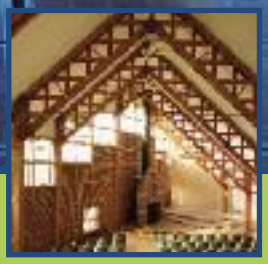
McGraw Hill CONSTRUCTION

outlook 2011 Industry Forecast and Trends

Green Outlook 2011

Green Trends Driving Growth



connecting people_projects_products




Contents

Photos in this report are courtesy of the National Renewable Energy Laboratory (NREL). NREL and MHC do not endorse any of the projects shown in these images.

The Business of Green Building

The demand for green buildings has been increasing nationwide. This growth has been the bright spot in the severe economic downturn that has affected building construction. It is also an area expected to bring employment as well as financial opportunity

There are a number of market drivers encouraging green building. None are more important than the business benefits they pose. Each year, more building owners and developers are deciding to build or renovate according to green principles. The business rewards of sustainable construction are compelling—they equate to a competitive edge, boosts in profits and lower expenses. At a time when financial solvency is critical, green building is becoming about more than saving just energy and operating costs.

Benefits to Corporate Leaders

From 2006 to 2009, a fundamental shift occurred in the leadership levels of corporate America—the reasons for investment in sustainability had shifted away from fears or anticipation of government regulation or solely on internal operating and energy cost savings from green building and other sustainability efforts. Sustainability is now also viewed as a business opportunity—tied to product development, marketing strategies, research budgets, and ultimately the external metrics measuring these business benefits—ROI increases, customer retention and competitive advantage. In fact, 75% of firms view sustainability as consistent with their profit missions.

Market Differentiation

61% of corporate leaders believe that sustainability leads to market differentiation and improved financial performance—a dramatic increase from 2006 to 2009, indicating that management is now seeing a business opportunity coming from sustainability.

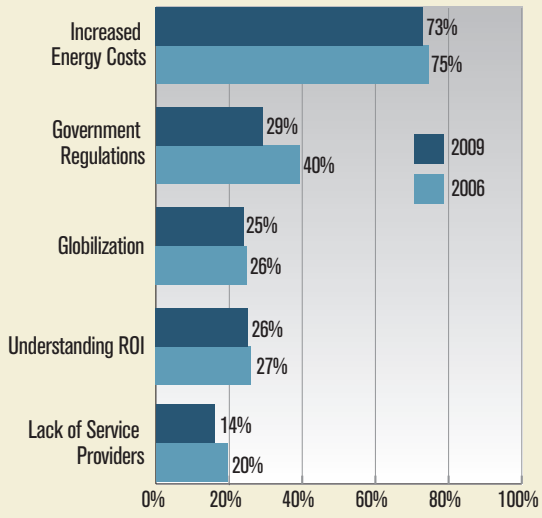
Customer Attraction and Retention

73% of corporate leaders expect to attract and retain customers as a direct result of their sustainability efforts—allowing a firm to increase market penetration, keep competitors out and generate new revenues.

Key Market Intelligence

- Benefits reported by owners from green projects:
  - Operating cost improvement: 8.5% on average for RETROFIT/RENOVATION green projects compared to 13.6% for NEW green projects
  - Building value increases: 6.8% on average for RETROFIT/RENOVATION green projects as compared to 10.9% on average for NEW green projects
  - ROI Improvements: 19.2% on average for RETROFIT/RENOVATION green projects as compared to 9.9 % on average for NEW green projects
  - Occupancy increases: 2.5% as a median increase for RETROFIT/RENOVATION green projects compared to an average of 6.4% for NEW green projects
  - Rent increases: 1% as a median increase for RETROFIT/RENOVATION green projects compared to an 6.1% for NEW green projects
- Major motives behind investment in sustainability and green building efforts are the desire to reduce the costs and use of energy and the market differentiation posed by green.
- While an important driver to the industry at large, corporations are less influenced by government regulations and incentives as compared to three years ago and the rest of the industry.

Motivations Behind Green Building for Corporate Leaders (2006–2009)



Source: 2009 Greening of Corporate America Report, Siemens/McGraw-Hill Construction, 2009.

Benefits of Green Building

In addition to the economic benefit of savings on energy costs, there is mounting evidence that green buildings—whether they be new or renovation projects—return higher rents, offer faster letting, secure greater occupancy and generate higher resale value. In an economic environment where quality is foremost, green buildings can deliver advantages.

Several studies on green buildings over the past two years point to cost and productivity savings being offered by green building.

- A 2009 study by CB Richard Ellis reported higher productivity in its LEED and Energy Star buildings for 42.5% of the employees in those buildings and lower sick leave at 2.88 days on average for 45% of employees.
- A 2007 study from the University of Michigan reported that green buildings yielded 40 hours of additional work output for sufferers of respiratory and stress-related conditions/year.
- The Green Building Market and Impact Report 2009 released by Greener World Media reported LEED projects were responsible for saving 2.9 million tons of CO_2 and 1.2 trillion gallons of water and for leading productivity benefits of $230 million to $450 million.
- In his recent book, Greening our Built World, Greg Kats suggests the net present value of 20 years of energy use savings ranges from $4–$16/square foot and of water savings ranges from $0.50–$2/square foot.

Commercial Property Business Benefits

For commercial property owners, there are significant savings both from retrofit and renovation green projects as well as new ones.

Aside from the significant business benefits listed in the chart above right, owners report on other benefits.

- **Expected Time to Lease:** There are mixed opinions as to faster leasing times. While 27% believe green renovation work will lead them to lease their properties faster, nearly a third do not know what to expect. This uncertainty may also be influenced by the economy and high level of vacancy in all office properties.
- **Tenant Willingness to Pay a Premium:** One-third of commercial office building tenants surveyed in 2009 said they would pay a premium price for a green retrofitted space, with 16% of premium in rent for green space. Given economic conditions, this is an astounding factor and suggests that there are some firms out there heavily valuing green building spaces.

Business Benefits of Green Building

	for Green Retrofit and Renovation Projects	for New Green Buildings
Operating Cost Savings		13.6%
Over 1 year	8.5% owners (10.5% tenants)	
Over 10 years	16% owners (15% tenants)	
Building Value Increases	6.8%	10.9%
ROI Improvement	19.2%	9.9%
Occupancy Increases	2.5%*	6.4%
Higher Rents	1%	6.1%

* Median is presented here because a few significant outliers skewed the average, likely due to major renovations that turned previously unrentable spaces into Class A rental properties.

Source: Green Building Retrofit & Renovation SmartMarket Report, McGraw-Hill Construction, 2009; Commercial and Institutional Green Building SmartMarket Report, McGraw-Hill Construction, 2008

- **Importance of Green Retrofitting to Companies Leasing Space:** Given the findings above, it is consistent that tenants place at least some importance on green renovations in properties they are leasing.

The Cost Myth

Since 2005, McGraw-Hill Construction has been tracking industry trends, reported results and market opinions on the benefits of green building. Industry research and reports refute lingering misperception that green buildings are much more expensive than non-green ones.

Kats asserts that while most green builds do cost slightly more than similar non-green buildings to construct, the typical added cost of building a green building is $3/sq. ft. to $9/sq. ft. and that lower levels of LEED certification can be achieved for minimal additional cost.

MHC research has shown a correlation between familiarity and involvement in green building with realistic expectations of its cost. Therefore, we expect as all players get more experienced with green building, expectations of cost will start to align around real figures.

Market Influences

There are several factors that are consistently driving green building activity across the industry for all players from building owners to occupants, architects, engineer, contractors and corporate leaders.

Energy Use and Prices

Consistently, high energy prices and the desire to reduce energy consumption are cited as important triggers to higher levels of green building activity.

- **Corporate Leaders:** 91% report energy savings as a driver to sustainability; 40% rank it as the most important driver. These levels did not shift much between 2006 and 2009.
- **Commercial Building Owners:** 89% report the reduction of energy use to be a motive behind the decision to engage in a green retrofit project.
- **Commercial Building Tenants:** 96% report energy savings as a driver to their decisions to perform green upgrades to their space.
- **Architects and Engineers:** 80% reported energy cost increases as the impetus behind expanding their green building business.

It is not surprising that energy has such a heavy influence on industry players in their decisions to build green. Energy saving technologies are readily available and incentivized for use by governments and utilities. Energy consumption and reductions are also relatively easy to benchmark, measure and track over time, making the savings from a new green building or green renovation project easily estimated. Further, the paybacks for some of these technologies are relatively short, particularly for investments in regions of the U.S. with higher than average energy prices.

Energy is also a critical component behind green building because buildings are such heavy users of it. In fact, energy use in commercial and residential buildings has been growing steadily over the last thirty years, surpassing industrial in 1998 to become the top energy user, accounting for 40% of all energy consumed in the U.S.

Since reduction of energy use in buildings is easier to address than transportation energy use, it is no wonder that the U.S. political leadership is so engaged in supporting and increasing energy efficiency levels in buildings.

All together, these factors point to a significant market opportunity for vendors, manufacturers, suppliers and professionals who can help buildings become more energy-efficient.

Market Demand

Many industry members believe that various players are demanding that they become more engaged in green building and sustainability.

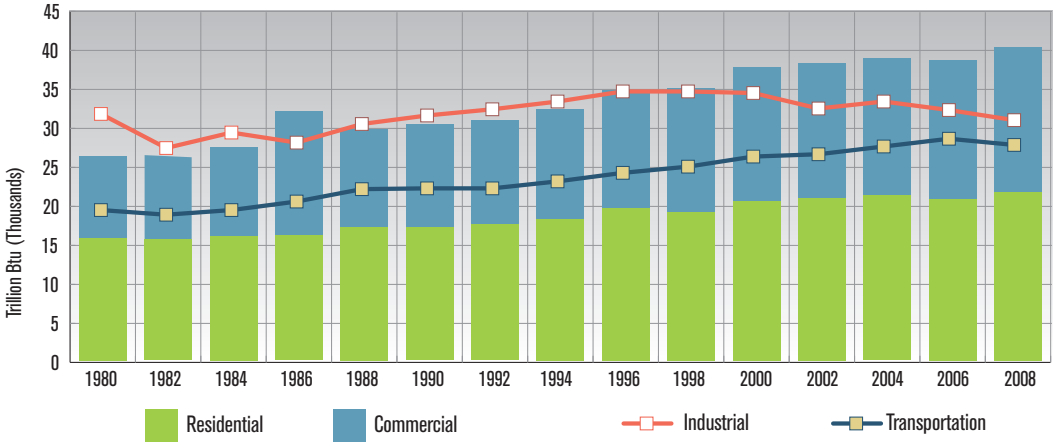
- **Corporate Leaders:** 67% believe their customers have need for sustainability services, thus driving their engagement in such efforts. It is the number two driver behind energy use.
- **Architects, Engineers and Contractors:** 78% of A/E firms and 81% of contractors report that client demand is driving them toward green building investments.

Other Drivers

Though not the top factors, other important drivers include the following:

- Market differentiation
- Public relation benefits, relatively more important to healthcare owners
- Greater health and well-being for occupants, students, patients, employees and other building users
- Government regulations, though not as critical as other factors, is helping drive green building in certain areas, most notably around water use and waste reduction practices.

Growth in Building Energy Use Relative to Other Sectors



Source: Energy Efficiency Trends in Residential and Commercial Buildings, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, 2010.

Green Jobs

Due to the severe recession over the past two years, the U.S. economy has lost more than an estimated eight million jobs across many of its sectors.[1] The construction industry was hit particularly badly—with a loss of 210,000 jobs from September 2009 to September 2010, or 3.6%.[2] As of October 8, the construction unemployment rate remained high at 17.2%.[3]

Not surprisingly, jobs are on everyone's minds, as is trying to find areas of both job retention and expansion. Green jobs emerging from a growing green economy pose one potential area to address those issues.

Green job growth, defined broadly as employment that is associated with some aspect of environmental improvement,[4] is driven by increasing consumer demand, venture capital investments eager to capitalize on new market opportunities and policy reforms by federal and state lawmakers seeking to spur sustainable economic growth.

Policies

Across the U.S., state lawmakers are pursuing the goals of economic growth and environmental sustainability. A growing number of states are implementing policies to capitalize on green industries, from renewable portfolio and energy efficiency standards to financial incentives for public- and private-sector innovation and investment. New York, California, Washington, Massachusetts, Michigan and Ohio are among the states that have a strong set of policies in place to support green business and green job creation.

At the federal level, the American Recovery and Reinvestment Act (ARRA) established infrastructure development and job training programs aimed at helping these green industries grow. Key provisions of ARRA are aimed at green job creation in the buildings sectors:

- **Greening the Federal Government:** ARRA provides $4.5 billion to GSA to convert federal buildings into high-performance green buildings, using energy efficiency and renewable energy to minimize the energy use of the buildings.
- **Investing in Green Retrofits:** ARRA boosts funding for programs that will enable energy efficiency retrofits for homes and businesses around the country, including $5 billion to the Weatherization Assistance Program.
- **Launching a Green Job Training Program:** ARRA funds workforce training initiatives, including $500 million for an Energy Efficiency and Renewable Energy Worker Training Program that is to be administered by the U.S. Department of Labor.

Job Growth Outlook

A study by the U.S. Green Building Council and Booz Allen Hamilton reveals that green construction spending between 2000 and 2008 has created more than two million American jobs and generated more than $100 billion in gross domestic product and wages. Despite a challenging economic outlook, the study expects green building to support nearly eight million U.S. jobs and pump $554 billion into the American economy—including $396 billion in wages—over a four-year period from 2009 to 2013.[5]

Other studies have looked at green jobs emerging from the growth of a green economy more broadly than just in the construction space.

Two notable studies include the following:

- Pew Charitable Trusts estimated that clean energy jobs have grown at a faster rate (9.1%) than U.S. jobs overall (3.7%), and asserted that they are poised for even greater growth. As of 2007, their study showed that 770,385 people were employed by the clean energy sector.[6]
- The Center for American Progress revealed that clean energy investments generate 16.7 jobs per $1 million of investment as opposed to 5.3 jobs created by investments into conventional fossil fuels. Their research also suggested that clean energy had particular advantages for the jobs market: it used more man power versus machines, relied heavily on U.S.–based activities and included jobs for people at all levels of pay.[7]

[1] American Society of Civil Engineers. "Report Card for America's Infrastructure 2009." http://www.infrastructurereportcard.org/fact-sheet/drinking-water (accessed September 2010)

[2] "Poof: Another 800,000 jobs disappear," CNNMoney.com, accessed 04 Feb 2010, http://money.cnn.com/2010/02/04/news/economy/jobs_outlook/

[3] "Current Employment Statistics September 2010," Bureau of Labor Statistics, U.S Department of Labor, accessed 8 October 2010, http://www.bls.gov/web/empsit/ceshighlights.pdf.

[4] "Progress report: The Transformation to a Clean Economy," Office of the Vice President, accessed December 2009, http://www.whitehouse.gov/administration/vice-president-biden/reports/progress-report-transformation-clean-energy-economy.

[5] "Green Jobs Study," U.S. Green Building Council, prepared by Booz Allen Hamilton, accessed 11 November 2009, http://www.usgbc.org/ShowFile.aspx?DocumentID=6435.

[6] "The Clean Energy Economy: Repowering Jobs, Businesses and Investments across America," The Pew Charitable Trusts, accessed 10 June 2009, http://www.pewcenteronthestates.org/uploadedFiles/Clean_Economy_Report_Web.pdf.

[7] "The Economic Benefits of Investing in Clean Energy," Political Economy Research Institute and Center for American Progress, accessed April 2009, http://www.americanprogress.org/issues/2009/06/pdf/peri_report.pdf

Trends in Water and Waste Management: Critical Aspects of Green Building

With the increased focus on energy independence and climate change, the dialogue around green buildings can become focused on increasing energy efficiency to the exclusion of other factors important to improving the environmental—and financial—impact of buildings. In particular, two often overlooked resources include water and construction waste.

Water Efficiency

Water use in buildings is substantial. Buildings account for 12% of all water use in the U.S., and heating water is responsible for 12% of a building's energy consumption. Couple this with water supply problems across regions of the U.S. and around the world, and the importance of water becomes readily apparent.

McGraw-Hill Construction investigated water use in buildings in 2009. That research revealed that most of the industry is recognizing this fact. In 2009, 69% of industry professionals ranked water use reduction as one of the most critical factors in a green building. By 2013, that number is expected to grow significantly to where 85% anticipate it will rank as one of the most critical green building strategies.

Relationship between Energy Efficiency and Water Efficiency

The connection between water use and energy use in buildings is clearly recognized by the industry; 79% of industry players believe the need to reduce energy use will increase investment in water-efficient technologies and practices.

Paybacks of Water-Efficiency Efforts in Buildings

In line with this, the industry expects that water-efficiency efforts will yield the following business benefits:

- Energy use decrease of 10%–11%
- Operating cost savings of 11%–12%
- Water reductions of 15% on average

Rise of Green Infrastructure

Unlike energy efficiency, which is concentrated largely on the building itself, concerns about water efficiency focus on the use of water throughout the site. Government regulations and standards are a strong driver in this area, second only to energy cost increases as a trigger for using water efficiency.

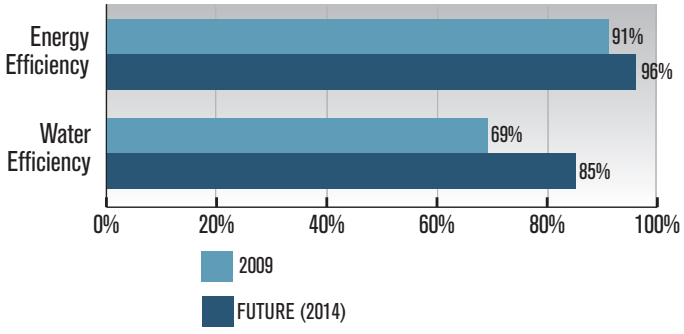
Local regulations around stormwater have increased over the past few years, with a few communities requiring higher payments from properties that allow too much wastewater runoff. In fact, the water-saving products most frequently selected by industry players are stormwater management systems and automatic irrigation systems. U.S. architects, engineers, contractors and owners also predict that on-site wastewater management and collection of gray water will increase in importance by 2013.

Near-Term Water Efficiency Opportunity Lies with Owners and Existing Buildings

The greatest evidence for future growth in water efficiency in buildings lies with the building owners' commitment to this aspect of green building. Owners have been shown to have a heavy influence in the adoption of green building practices—particularly for contractors.

In 2009, 30% of building owners reported that more than half of their building stock include water-efficient practices, but by 2013, 50% of them expect the same. This result demonstrates that owners are not only looking to include water efficiency in new projects, but that they consider it an important retrofit opportunity for existing buildings. Given the increase in the overall share of the construction market by retrofit work on existing buildings, the owners' commitment to increasing water efficiency in their existing portfolio is a critical trend for increasing opportunities for professionals in this area.

Relative Importance of Green Building Practices Over Time
(according to Industry Players—Architects, Engineers, Contractors and Owners)



Source: Water Use in Buildings SmartMarket Report, McGraw-Hill Construction, 2009.

Sustainable Waste Management

Buildings also use a tremendous amount of raw materials—and much of it is still not recycled or reused today. Of the 143.4 million tons of construction and demolition debris, only 28% was recycled, reused or sent to waste-to-energy facilities. The remaining 72% was sent to landfills.

McGraw-Hill Construction investigated sustainable construction waste management in 2009. That research revealed that contractors found this to be an extremely important aspect of green building—even if the rest of the industry viewed it as less important than water efficiency. 61% of the study's representative sample of U.S. contractors ranked construction waste management as an important green building practice—second only to energy efficiency. This is likely due to contractors' responsibility for this part of the construction process.

Healthy growth is also expected in this aspect of green building, with 80% of contractors anticipating sustainable waste management to be an important green building practice by 2014.

Client Demand Has Helped Drive Sustainable Waste Management Adoption

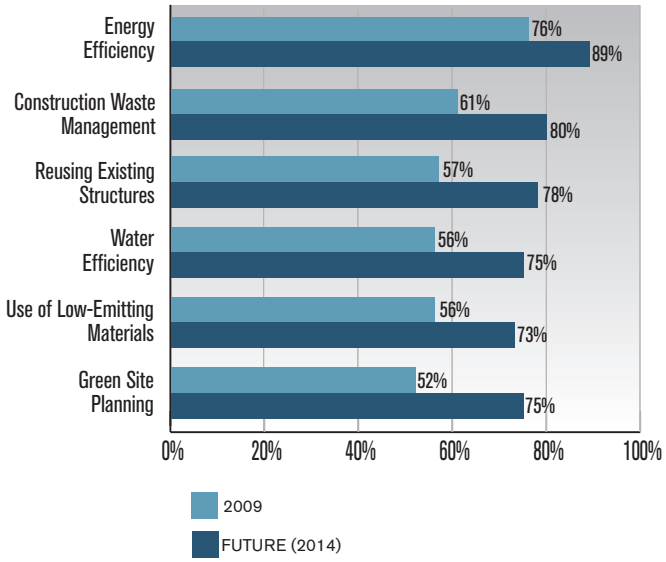
The highest percentage of contractors, 66%, regard owner demand as the most influential factor in their adoption of these practices, and the industry believes that pressure will grow; 77% of contractors regard competitive advantage as an important trigger to future adoption of sustainable waste practices.

Now that green building is no longer a niche market, owners will expect that contractors will be able to provide sustainable waste management as part of green project site strategy.

Trends for Current Sustainable Waste Practice Adoption

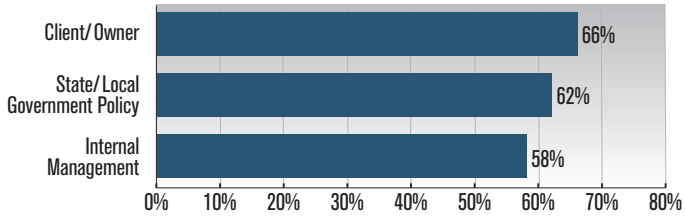
Seventy percent of contractors report diverting large amounts of waste on at least one project. However, the actual penetration of these high levels of waste diversion varies widely, from firms doing it on less than 5% of their projects to more than 50%. This suggests that while the practice of sustainable waste management is being adopted, there is not consistent commitment to it across the industry. One possible obstacle may be the access to waste diversion vendors; 39% of contractors report it as an important challenge.

Relative Importance of Green Building Practices Over Time (according to Contractors)



Source: Sustainable Construction Waste Management SmartMarket Report, McGraw-Hill Construction, 2009.

Influence Agents Behind Construction Waste Diversion (according to Contractors)



Source: Sustainable Construction Waste Management SmartMarket Report, McGraw-Hill Construction, 2009.

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