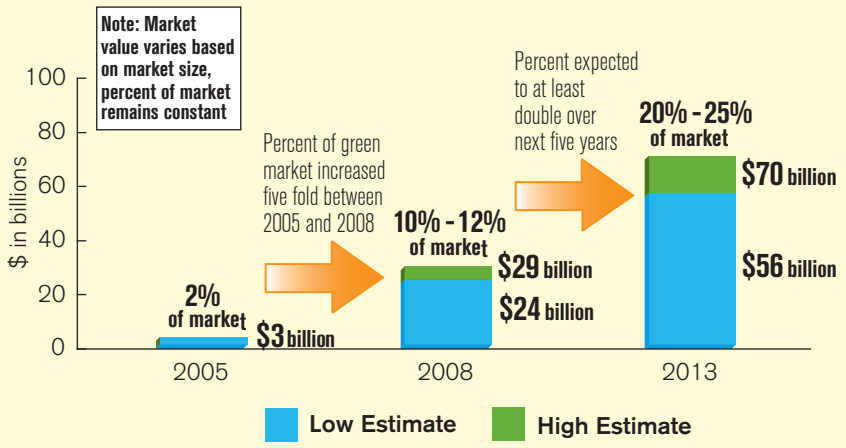

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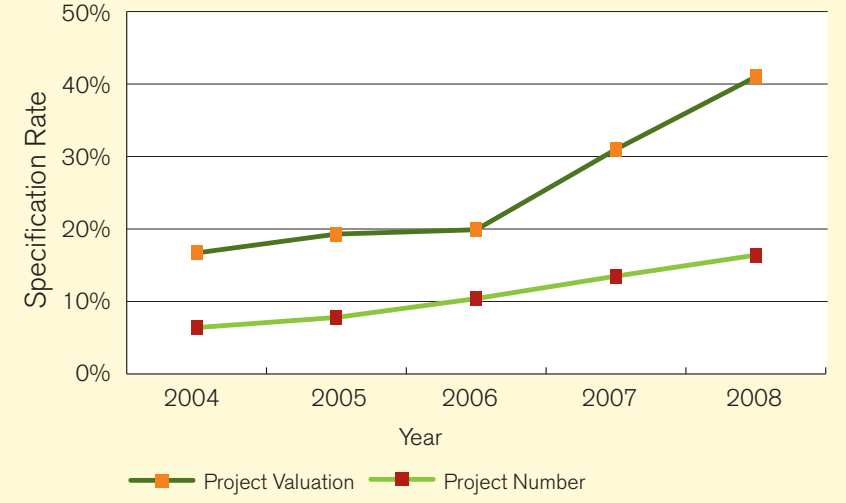


Source: McGraw-Hill Construction, 2008

Growth is expected to continue to expand, with a projection that the commercial and institutional green building market will be **20% to 25% of new construction starts by 2013.** This would equate to **$56–$70 billion** based on McGraw-Hill Construction's economic forecast.

The nonresidential market expected to stay fairly consistent through 2013. As a result, we expect that the commercial and institutional market will provide ample opportunity for green building to continue to thrive.

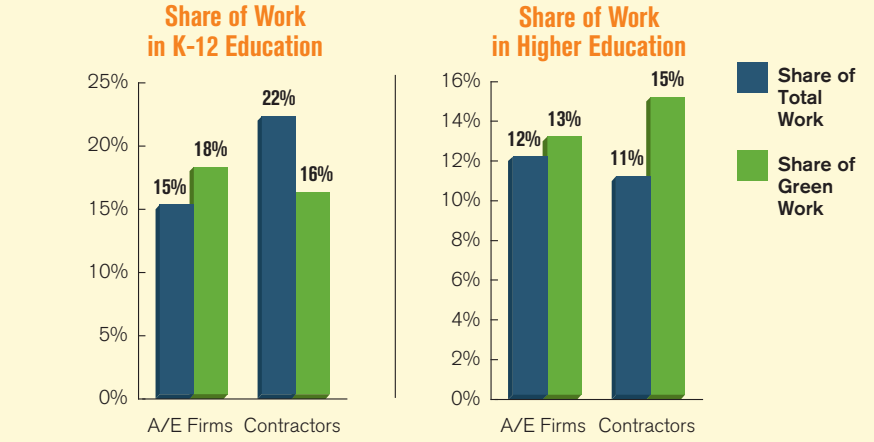
Market Activity by Industry Sector

With government involvement in green building increasing (see page 21), more attention is being placed on greening public buildings, especially schools. Our analytic data and research studies confirm the supposition in 2005 that education—today's largest nonresidential construction sector by value—would be the most rapidly growing green building marketplace.

Additionally, the industry respondents reported a heavier concentration of their work in education projects being green ones.

As can be seen by the charts at right. A/E firms are reporting a greater proportion of their green work in the education sector—both K-12 and higher education—as compared to their education work overall.

Percent of Education Projects that are Green



Source: McGraw-Hill Construction, 2008

Contractors are also reporting heavy green activity in higher education market, suggesting that when they work in this sector, the work is more often green. Though their share of K-12 work that is green is slightly smaller than average, they still report heavy activity (see page 9) in this sector.

We expect this trend will continue, with education a consistently strong sector for green building.

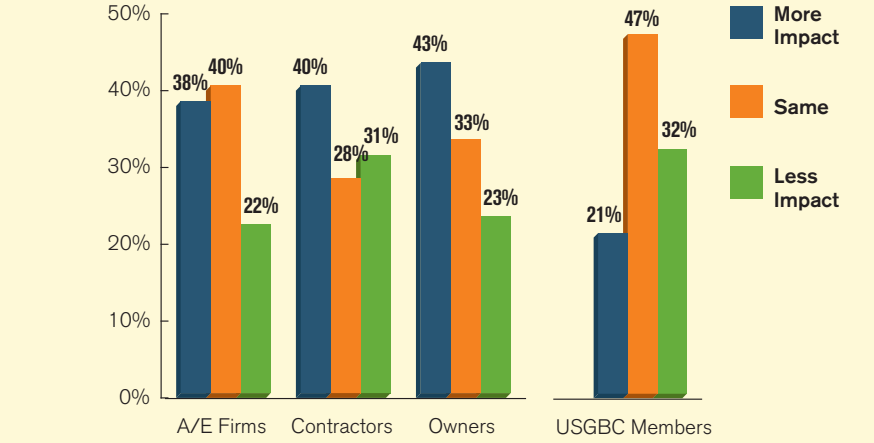
Green Building in the Current Down Market

Industry-wide, 60% feel that a sluggish economy impacts green building the same or less than conventional construction. More specifically, 25% report green being less affected by the downturn, though 40% feel it is impacted more.

Differences between Industry Players

- **Contractors are most optimistic:** 31% of contractors feel that green building is more insulated from a slow economy than is conventional construction, compared with 22% of architects and 23% of owners.
- Price-sensitive **owners are less optimistic:** 43% of owners think a down economy will impact green building projects negatively while fewer A/E firms (38%) and contractors (40%) foresee a negative impact.

Impact of Down Economy on Green vs. Non-Green Construction



Source: McGraw-Hill Construction, 2008

USGBC Members versus Overall Industry Opinion

USGBC members—an indicator of those more heavily involved in green building—believe almost the opposite of the overall industry. Nearly a third (32%) of them anticipate green building being *less affected* in the down market. Only 21% believe it is more affected.

The discrepancy bodes well for green building, since those working more heavily in it are seeing market differentiation, important in a down economy.

Green Building Market Activity

Share of Green Building Work by Sector

Architecture/Engineering Firms

K-12, higher education, and office buildings make up about half of architect/engineering (A/E) firms green building work. Firms expect only modest changes in the types of green buildings they will design most over the next five years. They predict a slight increase in institutional buildings—education and healthcare—which lend themselves more to green building due to their missions of fostering wellness for the improved ability to learn and heal. Further, there is more often financial incentives and government policies encouraging green in these sectors.

In general, institutional buildings pose the greatest opportunity for green building, and all three structure types—K-12 education, higher education and healthcare—are expected to increase over the next five years.

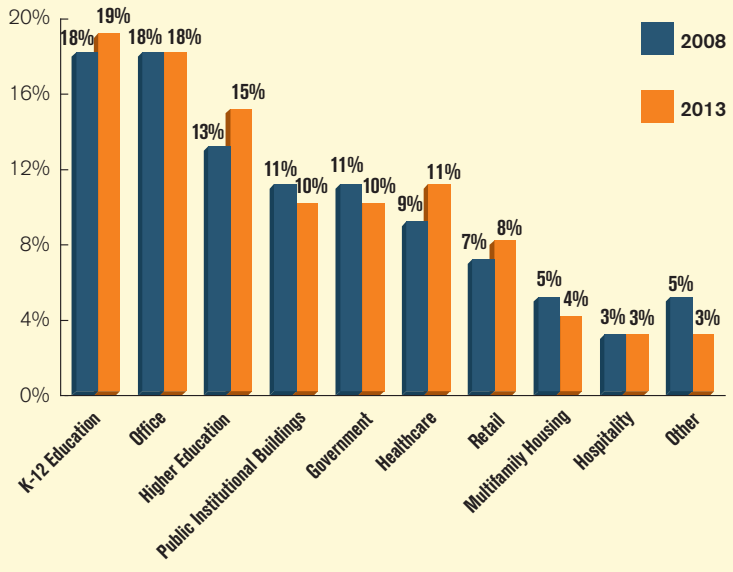
The exception is office buildings, the strongest commercial construction sector for green building. As can be seen at right, the other major commercial sectors—retail and hospitality comprise a low share of green building work.

According to USGBC, there is currently strong demand for LEED by the retail sector. They state that they have over ten national retailers building LEED into their standard design/construction specifications and a number of individual retailers involved in a green building project. While the current penetration of green in retail is reported by the AEC/O community as relatively small, this may indicate future growth in this sector.

For A/E firms, the distribution of green work tends to follow their distribution of overall work, with two notable exceptions:

- **K-12 green work is disproportionately high:** As indicated on page 7, K-12 buildings comprise only 15% of A/E firms' work but 18% of their green work. Again, state and local government mandates for green public school buildings as well as the availability of financial incentives are big factors driving the proportionally higher market activity in this sector. Further, with emphasis on student performance, there are metric systems in place to track improvements in student performance due to green building.
- **The green share of retail projects is lower:** Retail makes up 12% of A/E firm work but only 7% of their green work. Owners may find it difficult to justify the added cost of green building when the space will be occupied by tenants who may not pay more for green space.

Share of Reported Green Building Work Over Time by Sector according to A/E Firms*



Source: McGraw-Hill Construction, 2008

Note: This is not normalized by firms' overall sector activity breakdown (as was overviewed on page 7) or by the overall construction industry activity in these sectors. See page 35 for context on the share of reported 2008 work.

Contractors

The majority of contractors' green building work is in office buildings (24%), K-12 (16%) and higher education (15%). Over the next five years, contractors foresee the strongest growth occurring in K-12 education projects and healthcare. They envision the steepest declines in office and multifamily residential (apartment buildings over 4 stories) buildings.

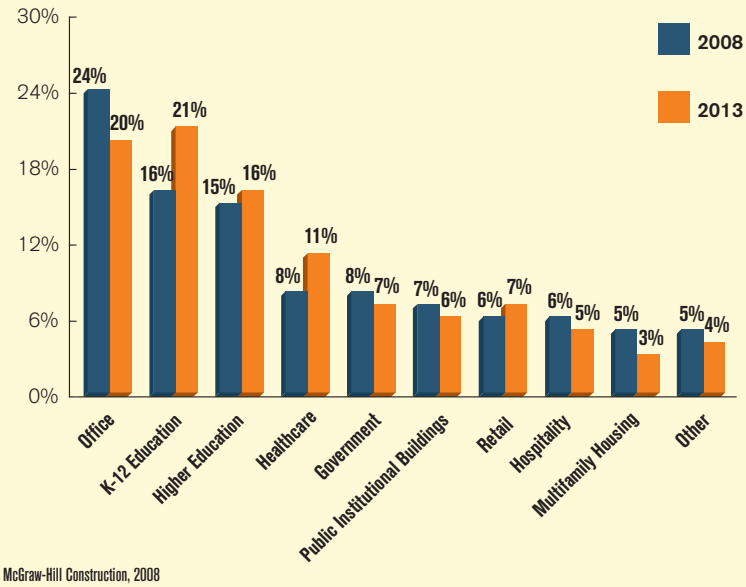
Because of the high level of activity in office building construction, the commercial market is currently posing the greatest opportunity for contractors around green building.

However, with a turbulent market, contractors estimate their share of green work will grow the most in institutional buildings, likely due to those markets being relatively more stable during an economic downturn.

Looking at contractors' distribution of overall work (see page 35) compared to green work, a few interesting points surface:

- Higher education, office, and multifamily buildings represent a larger percentage of green work compared to contractors' overall work. Some factors that may contribute to the strength of green in these sectors may include the following:
  - College campuses, which are increasingly building green, tend to be less affected by a decelerating market. In addition, large contracting firms, which typically serve college campuses, may skew the data.
  - Multifamily construction projects may be popular because of increasing awareness of the connection between indoor air quality and health and the ability to market energy efficient residences to a large population Further, in some urban areas like New York City, large apartment buildings are being mandated to be built green.

Share of Reported Green Building Work Over Time by Sector according to Contractors*



Source: McGraw-Hill Construction, 2008

**Note: This is not normalized by firms' overall sector activity breakdown (as was overviewed on page 7) or by the overall construction industry activity in these sectors. See page 35 for context on the share of reported 2008 work.*

- K-12, healthcare, and retail make up a disproportionately small percentage of green work compared to overall work. Some possible explanations include:
  - K-12 projects may tend to be large in number but small in scale so larger contractors are not as drawn to those projects.
  - In today's litigious society, hospitals may shy away from adding additional design features into projects because they are unfamiliar with the practices and may deem them riskier than non-green practices.
  - Retail owners of buildings that are to be leased may not embrace green as much as the overall market if they do not perceive being able to get a premium for the space.

Green Building Market Activity

Level of Involvement in Green Building

Across the board, the industry reports their green building activity increasing. As noted those doing more than 30% of their work green expanded substantially from 2007 to 2008. The trend is expected to continue, as green building activity is estimated to represent an even larger share in 2009.

- **Activity is increasing:** About 34% of all firms report that in 2007, 16% or more of their projects were green; in 2008, that number increased to 49%.
- Those highly committed to green building (60% or more green activity) expanded slightly from 6% in 2007 to 7% in 2008 (a portion of the green bar on the chart below right).

Green building activity is becoming increasingly pervasive across the industry with very few remaining uninvolved over time:

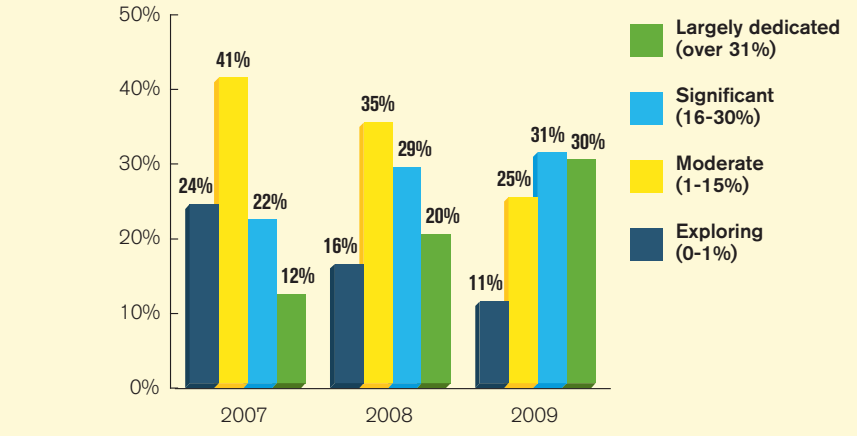
- In 2007, 24% of companies were exploring whether or not to build green.
- In 2008, 16% were still just exploring the issue.
- In 2009, only about 11% expect to still be considering building green—with 86% of firms involved on some level.

Tipping Point and Critical Mass

The "tipping point" at which the industry has overwhelming adopted green building practices is anticipated to occur in 2011. At this point—when the number of firms largely dedicated to green building surpasses the number of firms with little involvement—the momentum shifts such that green building becomes standard practice.

The lower tipping point—at which a higher percentage of firms report moderate involvement (16-60% of overall activity) in green building than do those reporting less than 16% involvement—is expected to occur in 2008. This suggests that the rate of moderate involvement in green building is likely to increase rapidly, while those fully dedicated to green is growing more gradually.

Involvement in Green Building Over Time



Source: McGraw-Hill Construction, 2008

Involvement by Industry Player

Across the AEC/O community, some interesting trends emerge. Involvement among all groups has increased since 2007 and is expected to continue to grow. Involvement is highest among A/E firms, consistent with the leadership role these firms have played in driving green building market growth. Contractors have, for the most part, been more reactive to the market.

Owner involvement is on par with contractors. However, more owners classify themselves as heavily involved (greater than 60% of operations) than contractors, on part with A/E firms. This finding suggests that some owners are transforming their businesses toward green. This apparent transformation is consistent with findings from the *Greening of Corporate America SmartMarket Report* when 14% of leaders of the largest corporations in America described themselves as being a market leader with respect to sustainability.

Owners:

- In 2009, the fewest owners expect to be more than 16% involved in green building.
- Yet, for all three years, the percent of owners largely dedicated to green building has been at or above average. This suggests that an owner, once committed to green building, becomes fully committed.

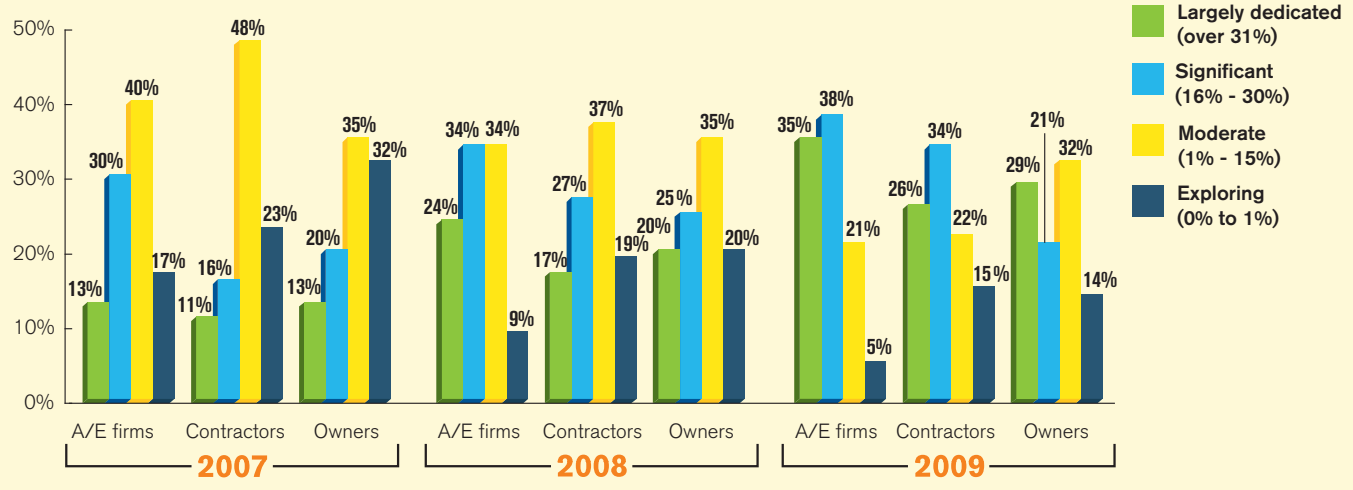
Architects/Engineers:

- A/E firms have the largest proportion of involvement in green building. Nearly nine in ten firms report at least some level of green building activity in 2008.
- Almost three-quarters (73%) of firms expect green building to comprise more than 16% of overall operations in 2009, up from 58% in 2008 and 43% in 2007. In 2009, nearly all A/E firms will have at least some involvement in green building.

Contractors:

- In 2009, 60% of contractors expect to be building green at least 16% of the time. However, contractors with more than 60% of their work green (a portion of the green bar in the chart below) is still relatively small at 9%.

Involvement in Green Building Over Time by Industry Player



Source: McGraw-Hill Construction, 2008

Green Building Market Activity

Share of Green Building Work Over Time

Green building work is substantial and growing. No longer can green building be considered just a trend. It is becoming a standard form of practice in the design of buildings. The market is moving beyond the early adopter phase with a large share of the industry both aware of green building and reporting an intention to incorporate it into their work.

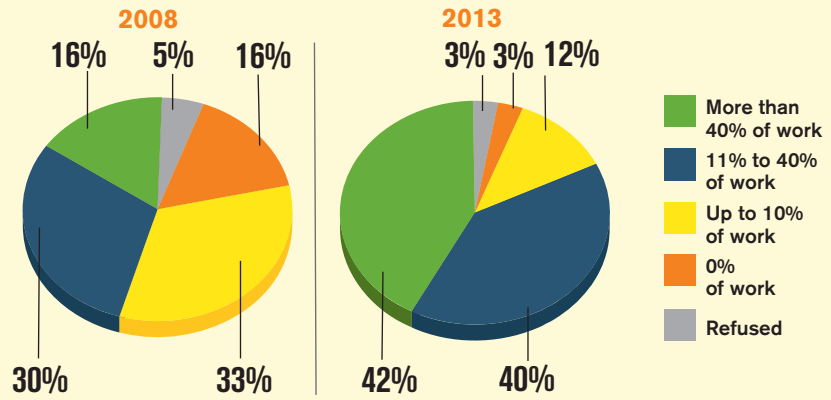
- In 2008, 16% of all firms report that green building comprises more than 40% of their work by square footage; Over the next five years, this is expected to climb significantly to 42% of firms.
- Most firms anticipate more green building work over the next five years. In 2008, nearly half (49%) report that 10% or less of their work is green; over the next five years, only 15% anticipate this minimal amount of green building work. Companies reporting no green building work at all are expected to shrink from 16% currently to 3% over the next five years.

Differences by Firm Type

A/E firms are adopting green at a greater rate than the overall industry.

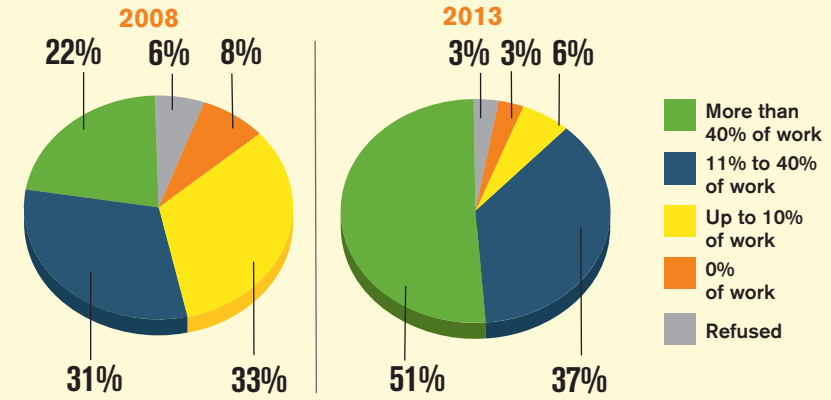
- 22% report that more than 40% of their work is green compared to 16% for the overall industry. This number is expected to increase to more than half of firms over the next five years.
- Currently, 41% of A/E firms report 10% or less of their work as green compared to 49% across the industry. Within 5 years, only 9% of architects expect to have 10% or less green work.

Total Work Expected to be Green in Five Years
Total AEC/O Community



Source: McGraw-Hill Construction, 2008

Total Work Expected to be Green in Five Years: A/E Firms

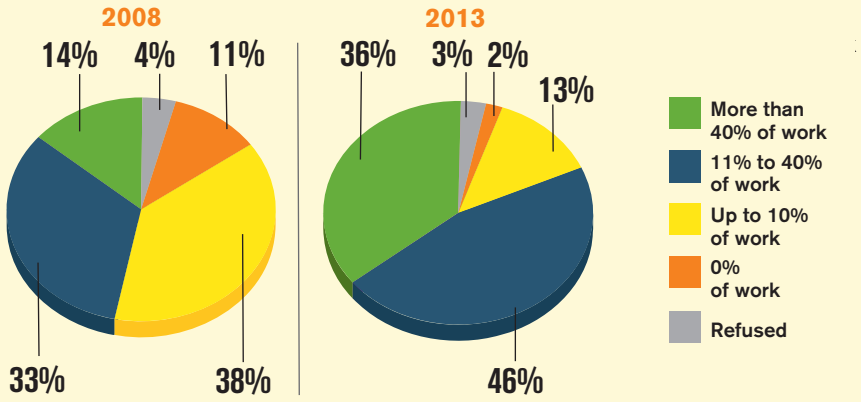


Source: McGraw-Hill Construction, 2008

Very few A/E firms have not adopted green building.

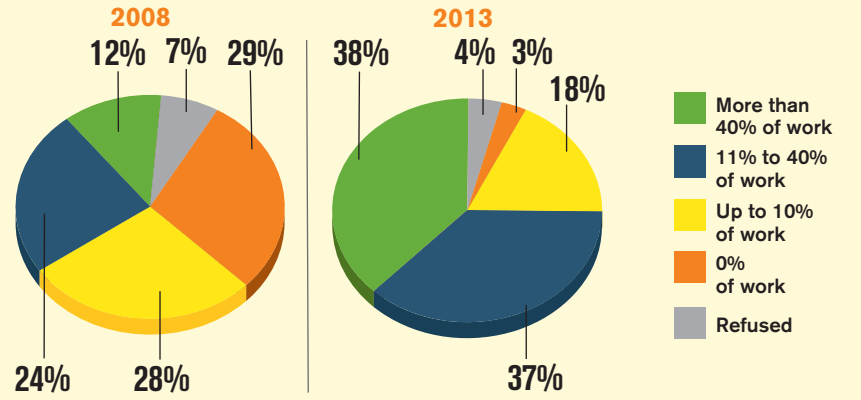
- Currently, 8% of A/E firms report conducting no green building work at all compared with 11% of contractors and 29% of owners.
- The level of non-adopters is expected to decrease to 3% over the next five years, which is in line with the other industry groups' expectations.

Total Work Expected to be Green in Five Years: **Contractors**



Source: McGraw-Hill Construction, 2008

Total Buildings Expected to be Green in Five Years: **Owners**



Source: McGraw-Hill Construction, 2008

Contractors

In 2008, 49% of contractors report that 10% or less of their work is green. As firms respond to the growing market for green buildings, this number is expected to shrink considerably to 15% over the next five years. Simultaneously, the number of firms having more than 40% of their work green expected to increase dramatically from 14% to 36%.

Owners

Not surprisingly, owners appear to be the slowest to adopt green building, with 29% reporting no green buildings at all and another 28% reporting that between 1% and 10% of their buildings are green.

Conversely, a number of them (12%) report that more than 40% of their building stock is green. Like other industry players, owners expect significant increases over the next five years. By 2013, 38% of owners expect 40% of their buildings will be green.

Green Building Business Benefits

Sales Growth from Green Building

About three-quarters (77%) of AEC/O predict short-term green building sales growth.

- 19% predict rapid growth, 58% predict slow but steady growth, and 19% predict stable growth.
- **Owners are less optimistic than A/E firms and contractors:** 82% of A/E firms and 89% of contractors predict slow and steady or rapid growth while only 56% of owners predict the same.

Sales Growth over Time

Sales growth predictions have held fairly steady over time, indicating that green is still a growing market and that green hasn't reached the point where green building needs to be redefined to attain growth.

USGBC Members versus Industry

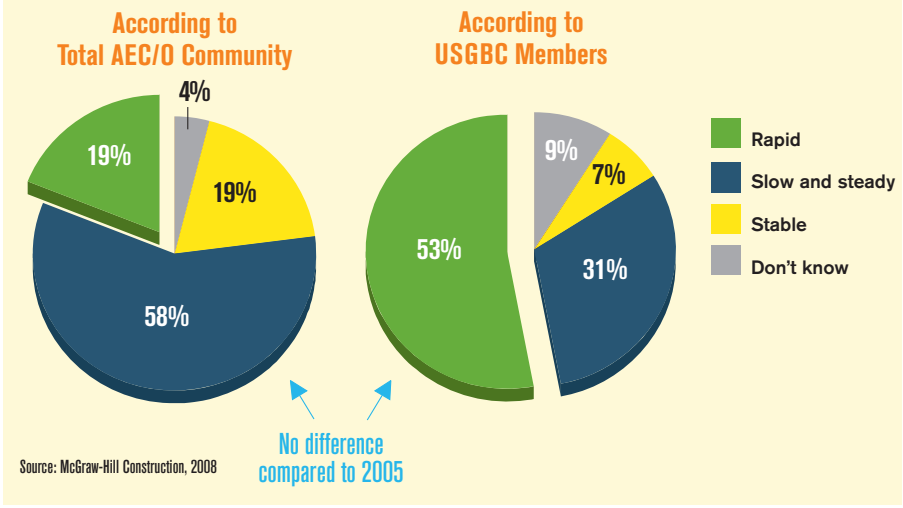
Similar to the results in 2005, USGBC members, likely to be more involved in the green building marketplace, anticipated much higher revenue growth, with rapid growth at 53%—overwhelmingly higher than the 19% of the overall industry. In fact, only 16% did not report growth. However, just as the overall industry opinion did not change over the last three years, neither did that of USGBC members—similar results were reported in 2005.

Expected Profit Level from Green Building

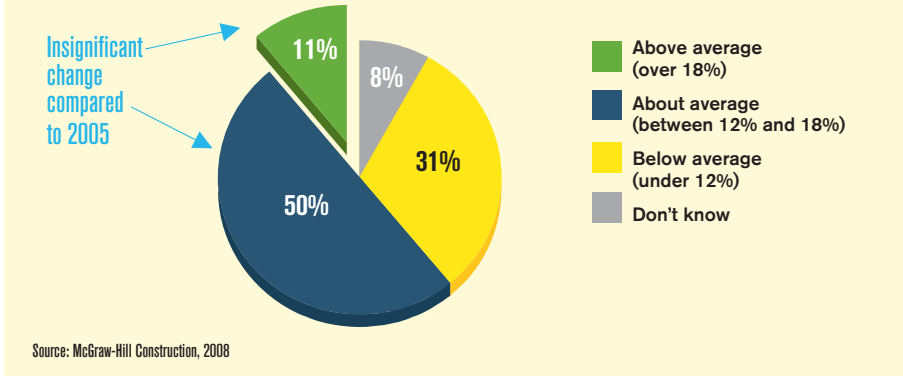
Among AEC/O, half of respondents expect green building profits to be average, 11% predict above-average profits and 31% predict below-average profits.

- The portion who views green building as a huge business boon is fairly consistent across groups, with 10 to 12% of each group predicting above-average profits.

Sales Growth Associated with Green Building in the Short Term



Profit Level Associated with Green Building in the Short Term according to Total AEC/O Community



- Owners are less likely to predict below-average profits: While 31% of A/E firms and 39% of contractors expect below-average profits, only 23% of owners have the same expectations.
- Owners are less confident in short-term sales growth predictions: 22% of owners admit they "don't know" what growth will be, compared to 2% of A/E firms and contractors.

Profit Increases over Time

Predictions on profit remained fairly stable, with slight increases in "above average" result similar to increases in "below average" suggesting that the economy is impacting players differently.

USGBC Members versus Industry

Similar to the results in 2005, USGBC members opinion did not significantly differ from overall industry opinion.

Impact of Green Building on Business Bottom Line

Over the years, many industry players have been cynical of the magnitude of green building benefits. Yet, across every factor—from operating cost savings to increased asset value, occupancy ratio, rents and ROI—the perceived benefits of green building rose between 2005 and 2008 (seen at right). As the industry gains experience operating and monitoring green buildings, more is understood about the benefits and, as a result, an increasingly optimistic view of green buildings in 2008 appears legitimately earned.

As further evidence of this, the reported actual savings over the last three years exceeded or met expectations.

Operating Cost Savings

Most companies anticipate lower operating expenses for green buildings. Expected savings are higher in 2008 than it was in 2005, suggesting a maturing industry with growing confidence in the paybacks of building green.

Perceived Benefits of Green Building Over Time according to Total AEC/O Community

	2005	2008
▪ Decreased Operating Costs:	8-9%	13.6%
▪ Increased Building Values:	7.5%	10.9%
▪ Improvement in ROI:	6.6%	9.9%
▪ Increased Occupancy:	3.5%	6.4%
▪ Rent Rise:	3.0%	6.1%

Source: McGraw-Hill Construction, 2008

Of particular note is the fact that since 2005, more firms anticipate greater savings—18% of firms anticipate 20% or higher operating cost savings in 2008, up from 11% in 2005.

Differences between Industry Players

Although all types of firms anticipate operating cost savings with green buildings, some differences do exist. Owners tend to be conservative while A/E firms are optimistic. However, owners are becoming less cynical—no one in 2008 expects green building to have no impact on operating costs, while 11% expected it to have no impact in 2005.

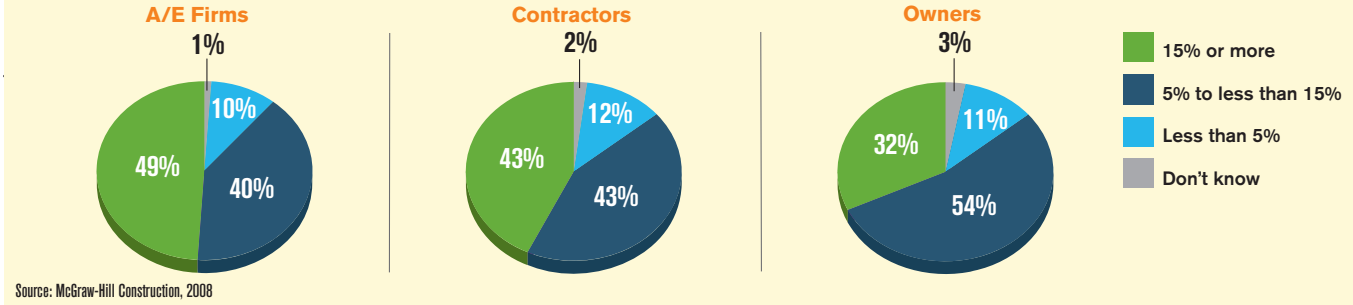
Building/Asset Value Increases

Most respondents believe that green features positively impact a building's value. However, this perception was coincident with strong growth in the real estate market. The next three years will show how the industry fares in a down market.

Differences between Industry Players

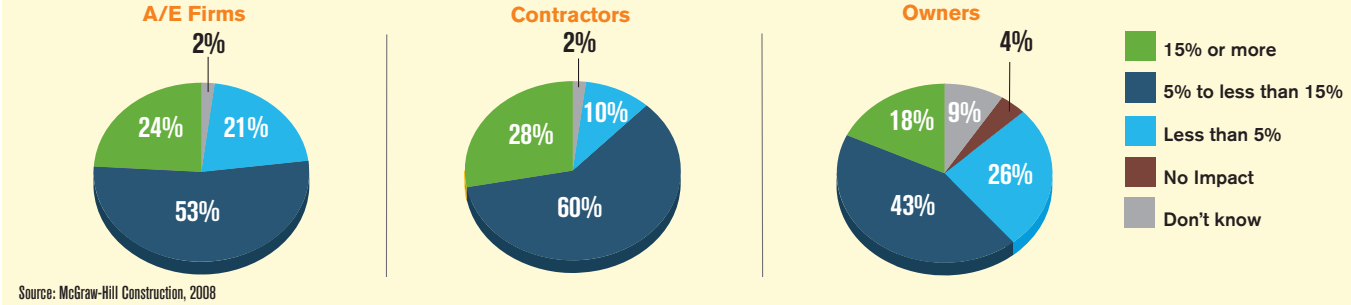
Owners are more likely to predict modest gains: While half of A/E firms and contractors predict 10% or more increase, only 31% of owners do.

Expected Decrease in Operating Costs from Green Building



Source: McGraw-Hill Construction, 2008

Expected Increase in Building Values from Green Building



Source: McGraw-Hill Construction, 2008

Green Building Business Benefits

Increase in Return on Investment

The industry predicts a better ROI with a green building, with owners expressing less optimism than other groups.

- On average, the industry expects a green building to have a 9.9% higher ROI than a conventional building, up from 6.6% expected in 2005.
- Owners are the most cautious: Owners anticipate an 8.1% higher ROI, which falls lower than A/E firms (11%), and contractors (10.6%).

Increase in Occupancy Ratio

The notion that green buildings generate higher occupancy ratios is on the rise. As can be seen on page 15, respondents expect an higher average occupancy ratio due to green building compared to three years ago.

- Owner-landlords consistently predict some effect: Although only 13 owner-landlords responded, all felt that occupancy ratio is at least somewhat (1% or more) affected by green building.

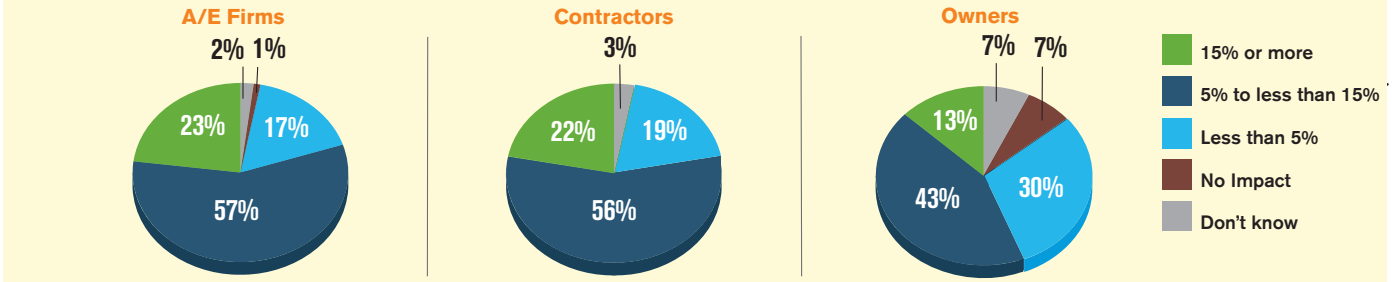
Rent Increases from Green Building

On average, respondents predict that rents will increase by about 6% for green buildings.

- Across all respondents, 19% predict increases of 10% or more. On average, owner-landlords predict a 3% increase.

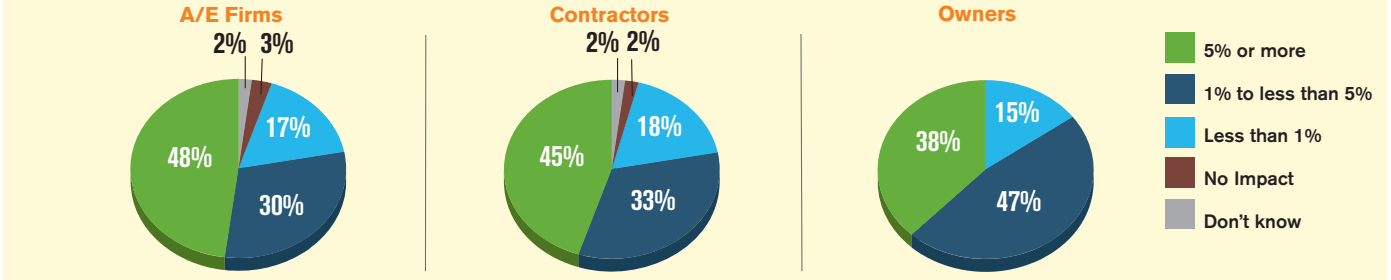
At this point, there simply is not a lot of data comparing rents of green and conventional buildings. In three years, as more green buildings are built for lease, the effect of green building on rents should become more apparent.

Expected Increase in Building ROI from Green Building



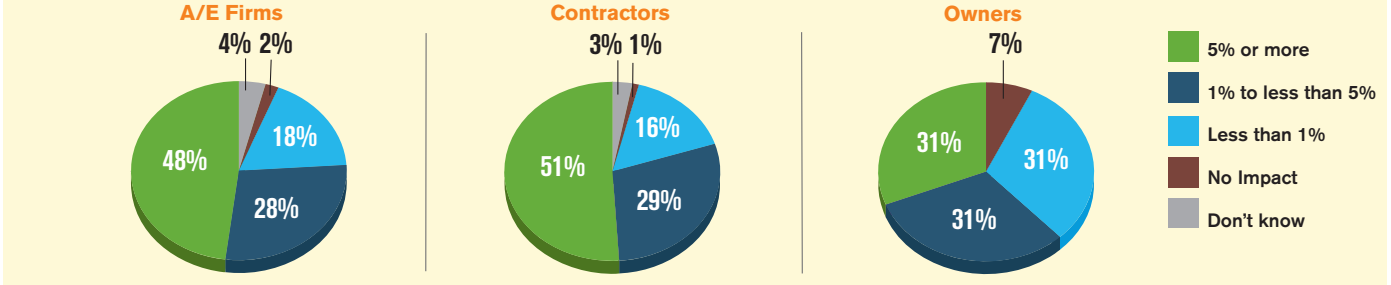
Source: McGraw-Hill Construction, 2008

Expected Increase in Overall Occupancy Rate from Green Building



Source: McGraw-Hill Construction, 2008

Expected Increase in Building Rents from Green Building



Source: McGraw-Hill Construction, 2008

The Green Building Advantage

The challenges posed by growing environmental concerns and diminishing natural resources can be solved in part through sustainable design and construction.

As the interest in conservation and efficiency has become more visible throughout the marketplace, a number of research studies have demonstrated the tremendous benefits—for the environment, occupant and business—of bringing green to the construction industry.

Environmental Benefits

As described on page 23, the built environment is the heaviest consumer of natural resources in the U.S. and around the world. Green building features can help reduce the amount resource consumption typically used for operational needs such as lighting, heating and cooling, as well as substitute carbon-heavy energy with environmentally-friendly alternatives.

Incorporating measures such as daylighting, natural ventilation, low-emitting materials and green roofs can lead to the following reductions:

- Reduced energy use by 30-50%
- Reduced waste output by 70%
- Reduced water usage by 40%
- Reduced CO2 emissions by 35%[1]

According to the Commission for Environmental Cooperation (CEC), the rapid evolution in recent and future energy-saving technologies could result in annual reductions of 1711 megatons of CO_2 in the North American atmosphere by 2030.[2]

These innovations will make zero net-energy and carbon-neutral targets more achievable as green buildings gain further visibility and momentum in the marketplace.

Occupant Benefits

Recent studies have demonstrated that sustainable design features such as improved indoor air quality and natural daylighting can lead to extensive health and productivity benefits and foster stronger communities.

Improved Health

Several studies have demonstrated health improvements linked to green buildings. These include:

- Reduced asthma among nurses in green hospitals.[3]
- Reduced absenteeism and improved concentration and annual body growth among students.[4]
- Reduced average sick days by 39% and lower monthly health care costs among staff by 44%.[5]

Alameda County Juvenile Justice Center
San Leandro, California

Photo: John Swain, courtesy of HOK

Improved Performance and Productivity

Incorporating sustainable features into schools, offices and hospitals can lead to improved performance of tenants. Studies have shown the following:

- Increased billable hours by 7% and improved typing performance by 49%.[6]
- Improved test scores of 7% to 18% among students.[7]
- Reduced errors in medication dispensing among hospital staff.[8]

Business and Financial Benefits

The social and environmental impacts of green building have led to proven savings and benefits for businesses.

A study by Gregory Kats of Capital E Analytics showed that the green building savings on improved productivity alone can be as much as ten times the costs saved on energy.[9] These findings are consistent with those reported in this study on pages 14–16.

Shifting Perceptions

As the average costs of building green continue to decrease and the business benefits become more widely known, the perceived risks associated with investing in green buildings is diminishing. Combined with growing industry awareness of the social and environmental benefits associated with green building, and rising pressures from soaring energy costs and financial turbulence, green building is set to continue growing rapidly in the near future.

Green Building Market Intelligence

Motivation Behind Building Green

In general, builders and designers are compelled to think long-term when they create buildings designed to last for decades. Coupled with an uncertain economy and volatile energy prices, it is not surprising that reducing lifecycle cost is the primary motivator for building green.

Desire for publicity is also a strong motivator, which seems to be a natural progression from the mainstream visibility of green issues. Spurred in part by the vast popularity of *An Inconvenient Truth* in 2006, green is everywhere—it's on the cover of *Vanity Fair*, in *People* magazine, on the nightly news, on cereal boxes, and in TV ads. Stakeholders want some of this publicity which, in turn, can bring their company more business and a better public image.

Yet, there is sufficient evidence that the industry does not simply see green as fleeting. Rather, they see it as a steadily increasing market and are embracing green to capitalize on the potential new business opportunity.

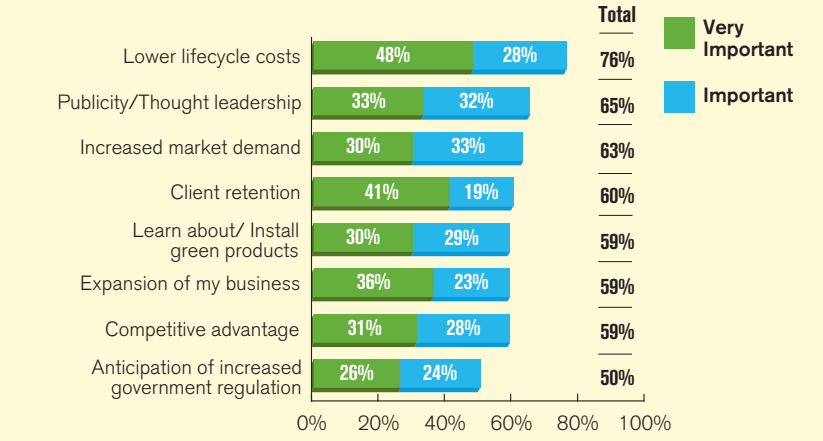
- More than three-quarters (76%) of respondents rank reducing lifecycle cost as an important or very important motivator, followed by the desire to gain publicity (65%) and an anticipated increase in demand (63%).
- Business reasons are the highest-rated (ranked "5") motivators: When evaluating what's most important, lifecycle cost reduction (48%), retaining clients (41%), and expanding business (36%) rise to the top, outstripping publicity (33%) and anticipated demand (30%).

Changing Motivations for Building Green

Compared to 2005, companies are more highly motivated to build green across all factors.

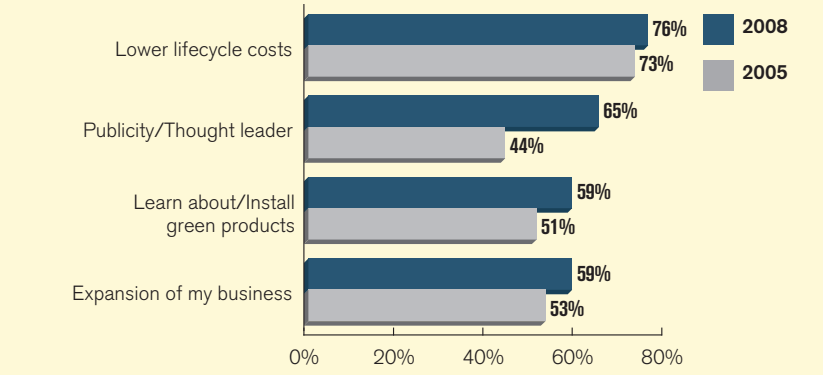
- **Publicity is more important:** The striking upsurge between 2005 and 2008—from 44% to 65%—reflects the pervasiveness of green issues in the media and the belief by firms that a green project can generate positive media coverage.
- **Slight increase in importance of lowering life cycle costs:** 76% in 2008 versus 73% since 2006 are motivated by reducing life cycle costs, probably due to higher energy prices since 2006.

Important Motivations Behind Building Green



Source: McGraw-Hill Construction, 2008

Important Motivations Behind Building Green from 2005 to 2008



Source: McGraw-Hill Construction, 2008

Motivators by Firm Type

Across the industry, the reasons for building green vary. Owners are mostly motivated by the bottom line of ownership while the AEC community is more motivated by the business opportunity. In general, companies that design and construct green buildings tend to place more value in the corporate benefits of green building—from attracting and retaining clients and talented employees—than do building owners.

Owners

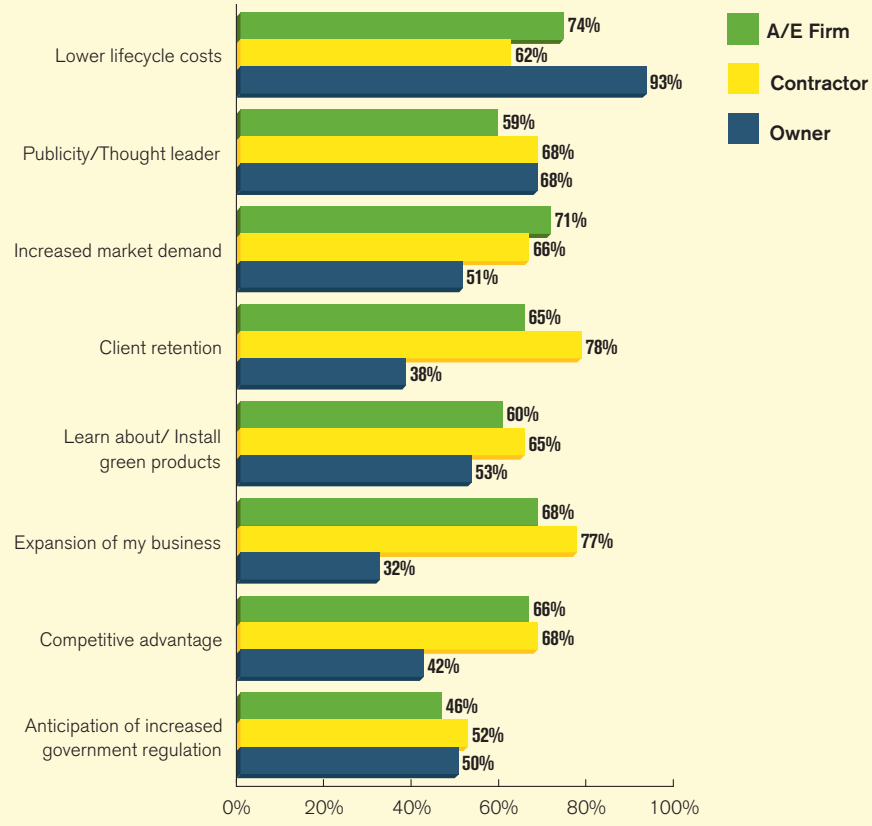
Reflecting their unique sensitivity to the cost of building ownership, owners overwhelmingly (93%) cite lifecycle cost as an important motivator for building green. As building financiers, owners may be keenly aware of the importance of reducing lifecycle cost in an uncertain economy.

Architect and Engineering Firms

A/E firms tend to fall in between owners and contractors.

- Although influenced by lifecycle cost (74%), they are almost equally motivated by increasing market demand for green (71%).
- A/E firms are not as motivated by publicity (59%) as are the other industry groups (68% of owners and contractors). This may reflect the nearly ubiquitous presence of LEED AP and green building projects among A/E firms, where green is not necessarily a distinguishing factor anymore.

Important Motivations Behind Building Green



Source: McGraw-Hill Construction, 2008

Contractors

Contractors are primarily motivated by business reasons. They build green to meet demand and see a growing market for green buildings.

Contractors seek to:

- Retain existing (78%) and attract new (77%) clients.
- Gain a competitive edge in the marketplace (68%).
- Benefit from favorable publicity (68%).

Green Building Market Intelligence

Reasons for Building Green

Business Reasons

In this time of unstable energy prices, high building material prices, and an uncertain economy, lowering operating costs emerges as the most important business reason for going green, surpassing all other business reasons by a clear margin.

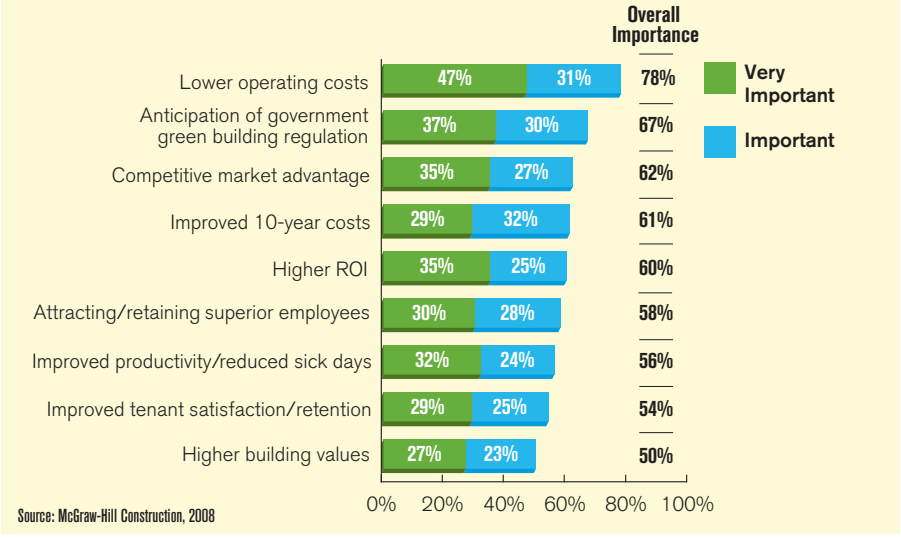
- 78% of firms rank lowering operating costs as an important business reason. Lowering costs is also given highest importance rating by 47% of respondents.
- **Government regulations increasingly important:** Conforming to existing or anticipated regulation ranks second in importance (67%).

Differences by Firm Type

Naturally, differences surfaced between types of companies with respect to business reasons for building green.

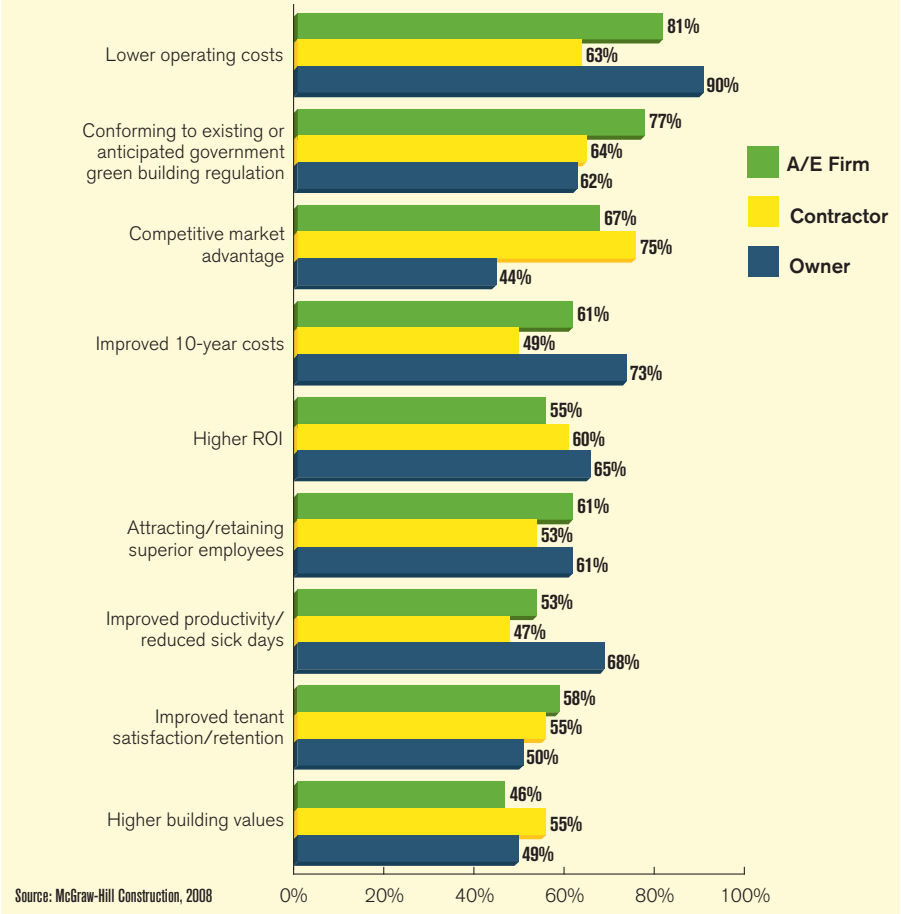
- **Owners** overwhelmingly (90%) rank lowering costs highly—but also strongly value positive impacts on 10-year costs (73%) and employee productivity (68%), reflecting motivations of owner occupants (as well as renters who pay for O&M) who are direct recipients of the benefits.
- **A/E firms** find lowering operating costs (81%) the most important business reason behind green building.
- **A/E firms** also rank government regulation almost as highly as costs (77%)—and much more highly than do owners (62%) and contractors (64%).
- **Contractors** find competitive business advantage of being a green builder (75%) most important.

Important Business Reasons to Build Green



Source: McGraw-Hill Construction, 2008

Important Business Reasons to Build Green by Industry Player



Source: McGraw-Hill Construction, 2008

Government Activities

In the last three years, the proliferation of green building policies, standards, legislation and programs has been astounding. The maps alone visually demonstrate this growth just at the state level.

Federal Government Efforts

Though the federal government was one of the earliest players in green building, their role over the last three years has been diminished by the more aggressive policies at the state and local levels.

However, as a major landlord, the U.S. General Services Administration will continue to be influential at continuing to expand the green building market.

The most recent significant activity around green building at the federal level was the extension of the renewable energy tax credits through the "Energy Economic Stabilization Act of 2008," passed on October 3, 2008. The credits apply to energy-efficient home improvements that had expired in 2007 as well as for home builders and owners and designers of energy-efficient residential and commercial buildings.

The Act also extended credits related to solar energy systems, and new credits were established for electric vehicles and small wind energy systems.

It is expected that in the coming years, green building will accelerate with the leadership at the executive and legislative branches and the increasing global pressure to make energy reduction commitments.

State Involvement

States have been rapidly adopting a variety of green building initiatives. There were policies in only 13 states in 2005, but by October of 2008, this number had nearly tripled to where 31 states have policies on the books.

Though most are oriented toward the greening of public buildings, the shift has been to do so through legislative acts rather than through Executive Orders, which was the trend prior to 2006.

Also, states are going further than those prior to 2006. For example, Ohio now requires all schools receiving public funding to be green, creating a strong local market for green.

Local Government Activities

Cities too have been rapidly increasing involvement in green building policies and acts.

As can be seen in the box below, 57 localities had policies in 2005, and that number has skyrocketed to 156 by October 2008.

Local Initiatives on Green Building from 2005 to 2008

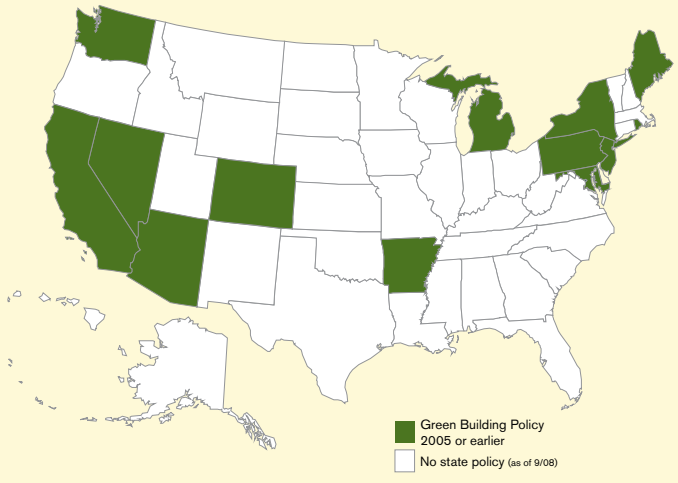
2005	2008
57 localities	**156** localities
In **20** states	In **35** states

Most of these initiatives are also oriented toward requiring the greening of municipal and public offices. However, there is a growing trend of localities to engage in other practices, such as requiring green in private construction and offering expedited permitting and fiscal incentives for green buildings.

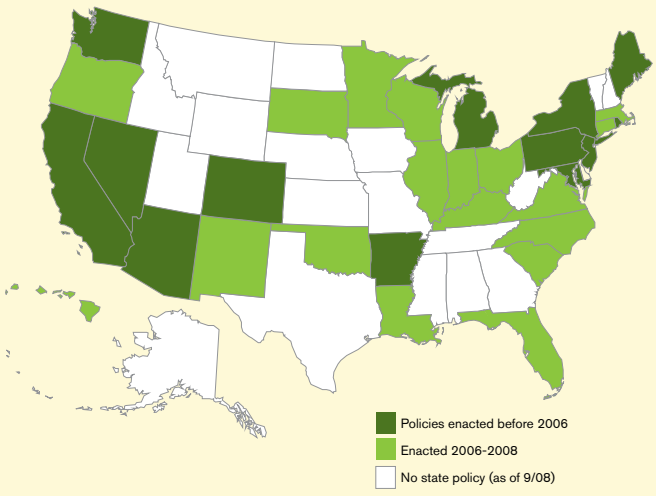
Given the innovation happening at the state and local level, it is likely that adoption of these policies and practices will only increase.

State Green Building Policies and Legislation from 2005 to 2008

Policies Enacted Before November 2005



Policies Enacted Before November 2008



Reasons for Building Green

Environmental Reasons

Saving energy tops the list of environmental reasons for green building, reflecting concerns about the uncertainty of energy prices, operating costs and the growing awareness of the link between energy use and the global environment.

- Eighty-four percent rank saving energy as important or very important.
- Three other reasons—indoor air quality (75%), valuing the environment (74%) and reducing water usage (71%)—align similarly in importance behind energy efficiency.

Differences by Firm Type

Owners

Not surprisingly, owners place a high level of importance on factors associated with building performance and operation.

- Virtually all (96%) rank energy savings as a top environmental reason for building green
- A large portion rank indoor air quality (85%) and reduced water usage (79%) as very important.

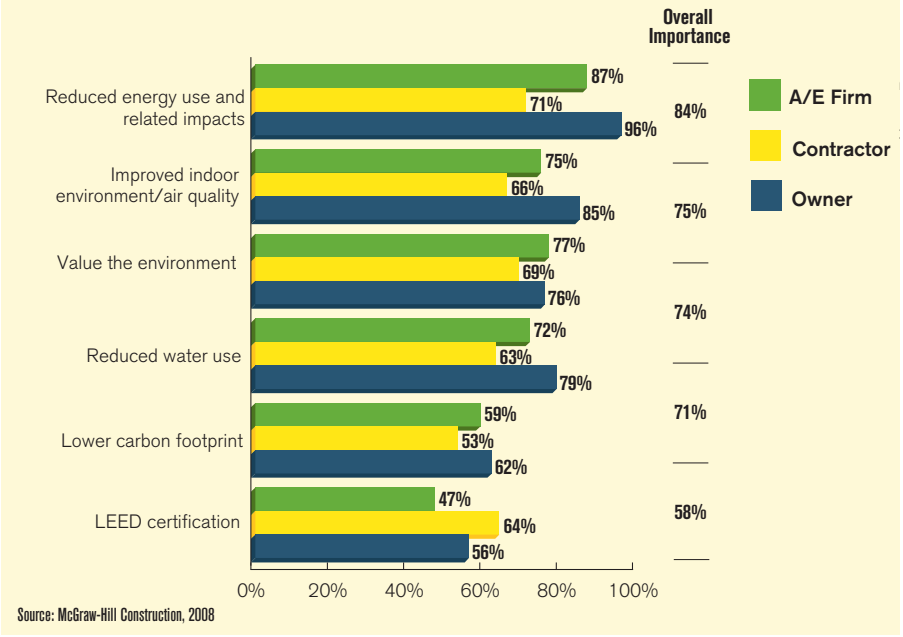
A/E Firms

Architects and engineers place a high level of importance on all environmental reasons for building green, reflecting a high overall knowledge of green issues.

Contractors

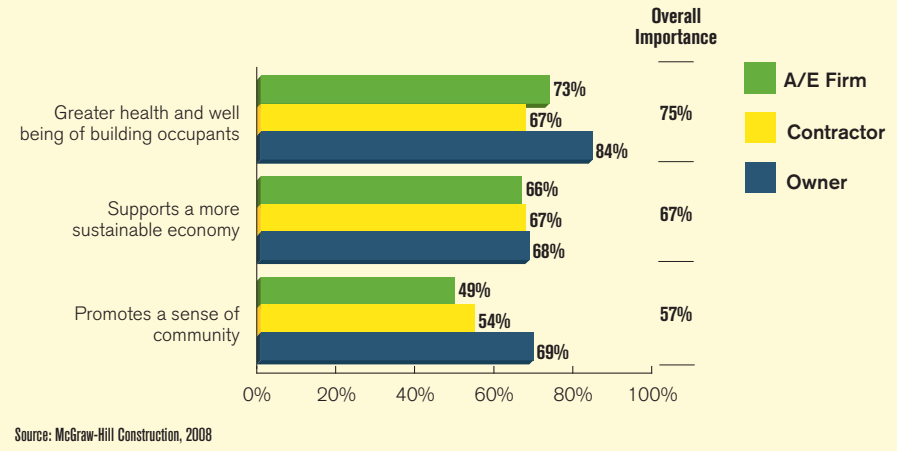
Contractors tend to place more importance on LEED certification than other groups (64% of contractors rate it "4" or "5" versus 47% for A/E firms and 56% for owners). This trend may be more indicative of business reasons for building green than of an environmental justification.

Important Environmental Reasons to Build Green



Source: McGraw-Hill Construction, 2008

Important Social Reasons to Build Green



Source: McGraw-Hill Construction, 2008

Social Reasons

Across all groups, concern for the health and well being of building occupants is the most important social motivator, which aligns with the nearly universal awareness of the link between occupant health and the built environment. Other social motivations may reflect a desire for corporate social responsibility.

- 75% rank concern for health and well being of occupants important.
- 67% find supporting a sustainable economy important.
- 57% of the industry report promoting a sense of community as an important social reason to build green.
- **Owners rank the importance of all social factors more highly** than their A/E and contractor counterparts.

Impact of Buildings on Natural Resources

Globally, the built environment is the heaviest consumer of natural resources. In an economy that faces mounting pressures from diminishing resources, buildings account for a large percent of consumption and waste. By gaining a better understanding of how resources are being used in today's buildings, the construction community can mitigate the negative impact of the built environment through more sustainable design and construction.

Energy Consumption

On a global scale, buildings consume 40% of the world's energy resources.[1] In the U.S., this share is 39%, amounting to over $400 billion in aggregate energy expenditures in the U.S. in 2008, with $180 billion in the commercial sector alone (see chart at right).

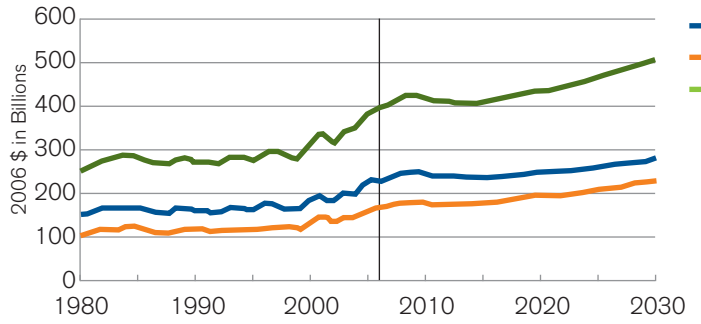
The majority of this consumption is attributable to heating, cooling and ventilation systems. Global demand for energy is expected to continue to rise, increasing by an estimated 71% by the year 2030 with new energy investments of $538 billion needed each year to satisfy this growth.[2] In today's tenuous economy, this rising emphasis on energy translates into increasing operational costs for today's buildings.

Water Consumption

Water is becoming an increasingly scarce commodity around the world. Globally, buildings are responsible for 20% of available water resources.[3] In the U.S., building occupants consume 12.2% of potable water each day.[4] Commercial buildings contain several water-heavy elements, including plumbing fixtures and landscaping and irrigation systems.

As water efficiency becomes a stronger concern of public and private industry leaders, alternative methods such as low-flow plumbing fixtures, drought-resistant landscaping and innovative water reuse systems are helping building owners conserve this diminishing resource and cut back on operating costs.

Buildings Aggragate Energy Expenditures (2006 $ in Billions)



Source: 2008 Building Energy Data Book, U.S. Department of Energy, October 2008

Raw Materials and Solid Waste

Recent shocks to the global oil supply have sharpened the growing pressures on raw materials and the price of building supplies. The built environment consumes 30% of raw materials around the world, and 40% in the U.S.[5] Today's buildings are focusing more on materials reuse and alternatives.

The construction industry also contributes a significant amount of waste, producing approximately 136 million tons of building-related construction and demolition debris per year. Each year, 44,000 buildings are demolished, creating a steady flow of waste heading directly into the country's landfills.[6] A significant share of these materials are wood, brick, concrete and rocks which can easily be reclaimed and reused in construction projects.

Carbon Dioxide and Climate Change

Buildings are strong contributors to atmospheric pollution by releasing 38.1% of total U.S. carbon dioxide emissions each year.[7] CO_2 has a tremendous impact on climate change, since it is the most prominent greenhouse gas present in the atmosphere.

Recent studies sponsored by the U.S. Government have demonstrated a direct relationship between human-induced emissions of greenhouse gasses and global increases in temperature, extreme weather and natural disasters that have occurred over the last 50 years.[8] These climatic shifts placing new pressures on materials availability and growing demand for reconstruction due to the recent unprecedented natural disasters.

These impacts are expected to intensify in the future, leading to frequent heat waves, increases in evaporation and droughts and the higher occurrence of typhoons and hurricanes.

The Intergovernmental Panel on Climate Change (IPCC) identified the direct fallout of these shifting natural systems on human health and development. These emerging impacts are likely to place further strain on essential building resources such as water and timber as well as lead to periodic demand shocks and price increases for materials in the wake of natural disasters around the world.

Green Building Market Intelligence

Triggers to Increased Green Building

Unlike company-specific motivations for building green, triggers are issues that propel the entire industry towards green building.

- **Energy cost increases are viewed as the biggest influencing factor:** 47% of respondents rate energy costs as having "heavy impact" on motivating the green building market.
- Other triggers that have a great deal of impact on business: Client demand, superior building performance and government regulations.

Differences by Firm Type

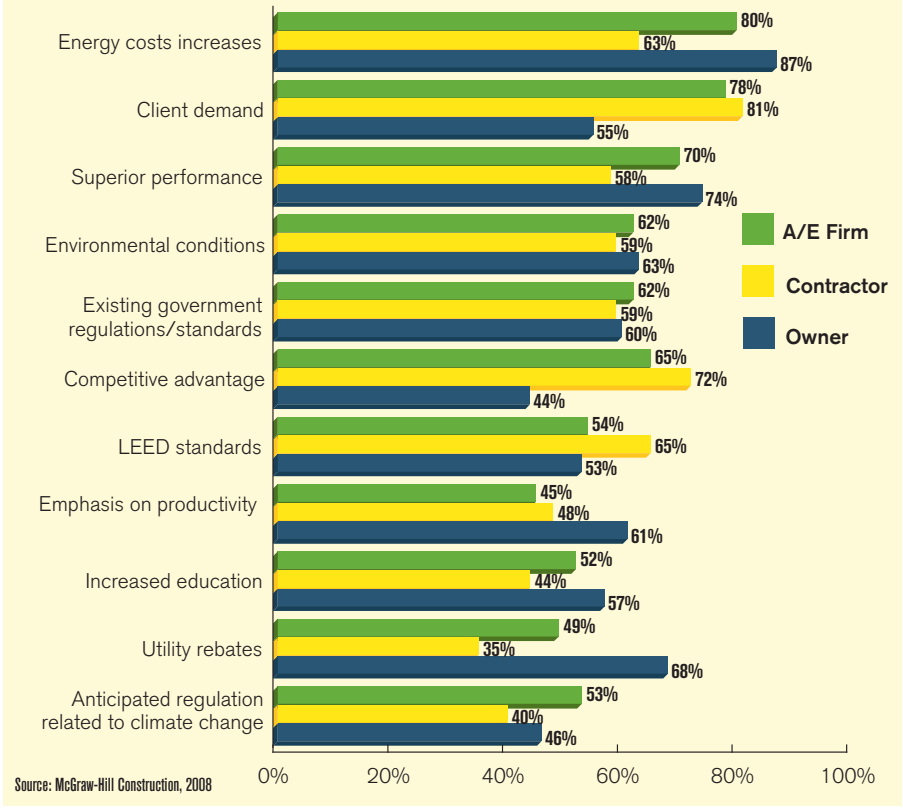
- Building owners also find utility rebates (68%) to be a trigger with strong impact on expanding green building.
- A/E firms also emphasize the impact of client demand (78%).
- Contractors also find client demand (81%) important in spurring the market, but they also—unlike the other players—rank LEED as third most impactful (65%) above energy cost (63%).

Differences over Time

Across the board, the industry finds all triggers more impactful in 2008 compared to 2005. Higher levels of publicity on green building, environmental issues and USGBC's LEED program—as well as higher general awareness of the benefits of green building—could account for this increase. Firms seem to acknowledge that green is no longer a fad and that, to remain competitive, a shift towards green building is necessary.

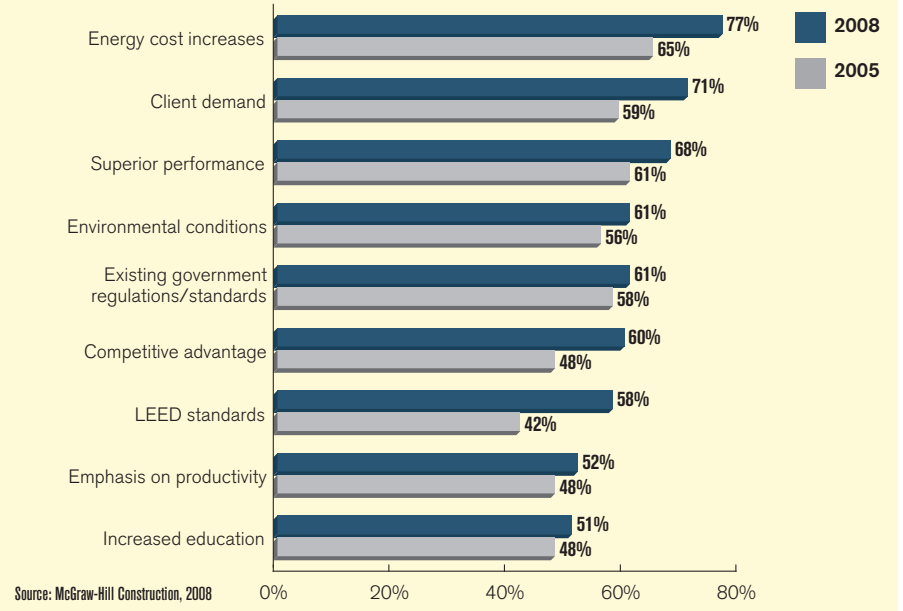
- The top three triggers remained consistent over time.

Triggers Impacting Expansion of Green Building by Industry Player



Source: McGraw-Hill Construction, 2008

Triggers Impacting Expansion of Green Building Over Time (2005 to 2008)



Source: McGraw-Hill Construction, 2008

USGBC's LEED 2009

LEED 2009 Green Building Rating System

In a an effort to keep its LEED program of optimal use for today's green building marketplace, USGBC has developed an updated version of its Leadership in Energy and Environmental Design (LEED) green building rating system. The new version, LEED 2009, represents a major evolution of the existing LEED rating systems for commercial buildings, and includes a series of major technical advancements focused on improving energy efficiency, reducing carbon emissions and addressing other environmental and human health outcomes.

LEED Prerequisite/Credit Alignment and Harmonization

The new prerequisite/credit structure consolidates and updates all of the pre-existing LEED Rating Systems in order to increase the environmental impact of LEED while also improving the user experience. LEED 2009 brings the core elements into a single "bookshelf" of credits and prerequisites that are common to all LEED Rating Systems, retaining multiple versions only where necessary for specific market situations. This initiative also allows USGBC to more seamlessly certify and connect design, construction, and operations and maintenance throughout the entire life cycle of a building. New features include:

- Increased minimum energy performance prerequisite requirements.
- Updates to ASHRAE 90.1-2007 for energy requirements.
- Increased incentives for on-site renewable energy.
- A new Water Use Reduction prerequisite and increased incentive. LEED 2009 also incorporates market and user feedback by updating the existing Credit Interpretation Rulings (CIRs) to ensure project team clarity.

Franchise Tax Board Headquarters
Sacramento, California

Photo: John Swain, Courtesy of HOK

Predictable Development Cycle LEED will evolve on a set schedule based on a cycle similar to how building codes are developed. In order to respond to the rapid shifts in the marketplace, LEED will include administrative credit interpretations and the establishment of performance/intent equivalent alternative compliance paths to existing LEED prerequisites/ credits.

Transparent Environmental/Human Impact Credit Weighting

The biggest change to LEED 2009 is the re-weighting/point re-allocation of LEED credits. New credit weightings reflect a move to a common 100-point scale and strive to make sure a given credit's point value more accurately reflects its potential to either mitigate a negative environmental or human health impact. The new weightings process introduces into LEED a transparent and reproducible approach to assign weights to credits.

Regionalization

Responding to the needs of LEED users, LEED 2009 includes incentives through extra points awarded to credits identified as important for defined regions. These LEED Innovation and Design style bonus points can be selected from a list of eligible credits based on the project's location. The LEED Steering Committee collaborated with Regional Councils and Chapters to create this list of eligible credits.

Other Key Changes for LEED 2009

- More options for low-emitting and fuel-efficient vehicles.
- Expanded options for heat island effect non-roof materials.
- Inclusion of requirements for non-carpet flooring.
- Inclusion of permanent monitoring system for thermal comfort verification.
- Alignment and clarification of the daylight and views requirements.

Process innovation in how new technical advancements are incorporated into LEED will also be introduced, including a "pilot process" for individual credits that will allow major new technical developments to be flexibly trialed, evaluated, and incorporated into LEED. LEED 2009 was approved by member ballot in November, and will be launched in January 2009.

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

Green Building Market Intelligence

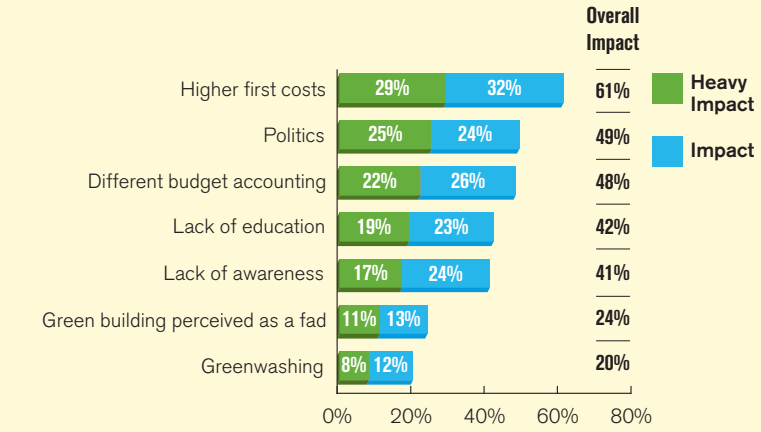
Obstacles to Increased Green Building

Higher first costs, different accounting methods for capital and O&M costs and politics are perceived as the biggest obstacles to future green building. Again, although first cost is a common obstacle in any capital undertaking, the general state of the economy may exacerbate its importance. Reconciling those higher up front costs with long-term operating cost savings can be difficult for anyone considering a sizeable investment, especially when prices are uncertain.

Less than one-third (29%) of firms rated any obstacle as having a "great deal of impact" on business. Further, most obstacles are declining—with most factors identified as having a lesser impact in 2008 than in 2005—which suggests that building green is becoming more accepted.

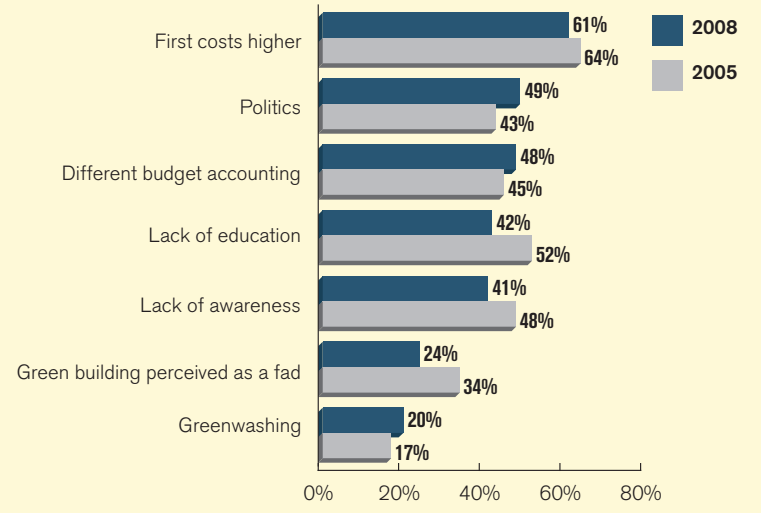
- **Steep declines from 2005 to 2008 in some areas:** Lack of education fell from 52% to 42% and green building perceived as a fad fell from 34% to 24%, suggesting that **as the industry matures, firms understand that green building is not going away** and that information is readily available to facilitate the process.
- **Moderate decline in the challenge posed by first cost concerns** (from 64% to 61%) as the industry begins to recognize that **green building does not have to cost substantially more** than conventional building.

Obstacles Impacting Expansion of Green Building



Source: McGraw-Hill Construction, 2008

Obstacles Impacting Expansion of Green Building Over Time (2005 to 2008)



Source: McGraw-Hill Construction, 2008

- **Politics experienced the steepest increase** (from 43% to 49%). This could indicate that there is so much regulation that innovation is being discouraged or, conversely, it could suggest that there are insufficient regulations and policies encouraging green building. It is an area that warrants further investigation.

Stakeholder Differences

Although the top three obstacles are consistent for all groups, there are some notable differences in how each group perceives obstacles to green building.

- **Owners don't rank first costs as much of an obstacle as other industry players:** Remarkably, although owners are considered the most cost-conscious group, fewer (53%) perceive first costs as an obstacle compared to A/E firms (70%) and contractors (61%).
- Owners perceive politics as an obstacle equal to that of first cost.
- More than half of owners (51%) see different budget accounting methods as an important obstacle.
- Across the board, not as many contractors perceive obstacles as impactful as the rest of the industry does. Again, this reflects contractors' responsiveness to the growing market for green buildings and, possibly, their current stock of business.

Interestingly, greenwashing and the perception of green building as a fad ranks low on the list for all groups, and owners in particular seem to think that green is here to stay.

Greenwashing did increase slightly from 2005 to 2008, suggesting that there may be more need for market distinction as green more fully penetrates the marketplace.

Perspectives

Industry Thought Leaders: The Growth of the Commercial & Institutional Green Building Market

As green building continues to grow, industry leaders are seeing a dramatic transformation in the marketplace. "In 2004, we were in learning and education mode, educating ourselves, our clients and anyone who would listen," recalls Michael Deane, Vice President and Chief Sustainability Officer at Turner Construction. "Now, green buildings represent about 20% of our total sales and total work in place, and we are not alone. Our competitors are building green as well."

Deane is right. Green building has changed the way firms do work across all market segments. Mary Ann Lazarus, Senior Vice President and Firmwide Director of Sustainable Design at HOK also sees dramatic changes. "The vast majority of clients are coming to us asking for green designs," she says, adding that the most significant growth has occurred in the developer and commercial sector. "In the past, they were the hardest to convince, but now that's changed."

Not only is demand growing, but the appreciation and understanding of green building benefits are deepening. "The most exciting aspect is that issues of resource efficiency and human health are now key factors in building design, construction, leasing and operations," says Rebecca Flora, Executive Director of Green Building Alliance in Pittsburgh. Flora sees the green market expanding to new levels: "The conversation has moved beyond commercial building owners to persons from all walks of life that want to bring green principles into their lives."

Looking forward, industry leaders anticipate a stronger emphasis on the greening of existing buildings, internal firm operations and supply chains and nurturing awareness. In the face of economic uncertainty, green building also offers growth opportunities.

Building product manufacturers are positioning themselves for the transforming marketplace. "It's a question of offering options," says Joanne Davis Brayman, Vice President of Armstrong Building Products. "We need to offer a broad portfolio of environmental products." At Sloan Valve Company, the emphasis is on how to meet growing needs for water efficiency and other water-related concerns in green building. "Water is one of the critical elements of green building that sometimes gets overlooked," says Susan Kennedy, Director of Marketing at Sloan Valve. "We are thinking not just about energy saved by water conservation, but also addressing water shortages, costs and health impacts. This will be a major issue in the future, and innovative products can be part of the solution."

Companies are also looking internally with their commitments to sustainability. "If companies are providing products to the green marketplace, we believe they should 'walk-the-walk' and embrace it for themselves," explains John J. White, Director of Energy Management and Sustainability Solutions for Eaton Corporation, pointing to Eaton's own sustainability commitments. Looking ahead, White anticipates that the growing availability of green building products will require companies to "substantiate the 'greenness' of products by way of Life Cycle Analysis and product certification." Melissa Vernon, Director of Sustainable Strategy at InterfaceFLOR, agrees, saying, "Our challenge today is sorting through the greenwash and ensuring that our accomplishments rise above the flurry of green claims made by new market entrants."

Green Building Products

Green Building Products

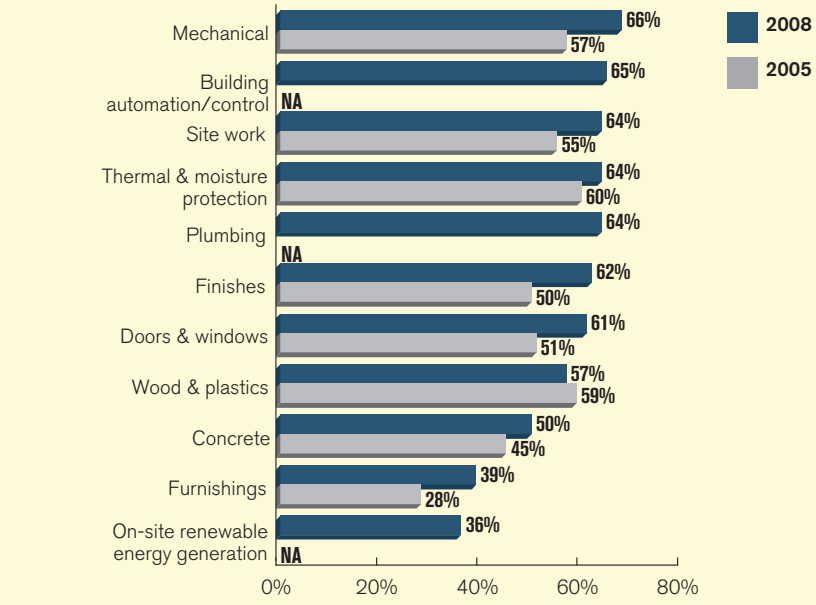
Almost every respondent (98%) has specified or installed a green product or practice within the last two years. This nearly universal use of green products supports the notion that the industry is increasing its involvement in green building. Since 2005, use of a green product in nearly green product category increased, reflecting the widespread availability of green products and heightened awareness of green products.

- **Specification of green building is prevalent:** More than 50% of specifiers are incorporating green products across most product categories.
- **Green furnishings and renewable energy are specified least:** Less than 50% of respondents specified or installed green furnishings and on-site renewable energy generation.

Top green products/practices differ by industry player.

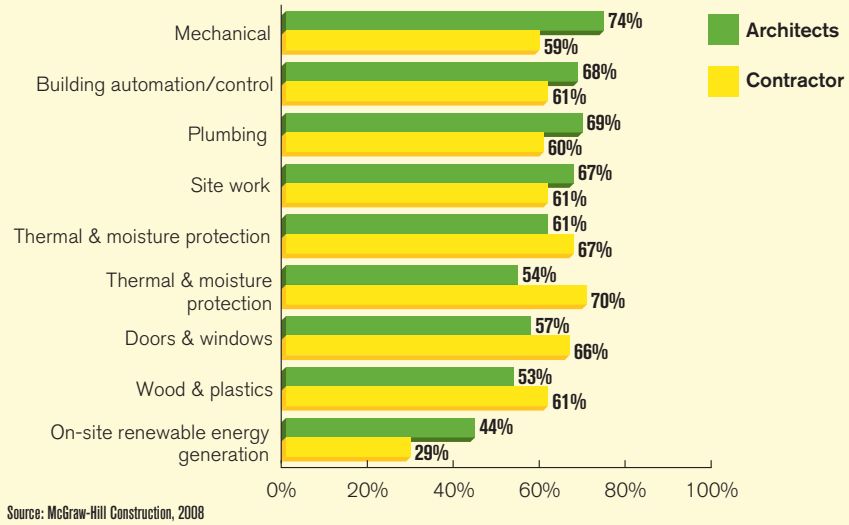
- **Architects focus on building systems:** Architects most often specify green mechanical systems (74%), plumbing fixtures (69%) and building automation (68%).
- **Contractors focus on materials and finishes:** Contractors most frequently use green finishes (70%), thermal and moisture protection (67%), and doors and windows (66%).
- **Contractors use more green wood and plastics than architects:** Perhaps due to their enhanced awareness of FSC lumber, 61% of contractors specify green wood and plastics while only 53% of architects do.

Percent of Green Building Products Specified Over Time



Source: McGraw-Hill Construction, 2008

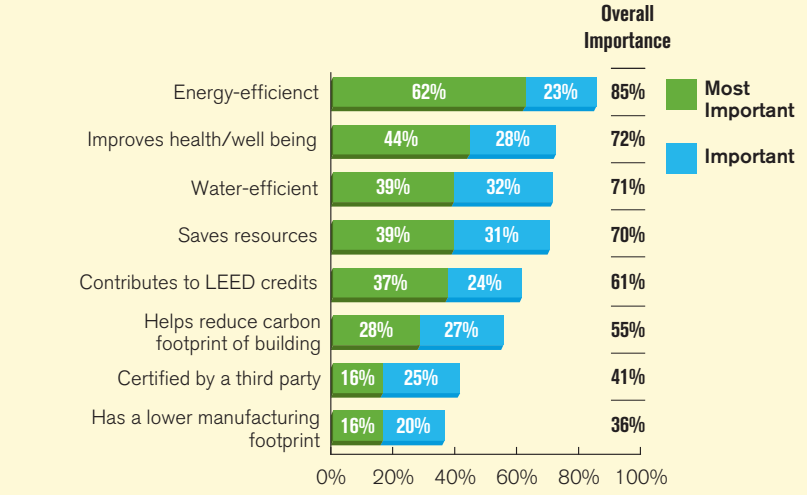
Percent of Green Building Product Specified by Industry Player



Source: McGraw-Hill Construction, 2008

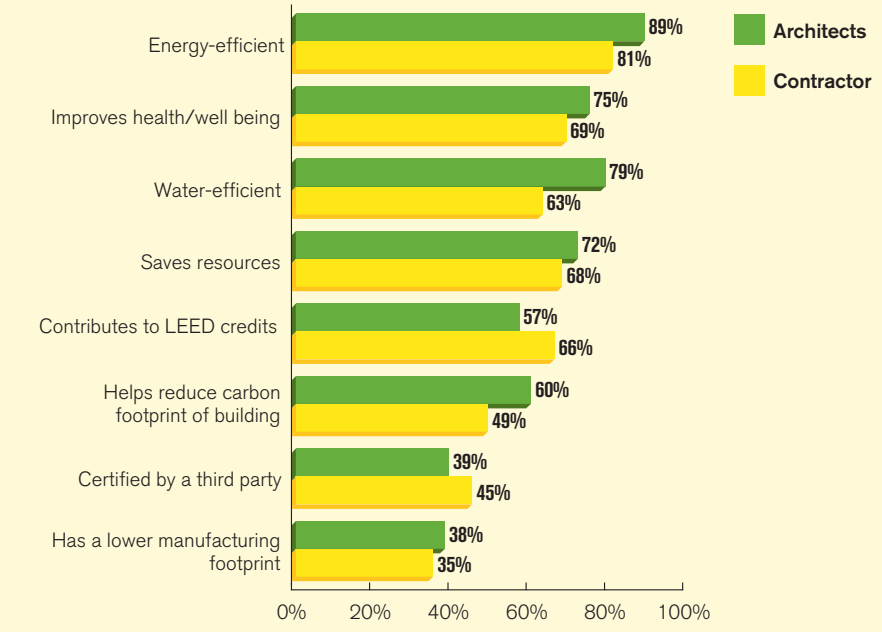
- **Renewable energy generation is specified more often by architects:** 44% of architects have employed renewable energy systems while only 29% of contractors have.
- **Wood and plastics use declined from 2005 to 2008:** Considering the controversy about the "greenness" of plastics and the sustainability of FSC certification, the decline is not surprising.

Important Aspects Used to Identify a Product as Green



Source: McGraw-Hill Construction, 2008

Important Aspects Used to Identify a Product as Green by Industry Player



Source: McGraw-Hill Construction, 2008

Identifying a Building Product as Green

Energy efficiency is a principal factor in deciding if a product is green. However, other considerations hold a lot of weight. Since energy efficiency doesn't dominate the decision-making process, green building trends are more likely to have permanence even if energy prices decline.

Other key factors include

- Health/well being benefits (72%).
- Water efficiency (71%).
- Recyclability/recycled content (70%).

Nearly across the board, architects place more weight on all factors when determining if a product is green, while contractors focus on third-party certification and the contribution of a product to LEED certification.

Of particular note is how much more heavily water efficiency factors into architects' decisions about whether a product is green.

Green Building Products

Product Brand Awareness

Top-of-mind brand recall is an effective method for determining the market penetration of a particular brand.

This survey asked product specifiers—architects and contractors—to identify the brand they thought of as the greenest in each of several product categories.

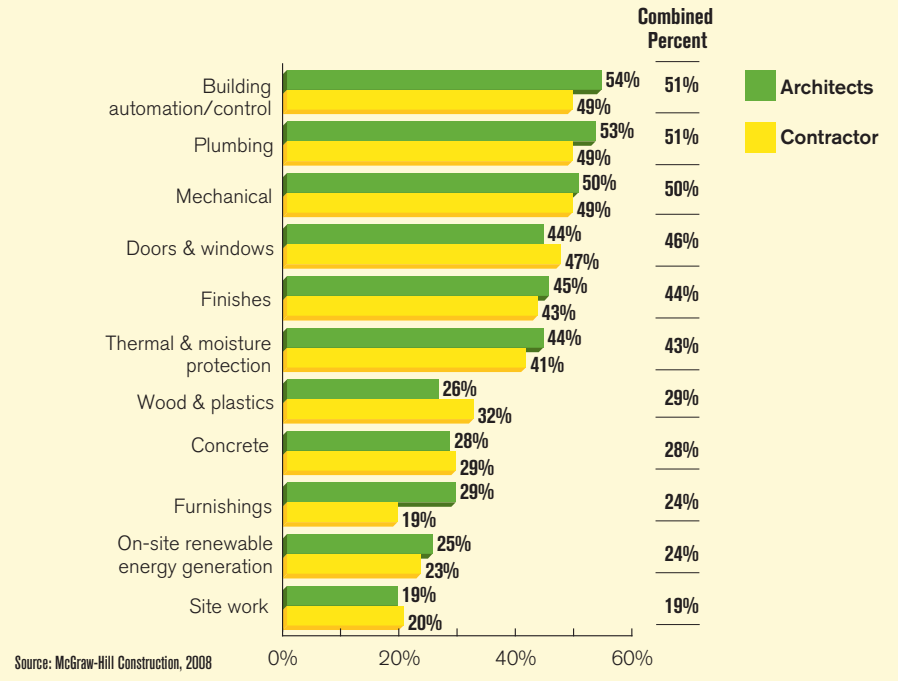
Only in three categories (building automation, plumbing and mechanical) could at least half the respondents name any brand at all.

In 2005, the results were very similar. The only exceptions were plumbing and thermal/moisture protection—in 2005 only 14% could name a green brand, compared to 51% and 43% in 2008 respectively.

Within many of those categories, dominance by one brand was minimal, though there were some exceptions:

- **Mechanical systems:** The highest green brand named was Trane by 23% of specifiers, though Carrier also had more than 5% recall. Growth was significant for both these—Trane was recalled by 9.6% in 2005, while Carrier had only 3.6% recognition.
- **Building Automation:** Though not measured in 2005, both Johnson Controls and Siemens were named by more than 5% of respondents.
- **Plumbing:** There was dramatic increases between 2005 and 2008. Both Kohler and American Standard had less than 1% recognition in 2005. Kohler's penetration may be in part due to their identification as a green brand in the consumer marketplace.

Ability of Survey Respondents to Name Any Green Brand



Source: McGraw-Hill Construction, 2008

There remain a number of categories without a dominant green brand: finishes, concrete, renewable energy generation systems and site work.

There is still ample opportunity for manufacturers to gain green brand penetration, but they may want to examine the strategies of those firms that increased their 'green' identity from 2005 to 2008.

Green Brand
(mentioned more than 5% of the time)

PRODUCT CATEGORY	2005	2008
Mechanical	Trane (10%)	1. Trane (23%) 2. Carrier (9%)
Building Automation	N/A	1. Johnson Controls (18%) 2. Siemens (8%)
Plumbing	None over 5%	1. Kohler (21%) 2. American Standard (8%)
Thermal & Moisture Protection	None over 5%	Owens Corning (6%)
Finishes	None over 5%	1. US Gypsum (9%) 2. Sherwin Williams (5%)
Doors & Windows	None over 5%	1. Pella (7%) 2. Andersen (6%)

Determining Green Brands

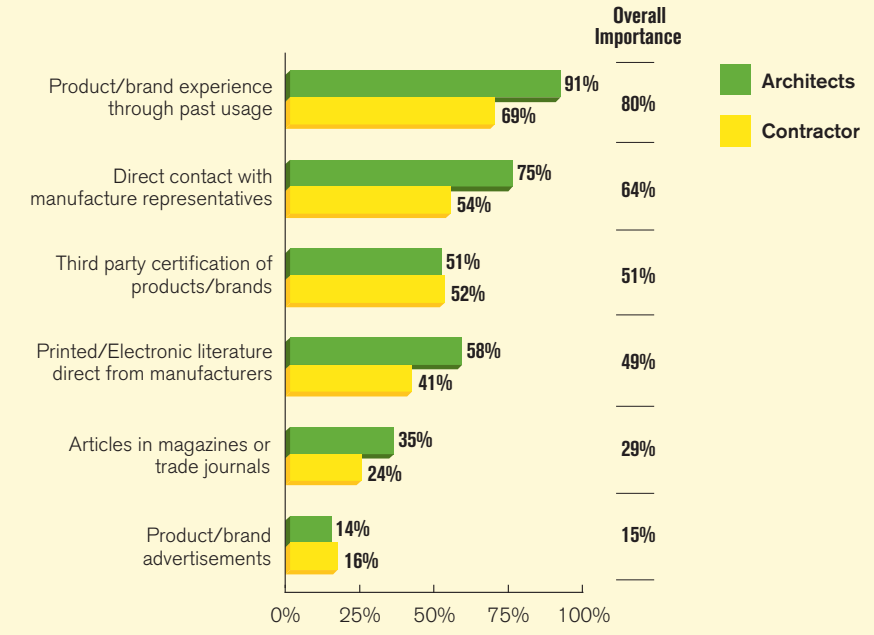
There are a number of different ways in which industry players decide on whether a product is green.

For the most part, respondents—especially architects—look to past experience to guide their decisions. 91% of architects and 69% of contractors cite previous experience as important when deciding on which green product to use.

There are some differences by stakeholder group:

- **Architects rely heavily on relationships with product manufacturers:** 75% cite direct contact with manufacturer's representatives as an important factor in deciding on which green products to specify—compared to 54% of contractors. Architects also rely on manufacturer's printed literature more heavily (58%) than contractors (41%) do.
- Contractors rely on third party certification (52%) almost as much as they rely on direct contact with manufacturers (54%). Combined with other results in this study (see pages 24 and 29), it is clear that **contractors place tremendous value on third-party programs**.

Level of Importance in Determining Which Green Brands & Products to Specify and Install



Source: McGraw-Hill Construction, 2008

Pine Jog Elementary School
Palm Beach, Florida

Photo: Courtesy of Thorn Grafton, Zyscovich Architects

Green Building Standards and Practices

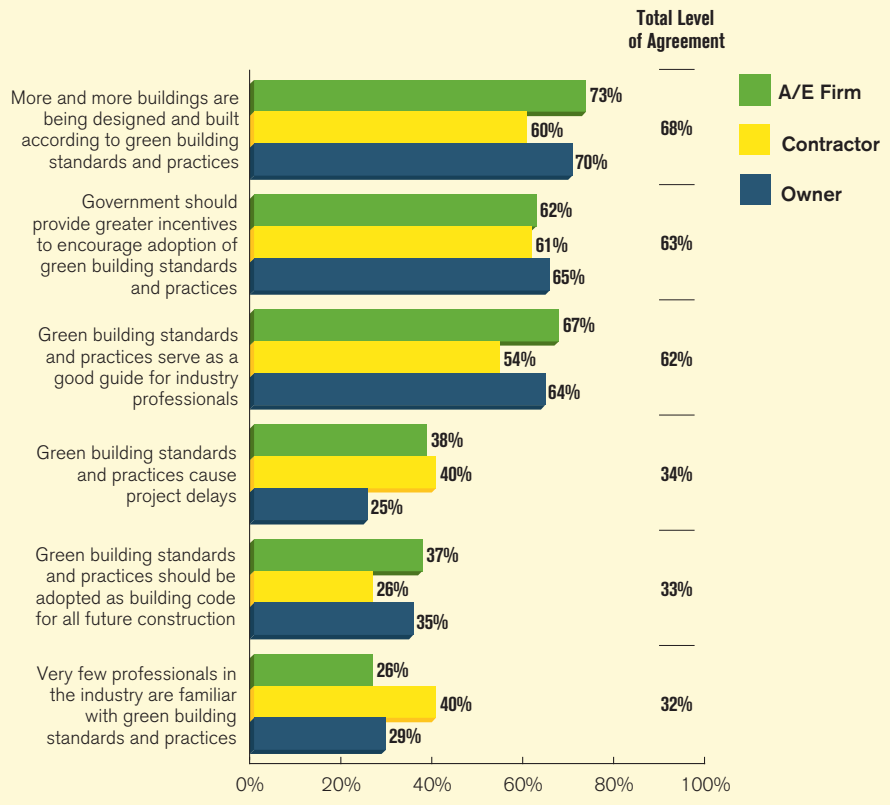
Green Building Standards and Certifications

As LEED and other green building standards and certifications take hold in the market, they are generally viewed positively. The majority of respondents agree that the current green building standards are a good guide for the industry. Yet, few agree that green buildings should be code-mandated, which may reflect a generally negative view of codes and their impact on the construction process.

- Less than a third (32%) agree that there are very few professionals who understand green building standards and practices.
- A/E firms and owners generally embrace green building standards and certifications to a higher degree than contractors:
  - More contractors (40%) than A/E firms (38%) and owners (25%) blame construction delays on green standards and certifications.
  - Fewer contractors (54%) than A/E firms (67%) and owners (64%) feel that green building standards and practices serve as a good guide for the industry.
  - More contractors (40%) than A/E firms (26%) and owners (29%) agree that there is a lack of awareness of green building standards among industry professionals.
  - Fewer contractors (26%) than A/E firms (37%) and owners (35%) believe that green building practices should be adopted into code.

What is so interesting about these findings is that contractors rely on certification programs more than other players (see pages 29 and 31), and they believe LEED certification is a trigger to green building more than other industry players (see page 24).

Opinion on Green Building Standards
Level of Agreement by Industry Players



Source: McGraw-Hill Construction, 2008

Awareness of Green Product Standards

The onslaught of manufacturer claims about the "greenness" of products and the growing greenwashing of products and practices has created a thirst for independent green product information throughout the industry. There are several independent green product standards and labels. However, navigating the myriad of standards can be challenging and there appears to be significant confusion about the programs.

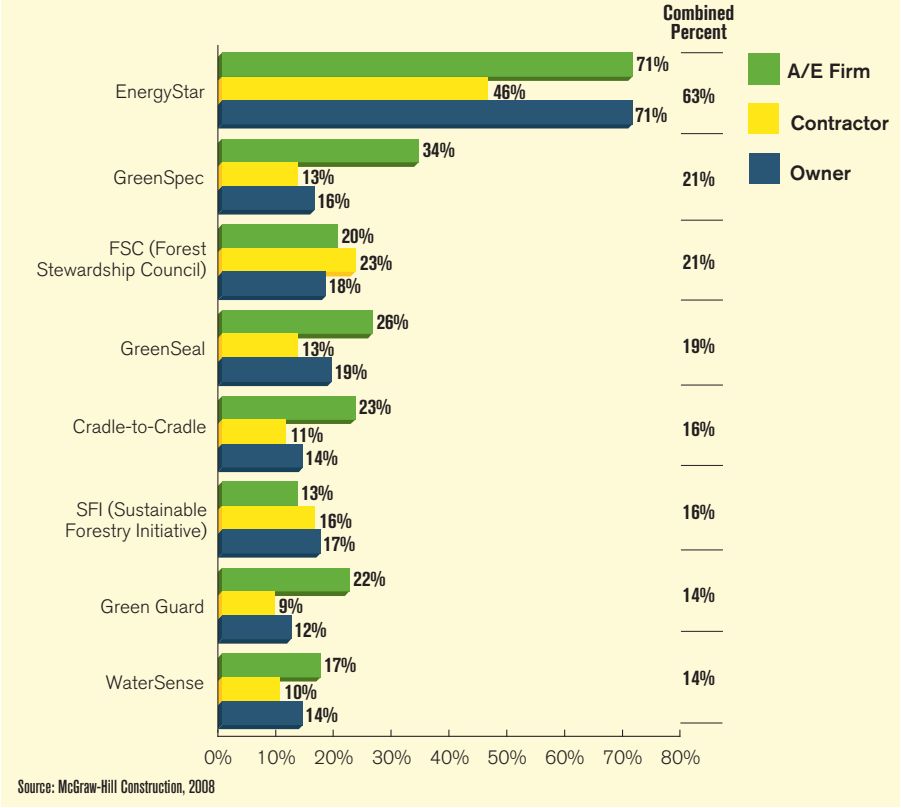
It is apparent that there is a tremendous desire to create a single green product information source, though the complicated nature of this task is likely why no one has emerged as that source yet.

Awareness of Different Standards

By a large margin, Energy Star is the most recognized green building product standard. Among industry groups, a few differences emerge:

- A/E firms are much more familiar with GreenSpec (34%) than are owners (16%) and contractors (13%). Across the board, A/E firms are most familiar with green product certifications, consistent with their greater involvement in green building (see pages11 and 12).
- Contractors are much less familiar with Energy Star (46%) than are A/E firms and owners (71%).
- Contractors are more familiar with FSC-certified wood products (23%) than are A/E firms (20%) and owners (18%). This is consistent with their specification habits (see page 28).

Knowledge & Awareness of Green Building Product Standards & Certifications by Industry Player



Source: McGraw-Hill Construction, 2008

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page 17

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Green Building Information

Valuable Green Building Information Sources

More than half (56%) of respondents cite green building certification programs as a "valuable" or "very valuable" source of green building information. Other valuable sources include trade associations (47%), friends/colleagues (46%), government sources (44%) and product manufacturers (44%).

When examining what information source is *most highly valued*, certification programs and government sources top the list.

Differences by Firm Type

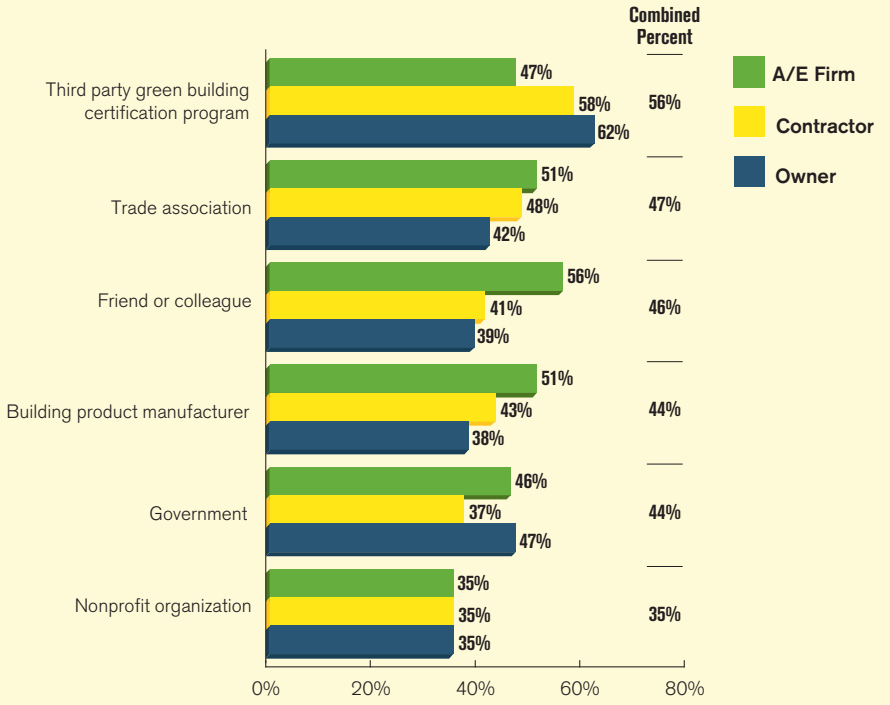
- **Owners place the most weight on third-party certification programs**.
- **Government information ranks second highest for owners,** but contractors rank it second lowest.
- **A/E firms turn to their peers:** 56% cite friends/colleagues and 51% rank trade associations as valuable or very valuable sources for green building information.
- **A/E firms place more value on relationships with product manufacturers:** Many more A/E firms (51%) rate product manufacturers a valuable source of green building information than do owners (38%) or contractors (43%).

Important Methods for Obtaining Green Building Information

Respondents consistently rank the Internet as the most important method for receiving green building information, with 65% ranking it "important" or "very important." Also important are conferences and trade shows (56%). Most industry players do not gather information through TV or direct mail.

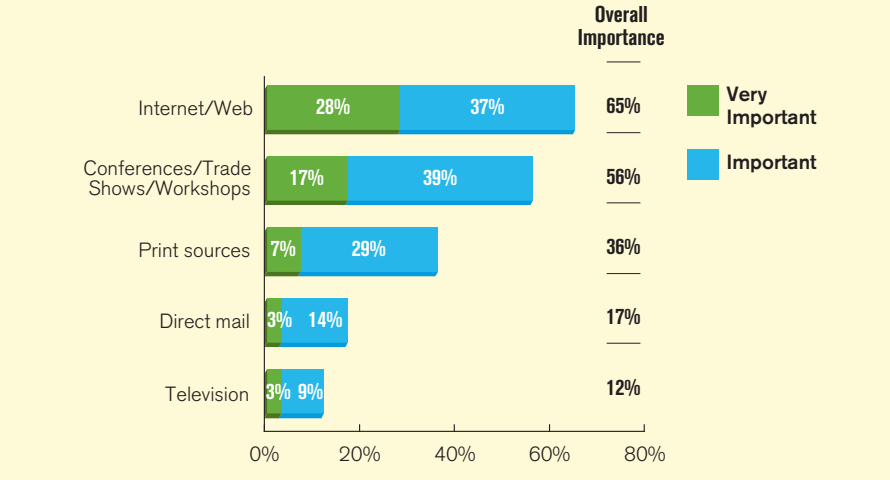
- The ranking of methods is the same for all groups.
- More A/E firms place importance on the Internet (71%) than do contractors (60%) and owners (63%).

Percent Finding Value in Different Sources for Green Building Information by Industry Player



Source: McGraw-Hill Construction, 2008

Most Important Methods for Obtaining Information about Green Building



Source: McGraw-Hill Construction, 2008

METHODOLOGY

The research in this report was conducted under the direction and management of John DiStefano, Director of Market Research under MHC Research & Analytics. The research focused on green building trends in the commercial and institutional sectors from the perspective of the architects/engineers, contractors and owners. A representative sample of 400 was drawn from the McGraw-Hill Construction Dodge database that tracks over 98,000 non-residential construction projects and captures the contact information and related specifications for each project. McGraw-Hill Construction collected the data between June 30 and July 31, 2008. The total sample size benchmarks to a high degree of accuracy: a Margin of Error of +/- 4.9% at 95% Confidence Interval.

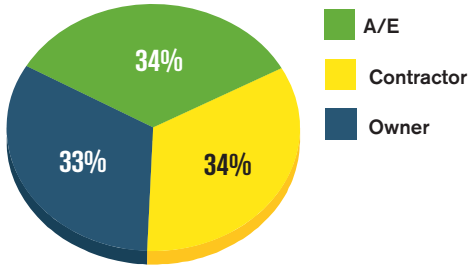
In order to identify eligible respondents for this study, the following screening criteria was utilized:

- Percentage of firm's residential work does not exceed 50% of total work
- A/E Firms: Company billings of $500,000 or more in 2007
- Contractors: Company revenues of $5 million or more in 2007
- Owners: Value of all company projects is $5 million or more in 2007

A third of the interviews were conducted with Architects/Engineers (sample size of 133), a third with Contractors (sample size of 134) and a third with Owners (sample size of 133) that reported working on a wide diversity of projects across a variety of commercial and institutional sectors (e.g. education, office, healthcare, retail, hospitality).

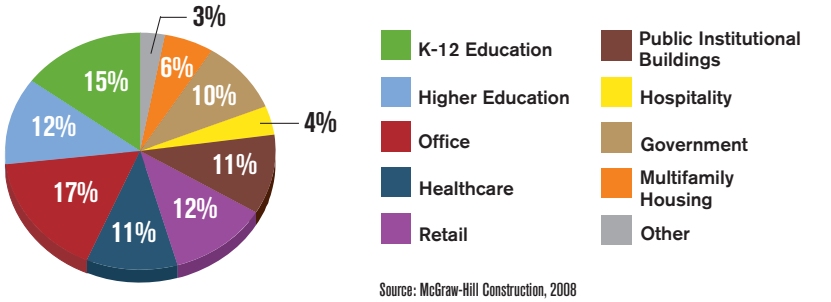
For the purposes of this report, green building was defined as a commercial or institutional building that had been built according to LEED standards or included many numerous green building elements across five category areas: energy efficiency, water efficiency, resource conservation, responsible site management/construction and improved air quality. Projects featuring only a few green building products or that addressed just one aspect of green (like energy) were not included in the market size calculations.

Respondent Principal Operation



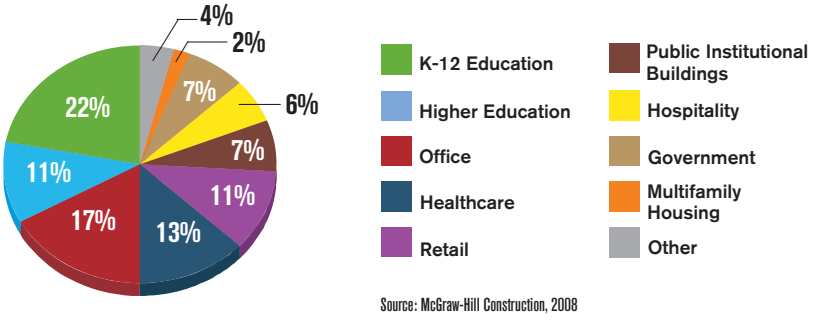
Source: McGraw-Hill Construction, 2008

Percent of Work by Sector by Square Footage: A/E Firms



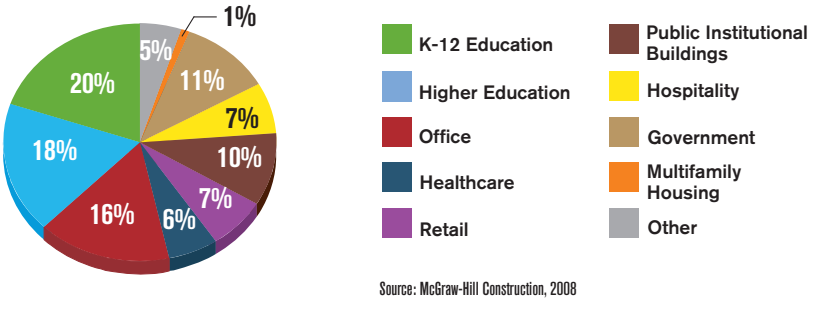
Source: McGraw-Hill Construction, 2008

Percent of Work by Sector by Square Footage: Contractors



Source: McGraw-Hill Construction, 2008

Percent of Work by Sector by Square Footage: Owners



Source: McGraw-Hill Construction, 2008

Institutional Green Building: A Green Healthcare Facility

The Isaac Ray Treatment Center

Logansport, Indiana

> **"I think [green] is where the design profession and built environment are going."**

The Isaac Ray Treatment Center was the first LEED-certified building in Indiana. Architect Steve Gloyeske of Scholer Corp. talked recently with Scott Lewis of McGraw Hill Construction.

Can you describe the Center?

The Isaac Ray Treatment Center is a 105-bed, 113,000 sq ft. forensic psychiatric hospital—a high security hospital; a therapeutic environment for high security risk patients. It is surrounded by a prison fence, controlled with closed circuit TV systems, infrared along fence lines and roof lines, anybody that comes and goes has to go through metal detectors to ensure no contraband comes in or goes out.

Who was the project owner?

There were actually two clients. The first was the Indiana Finance Authority, which builds facilities for the state. The user of the building was Logansport State Hospital which is part of the Family Social Services Administration of the state of Indiana.

Did the owner want a green project from the word go?

No. When the project was conceived and we were hired, there was no goal that this be a LEED certified building. It was not until seven months after we were hired that the owner said, 'we want this to be LEED certified.' Because of functional design issues, we could not change the design. We instead took the plan as it stood at that point and overlaid LEED on top of it to see how we could make the two mesh. In the end, we ended up with a silver certification, so we exceeded the state goal.

Project Facts & Features

Location: Logansport, Indiana

Size: 113,000 sq.ft. (105-bed)

Dates: 2003 (start)
August 2005 (completion)

MHC Dodge Report (DR) Number:
DR# 200100897544

Green Building Practices

- Use of a custom manufactured environmental concrete block with 46.5% recycled content
- Aggressive construction waste management program that diverted 88.75% of waste from landfill
- 56.07% of construction materials utilized were locally/regionally manufactured
- Insulation value of exterior envelope was improved to optimize energy performance - 20.7% reduction

Products

- Extensive use of Linoleum flooring
- Low or No VOC painting and interior finish products
- Pre-manufactured and custom casework used Agrifiber Board substrate in lieu of particle board
- 90.79% of roof Energy Star compliant roofing materials with an emissivity greater than 0.9 when tested in accordance with ASTM 408

Where did your firm turn to for advice on the LEED standards?

One of the first things that we did was to go out and hire a LEED consultant to help us and the owner to understand the impact of the LEED process on the project. We hired the 7 Group out of Pennsylvania.

How did that work out?

Excellent. They were able to do a variety of functions. The most important one was to spend time at the beginning of the project to really make sure the design team and the owner understood the impact of LEED on design and construction and what the goals and aspirations of the process were.

Can you describe some challenges in doing this project to meet the LEED certification?

There were a couple of challenges. Because of high security requirement, patient and staff safety, we were limited to a palette of materials that could be used in this environment. It is a concrete block building because of security, but that ended up being a benefit from the LEED standpoint because we were able to work with a local concrete block manufacturer, Carter, who on their own did a lot of legwork to develop a concrete block with a recycled content of 46.5%.

The energy side of the building was a challenge in that it required us to think differently about the design from an operating standpoint. The exterior envelope of the building has a higher level of insulation than we typically would have done. Exterior walls are cavity insulated.

We were required to use a triple-glaze window system because of security issues. We got the benefit of thermal efficiency at no additional cost to the project.

From a water efficiency standpoint, the number one requirement was they be security grade fixtures, but they all achieved water efficiency requirements,

The Isaac Ray Treatment Center
Logansport, Indiana

Photo: Courtesy of Scholer Corp.

so we ended up [with] 20% reduction. There were not a lot of substantial differences—we just had to think of them in a global manner. We did research in 2002-03, so there was not the availability of green building products [there are] now. We diverted 88.75% of construction waste from the landfill so that was a big success. I think the contractor was instrumental and did a great job.

Describe your experience with your contractor.

It was clear that for a LEED project to be successful, there has to be ownership of the process not only by the owner and the design firm but also by the contractor. So one of the things done through the bidding process was a mandatory pre-bid meeting, of which a large chunk was run by the LEED consultant educating the contractors as to what his goals and responsibilities were going to be.

The general contractor was out of Ft. Wayne, Indiana, Hagerman Construction Corp. and they really latched onto the LEED process. They assigned a project manager whose responsibility was strictly in the LEED area. They really did an outstanding job of not only educating their own people but all of the subcontractors underneath them, making sure they understood [and adhered to] the LEED requirements.

What was the owner's reaction to how the project went?

The state of Indiana was excited we were able to achieve silver status because that was more than they had hoped for. It is documented that it is a more efficient building for them to run and operate. There was a lot of concern that the green materials wouldn't hold up to rigors of building requirements, but the building has functioned very well.

What is your perspective of the green building market?

Many of the things that LEED requires are logical and rational—things that architects have done within their buildings for years. The LEED process just quantifies it into an organized process. But things like natural daylight in buildings and use of outside, good ventilation—all those things have been around for years and were in practice. I think [green] is where the design profession and built environment are going for lots of valuable reasons.

Institutional Green Building: A Green School

Pine Jog Elementary School and Environmental Education Center

Palm Beach County, Florida

> **"The amenities that sustainable design offers are affecting the bottom line... It's a great way to enrich the curriculum and do the right thing."**

In southern Florida, the race is on to set the bar in green school design and construction. Jose Murguido, AIA, Principal in Charge of the Pine Jog Environmental Education Center and Elementary School campus in Palm Beach County explains, "We didn't quite make it to be first, there were some projects that snuck in ahead of us. But it's a wonderful race to be in. There is a lot more sustainable design going on in Florida today."

Murguido and his team from Zyscovich Architects have certainly contributed to the green building momentum in the region. The Pine Jog project represents multiple achievements in sustainable design, ranging from its unique 15-acre site within a larger 150 acre pineland, to an expected LEED®-Gold certification on a relatively modest $30 million budget for both facilities. "We were planning during a time when South Florida was going through a building boom," Murguido explains, describing pressures from the resulting price escalation in the region. "When you try anything new in that environment it causes a lot of concern. So we really had to [design] this building close to what a conventional school would cost."

Despite these constraints, Murguido and his team, including project managers Mike McGuinn, LEED AP and Thorn Grafton, AIA, LEED AP, managed to produce a model green school for students and administrators in the School District of Palm Beach County (SDPBC), and Florida Atlantic University's College of Education. Murguido credits an integrated design process for the success of the project, as well as strong support from the community. "I can't tell you how important it is to have someone from the owner side to champion the cause," he says. McGuinn agrees, adding that support from the broader community also played a key role. "We had early meetings to convey the goals of the project and to build synergy. Once they understood what we were really trying to achieve, everybody became the champion."

The resulting project reflects this consensus and synergy in appearance and operation. "The campus design is really a result of the site," explains Murguido,

Pine Jog Elementary School
Palm Beach, Florida

Photo: Courtesy of Thorn Grafton, Zyscovich Architects

referring to the 150 acres of native Florida landscape that previously hosted an environmental education center owned by Florida Atlantic University's (FAU) College of Education. "The buildings are not really on a site, they are almost inside a site," he says, "everything informs the placement of the buildings."

Boasting expansive trails featuring wetland environments, wildlife and a playing field located on a dry pond bottom clearing, the site offers a living laboratory for two sets of students—those attending Pine Jog Elementary and those studying environmental education at FAU. The School District's elementary school and FAU's environmental center work together to boost environmental education and develop innovative curriculum. "They have become a part of each other," says Murguido. "They are sharing ideas as well as each others facilities, the air conditioning chiller plant, and their operational footprint."

The school's other green features add to the living classroom effect. "The design is live and ongoing," says Grafton, pointing to a hydroponic garden that draws water from the site's rainwater collection cisterns, windows that expose the workings of the mechanical rooms, and a "solar plaza" featuring energy creation through solar hot water and photovoltaics. Students also have access to touchscreen computers where they can access real-time data about operational savings presented in accessible quantities such as "bathtubs of water." Design features are marked with signage to enhance visibility of the sustainable elements in the school. "The LEED signage program that we have meandering through the school is almost like a nature trail in itself," says Grafton.

Pine Jog's achievements are reverberating throughout the school district and beyond. SDPBC has set a new standard for all new construction to achieve LEED-Silver certification and is seeking LEED-EB improvements to existing facilities. Murguido and his team are also seeing the impacts on their practice. "This was our first LEED certified project, but now we have about 12 or 15 green school and other projects," he says. The Zyscovich team admits that they faced initial challenges in meeting the administrative requirements for LEED's documentation-heavy certification process. However, in light of their shifting workflow, Murguido and his team have made LEED management more central to their project procedures. "We're actually changing the way we work now as a result of [those challenges], because every owner we work with would like to have their building certified or at least follow LEED metrics."

McGuinn agrees. "The amenities that sustainable design offers are affecting the bottom line. We are seeing more private schools utilize sustainable building metrics to enhance their position in an increasingly competitive market." At the end of the day, however, the process is really about the students, reminds Murguido. "It's a huge lesson that needs to be transferred to the kids. LEED schools provide an important value system that their generation needs to carry forward. It's a great way to enrich the curriculum and do the right thing."

Project Facts & Features

Location: Palm Beach County, Florida

Size: Approximately 155,000 sq.ft. (138,000 for the Elementary School)

Cost: $30 million for total project

Dates: 2006 (start)
August 2008 (completion)

MHC Dodge Report (DR) Number: 200500916368

Green Building Educational Practices

- Air filter rated 8 on the minimum efficiency reporting value (MERV) scale.
- Interactive sun-dial "Solar Plaza" for solar technology demonstration
- Hydroponic garden
- Interactive, real-time building control and monitoring stations
- Water re-use demonstration areas
- Environmental mitigation and restoration areas
- Eco-trail with wildlife habitats and butterfly gardens
- Viewable mechanical and electrical systems

Features

- Photovoltaic panels and solar hot water
- On-site windmill for wind power
- East-West classroom orientation
- Recycling stations
- Waterless urinals and low-flow fixtures
- Storm-water collection and treatment system
- Eco-swale retention areas for wetland recharge
- High-albedo coating for solar-reflecting roof
- Exterior solar window shading
- Regional and recycled building materials
- Motion-sensor lighting controls
- Non-toxic and hypo-allergenic paints, sealants, adhesives and carpets

Commercial Green Building: Green Retail Facilities

Office Depot

> **"It became more of an issue where big corporations started saying... we also want to buy something from companies who are trying to be more sustainable and environmentally compliant."**

A retail powerhouse, with over 1,300 stores across North America, Office Depot builds dozens of new stores each year. They completed their first LEED-certified store, in Austin, Texas, in July 2007.

Since most Office Depot stores are fairly similar structures, the company relies on a prototype design that is adjusted to fit each location. SBLM Architects, based in New York, has worked with the chain for many years.

Several years ago Office Depot introduced sustainability policies, reducing their vehicle fleet emissions, installing bailers to aid in recycling, and introducing more green products. After incorporating a number of energy-saving features in their store designs, in early 2007 the company's design and construction team decided to change their building model systematically.

"It came to the point that we said we are doing all of these things individually, it's time we incorporate it all into one package and get a LEED certification," explained Ed Costa, vice president of construction for Office Depot.

After investigating, "it really was something that we wanted to do and could afford to do and was practical on a return on investment standpoint."

The company's commitment to going green was also a reflection of shifts taking place in the wider business landscape, according to Costa. "The marketplace started to change around that time to where major corporations, when they were going out to bid on office products (our business to business side rather than our retail side), it became more of an issue where big corporations started saying we want the best price but we also want to buy something from companies who are trying to be more sustainable and environmentally compliant that was done in the past. It all started happening about a year ago to converge where some of these decisions were being made."

Jim Cornwell, senior director of design and construction, said "we decided to restart our [store] prototype from scratch, and become more creative. We started getting some education on green building and reached out to USGBC, to LEED, because it is an internationally accepted standard."

Office Depot, Austin, Texas

Photo: Courtesy of Office Depot

Cornwell itemized some of the green features of the Austin store: "high efficiency T5 lighting fixtures, a highly reflective white roof membrane, and 50 tracking skylights. The skylights actively track the sun's movement through the day via a GPS system. And the store has solar panels, as well." According to Costa, "we are hoping to see a 20 percent reduction in energy use," but they won't have data from the store's energy utility for several more months.

The Austin site used to be an old post office. "We recycled everything we could possibly recycle from that building," said Costa. The store is slab on grade, steel-framed, tilt-up wall construction. The steel contained 85 percent recycled content. One unexpected feature was the interior doors. "We put wood doors in the building because that was more environmentally compliant that the steel doors we typically do," explained Costa.

Office Depot chose J.R.Heineman & Sons, Inc., based in Saginaw, Michigan, as the general contractor because "they had a track record of doing successful LEED construction," said Costa. "We also put one of our best project managers on it, Carl Cruz, who had experience with LEED certification, because of all the documentation that is required for this process."

The company's intention was to have their prototype pre-certified through the volume certification process. They achieved that May 20, 2008. "When we build a prototype store now, it helps us get through the paperwork quicker," said Costa. "We already have features in the prototype where LEED has said yes, that is a point. It's not something we have to come back later, go through individual drawings and make a judgment on a particular item. If you build to that prototype, you will get a point for those items that are on there.

Project Facts & Features

Store Location: Austin, Texas

Certified LEED: May, 2008

MHC Dodge Report (DR) Number: 200700912547

Features

- T5 Energy-Efficient Lighting
- Over 50 Ciralight SunTracker active skylights that adjust with the path of the sun, providing natural light for approximately 90% of the store
- Solar panels on the roof generate about 10% of the store's energy needs and power exterior signs
- Sensor lighting
- High-efficiency HVAC units and insulation
- Water-efficient fixtures to reduce the buildings overall water use by over 40 percent, including exterior xeriscaping with native plants, dual flush toilets and low flow urinals
- Polished concrete floors, made of near 30% recycled material
- Interior partitions composed of more than 95% recycled materials
- A highly-reflective membrane on the roof so that heat from the sun is not absorbed by the roof

Green Building Practices

- Uses all low-emitting materials including carpet, paint and adhesives
- Employs an Energy Management System that allows tracking of energy usage and trends from one central location
- Purchased renewable green power credits
- Sourced all cement and 90% of steel from suppliers within 500 miles of the site
- Recycled approximately 80% of the construction's demolition waste
- Purchased recycled shopping carts that were refurbished with a reduced amount of aerosol spray paint
- The store has a comprehensive recycling program, including cardboard, paper, beverage containers, ink and toner cartridges, technology, cell phones, rechargeable batteries and plastic film
- Offers reserve parking for low-emitting, fuel-efficient vehicles and customers that carpool
- Offers an in-store recycling center for cellular phone and rechargeable batteries, ink and toner cartridges, paper and technology
- Displays signage within and throughout the store educating our customers and associates of why the store is green
- Features green products
- Has a white concrete parking pavement to reflects the sun

By the middle of 2009 we should see stores remodeled or renovated based on that prototype. We are not only registering our buildings for LEED, we are certifying our buildings for LEED, and there is a difference."

Commercial Green Building: Real Estate Investment

Kennedy Associates Real Estate Counsel, LP

"It's important to walk the walk, make sure our principles and team members are doing things that make a difference."

For the past 30 years, Kennedy Associates Real Estate Counsel, LP (Kennedy) has been leading by example and going green from the inside out.

Based in Seattle, Kennedy maintains an exclusive client base of institutional investors including both corporate and public funds, university funds, Taft-Hartley retirement systems and an open-ended commingled Multi-Employer Property Trust (MEPT) fund. Kennedy maintains a portfolio that consists of a little more than half of office buildings and a quarter industrial buildings, in addition to residential, hospitality, land and retail investments.

About 37% of Kennedy's portfolio is based in the Pacific regions, 12% in the Northeast and less than 10% in the Mountain, Northwest Central, Southwest and Southeast regions.

Robert Ratliffe, Principal and Executive Vice-President of Portfolio Management for Kennedy, comments, "We feel a big part of the environmental movement in this country has some roots here in the Pacific-Northwest and we care deeply about it. Over the 30 years, we have placed a very high level of importance on transparency and the quality of reporting to our clients...so it's been a long term process and a natural process too because it's the ethos of how we all live our lives."

Kennedy has taken this green ethos and used it to promote its green practices from the inside out. "It's important to walk the walk, make sure our principles and team members are doing things that make a difference."

As part of its commitment to green building practices, Kennedy emphasizes the importance of LEED. "We developed, with the help of a consultant, a curriculum for our employees to become LEED accredited. We have about 20% of the professionals LEED accredited now and it is the most sought after thing that we are doing professionally."

In addition to providing educational opportunities, Kennedy also greens from the inside out with its corporate culture. "Many of our employees ride bikes or walk to work and we took 85 of our

Rivergate III Industrial facility
Portland, Oregon

Photo: Bergman Photographic, Inc.
courtesy of Kennedy Associates

people and planted 1,600 trees in one day in an urban forest with the idea that we are going to neutralize our carbon footprint with our efforts."

Kennedy extends its green practices to its clients through Responsible Property Investing (RPI). RPI is a major initiative integral to Kennedy's investing practices. The three pillars of RPI include Sustainable Development/Re-Development, Property Operations and practicing Economic Fairness and Worker Health standards.

With RPI working at the heart of its operations, Kennedy completed its first LEED certified building in 2002 with a mixed-use property including both office and retail space. Currently, Kennedy has approximately $2.5 billion in LEED projects, including certified, pre-certified and projects in development and re-development.

Kennedy works to educate their clients on the benefits of green building practices and to dispel the myths about LEED. "It is really an education process that takes some time and has frustrations like any change of how we look at things and do things. But I think people have embraced it. [Our clients] have heard the rumor that when you build LEED, it costs 10% more, but our experience is 1-2%, so part of it is helping them have a realistic understanding of green building given their goals and aspirations."

One of the most recent examples of how Kennedy greens from the inside out with its clients is the Rivergate III project in Portland, Oregon. This first green industrial project for Kennedy is LEED Core and Shell pre-certified Silver. Working with Trammell Crow Company as the developer, Kennedy looked to gain a competitive advantage with the Rivergate III project in terms of property performance and leasing.

From the high-performance lighting to low flow fixtures and smart irrigation practices, Rivergate's LEED costs represented less than 1% of the total project costs.

From a green corporate culture to RPI, Kennedy understands the future role of green building practices. "Buildings have such a huge impact on the health of the planet...The trend is that [green building] is more than the cover of New York Times magazine, it is at the very basic level—it is being driven from the top-down and bottom-up."

Project Facts & Features

Location: Portland, Oregon

Size: 573,420 sq. ft.

Type: Industrial distribution facility

Dates: 2007 (start)
March 2008 (completion)

MHC Dodge Report (DR) Number: 200500916368

Developer: Trammell Crow Company

Architect: Group MacKenzie

LEED Consultant: Green Building Services

Sustainable Characteristics

- High-performance lighting (T-5) systems
- Utilized regional and recycled concrete and steel materials during construction
- Used low-emitting paints, sealants and carpets
- Limited tenant improvements will be built out under sustainable tenant improvement guidelines
- 75% of construction waste diverted from local landfills
- 42% projected water savings with use of native landscaping, low flow fixtures and smart irrigation

> **"Green building is being driven from the top-down and bottom-up."**

Resources

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

McGraw Hill CONSTRUCTION

- Main Website: **construction.com**
- GreenSource: **greensourcemag.com**
- Research & Analytics: **analytics.construction.com**
- Architectural Record: **archrecord.com**
- Engineering News-Record: **enr.com**
- Sweets: **sweets.com**
- Green Reports: **greensource.construction.com/resources/SmartMarket.asp**

- Main Website: **www.usgbc.org**
- LEED: **www.usgbc.org/leed**
- Greenbuild 365 Education Portal: **www.greenbuild365.org**
- Green Schools: **www.buildgreenschools.org**

Other Resources for Green Building Information (listed alphabetically by category)

Federal Government

- U.S. Department of Commerce,
  National Institute of Standards and Technology (NIST):
  Main website: **www.nist.gov**
  BEES software: **www.bfrl.nist.gov/oae/software/bees**
- 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**
  National Renewable Energy Lab: **www.nrel.gov**
- U.S. Environmental Protection Agency:
  Main website: **www.epa.gov**
  Energy Star: **www.energystar.gov**
  WaterSense **www.epa.gov/watersense**

Academia and Nonprofit Organizations

- Alliance to Save Energy: **www.ase.org**
- American Council for an Energy-Efficient Economy:
  www.aceee.org
- American Institute of Architects (AIA): **www.aia.org**
- Associated General Contractors of America (AGC):
  www.agc.org
- Building Owners and Managers Association: **www.boma.org**
- Carnegie Mellon University, Center for Building Performance and Diagnostics: **www.arc.cmu.edu/cbpd**
- Center for the Built Environment, University of California Berkeley: **www.cbe.berkeley.edu**
- Global Green USA: **www.globalgreen.org**
- Green Building Initiative: **www.thegbi.org**
- MIT Building Technology Group: **bt.mit.edu**
- Natural Resources Defense Council: **www.nrdc.org**
- Rocky Mountain Institute: **www.rmi.org**
- Southface Energy Institute: **www.southface.org**
- Sustainable Buildings Industry Council (SBIC):
  www.sbicouncil.org
- Whole Building Design Guilde: **www.wbdg.org**

Other

- Building Green, Inc.: **www.buildinggreen.com**

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SmartMarket Report

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McGraw-Hill Construction
President: Norbert W. Young, Jr., FAIA

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Commercial & Institutional Green Building SmartMarket Report
Editor-In-Chief: Michele A. Russo, LEED AP
Contributing Editor: Catlin O'Shaughnessy, LEED AP
Contributing Editor: Scott Lewis
Research Project Manager: Manisha Sharma, MRA, PRC

For further information on this *SmartMarket Report* or for any in the series, please contact McGraw-Hill Construction Research and Analytics.
1-800-591-4462, 34 Crosby Drive, Suite 201, Bedford, MA 01730
www.analytics.construction.com
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