

# Green Building

in the Pacific Northwest:

*Next Steps for  
an Emerging  
Trend*



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This report provides an understanding of why green building is important to our communities, a brief look at the emergence of green building standards, research evidence on the perceived pros and cons of green building, and original research on green building in the Pacific Northwest. The original research is an analysis of perspectives voiced in conversations, focus groups and surveys with both members of the construction industry and local government on the barriers and incentives to green building in their local communities. As nearly 500 construction industry members and just over 300 local governments participated



in the research, this report encompasses, perhaps for the first time, one of the largest examinations of the aggregated voices of both the public and private sector on factors that affect green building. Green house gas emissions from commercial buildings are growing at a faster than average annual rate – 1.8% higher – than either transportation or residential emission rates. This trend alone provides strong justification to take a close look at the factors that may help change this dynamic.

Faculty and graduate students in the College of Social Sciences and Public Affairs and the College of Engineering assembled this report. It consolidates information to provide a deeper understanding of green building issues and opportunities facing Pacific-Northwest

communities. The report provides both municipalities and construction professionals information that may foster their green building goals.

Members of both groups indicate they want to engage in green building, but in a financially viable way. This report is a starting point for formally identifying the next steps for making green building more likely. ☘



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*The authors gratefully acknowledge the generosity of the sponsors who made this research possible.*



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## Contents

Executive Summary .....	5
Statement of the Problem .....	6
The Emergence of Green Building and Rating Systems .....	8
What Is Really Known About the Pros and Cons of Green Building? – Research Evidence .....	11
Research Methods and Findings .....	18
Focus Groups .....	18
Survey Purpose, Audience and Method .....	25
Local Government Survey, Findings and Analysis .....	25
Construction Industry Survey, Findings and Analysis .....	35
Next Steps .....	42
References .....	45
Appendices	
Appendix A-Green Building Survey .....	47
Appendix B-Construction Industry Member Survey .....	51
List of Tables and Figures .....	Inside Back Cover





# Executive Summary

This report provides data from conversations, focus groups, and surveys with both members of the construction industry and local governments about their perspectives on the barriers and incentives for green building in their communities, primarily, in the Pacific Northwest. Nearly 500 construction industry members and just over 300 local governments participated in the research, providing one of the largest — and perhaps the first — studies of the aggregated voices for both the public and private sector on factors that affect green building.

**G**reen building practices use environmentally friendly materials or systems applied in a holistic and integrated approach to design and construction. Leadership in Energy and Environmental Design (LEED) is one rating system and one of only two (Green Globes being the other) that have been developed by agencies accredited by the American National Standards Institute (PRNewswire-USNewswire). The large body of research that exists on LEED-certified buildings makes LEED a useful frame of reference to understand more about green building in general as well as LEED-certified buildings specifically.

Research reveals that on some green or LEED-certified development projects the upfront costs may be higher (2-7%) but not nearly as high as anecdotal evidence (30%) suggests. Being selective about the sustainable design criteria and features used in a building can keep construction within budget and produce greater long-term energy conservation. Incorporating green building techniques from the inception of a project, and in a holistic manner, can reduce costs as well as further assure benefits will be used and realized by owner and tenants alike. Familiarity with green building standards provides greater understanding of costs and benefits, lessening resistance to green building. Education for builders, owners, and tenants will go a long way to encourage green building.

Data drawn from focus groups conducted in Boise, Idaho and surveys with cities in the Pacific Northwest (Idaho, Oregon, Utah, and Washington) reveal healthier buildings and social responsibility are currently the biggest incentives for encouraging developers to engage in green building practices,

while costs and uncertainty about return on investment are the biggest barriers. Cities wanting to address the biggest barriers see financial incentives as the key to promoting green building in the short term. Over the long haul, cities see education about the benefits and practices of green building as essential to ensuring the desired return on the investment and meeting community goals — a perspective shared by developers.

This paper recommends several best practices identified from a review of research and interviews conducted for this report, as well as from the new empirical evidence gathered here. The strategies that follow may be appropriate for communities in the Pacific Northwest interested in promoting and supporting green building practices. The recommendations fall into four broad categories that involve providing:

- ▶ Marketing to increase public demand for green building
- ▶ Policies and processes to support financial payback for developers
- ▶ Information, demonstrations, and training to encourage the adoption of green building
- ▶ Support for current users of green building and LEED certification to continue their use and advocacy of green building

Although the bulk of the leadership for the recommendations falls on the cities, success in meeting green building goals will be best accomplished through public and private partnerships that enable both cities and developers to initiate and advance green building practices. ☘

***This report consolidates information to provide a deeper understanding of green building issues and opportunities facing Pacific Northwest communities.***



*Buildings generate about 2 million metric tons of CO<sub>2</sub> equivalent per year.*

# 2 Million

*An automobile with gas mileage of 19-20 miles per gallon generates about 1.5 metric tons of CO<sub>2</sub> equivalent per year.*

# 1.5

## Statement of the Problem

Greenhouse gas emissions from commercial buildings are accelerating at a faster average annual rate than either transportation or residential building emissions. States are grappling with making their communities more sustainable. In Idaho, one example of how communities are tackling this problem is the Department of Veterans Affairs (VA) Regional Office in Boise, which was recently awarded a “gold” rating by the independent U.S. Green Building Council for reducing environmental impact in the construction and design of its 25,000 square-foot facility

**What does a ton of CO<sub>2</sub> look like? Containing a metric ton of invisible CO<sub>2</sub> (2,204 pounds) would require a cube container measuring 27 feet by 27 feet, a total of 19,683 cubic feet. Right: Ninth grade physics students built this model to scale.**

**W**e continue to take steps to assess and reduce our environmental impact,” Secretary of Veterans Affairs Eric K. Shinseki said. “Ensuring the sustainability of our facilities across the country helps us accomplish our primary mission – serving veterans.” (PRNewswire-USNewswire/).

How does meeting green building standards ensure sustainability? Or more plainly, why should we care about building emissions? Carbon

dioxide is, by far, the most prolific component of all greenhouse gas emissions, specifically accounting for 6,021 million of the 7,282 million of metric tons of carbon dioxide equivalent (MTCDE) generated in the U.S. in 2007 – more than 80 percent of the greenhouse gas emissions (U.S. Energy Information Administration (EIA), 2009).<sup>1</sup> And residential and commercial buildings combine to account for 40 percent of all energy consumption and energy-related greenhouse gas emissions annually, making them an obvious focus of greenhouse gas emission reduction efforts. Transportation and industry are the other major sectors of energy use, but neither contributes as much as buildings to greenhouse gas emissions (EIA, 2009).

While, there is no “average” building to allow for comparisons, one way to think about the issue is by using Environmental Protection Agency (EPA) estimates, which say that burning one gallon of gasoline generates about 19.4 pounds of CO<sub>2</sub>. By



Figure 1

Source: [http://www.energyrace.com/commentary/what\\_does\\_a\\_ton\\_of\\_co2\\_look\\_like/](http://www.energyrace.com/commentary/what_does_a_ton_of_co2_look_like/)

<sup>1</sup> Energy use accounted for 5,917 MTCDE of the 6,021 MTCDE generated in 2007 (EIA, 2009)



converting that to miles per gallon, we can estimate that an automobile with gas mileage of 19-20 miles per gallon generates about one pound of CO<sub>2</sub> equivalent per mile. Using that comparison, the average person generates 1.5 metric tons of CO<sub>2</sub> per vehicle annually (U.S. Environmental Protection Agency (EPA), 2009). In comparison, the amount of CO<sub>2</sub> buildings generate can be sobering. Each year since 2001, buildings have generated approximately 2 million metric tons of CO<sub>2</sub> equivalent (EIA, 2009). And it's a growing problem – emissions from commercial buildings are accelerating at a faster average annual rate (1.8 percent from 1990 to 2008) than either transportation or residential building emissions (1.4 percent) (EIA 2009).<sup>2</sup>

As noted in the recent news about the VA regional office in Boise, 'sustainability' refers to development that meets current needs without compromising the environment of future generations" (PRNewswire-USNewswire/). To that end, more than 900 city mayors to date have committed to reducing greenhouse gas emissions in their communities by 7 percent or more below 1990 levels by 2012 (U.S. Conference of Mayors Climate Protection Agreement, 2009). The agreement lists a dozen strategies to help communities reach this goal, including:

- ▶ Practicing and promoting sustainable building practices by using USGBC LEED certification program or similar programs
- ▶ Providing education about reducing global warming pollution

- ▶ Adopting land-use policies that reduce sprawl
- ▶ Making energy efficiency a priority through building codes
- ▶ Retrofitting lighting
- ▶ Conserving by increasing water- and wastewater-pump efficiency

Even as awareness about climate change grows and more mayors sign on to climate change agreements, a ground swell of change has been slow to take shape. There are communities making great strides, such as Seattle and Portland, but these cases tend to be the outliers and not yet the norm. Concern that the current goals of the agreement may not be met is real. And the persistence of the sluggish economy, one of the worst downturns in generations, fuels these concerns. Still, whether good times or bad, meeting climate change goals and the growing interest in green building as a construction industry practice makes it worth examining what works in local communities. To that end, this report seeks to provide:

- ▶ A history of green building rating standards
- ▶ Current research on LEED — one of the most widely used green building standards
- ▶ New data drawn from cities and construction industry members specifically for this study
- ▶ An analysis of the data and recommendations for next steps in light of what is already known and in conjunction with the findings from this original research. ☘

<sup>2</sup>The commercial sector includes schools, office building, and shopping malls.



# The Emergence of Green Building and Rating Systems

Almost every day, in every major news outlet, there is some mention of the achievements of a new green building. But there are still many people who are unsure of what really makes a building green. This section talks about the defining characteristics of green building design and construction, the origins of green design, and a brief history of how we have arrived at today's standards and the LEED rating system.

**A** layperson might say that a green building uses environmentally-friendly materials or systems, or perhaps that the developer incorporated processes to reduce resource consumption during construction. Though these are important characteristics, perhaps the most powerful aspect of a green design in the built environment is that practitioners apply a holistic and integrated approach to design and construction. And though we may have veered from such approaches in recent history, the concept actually dates back thousands of years to the origin of the master builder. Most of civilization's significant works of architecture, from the pyramids of Egypt to the classic cathedrals of Europe, were designed and built by the master builder (Dinsmore, 2007). These builder-architects had a far-reaching view of the entire building from design through construction and lifetime operations, incorporating functional passive designs for heating, cooling and lighting. Today, these efficient, passive design features, which consider climatic setting and solar orientation, are mainstays of what is considered to be green building, and

feature strongly in today's green building rating schemes.

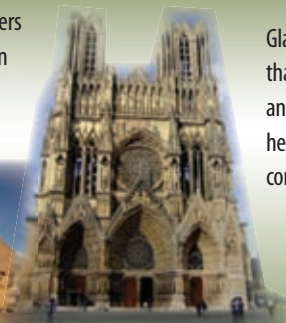
Long before the 20th century however, the master builder had all but disappeared, replaced by designer-artists who received architectural commissions but had little understanding of the building arts. As the separation of architectural design and construction became more distinct, a new business enterprise emerged – that of the general building contractor (Dinsmore, 2007).

Starting in the 1930s, the availability in the U.S. of cheap fossil fuels spurred the development of glass-and-steel structures that could be heated and cooled with massive heating, ventilation, and air conditioning systems (GreenBuilding.com, 2007). New building technologies, including air conditioning, low-wattage fluorescent lighting, structural steel, and reflective glass allowed architects, developers and general contractors to eschew the time-tested methods of the master builders, in favor of these energy intensive technologies.

## Green Building and Rating Systems 3,000 B.C. to 2009 A.D.

3,000 B.C.

Pyramids to Cathedrals -- Master builders of antiquity were responsible for design and lifetime construction.



1,200 A.D.

Glass-and-steel structures that could be heated and cooled with massive heating, ventilation, and air conditioning systems



1930 A.D.

Forward-thinking architects, environmentalists, ecologists begin questioning advisability of energy intensive building practices. Oil prices spike, calling attention to nation's use of fossil fuels.



1970 A.D.

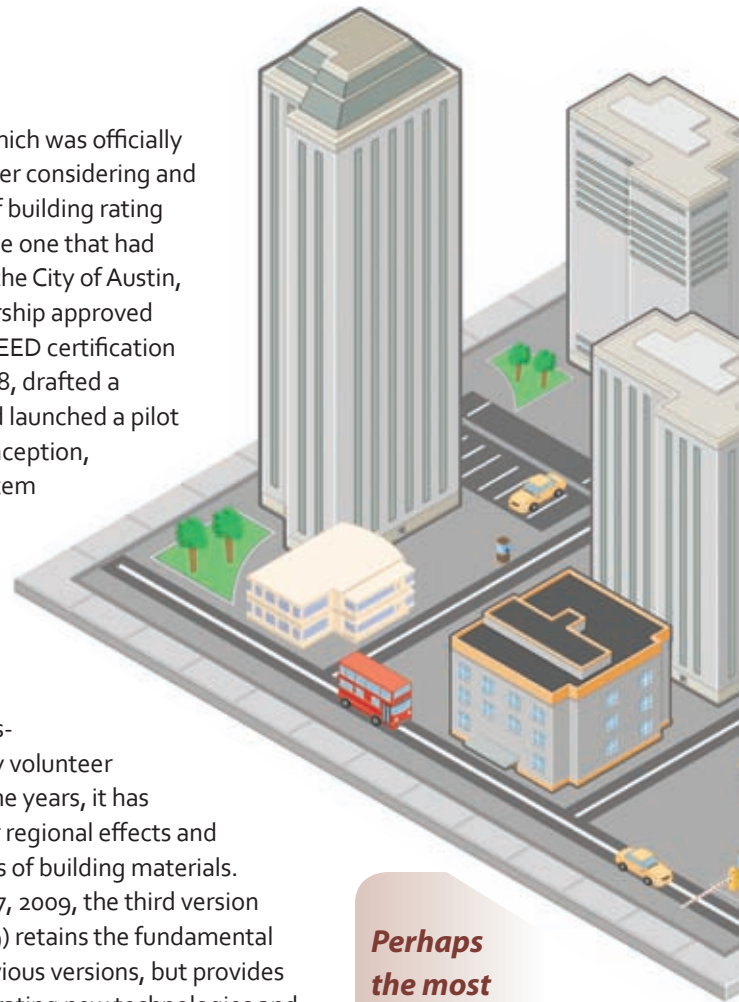


By the 1970s, suburban development based on these technologies was rampant and some forward-thinking architects, environmentalists, and ecologists began to question the advisability of such energy intensive building practices. But it was the OPEC oil embargo of 1973, spiking gasoline prices, and lines at gas stations that finally caught the attention of the American public and called into question the nation's heavy reliance on fossil fuels for transportation and buildings (Building Design & Construction, 2003).

Still, it would be another two decades before the EPA and the U.S. Department of Energy would launch the ENERGY STAR program and the City of Austin, Texas would introduce the first local green building program. In 1993, President Clinton introduced the "Greening of the White House" initiative. Through the collaboration of environmentalists, design professionals, engineers, and government officials, numerous off-the-shelf improvements led to \$300,000 in annual energy and water savings, and reductions in landscaping expenses, waste management costs, and carbon emissions at the executive mansion (Building Design & Construction, 2003). The success of this landmark effort led to a flurry of federal greening projects and gave new life to the sustainable building movement.

At the same time, the efforts by professionals from a variety of public and private companies, organizations and agencies (including the American Institute of Architects, the Rocky Mountain Institute, the Carrier Corporation, Herman Miller Inc., the Department of Energy, and the National Institute of Standards and Technology, along with many others) led to the development of the U.S. Green Building

Council (USGBC), which was officially founded in 1993. After considering and rejecting a variety of building rating models, including the one that had been developed by the City of Austin, the USGBC membership approved the first version of LEED certification requirements in 1998, drafted a reference guide, and launched a pilot program. Since its inception, the LEED rating system has undergone various iterations. A key characteristic of LEED is its evolution through a consensus-based process led by volunteer committees. Over the years, it has changed to consider regional effects and the life cycle analysis of building materials. Launched on April 27, 2009, the third version of LEED (LEED 2009) retains the fundamental structure of the previous versions, but provides avenues for incorporating new technologies and prioritizes energy use and CO<sub>2</sub> emissions. LEED 2009 incorporates five separate commercial and institutional building rating systems: new construction, core and shell, commercial interiors, existing buildings, operations and maintenance, and schools. Other LEED rating systems exist for homes, neighborhood development, retail, and healthcare. There are currently 35,000 projects participating in the LEED system, comprising over 4.5 billion square feet of construction space in all 50 states and 91 countries (U.S. Green Building Council, 2010). ☞



**Perhaps the most powerful aspect of a green design in the built environment is that practitioners apply a holistic and integrated approach to design and construction**

1993 A.D.



"Greening of the White House" by President Clinton.

1998 A.D.



U.S. Green Building Council members approve first version of LEED certification requirements.

2009 A.D.

Third version of LEED (LEED 2009) retains fundamental structure of previous versions, but provides avenues for incorporating new tech and prioritizes energy use and CO<sub>2</sub> emissions.









# What Is Really Known About the Pros and Cons of Green Building? – Research Evidence

What is really known about green building practices and more specifically, the effects of implementing LEED standards? There has been a great deal of discussion – and more than a small amount of hype – about green building. That discussion has coincided with growing awareness about the impact of human activity on the global climate and a growing urgency to conserve energy and curb emissions. Evidence and research substantiate some of the discussion, while other discussion areas fall into the categories of anecdote or hearsay. How does one separate fact from fiction? There is a large body of documented research available for LEED-certified buildings (as opposed to data on buildings designed and constructed using other green guidelines), so this section reviews that research to see what is currently known about the pros and cons of building green within the LEED framework.

## Costs

The U.S. development community largely retains the perception that new or retrofitted LEED-certified green buildings cost more than conventionally constructed buildings. Though there can be real and perceived first cost premiums, many building owners – particularly in the public sector – are realizing long-term savings in lower operating and maintenance costs as well as in the significant costs associated with personnel or tenant attraction, retention and productivity.

### First Costs

One of the biggest obstacles to adopting green building practices in general, and LEED certification specifically, is a perception that those buildings will cost more to construct. Peter Morris and David Langdon's 2007 article "What Does Green Really Cost?" asserts:

The most common reason cited in studies for not including green elements into building designs is the increase in first cost. People who are green averse are happy to relate anecdotes of premiums in excess of 30% to make their buildings green. The numbers are simply not, however, borne out by the facts, as evidenced by many studies of the cost of green building. Even though there is no one-size-fits-all answer to the cost question, it is clear from the

substantial weight of evidence in the marketplace that reasonable levels of sustainable design can be incorporated into most building types at little or no additional cost (Morris & Langdon, 2007, p. 55).

The USGBC in a 2002 National Trends for High-Performance Green Buildings report chimed in on this issue as well, citing the importance of evaluating the costs of a building's life cycle, rather than looking only at first costs. They concluded:

Of the total expenditures an owner will make over the span of a building's service lifetime, design and construction expenditures, the so-called "first costs" of a facility, account for just 5-10 percent. In contrast, operations and maintenance costs account for 60-80 percent of the total life-cycle costs. Unfortunately, decision-makers rarely use life cycle cost analysis to link capital and operating expenses. Therefore, energy savings, decreased worker absenteeism, and higher productivity are not universally accounted for in the cost equation (USGBC, 2002, p. 17).

However, that same study admitted that there were still real and perceived higher first costs associated with incorporating green design features:

While many green buildings are designed and constructed at comparable or even lower costs than conventional buildings, environmental performance features can add costs to design and construction expenditures. According to green building professionals, such initial cost increases generally

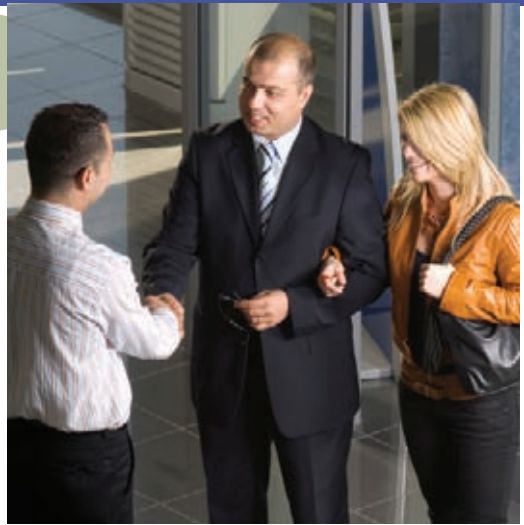




**The California university's main reason for adopting green building practices was to offset the projected future increases in electrical consumption and energy rates.**

range from an average of 2 to 7 percent, depending on the design and extent of added features (USGBC, 2002, p. 17).

Yudelson, (2007) found that "28% of survey respondents thought that green building carried a four percent or more cost premium" (p. 10). In the same study, 48 percent of respondents cited perceived cost increases as the biggest barrier to green building, and 40 percent perceived that they had not received an adequate amount of publicity or new business for their decision to build green (Yudelson, 2007, p. 11). We can speculate that this may be more of an obstacle in the United States where the development model shows a tendency to develop a building and then sell it shortly after construction. In this approach, developers seek to minimize short-term construction costs up front because they intend to sell the building immediately. This short turnaround sales model means that developers themselves do not enjoy



acknowledged – cost benefits as well. For example, one California study looked at the economic impact of green building policies at a university. The authors found that the university already employed many sustainable practices in the construction of its buildings although the practices varied widely from project to project. The university's main reason for adopting green building practices was to offset the projected future increases in electrical consumption and energy rates. To evaluate future impacts, the university chose to take a systems approach to green building, extending the time frame against which it measured economic costs and benefits.

The report recommended that the university's policy include a requirement that "campus design standards incorporate a minimum number of sustainability attributes such that all new buildings will achieve the equivalent of a certified rating using the LEED system" (Bade, 2003, p. 4). To achieve this goal, the study recommended that the university include performance measures in the project-programming and budget-setting processes (Bade, 2003).

At the time the report was published there was "no mandate to document the costs of specific design features meant to achieve green ratings. Therefore, there are no comprehensive data reflective of the probable cost of specific green measures" (Bade, 2003, p. 16). However, there was evidence to suggest that the university could achieve LEED certification without increasing current standard building budgets. The greatest initial capital expenses are related to energy efficiency and water conservation.

A cost review by Langdon in 2007 was quite thorough. This study was notable because it not only included hundreds of buildings, but also because it took the unusual step of categorizing

**The U.S. developer in the public sector who owns and maintains a new building is in a position to realize the lower operating and maintenance costs that can result from building green.**



the longer-term building efficiencies resulting from lower operating and maintenance costs, and thus are not motivated to incorporate green design features that provide long-term cost savings.

**Longer-term Cost Savings and Profitability**

Counter to the short-term development model, the U.S. developer in the public sector who owns and maintains a new building is in a position to realize the lower operating and maintenance costs that can result from building green. In addition, the more holistic approach that LEED certification promotes results in other significant – but less

results by building type. As a result, the study allows readers to compare costs for academic buildings, library buildings, laboratory buildings, community centers, and ambulatory care facilities. Perhaps more importantly, the study evaluated costs associated with each of the LEED credit areas, thus allowing developers to filter for potentially expensive credits early in the design process.

In a 2008 study, Lockwood also evaluated commercial retrofit costs. In his report, he asserts that:

A growing number of companies are implementing green retrofits of their buildings to save money, improve productivity, lower absenteeism and healthcare costs, strengthen employee attraction and retention, and improve their corporate sustainability reports and brand equity — all at a relatively modest cost. However, timing is important for companies seeking to use green retrofits as a point of competitive differentiation (Lockwood, 2008, p. 1).

Lockwood's mention of timing is perhaps an important factor. Innovators in a market usually derive a premium early in the process. For instance, those companies who first produced electronic calculators were able to demand a higher premium until those devices became more commonplace. Ultimately, Lockwood is suggesting that those who are quicker to implement green retrofits on their buildings may have the advantage of better competitive differentiation with corresponding rewards.

Yet another study looked at the incremental cost savings of Enterprise Green Communities Criteria, an investment capital and development organization that devises solutions for affordable housing and community revitalization (Bourland, 2009). As an organization, Enterprise has invested more than \$10 billion since 1982 to help finance more than 250,000 affordable homes in communities nationwide. Enterprise Green Communities Criteria requires housing developers to implement mandatory as well as a required number of optional criteria. This study found that:

When considering the benefits revealed in our study, the average cost per dwelling unit to incorporate the energy and water criteria was \$1,917, returning \$4,851 in predicted lifetime utility cost savings (discounted to 2009 dollars).

In other words, the energy and water conservation measures not only paid for themselves but also resulted in savings of 2.5 times over the projected lifetime costs. Moreover, water cost savings shared in this report are almost certainly underreported, given that they were unable to obtain complete data on sewer fee savings, which are a direct result of water-conservation measures (Bourland, p. 3, 2009).

Another long-term factor to consider is that some costs associated with green building appear to be tied to a learning curve. Once expertise with green building practices and the certification standards are developed, costs may go down. However, the learning curve can present a significant barrier on its own. While green developers can make real gains in

**Energy and water conservation measures not only paid for themselves but also resulted in savings of 2.5 times over the projected lifetime costs.**



**While green building projects that include a focus on energy efficiency do provide energy savings, researchers continue to gather the evidence.**

increasing short-term profits by carefully evaluating and selecting LEED credit areas that will have the maximum return, they may also find ready financial arguments to avoid green building practices due to the burden associated with learning something new.

### ***Balancing Short- and Long-term Interests***

According to Langdon, “Many projects are achieving LEED certification within their budgets, and in the same cost range as non-LEED projects” (Langdon, 2007, p. 3). Costs are related to but separate from benefits. Many benefits derived from green building practices do not appear on short-term ledgers, but developers and owners may be able to realize them during the lifetime of the home or commercial building.

What the trend toward long-term gains from green building does suggest is that those operating buildings over the long term can expect to see greater gains. Typically, these types of owners – federal, state, and local governments, as well as other long-lived institutions – may see the greatest return on investment. Also, developers relying on short-term sales models can actively market such benefits to potential owners – owners who may be very interested in long-term operating efficiencies once they are made aware of them – to help offset any additional first costs.

From another perspective, Langdon suggests that, “in many areas of the country, the contracting community has embraced sustainable design, and no longer sees sustainable design requirements as additional burdens to be priced in their bids” (Langdon, 2007, p. 3).

### ***Building Performance***

A key reason that project personnel adopt LEED standards and pursue LEED certification is to realize potential energy savings in the building’s day-to-day operational costs. While it appears that green building practices do indeed provide some energy conservation savings, the case that LEED certification directly correlates with energy savings is not yet water-tight.

In fact, actual energy savings in some LEED-certified buildings have been disappointing. This may be due, in part, to the nature of LEED certification itself. Some building designers pursue LEED certification specifically to gain maximum energy savings. However, it is feasible for project personnel to deemphasize the pursuit of energy efficiency and gain LEED certification by instead emphasizing

the pursuit of credits in site selection, water use or other areas. That said, even when builders do seek to achieve increased energy efficiencies in their buildings, they may not always reach intended conservation levels. To study this issue, the USGBC has started to require all new LEED buildings to collect operating data after construction in an effort to connect the anticipated efficiencies to the building’s day-to-day operational costs. In short, while there is some solid evidence that those green building projects that include a focus on energy efficiency do provide energy savings, researchers continue to gather evidence.

### ***Human Performance***

A developer who can realize at least a minimal financial gain may find additional incentives to pursue green building design and development by examining externalized costs that are traditionally overlooked. What are some of the real costs of not including green building strategies into the design of future buildings on the people who work in those buildings? And what can the developer adhering to



a short-term sales model do to draw attention to these benefits in a way that offsets first costs? It is certainly feasible to promote the “greater good” of your community while maintaining profitability.

Watson (2008, p. 10) asserts that “the construction and operation of buildings requires more energy than any other human activity. The International Energy Agency estimated in 2006 that buildings used 40 percent of primary energy consumed globally, accounting for nearly a quarter of the world’s greenhouse gas emissions.” In addition to cost and benefit comparisons and energy savings related to building performance, green building has other direct and indirect economic benefits including occupant satisfaction and improvements in employee productivity, performance and retention (Bade, 2003). “Salaries represent



approximately 90 percent of the money flow through a building, the rest being amortized construction costs, operations and maintenance, including utilities” (Watson, 2008, p. 14). While developers typically have less of a stake in employee productivity within a building, this suggests a powerful marketing point developers can make with potential building owners to recoup building costs by increasing the value of their building.

There is relatively strong evidence that building characteristics and indoor environments significantly influence the occurrence of communicable respiratory illness, allergy and asthma symptoms, sick building symptoms, and worker performance. Smith (2003) reports:

An increase of 1 percent in productivity (measured by production rate, production quality, or absenteeism) can provide savings to a facility that exceeds its entire energy bill. It is easy to see why this is the case by comparing the relative operating costs for commercial business. On average, annualized costs for personnel amount to \$200 per square foot – compared with \$20 per square foot for bricks and mortar and \$2 per square foot for energy. A modest investment in soft features, such as access to pleasant views, increased daylight, fresh air, and personal environment controls, can quickly translate into significant bottom-line savings.

Theoretical and limited empirical evidence indicate that existing technologies and procedures can improve indoor environments in a manner that increases health and productivity. Available existing research allows only rough estimates of the magnitude of productivity gains that operators might realize by providing better indoor environments. However, as Fisk (2000) says, “the projected gains are very large. For the United States, the estimated potential annual savings plus productivity gains, in 1996 dollars, are approximately \$40 billion to \$200 billion.” The potential savings and productivity gains are larger than the total estimated cost of energy used in buildings. For the United States, the estimated potential annual savings and productivity gains are \$6 to \$14 billion from reduced respiratory disease, \$1 to \$4 billion from reduced allergies and asthma, \$10 to \$30 billion from reduced sick building syndrome symptoms, and \$20 to \$160 billion from direct improvements in worker performance that are unrelated to health.

Judith Heerwagon, in a study she conducted in 2000, suggested that “green buildings can provide both cost reduction benefits and value added benefits. The emphasis to date, however, has been



on costs, rather than on benefits. The need for more data on value added benefits underscores the importance of studies that focus on these human and organizational factors.” She goes on to say:

It is also important to recognize that the benefits of green buildings are more likely to occur when the building and organization are treated as an integrated system from the start. As pointed out by Cole (1999), it is entirely possible to have a “green” building with “gray” occupants due to a lack of systems integration and lack of training on how to use the technologies in the most efficient and effective way. Gray occupants are also more likely to be found in buildings that “green” individual systems rather than the environment as a whole or in buildings which focus primarily on technology to the exclusion of building features that yield their effects through social and psychological mechanisms. And finally it is possible for “gray” organizations to exist in green buildings, thereby passing up significant opportunities for high-level benefits resulting from resource efficiency and process innovation throughout the organization (Heerwagon, 2000, p 20).

While some of the implications on building energy efficiency, as a result of the growing knowledge about productivity gains from better indoor environments, are uncertain, one might suppose that quantified and demonstrated productivity gains could spur the development of energy efficiency measures that have a positive impact on human performance.

A University of California study suggests that the greatest initial capital expenses on green projects relate to achieving higher levels of energy efficiency and water conservation. External costs associated with certification systems – most notably high consulting fees – also add significantly to overall project costs. These are costs that the developer normally shoulders, so it should be little surprise that developers resist these added costs. However, as already established, some of the greatest gains from green building come through increased employee productivity, and those gains are realized

***There is relatively strong evidence that building characteristics and indoor environments significantly influence the occurrence of communicable respiratory illness, allergy and asthma symptoms, sick building symptoms, and worker performance.***

not by developers, but by the building's tenants. This suggests that, when marketing those buildings to potential tenants, developers and owners can set a premium on indoor environments designed to increase productivity. The result would potentially be a win-win-win situation among developers who may be able to realize premiums from green buildings, owners collecting increased revenues for leased space, and tenants gaining increased efficiency and productivity resulting in a significant impact on their organization's bottom line.

Building stakeholders are increasingly recognizing the myriad benefits of green buildings beyond energy cost savings. In particular, this trend appears to be driving some of the exponential growth in the green building industry in Canada. There is currently a strong business case for green building in Canada that emphasizes a more holistic, longer-term view of real building costs. Developers can further strengthen this business case through focused collection of evidence on the benefits of their buildings and educating building stakeholders about productivity costs they may not be considering. For example:

- ▶ Good daylighting may increase productivity by 13 percent, retail sales by 40 percent, and school test scores by five percent
- ▶ Increased ventilation may increase productivity by four to 17 percent
- ▶ Better quality ventilation can reduce sickness by nine to 50 percent
- ▶ Increased ventilation control may increase productivity by as much as 0.5 to 11 percent

From a human performance standpoint, green buildings can offer numerous unique benefits when compared to conventional buildings, and there are strong indications that these benefits substantially outweigh the relatively small increase in construction costs.

## Performance Measurement

Much of the debate over the move toward green building practices has to do with developing a set of standard building performance measures and when to begin measurement. One report concludes that "adding

sustainable building measures after the design direction of the project has been established is typically far more expensive than incorporating them from the outset" (Bade, 2003, p. 4).

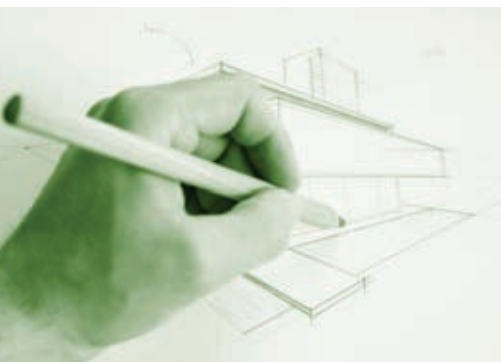
Birt and Newsham (2009) conclude that early generations of green-certified (including but not limited to LEED) commercial buildings now have several years of occupancy behind them and enable us to examine if they are living up to expectations. Their paper reviews several of the post-occupancy evaluations that researchers have performed. The problem they ran into was that only a limited number of such evaluations were available in the public domain. This access problem made it more difficult to draw solid conclusions. However, they tell us that "trends suggest that green buildings on average seem to be delivering reduced energy use, however, a large spread in performance is often observed meaning that individual buildings do not always perform as expected. Occupant satisfaction with some aspects of the indoor environment appears to have improved compared to conventional buildings, but there are areas where expected improvement trends are not realized."

## Progress in Adopting LEED Standards

When evaluating LEED standards adoption, it is worthwhile to examine whether projects that seek LEED certification are actually successful in achieving certification.

As of 2008, about six percent of new commercial construction projects applied for LEED certification. Of these applicants, only 25-30 percent ultimately gain certification (Watson, 2008, p. 3). Some projects apparently apply for certification in order to gain access to incentives such as fast tracking on permits without any real intention of following through with certification. Others may intend to follow through with certification but run into obstacles and never achieve final approval. Though the high attrition rate is discouraging, it is important to keep in mind that the initial six percent figure looks only at projects specifically pursuing LEED certification. The figure does not encompass projects whose personnel pursue other energy certification, nor those who use green building practices but – for various reasons – choose to avoid certification altogether.

*"... adding sustainable building measures after the design direction of the project has been established is typically far more expensive than incorporating them from the outset"*







## Community and Developer Incentives

Which green building incentives have proven most effective? The list of potential incentives can be long, but there are a few that seem to have better track records than others. Suggested incentives for cities to promote green building practices among the development community include offering (Watson, 2008):

- ▶ Lower utility connection fees
- ▶ Accelerated permit approval
- ▶ Density bonuses
- ▶ Carbon pricing
- ▶ Improved building codes
- ▶ Construction worker training programs
- ▶ Market education

However, Yudelson's (2007) survey research concluded that "developers are aware of these incentives, but don't always use them. One reason is that the timing of development decisions and the response time of local government don't always mesh together." From the developers' point of view money is important (in the form of tax reductions), but equally – or more important – are:

- ▶ A faster time to market
- ▶ More certainty in the development approval process
- ▶ Additional flexibility to add more space if market conditions warrant (Yudelson, 2007, p. 12)<sup>3</sup>

Furthermore, 62 percent of respondents said local government incentives are necessary to accelerate green building development. To make these incentives as effective as possible, governments should involve the developers in the discussion about incentive development. Yudelson points out that this is important due to the diverging motivations among the development community. For example:

- ▶ Architects cited marketing/good publicity as the most significant reason to build green
- ▶ Developers cited density bonuses as the most significant reason

## A Summary of What the Research Tells Us

The research offers several conclusions for governments and the development community as summarized in the table below. ☞

**Table 1: Summary of Main Points from Reviewed Research**

TAKEAWAY	DESCRIPTION/SUPPORT
Develop a more comprehensive view that goes beyond energy measures	Offsetting energy consumption is only one of many benefits to green building development.
Do not assume that green building will cost more	"Many projects are achieving LEED certification within their budgets, and in the same cost range as non-LEED projects" (Langdon, 2007, p. 3).
Involve developers in setting incentives	For governments to make green building incentives as effective as possible, they should involve the developers in identifying incentive priorities.
Building owners and the environment can both win	"Many measures that benefit the environment also improve both direct and indirect life-cycle cost performance of facilities. There are great prospects for developing win-win strategies" (Bade, 2003, p. 4).
Incorporate measures from the outset	"Adding sustainable building measures after the design direction of the project has been established, is typically far more expensive than incorporating them from the outset" (Bade, 2003, p. 4).
To reduce green development costs, be selective about certification choices	"Many projects can achieve sustainable design within their initial budget, or with very small supplemental funding. This suggests that owners are finding ways to incorporate the elements important to the goals and values of the project, regardless of budget, by making choices and value decisions" (Langdon, 2007, p. 11).
As governments promote green building, consider that contractor resistance to sustainable design practices may be lessening	"In many areas of the country, the contracting community has embraced sustainable design, and no longer sees sustainable design requirements as additional burdens to be priced in their bids" (Langdon, 2007, p. 3).
Becoming more familiar with LEED documentation requirements may provide a more realistic understanding of costs	"The cost of LEED documentation remains a concern for some project teams and contractors. As construction and design teams become accustomed to the requirements, the concern is abating somewhat" (Langdon, 2007, p. 3).
Consider that the benefits greatly exceed cost alone	"Green buildings can provide both cost reduction benefits and value added benefits. The emphasis to date, however, has been on costs, rather than on benefits" (Heerwagan, 2000, p. 20).
To better market green building construction and retrofitting, educate potential owners about productivity costs	"While operational savings are important, the financial benefits in LEED are achieved primarily through the enhancement of employee productivity. Salaries represent approximately 90% of the money flow through a building, the rest being amortized construction costs, operations and maintenance, including utilities" (Watson, 2008, p. 14).
Operation and Maintenance cost savings directly benefit long-term building owners, and can provide a significant marketing angle for the developer	Energy and water conservation measures can easily pay for themselves and then some over the projected lifetime of the building (Bourland, 2009).

<sup>3</sup> These items were not in a bulleted list in the source document but are displayed in bullets here for additional clarity.





*To get an initial picture of the potential differences and commonalities of city professionals and building developers, four focus groups were conducted.*

## Research Methods and Findings

In conducting original research, focus groups and interviews were used to develop survey questions that would provide empirical evidence to better sort out the barriers and incentives that exist for green building and LEED initiatives.

### Focus Groups

Focus groups were conducted in Boise, Idaho with two key stakeholder parties: city planners and public works professional as well as building developers and owners. The goal was to examine the differences and commonalities in the responses between the focus groups, with the objective of eventually understanding more about the incentives and barriers to green building for both cities and the development community.

#### Focus Group Questions

Focus group participants were asked to respond to the following questions within the context of green building practices in general, and then for LEED certification standards specifically:

- ▶ What are the overall factors that encourage green building?
- ▶ What incentives or information encourage the adoption of green building?
- ▶ What are the specific barriers to the adoption of green building practices?
- ▶ What tools or support would encourage you to adopt green building practices?
- ▶ Are there any other things that might impact the adoption of green building practices?

#### Focus Group Methodology

An adaptation of nominal group technique is used as an alternative to brainstorming as our process for collecting responses to the above open-ended questions. At the end of the process there is a prioritized list of solutions or recommendations. Specifically, after the conclusion of each focus group, we tabulated the results of the rankings according to the following scheme:

*Table 2: Ranking Values for Focus Group Responses*

RANK ASSIGNED BY PARTICIPANT	WAS WORTH
A ranking of 1 (most important)	5 points
A ranking of 2	4 points
A ranking of 3	3 points
A ranking of 4	2 points
A ranking of 5 (least important)	1 points

The points for each factor were then added and tallied to come up with the final ranking as shown in the tables following.

#### Focus Group Results

To get an initial picture of the potential differences and commonalities of *city professionals* and *building developers*, four focus groups were conducted: the first two with city planners and public works personnel, and the second two with developers, construction industry members, and architects. Each type of stakeholder had two separate focus groups. Each group generated their own ideas and rankings. As a result, the ideas (factors) generated by the separate focus groups for each of the questions often do not match exactly. Where they did match exactly, the results were combined. Where there was any significant difference (i.e., "Education" and "Consumer Education") they are left separate. The following tables show responses to each of the questions listed first by highest point value, and second (where points were equal) alphabetically.

#### **City Professionals - Question 1: What are the overall factors that encourage green building?**

City planners and public works professionals had a broad spread of responses on this question as indicated by the many items with low score totals. As a result, there were fewer factors that stood out

**Table 3: City Planners and Public Works Professionals' Ranking of Factors that Encourage Green Building**

RANK	RESPONSE / FACTOR	RANKING POINTS
1	Codes and ordinances requiring green building practices	9
2	Cost / Benefit data	9
3	Lower life-cycle costs of green buildings	9
4	Marketability of green buildings	9
5	Political vision	8
6	Public outreach and education	8
7	Current market demand	7
8	Supportive political climate	7
9	Codes that support green building	6
10	Bragging rights	5
11	Community branding	5
12	Contribution of green buildings to the environment	5
13	Financial benefits and support	5
14	Improvement of green designs	5
15	Increased ease of certification or recognition	5
16	Proven data on ROI	5
17	Citizen interest	4
18	Comprehensive plan, goals and objectives for green building	4
19	Improve materials and construction technologies	4
20	Increased longevity of green buildings	4
21	Policy alignment throughout hierarchy	4
22	Educate developers, architects and financiers of green building practices	3
23	Increased health of green buildings	3
24	Liaison with public utilities	3
25	Local champion	3
26	Energy grants	2
27	Ethical considerations	2
28	Green marketing	2
29	Remove regulatory obstacles	2
30	Operational efficiency of green buildings	1
31	Policy support at state and federal levels	1
32	Reduced construction costs	1
33	Regulatory mandates	1
34	Value marketing green products	1

**Table 4: City Planners and Public Works Professionals' Ranking of Incentives that Encourage Green Building**

RANK	RESPONSE / FACTOR	RANKING POINTS
1	Fast tracking and approval of green projects	28
2	Density bonuses for green buildings	21
3	Recognition for green builders and developers	16
4	Focus on social responsibility	14
5	Increased ROI on green buildings	10
6	Infrastructure cost rebates	9
7	Tax credits	9
8	Utility incentives	8
9	Enhanced political awareness	6
10	Reduced impact fees	6
11	Data proving ROI	5
12	Impact fee offsets	4
13	Information exchange with private sector	4
14	Basic information on green building practices	3
15	Regulations to provide predictability	3
16	Special financing for green projects	2
17	LEED Branding	1
18	Low impact development incentives	1

numerically in the rankings. The primary factors that participants listed were codes and ordinances that require green building, cost/benefit data, the lower life-cycle costs of green building, and the marketability of green buildings. These were seen as the primary factors that encourage adoption. The next factors (6 and 7) may be connected since public outreach and education might be seen as leading to increased consumer demand for green building. The last category of factors at the top of this list appears to be political. Items 5 and 8 suggest that planners and public works professionals see a need for both political vision and support for green building.

***City Professionals - Question 2: What incentives or information encourage the adoption of green building practices?***

With regard to incentives and information, the spread on the responses to this question was narrower than for Question 1. City planners and public works professionals perceived that fast tracking and approval of green projects was an important incentive to adoption. That response appears to dovetail with the second most important factor, density bonuses, in that both have a potential financial impact on developers. This is further supported by item 5, "Increased ROI on green buildings." In fact, going down this list from top to bottom there was a clear emphasis on financial incentives either through reducing costs or providing positive incentives for green building. Finally, city planners also saw the factor of social responsibility as a perceived incentive for adopting green building practices.

***City Professionals - Question 3: What are the specific barriers to the adoption of green building practices?***

Despite the larger number of responses to this question, city planners and public works professionals were still able to identify some common factors that pose a barrier to the adoption of green building practices. First and foremost were the up-front costs associated with green building. That, combined with the downturn in the economy suggests the additional importance of financial factors. Second to the financial factors, city professionals listed "Fear of the unknown" as a barrier which, when combined with "Resistance to change / integration"



**Table 5: City Planners and Public Works Professionals' Ranking of Barriers to Green Buildings**

Rank	Response / Factor	Ranking Points
1	Up-front cost	28
2	Bad economy	13
3	Fear of unknown	12
4	Political mindset	11
5	Resistance to change / integration	10
6	Lack of regulatory support	7
7	Perception that there is no problem	7
8	Conflict of standards	5
9	Cost of certification process	5
10	Lack of capacity to deal with new technologies	5
11	Not a high priority	5
12	Reluctance to build smaller	5
13	Complexity of green certification	4
14	Cultural resistance	4
15	Lack of consumer education	4
16	Lack of professional education	4
17	Outside comfort zone	4
18	Reluctance of consumers to go green	4
19	Lack of infrastructure support	3
20	Lack of unified green industry vision and standards	3
21	Uneven regulations	2
22	Aversion to regulation	1
23	Difficulty of certification for certain building types	1
24	Lack of case studies for common person	1
25	Lack of standards	1
26	Up front cost of change	1

**Table 6: City Planners and Public Works Professionals' Ranking of Tools that Encourage Green Building**

Rank	Response / Factor	Ranking Points
1	Educated staff, developers and public	21
2	Educational resources and support	18
3	Local legislative support	13
4	Political will	13
5	Trained staff	12
6	Appropriate ordinances and regulations	10
7	Government leadership by example	8
8	Good examples with details	7
9	Training for builders and developers	6
10	Monetary incentives	6
11	Local examples	5
12	Regulatory reform at state level	5
13	Awards and recognition	4
14	Political support	4
15	Assistance in bringing stakeholders together	3
16	Model ordinances and codes	3
17	Public awareness	3
18	Clearinghouse of green building information	2
19	Local champion	2
20	Planner support	2
21	Codes and ordinances	1

(Item 5) suggests possible room for change management strategies.

A change management strategy, for example, might entail cities addressing cost concerns that are high. In this instance, cities would be wise to emphasize the financial benefits of green building while directly addressing cost worries. To address fears of the unknown, they can try to deliver information, demonstrations, and training in convenient forms and venues and in easily digestible chunks. If these strategies are closely coordinated with the end users' stages of adoption (listed elsewhere in this report) then they are likely to be more effective in making frightening "unknown" factors of green building more acceptable, thus enabling constructive dialogue on solutions.

The final barrier listed by city planners and public works professionals was political mindset.

***City Professionals - Question 4: What tools or support would encourage you to adopt green building practices?***

When responding to the question about tools or support, city planners and public works professionals clearly ranked education for all stakeholders (municipal staff, private developers, and the public at large) as the most important. In fact, the combination of items 1, 2, and 5, totals 51 points just for education and training. The second most important factor listed by planners dealt with political will and local legislative support. Items 3, 4, 6, and 7, show a combined political and legislative factor that pulls in 44 points. Other factors on the list could be pulled in for further support of these categories, but even without doing so, education and political support garner a combined 95 out of 148 possible points.

***City planners and public works professionals perceived that fast tracking and approval of green projects was an important incentive to adoption.***

**Building Developers - Question 1: What are the overall factors that encourage green building?**

The primary factors identified and prioritized here suggest that first, members of the development community perceived that consumer demand drove the adoption of green building practices. The second and third factors combined demonstrated interest in a strong return-on-investment (ROI), supported by historical evidence that ROI can be achieved in the local market. This was followed by a perceived need for adding value to customers and educating developers and suppliers.

**Building Developers - Question 2: What Incentives or information encourage the adoption of green building practices?**

It is clear in the responses to this question that members of the development community viewed financial considerations as the primary driver for the adoption of green building practices. After financial incentives, a sense of social responsibility came in as second most important. The third highest factor was "Product information and trending" which appears to coincide with "Consumer desire / Market demand" in Question 1. Responses 5 and 7 suggest a perception among developers that the impact of the approval process with municipal planners was important both in providing consistent guidelines and feedback, as well as in the speed of the review process.

**Building Developers - Question 3: What are the specific barriers to the adoption of green building practices?**

The primary responses to this question of barriers dealt with three factors. The first of these was the cost of certification. This was particularly true with certification requirements by specific green building standards such as LEED. The second factor was "Lack of Education" for consumers, suppliers and contractors. The third category of important responses seemed to deal with perceptions associated with the descriptors themselves: misconceptions, skepticism, and perceived costs. These may suggest that the participants recognized that there was a disconnect between the realities of green building and how green building was perceived by various groups. Here too, the impact of cost concerns was evident as both "Certification cost" and "Perceived costs" were among the five most important factors.

**Table 7: Members of the Development Community's Ranking of Factors that Encourage Green Building**

Rank	Response / Factor	Ranking Points
1	Consumer desire / Market demand	18
2	Energy savings / ROI	14
3	Historical Local ROI Data showing success	14
4	Added value for customers	11
5	Education	11
6	Expedited review process	8
7	Market differentiation	7
8	Cost and availability of resources	7
9	Consumer education	6
10	Increased health / productivity	6
11	Industry trends	6
12	Health of occupants	6
13	Corporate green goals	4
14	Higher appraisals for green buildings	4
15	Political change	4
16	Association with green movement	3
17	Lowering carbon footprint/environmental impact	3
18	Ability to guarantee work based on commissioning	2
19	Reduced impact on health	2
20	Support of local utilities	1

**Table 8: Members of the Development Community's Ranking of Incentives that Encourage Green Building**

Rank	Response / Factor	Ranking Points
1	Reduced permits and fees	24
2	Historical local ROI data	16
3	Social responsibility and awareness	11
4	Product information and trending	11
5	Interagency coordination and cooperation	11
6	Saving money on utilities	10
7	Expedited review process	10
8	Perceived health benefits	8
9	Ease of certification for NAHB	7
10	Financial kickbacks	7
11	Reduced impact fees	7
12	Financing Incentives for green projects	7
13	Increased value of green buildings	6
14	Tax incentives	4
15	National focus	3
16	Ideology	1
17	Up-front planning and analysis	1
18	National media exposure	1
19	National focus	1
20	Decreased insurance rates for green buildings	1



**Members of the developer community perceive that consumer demand is driving the adoption of green building practices.**





***Building Developers - Question 4: What tools or support would encourage you to adopt green building practices?***

Consumer education topped the list of perceived tools or support that members of the development community saw as important to adopting green building practices, but not by much. The next three tools and support factors (2, 3, and 4) all dealt with reducing costs. One interesting desired tool was a “Certified Resource Database” listing certified suppliers of resources and services that meet the requirements for green building. Currently developers have to actively hunt down green building resources from a variety of sources. A single clearinghouse of data on these would, they suggested, have been useful in adopting green building.

**Table 9: Members of the Development Community’s Ranking Barriers to Green Building**

Rank	Response / Factor	Ranking Points
1	Certification cost	14
2	Lack of education	14
3	Misconceptions	13
4	Skepticism	13
5	Perceived Costs	12
6	Lack of agency coordination	11
7	Complexity of certification paperwork	8
8	Green washing	8
9	Availability of resources	8
10	Lack of available resources	5
11	Lack of consumer interest and demand	5
12	Commissioning cost	4
13	Low existing cost of utilities	4
14	Fragmented policies	4
15	High cost of green products	3
16	Lack of qualified sub-contractors	3
17	Process uncertainty	3
18	Educating Children	2
19	Cost of certification	1

**Table 10: Members of the Development Community’s Ranking of Tools that Encourage Green Building**

Rank	Response / Factor	Ranking Points
1	Consumer education	15
2	Waiver of impact fees	14
3	Expedited review process	13
4	Tax incentives	11
5	Certified resource database	11
6	Government and association marketing	10
7	Implementation of incentive programs	10
8	Education of building professionals	9
9	Local marketing	7
10	Local vendors and expertise	6
11	References and checklists	6
12	Tiered education program	6
13	BIM real-time modeling software	6
14	Web-based tools	5
15	Educating children	4
16	More material availability	2

***Return on investment and consumer demand were some of the most salient factors for construction professionals.***



***Local government professionals felt strongly about the education of the public with regard to the value of green building.***

**Focus Groups - Comparison**

Comparing answers between the two groups on each question may be helpful in further communication and developing useful strategies and policies regarding green building. Table 11 shows the top five responses for city planners and public works professionals and members of the development community side by side for each question. By understanding the differing perspectives of the two stakeholder groups on each question, it may be possible to begin to understand how to bridge the gaps between them.

In reviewing Table 11 it is evident that city planners and public works professionals reported five distinct elements as important: tools, return on investment, performance, marketability, and political will and education. Members of the development community ranked consumer demand, return on investment and building performance at the top of their list, and then ranked customer value and education of developers and suppliers as important. The primary differences are that city professionals recognized that they need political support to take on new initiatives and members of the development community recognized the importance of customer value and consumer demand for green building to ensure long-term feasibility. Additionally, members of the development community pointed to the need for their own as well as their suppliers' education in green building. City professionals felt strongly about the education of the public with regard to the value of green building. While educating

the public may feed the developers' need for consumer demand of the green building product, it may also meet a city's goals with regard to their climate change initiatives and agreements. It is clear

interagency cooperation and coordination. City planners were just as likely to turn to the density bonus, which is a zoning tool, instead of reduced fees, which is more of a direct financial benefit to a developer.

Developers preferred the more direct benefits of reduced fees and also looked for trends and product information to help ensure their success. Nonetheless, both groups saw social responsibility as an important incentive. In fact, city planners may look to recognize and promote developers engaged in green building. The barriers seen by both groups were remarkably similar with cost and lack of education or information topping both lists. The economy and political mindset were two factors city planners noted that developers did not.

In terms of tools and support, education topped both lists, although each advocated for education of different groups. Members of the development community were interested in education for the consumers and city professionals were more interested in educating all groups, including city staff. Political will and local legislative support made the top of the city planners' and public works professionals' list. Members of the development community reported needing

more financial supports through incentives and expedited approval processes. Here, developers were searching for short-term supports and cities were seeking long-term supports with much greater emphasis on education for all the stakeholders (consumers, developers, and staff).

In short, for city planners, education, performance of buildings, in terms of return on investment and energy conservation, as well as political considerations were the top priorities noted in the focus groups.

**Table 11: Comparison of the Top Five Factors for City Professionals and the Development Community**

QUESTION	IMPORTANT ISSUES FOR CITY PROFESSIONALS	IMPORTANT ISSUES FOR THE DEVELOPMENT COMMUNITY
What are the overall factors that encourage green building?	<ul style="list-style-type: none"> <li>Codes and ordinances requiring green building practices</li> <li>Availability of cost/benefit data</li> <li>Lower life-cycle costs of green buildings</li> <li>Marketability of green buildings</li> <li>Political vision</li> <li>Public outreach and education</li> </ul>	<ul style="list-style-type: none"> <li>Consumer demand</li> <li>Energy Savings</li> <li>Actual Return on Investment (ROI) for green building</li> <li>Evidence that green buildings can provide ROI locally</li> <li>Adding customer value</li> <li>Educating developers and suppliers</li> </ul>
What incentives or information encourage the adoption of green building practices?	<ul style="list-style-type: none"> <li>Fast tracking and approval of green building projects</li> <li>Density bonuses for green buildings</li> <li>Recognition for green builders and developers</li> <li>Focus on social responsibility</li> <li>Increased ROI on green buildings</li> </ul>	<ul style="list-style-type: none"> <li>Reduced permits and fees for green building</li> <li>Historical data showing local ROI for green building projects</li> <li>Social Responsibility</li> <li>Product information and trending</li> <li>Interagency coordination and cooperation</li> </ul>
What are the specific barriers to the adoption of green building practices?	<ul style="list-style-type: none"> <li>Up-front costs</li> <li>Bad economy</li> <li>Fear of the unknown</li> <li>Political mindset</li> <li>Resistance to change</li> </ul>	<ul style="list-style-type: none"> <li>Certification costs</li> <li>Lack of education</li> <li>Misconceptions</li> <li>Skepticism of value added by green building</li> <li>Perceived costs</li> </ul>
What tools or support would encourage you to adopt green building practices?	<ul style="list-style-type: none"> <li>Education for all stakeholders (municipal staff, private developers, and the public at large)</li> <li>Education resources and support</li> <li>Political will</li> <li>Local legislative support in codes, ordinances, and regulations</li> <li>Trained staff</li> </ul>	<ul style="list-style-type: none"> <li>Consumer education</li> <li>Financial supports associated with:                             <ul style="list-style-type: none"> <li>-impact fees,</li> <li>-expedited review processes, and</li> <li>-tax incentives</li> </ul> </li> <li>Certified materials resource database</li> </ul>

that both city planners and developers valued building performance and return on investment as important to achieving green building goals.

In terms of incentives and information, it is once again clear that both groups placed value on return on investment. However, there was a small disconnect in that city professionals were much more likely to fast-track approval for projects, which could address developers' concerns with







## Survey Purpose, Audience and Method

Following the focus group evaluation two surveys were designed to examine green building practices in the Northwest. To obtain perceptions from key stakeholder groups on green building development incentives and barriers, this study makes use of data from the two surveys — one for planners and public works professionals and the other for the architects and construction professionals.

This section of the report provides an analysis of:

- ▶ The primary data collected at the city level and the findings from that data
- ▶ The county data and 101 largest MSAs by aggregated responses
- ▶ The aggregated individual level data for the construction industry members and Idaho architects

Statistical Areas (MSAs) across the United States to better understand the way large and small cities (in terms of population) may differ or be similar.<sup>4</sup>

A reminder letter with a paper copy of the survey was mailed approximately three weeks later.

Planning directors were also contacted by phone to encourage survey responses. The overall response rate was 51 percent with 201 of the 396 cities, and 38 percent or 57 of 152 counties responding to the survey. Table 12 provides the breakdown by state for cities and counties where Idaho demonstrates the highest response rate at 65 percent for cities and 50 percent for counties, and Utah the lowest at 45 percent for cities and 10 percent for counties. The overall response rate for the core cities of the 101 largest MSAs was 45 percent with 45 of 101 cities returning the surveys.<sup>5</sup>

### Architects and Construction Industry Members Survey

A second survey was developed after interviews with developers in Idaho, Oregon, and Washington and focus groups with Idaho developers, architects, and members of

the construction industry. The survey was sent by post to all the members of the Associated General Contractors of America (AGC) who are directly involved with building in the states of Idaho, Oregon, Utah, and Washington; and in Idaho to all of the members of Idaho chapter of the American Institute of Architects. The cover letter included a link so respondents could either take the survey online or complete it and return it in the self-addressed postage paid envelope. Reminders were sent approximately three and six weeks later encouraging a response to the survey. Also, AGC members were contacted by phone to encourage them to complete the survey. The steepest challenge of this survey was getting a response from construction

**Table 12: Local Government City and County Survey Response Rate by State**

State	Number of Cities	City Returns	Percentage Returned	Number of Counties	County Returns	Percentage Returned
Idaho	49	32	65%	44	22	50%
Utah	99	45	45%	29	3	10%
Oregon	103	50	49%	36	11	31%
Washington	145	74	51%	43*	21	49%
Total	396	201	51%	152	57	38%

\*Washington has 39 counties, but four regional councils of government were also surveyed

Source: 2009 Green Building Survey

## Local Government Survey, Findings and Analysis

The local government survey was developed after a handful of interviews with planning directors in Idaho, Oregon and Washington, and with focus groups in Idaho that included local planners and public works personnel. The local government survey questions were also modeled from surveys previously used by Saha and Paterson (2008) and Jepson (2004) and were pre-tested with selected interviewees for clarity. The survey was sent to planning directors in cities with a population of 2,500 or more in Idaho, Oregon, Utah, and Washington as well as all of the counties in those four states. In addition, the survey was also sent to city planners in the core cities of the 101 largest Metropolitan

**Photo featured (opposite page) is an example of an eco-community development in the UK.**

<sup>4</sup> An MSA is characterized as having a central core, comprising an urbanized area of at least 50,000 people, together with adjacent counties that have social and economic connectivity with a larger central core. The boundary designation of an MSA is determined by the Office of Management and Budget (OMB).

<sup>5</sup> In the remainder of the report MSA will refer to the core city of the MSA that responded to the survey.



**Table 13: Construction Professionals Survey Response Rate by State**

State	Surveys Mailed	Number of Respondents	Percentage Returned
Idaho	898	216	24%
Utah	320	68	21%
Oregon	803	123	15%
Washington	568	77	14%
<b>Total</b>	<b>2,589</b>	<b>484</b>	<b>19%</b>

Source: 2009 Survey of Construction Industry Members

**Table 14: Mayor/County Commissioner Support for Green Building Practices**

<b>Summary</b>	Support was high.
Does not support	No cities, counties or MSAs report that their mayor or commissioner absolutely does <i>not</i> support green building
Somewhat supports	65 percent of the cities indicated their mayor somewhat supported or supports green building, and 66 percent of counties
Supports	95 percent of MSAs report mayoral supported for green building

professionals. After assembling the mailing list from the public data available on the AGC website for each state, the first mailing went out after removing businesses that were not obviously related directly to construction such as insurance companies and law firms. Early returns indicated that some of the survey participants did not feel the survey applied to them. In follow-up phone calls to everyone in the population across the four states that had not yet returned the survey, additional businesses were identified that had ignored the survey because they also felt they it did not apply to them. One gentleman explained his business supplies concrete pumps and therefore is not directly involved with building construction. The additional follow up helped to focus the population of the target group as well as encourage additional responses. The response rate was 19 percent with 484 of 2,589 surveys being returned. By state, Idaho’s 24 percent response rate was the highest and Washington, at 14 percent, was the lowest, as seen in Table 14. The overall response rate of construction industry members and Idaho architects of 19 percent yields a margin of error of plus or minus five percent.

**Local Government Research Questions**

The research at the city level was designed to compare findings among cities, counties and MSAs. Specifically, the city survey questions were:

- ▶ What is the level of general knowledge and

support, and community factors that currently exist to support green building?

- ▶ What types of capacity are there in terms of established goals and policies, and number of personnel and their knowledge?
- ▶ How often are specific economic incentive tools used and what is the influence of federal, state and local factors on policy considerations?
  - ▶ What are the specific identified barriers and incentives for both green building and LEED certification?

**Findings**

**Community Factors**

Looking at the aggregated survey data provided by the city and county surveys in the four states and the top 101 MSAs, not

a single local government reported that their mayor or county commissioners do not support green building and, further, that the support from local leaders was high, as seen in Table 14. (See Appendix A for copy of the local government survey.)<sup>6</sup>

Interestingly, the reported awareness among developers of green building is somewhat less across cities and counties than MSAs. Cities and counties in the four states were less likely to report developers are trying out and using green building and LEED certification standards than MSAs. Sixteen percent of cities and counties report that developers are trying out and using green building practices in general, while 15 percent of cities and 8 percent of counties report that developers are trying out and using LEED standards specifically. A full 64 percent of MSAs reported that their development community is experimenting with and using green building techniques, and 47 percent indicated they are trying out or using LEED certification standards.

Community factors that might influence green building include: the availability of green materials near one’s community; developers and architects knowledgeable about green building; and existing green buildings in the community. More than 50

<sup>6</sup> The only difference in the city and county surveys was the first question was changed from City Mayor to County Commissioner. Additionally the word “city” was substituted with “county” for the county survey questions. The top 101 MSAs received the exact same survey as the four state city survey.



percent of the cities, counties and MSAs in the survey reported having sources of green building materials that would meet LEED standards within a 500-mile radius of their community. However, equally noteworthy that 41 percent of cities, 40 percent of counties and 36 percent of MSA respondents indicated they did not know if these materials existed within a 500-mile radius of their community.

More than half of the cities and 42 percent of the counties reported having a developer or architect

that promotes green building in their community. Additionally, cities (31%) and counties (26%) in the four states also indicated that they have formally recognized green buildings that used a rating system other than LEED, such as EnergyStar. An overwhelming 96 percent of MSAs reported that they had a developer or architect promoting formally recognized green buildings (including but not limited to LEED certified buildings).

**41 percent of cities, 40 percent of counties and 36 percent of MSA respondents indicated they did not know if green building materials existed within a 500-mile radius of their community.**

**Table 15: Cities' Perceptions of the Awareness of Green Building by Developers**

<b>Summary</b>	MSAs reported more developer awareness of green building than cities or counties
Trying out and Using green building techniques	16 percent of cities and counties and 64 percent of MSAs reported they have developers are this category
Trying out and using LEED certification standards	15 percent of cities and counties reported developer in this category and 47 percent of MSAs

**Table 16: Community Factors that Support Green Building**

<b>Summary</b>	Support was moderate.
Green materials nearby	More than 50 percent of cities, counties and MSAs have access to supplies that meet LEED standards that are located within 500-mile radius. Yet roughly 40 percent of cities, counties and MSA's did not know if these materials existed within a 500-mile radius of their community.
Local developer or architect promoting green building	96 percent MSAs, more than 50 percent of cities and 42 percent of counties report having a developer or architect in their community that promotes green building.
Non LEED recognized green buildings in community	About one-third of cities and counties reported other types of green building in their community.



### ***Economic Tools***

Although the majority of cities, counties and MSAs reported having promoted green building, using economic tools to foster green building was infrequent across cities, counties and MSAs, as seen in Table 17. Respondents in cities, counties and MSAs only noted using five tools relatively frequently or frequently. These more frequently reported tools — unlike the other economic development tools, such as grants, fee reduction, and tax credits — are relatively inexpensive to use.

### ***Policy Considerations***

In terms of green building being a goal or priority for a city, a majority of the cities indicated it was not and 74 percent of cities indicated they had not established informal or formal guidelines governing green building. Seventy percent of counties in the study did not have green building goals or priorities and a full 83 percent did not have guidelines or established policies for green building. In contrast to the four state cities and counties, the largest MSAs all indicated that green building was a goal or priority and 66 percent had formal or written goals and priorities for green building. Yet, 18 percent of the largest MSAs did not have either informal or formal policies or guidelines governing green building; however a majority (55%) did have formal or written policies or guidelines on green building.

***Although the majority of cities, counties and MSAs reported having promoted green building, using economic tools to foster green building was infrequent across cities, counties and MSAs***





Table 17: Use of Economic Tools to Promote Green Building

Summary	Tools that were less expensive, such as mayoral praise, are more frequently used than higher cost items such as grants or loans to promote green building
<b>Frequently used (approximately 33%)</b>	<ul style="list-style-type: none"> <li>• Permitting assistance (e.g., fast tracking or expedited review)</li> <li>• Codes that require green building</li> <li>• Publicity of green buildings (Mayoral praise, ribbon cutting, general recognition)</li> <li>• Providing educational materials on green building</li> <li>• Partnering to conduct demonstration projects</li> </ul>
<b>Somewhat used (approximately 10%)</b>	<ul style="list-style-type: none"> <li>• Fee reduction (reduce/rebate fees for buildings that meet or exceed specified green standards)</li> <li>• Infrastructure improvement</li> <li>• Zoning (e.g., increased floor area ratio for buildings that meet or exceed specified green building standards)</li> <li>• Provide training in green building technology</li> </ul>
<b>Never or minimal use (approximately 70% or more)</b>	<ul style="list-style-type: none"> <li>• Tax credits</li> <li>• Grants</li> <li>• Low Cost Loans-by paying some of the interest</li> <li>• Low Cost Loans-by covering a portion of the loan at substantially reduced rate</li> <li>• Tax increment financing</li> <li>• Provide financial awards for green building</li> <li>• Provide financial reward once obtain LEED certification</li> </ul>

Table 18: Policy and Guidelines for Green Building

Summary	MSAs were more likely to have green building goals and priorities as well as policies and guidelines governing green building
Green building goals and priorities	74 percent of cities and counties did not report green building as goal or priority while 83 percent of MSAs had either formal or informal goals.
Policies and guidelines governing green building	55 percent of MSAs had formal policies or guidelines on green building compared to only 12 percent of cities and 2 percent of counties.





Table 19: Factors and their degree of influence on green building policy

<b>Summary</b>	Differences exist in that MSAs were more influenced than cities or counties by federal policy, support of elected officials, global warming and CCP. State guidance and ICC was more influential to cities and counties than MSAs. There was virtually no difference in influence among the three groups on local leaders championing and political pushback. Developer pushback, incorrect codes or technology each had practically no influence on any of these groups.
<b>Federal guidance on green building</b>	<ul style="list-style-type: none"> <li>• Cities and counties were more likely to say it is not very influential</li> <li>• MSAs said much more frequently, compared to cities and counties, that federal guidance influenced their policies.</li> </ul>
<b>State guidance on green building</b>	<ul style="list-style-type: none"> <li>• State guidance was much more likely to be noted as influencing cities, counties and MSAs than federal guidance</li> </ul>
<b>International Code Council (ICC) or other code drafting body</b>	<ul style="list-style-type: none"> <li>• More influence on cities and counties than MSAs</li> </ul>
<b>Other neighboring cities engaging in green building</b>	<ul style="list-style-type: none"> <li>• More of an influence than cities not engaging in green building, but still not as much influence as reported by cities, counties or MSAs</li> </ul>
<b>Other neighboring cities not engaging in green building</b>	<ul style="list-style-type: none"> <li>• Only 20 percent of cities reported influence which is more than counties (12%) or MSAs (7%)</li> </ul>
<b>Championing of green building by local business leaders</b>	<ul style="list-style-type: none"> <li>• Nearly equally influenced cities, counties and MSAs</li> </ul>
<b>The support for green building by elected officials</b>	<ul style="list-style-type: none"> <li>• Most important for MSAs (70%) than cities (60%) and counties (45%)</li> </ul>
<b>Risk associated with getting the new code standard wrong</b>	<ul style="list-style-type: none"> <li>• Virtually no influence</li> </ul>
<b>Risk that the current technology is wrong</b>	<ul style="list-style-type: none"> <li>• Virtually no influence</li> </ul>
<b>Developer pushback (threat that they will take development elsewhere to avoid new standards)</b>	<ul style="list-style-type: none"> <li>• Cities, counties and MSAs more likely to say having no influence than having an influence</li> </ul>
<b>Political Pushback from developers (encouraging leaders not to adopt new standards)</b>	<ul style="list-style-type: none"> <li>• About one-third of cities, counties, and MSAs felt political pushback had no influence, some influence and was influential on green building policy equally</li> </ul>
<b>The implications of green building on global warming</b>	<ul style="list-style-type: none"> <li>• MSAs were much more likely to report global warming's influence on green building than counties, but counties were more likely than cities to indicate it was influential</li> </ul>
<b>The Cities for Climate Protection (CCP) Mayors agreement</b>	<ul style="list-style-type: none"> <li>• MSAs again noted the influence of CCP while cities and counties report virtually no influence and even less of an influence than global warming</li> </ul>

Table 19 highlights findings on factors that may influence green building policy. Specifically, when asked about the influence of federal guidance on green building policy in their communities, cities and counties were more likely to say it is not very influential (44% and 36% respectively) while MSAs, on the other hand, indicated much more frequently (40%, as compared 26% for cities and 22% for counties) that federal guidance influenced their policies. In all cases state guidance was much more likely to be noted as influencing city (42%), county (53%) and MSA (47%) policy on green building. The International Code Council (ICC) had more influence on policy for cities and counties where 50 percent report it as influential as compared to MSAs with 38 percent indicating ICC as influential.

The impact of whether neighboring cities were engaging or not engaging in green building was much less likely to have an influence on the city, county or MSAs policy on green building in their own jurisdictions. However, whether local business leaders championed green building clearly influenced cities (49%), counties (42%) and MSAs (49%). The support of green building by local elected officials was much more important to cities (60%) and core cities in the largest MSAs (70%) than the counties (45%).

Factors such as the risk associated with getting the new code standard wrong or that the current technology is incorrect had virtually no influence on policy for a clear majority of the cities, counties and MSAs. On developer pushback, the threat that a developer would take their development elsewhere, the survey reveals that cities (41%), counties (45%) and MSAs (46%) reported it had little or no influence. Conversely, far fewer cities (36%), counties (25%) and MSAs (36%) reported

it did have an influence. Political pushback from developers was a little more evenly divided with nearly a third of cities (36%), counties (35%), and MSAs (40%) indicating it has little or no influence compared to nearly a third of cities (37%), counties (26%) and MSAs (32%) reporting it to have at least some influence on policy. In terms of the reported influence of the implications of global warming, the differences among MSAs (53%), cities (34%) and counties (13%) is striking. Finally, the Cities for Climate Protection (CCP) Mayor’s agreement appears to have virtually no influence for cities (15%) and counties (7%) while a majority of MSAs (51%) report it influencing their green building policies. Cities, counties and MSAs differed in terms of capacity with regard to personnel. As expected, MSAs had much more capacity and were more likely to have a lead office or personnel (38%) dedicated to green building as compared to cities (19%) and counties (16%).

As noted in Table 20 a majority of MSAs (75%) also had ten or more public works personnel and planners and support staff compared to a minority for cities (42%) and counties (32%) in the four-state study. The same was true in terms of support staff for MSAs (67%), cities (13%) and counties (18%). Interestingly, and by significant margin, more cities (46%) and counties (51%) do not have LEED AP accredited staff than do. Nine percent of MSAs report having no LEED AP, while 9 percent report having 10 or more on staff.<sup>7</sup> Perhaps even more interesting is that a significant portion of cities (43%), counties (39%) and MSAs (43%) do

**A significant portion of cities, counties and MSAs did not know how many LEED AP staff they may have.**

<sup>7</sup> A LEED accredited professional is someone who has passed an exam, signaling an advanced level of knowledge in green building practices in general and LEED certification requirements in particular.



**Table 20: Staff and LEED AP Accredited Staff by City, County, and MSA**

<b>Summary</b>	<b>MSAs reported significantly more capacity in terms of staff than other cities or counties. It is likely this is a function of the population size of core MSA cities in comparison to other cities and counties.</b>
<b>Staff</b>	<b>75 percent of MSAs reported 10 more support staff as compared to only 42 percent of cities and 32 percent of counties and similar trend was found for support staff as well.</b>
<b>LEED AP Staff</b>	<b>Only 9 percent of MSAs reported having 10 or more LEED staff. Only 9 percent of MSAs also reported having no LEED AP staff compared to 46 percent for cities and 51 percent of counties. More than a third of cities, counties and MSAs did not know how many LEED AP staff they may have.</b>



not know how many LEED AP staff they may have. The difference in staffing between the MSAs and cities and counties is likely to be attributed to the

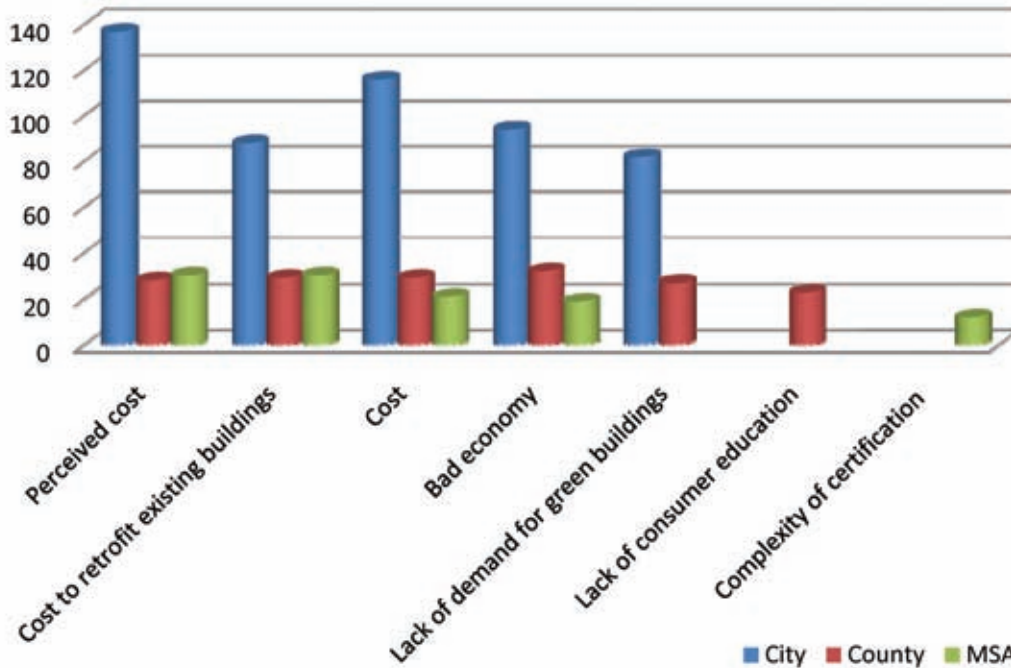
larger population size of central cities of MSAs as compared to the other cities and counties studied.

**Incentives and Barriers**

The respondents were asked to rank the top five incentives and barriers to green building. As seen in Figure 2, the top five responses were similar for cities, counties and MSAs, however, the fifth most important barrier was a significant deviation with counties indicating consumer education and MSAs noting the complexity of the certification process. There also appeared to be broad agreement that perceived costs, real costs, cost to retrofit, the bad economy and the lack of demand for green building were the most important barriers to green building practices in their communities.

As seen in Figure 3, there were several ties when it came to ranking the most important incentives that encourage the adoption of green building in local communities. The data varied across communities, but the factors that tended to be ranked more frequently by cities, counties and MSAs included financial payback, codes that encourage green building, trained staff with green building... marketability of "green" buildings, public outreach and education, expedited reviews, bank promoting green loans and/or... education resources, recognition for builders and developers, high profile champions locally.

**Figure 2: Top Five Barriers for Green Building**



**Figure 3: Top Five Incentives for Green Building**

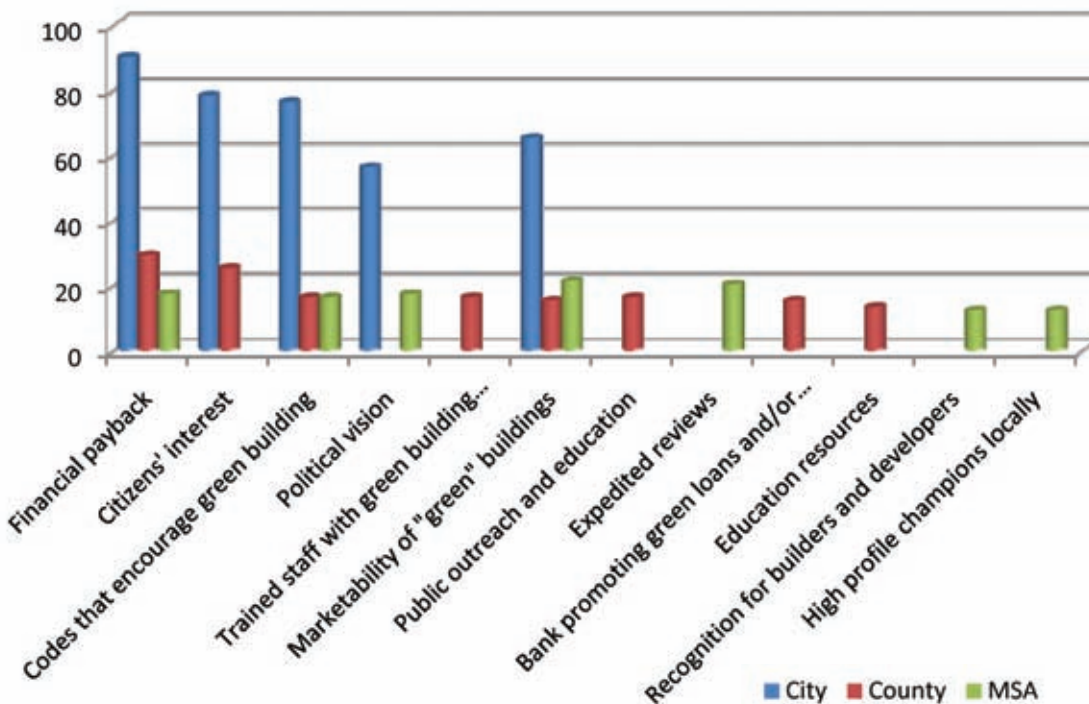


Figure 4 illustrates that the most important barriers to LEED certified building that had broad acceptance among cities, counties, and MSAs were, once again, perceived cost, real cost, and the bad economy. Cities and counties noted factors such as a lack of demand for green building, lack of consumers, and lack of consumer education. MSA respondents identified paperwork load and process uncertainty as the fourth- and fifth-most important barriers.

**Figure 4: Top Five Barriers for LEED**

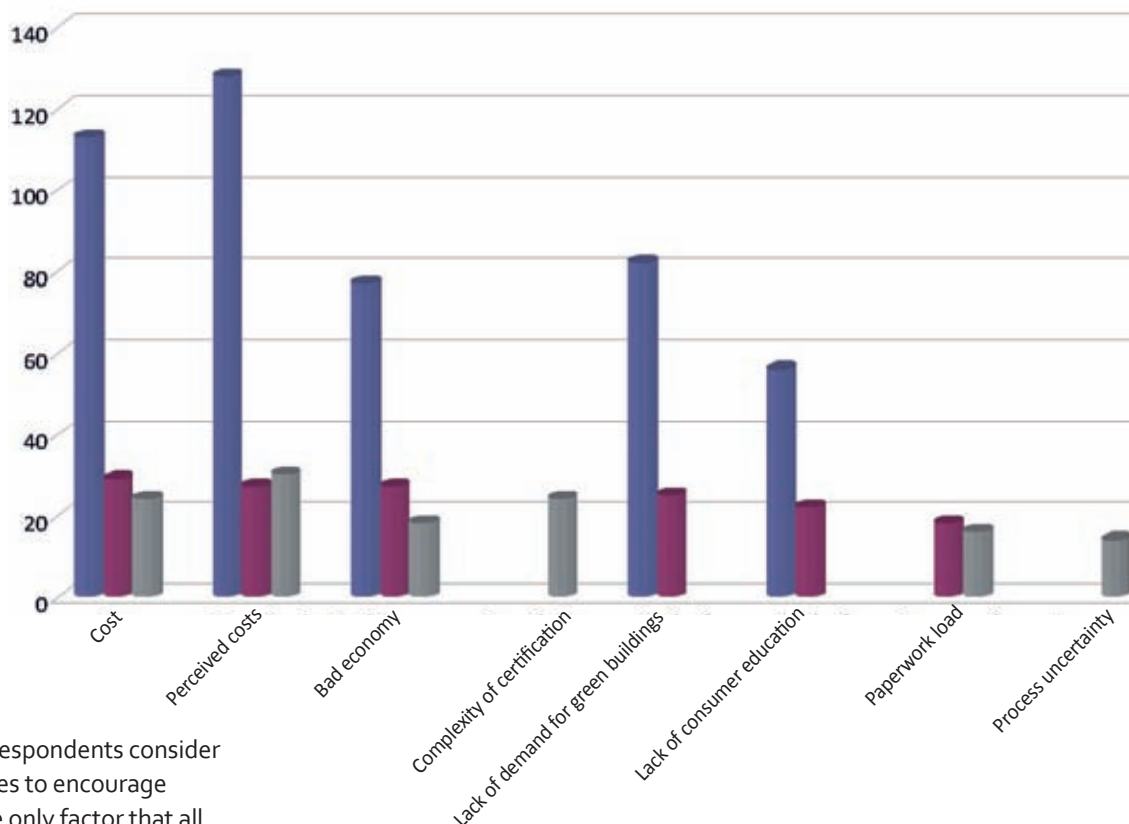
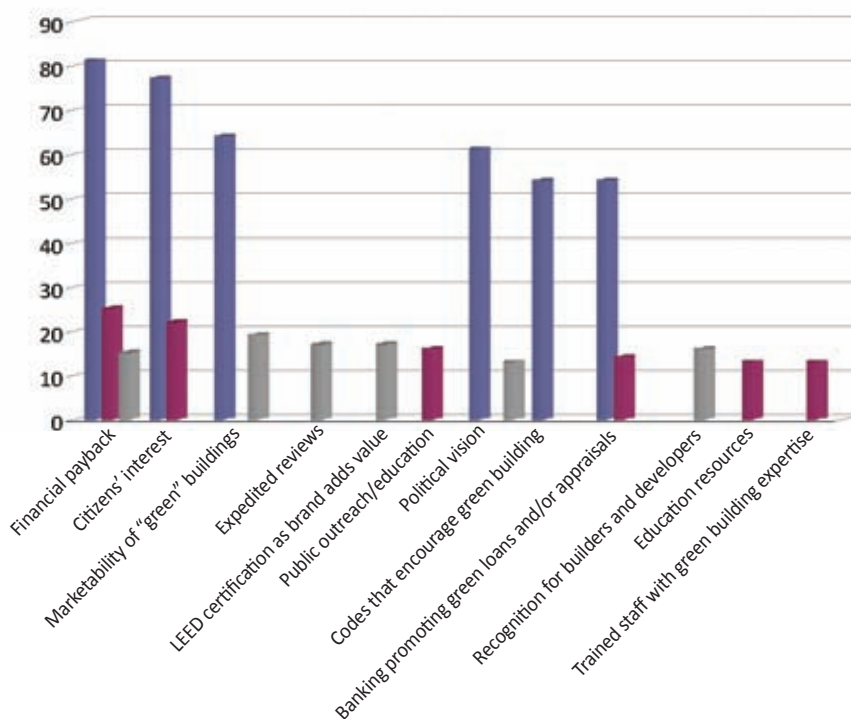


Figure 5 reveals considerable variation among cities, counties, and MSAs in terms of what respondents consider the most important incentives to encourage LEED certified practices. The only factor that all communities ranked as relevant was financial payback, but in varying importance. Four other factors ranked in the top five incentives for at least two of the respondent categories of city or county or MSA. The four factors were citizens' interest, marketability of LEED buildings, political vision, and banks promoting green loans and/or appraisals. The other factors noted included expedited reviews, recognition for builders and developers, codes that encourage green building, education resources, public outreach/education, LEED certification as brand adds value, and trained staff with green building expertise.

**Figure 5: Top Five Incentives for LEED**



Finally, open-ended comments revealed several themes. The most frequent comment was the need to address return on investment and knowledge of green building, and its costs and benefits. Another theme was that green building is difficult in small cities without additional funding or staff. Additionally, mandating green building, providing education and low-cost resources as well as acknowledging other non-LEED green building program/practices were other frequent comments.





## Analysis

In summary, city professionals' findings reveal the largest MSAs tend to have more capacity for green building than cities and counties since they have:

- ▶ Nearly universal support from their mayors
- ▶ Developers using the practices
- ▶ Access to LEED certified materials of staff
- ▶ Developers and architects promoting green building
- ▶ Non-LEED green buildings in their communities
- ▶ Green building goals, policies and guidelines
- ▶ A lead person or office responsible for green building
- ▶ More public works and planning, and support staff

Although some of this, such as number of personnel, may be a function of the size of the core cities of MSAs, it is noteworthy that they are just as likely as cities and nearly as likely counties to

indicate they do not promote green building. Those that do promote green building report using the same tools that cities and counties note. MSAs also show no greater tendency overall to use tax credits, fee reduction, grants, loans, or financial awards for green building than cities and counties.

For the most part MSAs, cities and counties are similar as well in terms of factors that influenced their green-building policy. However, the ways in which MSAs differ from cities and counties are noteworthy. First, federal guidance is more important to green building policy at the MSA level, while cities and counties are more in tune with the International Code Council or other code drafting bodies. The support of elected officials also tends to resonate more with MSAs than cities and counties. Finally, the implications of global warming and the Cities for Climate Protection Agreement are clearly more important to a majority of MSAs as compared to the fraction of cities and counties that reports these items having an influence on green building policy. ☞

# Construction Industry Member Survey, Findings and Analysis

A second survey was conducted to obtain information about the factors that encourage the adoption of green building practices in the eyes of the construction industry (see Appendix B for construction industry member survey). In the survey, participants were asked about:

- ▶ General construction industry factors that might suggest some level of existing inclination for green building
- ▶ Construction industry capacity in terms of specific environmental supports and personnel factors

Toward that end, the following specific questions with construction industry members were addressed:

- ▶ What are the overall factors that encourage green building?
- ▶ What are the specific barriers to adoption of green building practices?
- ▶ What incentives or information encourage the adoption of green building practices?
- ▶ What tools or support would encourage the adoption of green building practices?
- ▶ What is the demographic make up of the survey respondents?

## Findings

### Incentives and Barriers

The survey revealed that 71 percent of the respondents believed green building is becoming more important for the competitive edge of their company with 55 percent of respondents indicating that LEED certification is specifically becoming important for the competitive edge of their company. As seen in Figure 6, the five most important barriers to green building were real costs, perceived costs, bad economy, the cost to retrofit existing buildings, and confusion among green build programs. The data on incentives and barriers for LEED certified buildings illustrates that the biggest barriers for construction industry members were: paperwork load, real cost, perceived cost, complexity of certification process, and confusion among green building programs.

Figure 6: Top Five Barriers

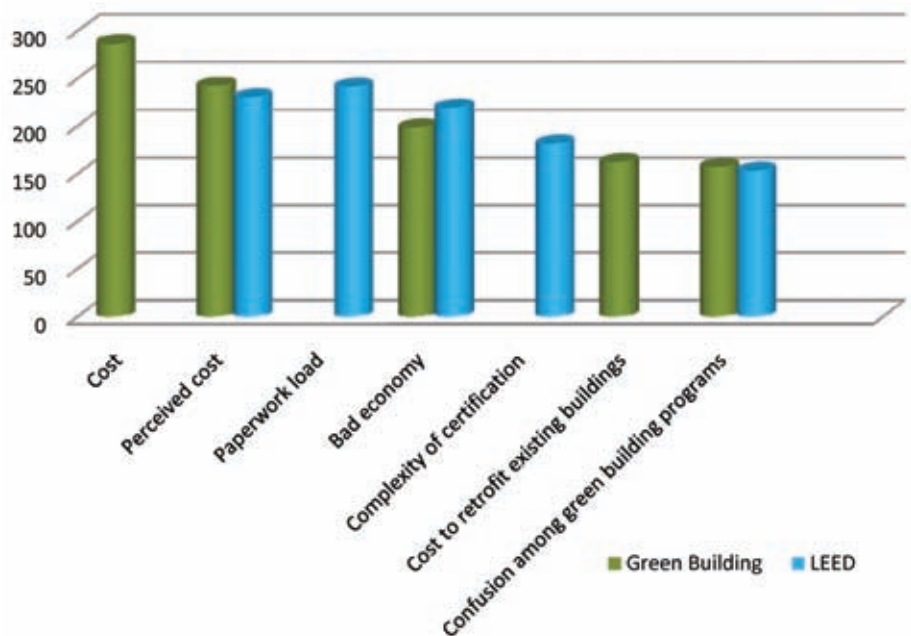
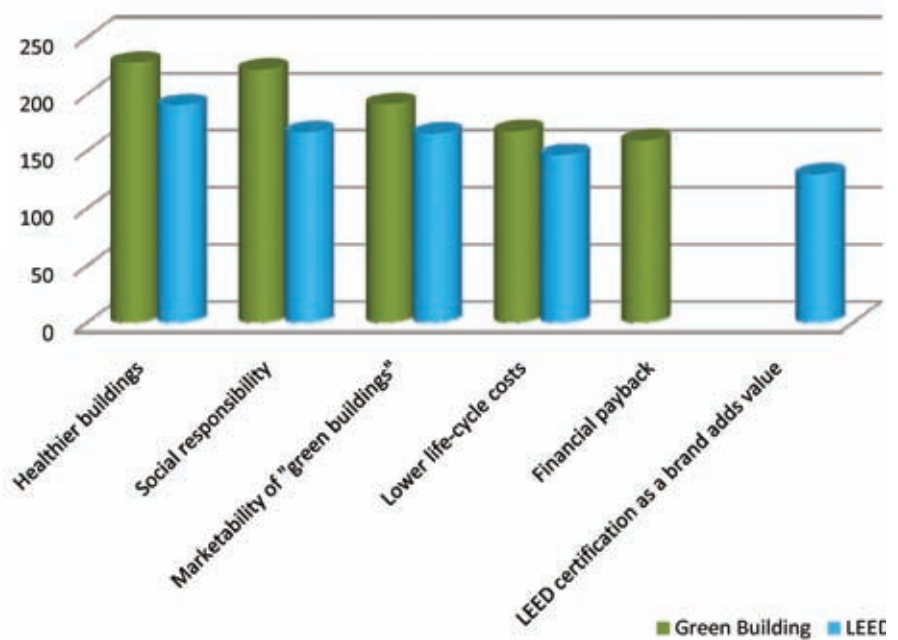


Figure 7: Top Five Incentives



The five most important incentives for green building, as seen in Figure 7, were healthier buildings, social responsibility, marketability of green buildings, lower life-cycle costs, and financial payback. The top five incentives for LEED certification in order were: healthier buildings, social



responsibility, marketability of green buildings, lower life-cycle costs, and LEED certification as a brand adds value.

#### ***Social Networks and Adoption of Green Building***

Nearly 40 percent of respondents indicated they frequently hear their colleagues talk about green building practices and understand green building practices. Forty-eight percent of respondents reported having a large social and professional network. Twenty-eight percent indicated they are considering enrolling in a professional accreditation course for green building. Thirty-seven percent indicated they enjoy working with green building practices and 28 percent regularly discuss green building practices with their peers and colleagues.

More than 50 percent indicated they believe green building practices have significant financial and environmental benefit for society, would like to see green building practices expanded, yet do not intend to find more information about green building practices. Eighty-five percent indicated they are not concerned about the well-being of future generations and 64 percent indicated they believe science and technology actively benefit humanity.

#### ***Disseminating Information and Making Connections***

When asked about sources of information, the respondents' top five sources reported, in order, were trade journals, newspaper, television,

magazines and the Internet. The top communication methods were email, cell phone, telephone, face-to-face meetings and text messaging.

#### ***Stage of Adoption***

When considering construction professionals' awareness of green building practices, only 5 percent reported being unaware. The largest percentage of respondents (36%) indicated they are curious, the next largest category was envisioning the use of green building practices (23%). Nearly a quarter, though, were trying out or using green building practices. The data reflected a very similar pattern with regard to how aware construction professionals believe city planners are with regard

to LEED certification standards. While 46 percent of respondents indicated they intend to try applying green building practices on a project, only 18 percent of respondents reported that they feel like they have the knowledge, resources and support to implement green building practices. Nineteen percent of respondents indicated they have earned a certification in green building practices and intended to seek out additional information to aid in the use of green building practices. Twenty-two percent of respondents indicated they are currently using green building practices on a regular basis, and 16 percent plan to continue using green building practices in the future. Nearly a quarter of respondents say they aggressively seek more information about green building practices. Additionally, only 19 percent of respondents reported seeing obvious benefits to their use of green building practices. Yet, 27 percent indicated that they encourage their colleagues and peers to adopt green building practices.

A little over 40 percent of respondents reported that they enjoy experimenting with new technology, (Technology, in this case, is defined as the application of best practices to solving construction industry problems) and 38 percent reported they enjoy working through complex problems. Forty-three percent indicated they can imagine complex goals and the path to reach them. Nearly three-quarters of respondents indicated they have a great deal more to accomplish in their professional life.

#### ***Demographics***

The demographics revealed that the highest level of education achieved by the parents of the majority of construction professionals is high school (37%), followed by those having a bachelor's degree (29%) and those with an associate's degree (11%) or master's degree (11%). The highest level of education of the respondents themselves was a bachelor's degree (43%) followed by high school (20%). Only 5 percent indicated they never participate in professional or social organizations and 13 percent never travel for professional purposes. A full 31 percent indicated they never have contact with persons or organizations representing green building practices.

In terms of income, 38 percent of the respondents reported their income to be \$100,000 or more, followed by 17 percent indicating their income was more than \$50,000 but less than \$75,000, and 16

***"... green building needs to look at the measurable benefits and provide empirical data showing the energy savings and costs."***



percent indicated that their income was in the range of \$75,000 to \$100,000. Fifteen percent declined to indicate their income.

Finally, open ended comments revealed several themes. The most commonly cited comment was that green building needs to look at the measurable benefits and provide empirical data showing the energy savings and costs. Another reoccurring concern was with “green washing” and the possibility that paperwork and certification processes make these efforts anything but green and ultimately draw into question the legitimacy of green building programs. Finally, developers also indicated there should be more recognition of programs other than LEED.

## Analysis

In summary, it comes as no surprise that the primary barriers to adopting green building practices center almost entirely around costs. The third factor (bad economy) is also cost-related since we can assume that a “bad economy” reduces profitability. The likely result of this is an increase in caution (risk aversion) for trying something new.

The fifth barrier, confusion over green building programs, is also related to cost in that construction industry members are limited in the resources they can devote to learning new techniques and standards. The lack of consensus on a green building standard means that they cannot commit to a single standard without putting themselves at risk for not committing to whichever standard emerges from the pack as “the” standard for green building. Because of this uncertainty, construction industry members may decide to avoid spending time, money, and other resources committing to

a standard that could be replaced, thus rendering their expenditure a less recoverable cost.

With regard to incentives, the responses were somewhat unexpected. The top two incentives listed were “healthier buildings” and “social responsibility.” This suggests that construction industry members are concerned about providing buildings that meet broader societal needs and goals. However the next three incentives suggest that the top two socially oriented incentives need to be supported by market demand and financial benefits. The ranking of the incentives may reflect

**Table 21: Summary of Construction Industry Survey Data**

TAKEAWAY	DESCRIPTION/SUPPORT
Demographically, construction industry members should be open to adopting green building	Higher income levels and upward social mobility suggest greater openness to innovation as well as less aversion to taking risks.
Construction industry members are interested in providing healthier and more socially responsible buildings but are averse to the financial risk they perceive is associated with green building	The top two incentives listed were “healthier buildings” and “social responsibility.” This suggests that construction industry members are concerned about providing buildings that meet broader societal needs and goals. However the next three incentives suggest that the top two socially oriented incentives need to be supported by market demand and clearly demonstrated financial benefits.
LEED certification is seen as having advantages but those advantages have not yet been proven to offset costs.	There may be a pattern of wanting to accept LEED as a certification standard but lack of confidence that the incentives offered offset the perceived up-front costs. The result, particularly in a time when the economy is seen as poor, may be that LEED is seen as too risky without more convincing proof of payback.
Construction industry members are equally split about whether or not green building provides financial and environmental benefits	One-half of construction industry members indicate they believe green building practices have significant financial and environmental benefit for society, and would like to see green building practices expanded.
The vast majority of construction industry members appear confident they are on track to provide for the well being of future generations	Eighty-five percent indicate they are not concerned about the well-being of future generations and 64% indicate they believe science and technology actively benefit humanity.
The majority of construction industry professionals use pre-existing social networks to foster change rather than trying to introduce new social networking technologies	A strong social network exists, but one that is dependent on person-to-person interaction both orally and in written communication.
The majority of construction industry members appear to need targeted information, demonstrations, and training to encourage adoption	Fewer than 5% are totally unaware of green building (at the bottom end of the adoption curve). And only about 25% are actively using green building (at the top end of the adoption curve). This leaves the large majority of users, about 75%, in the middle three stages.
Construction industry members do not tend to reject something new merely because of complexity	Over one-third of the members of this group aren't shying away from the complexity of applying new technology to solving difficult and challenging problems





an acknowledgement of the value of green buildings to society as a whole rather than an indication of individual motivation. Construction industry professionals in general see their profession as providers of the built environment as a benefit to human society. They enjoy seeing solid evidence of their labors and view that evidence as their legacy. Providing a healthy built environment that benefits society may therefore be seen as a worthy and admirable goal. The primary incentives for adopting LEED certification suggests that the construction industry sees LEED as providing healthier buildings that meet a social need. This, in turn, is seen as increasing marketability and brand value to those buildings while lowering operating and maintenance costs.

Two of the barriers to the adoption of LEED certification as a standard are similar to those for green building in general, including concerns surrounding costs. However, in the case of LEED certification, paperwork, process complexity, and confusion among green building programs suggest that construction industry members may fear that potential schedule and cost impacts will result from uncertain design and construction standards. This, combined with the risk of committing to a standard that still lacks universal industry support, suggests that LEED certification may be perceived as raising first costs without providing a correspondingly sure payoff at the point of sale.

convincing proof of payback.

According to Everett Rogers (2003), a researcher who investigated how innovations make their way into society, strong social networks are one indicator that people faced with something new will fall into the category of “innovators,” those people most open to trying something new. One-quarter to one-half of the respondents fall into this innovator category of Roger’s diffusion model. That suggests that these members are – at least potentially – interested in, willing to look into, and perhaps adopt changing construction practices. It further suggests a potential opportunity to take advantage of these social networks to promote green building, to disseminate information, and to provide demonstrations, training, and support. Training programs that specifically tie the construction industry to green construction programs sponsored by municipalities and regional utilities may help drive this change. By appealing to the innovators in the construction industry, cities and utilities can give those innovators the tools they need to transition into active change agents who, in turn, can help pull slower adopters along in the process. If green building advocates can maintain buy-in from these construction industry change agents they potentially can help drive the development of a critical mass in the early adopter category.

On the face of it, the contradiction in this result seems counterintuitive. However, it may be that

construction industry members feel that they already have the knowledge necessary to employ green building practices at a level at which they feel confident of results. If that is the case, then these findings may suggest the need to provide support mechanisms for their existing level of knowledge and expertise rather than in-depth training. Subsequently, support might then profitably come in the form of information, demonstrations, and smaller task- or technique-focused training opportunities as green building practices continue to change, driving new skill and knowledge needs. It may be worth noting that in an industry and region of the country where one might expect greater resistance to change, and resistance to green building in particular, half of the

**Table 22: Adoption Level and Strategy**

IF ADOPTERS ARE IN THIS STAGE OF ADOPTION...		THEN USE THIS STRATEGY...
1. Awareness	→	Advertise
2. Curiosity	→	Inform
3. Envisioning	→	Demonstrate
4. Tryout	→	Train
5. Use	→	Support

When we look at the barriers and incentives on LEED certification together, we start to see what may be a pattern of wanting to accept LEED as a certification standard tempered by a lack of confidence that the incentives offered offset the perceived up-front costs. The result, particularly in a time when the economy is seen as poor, may be that LEED is seen as too risky without more

respondents find enough benefit to desire greater adoption.

These information preferences, combined with earlier data on networking, tend to indicate that a strong social network exists, but one that is dependent on person-to-person interaction both orally and in written communication. This is supported by the data that most of these professionals have substantive social contact with their peers within the construction industry. The implications for using social networking tools to support this industry need to be considered in terms of maximizing the pre-existing networking systems. In other words, those advocating the adoption of green building practices should work with the communication and networking tools that are already in place. The introduction of any kind of new online social networking tool will take time and a good deal of marketing in the traditional sources such as trade journals and newspapers before those new networking tools can assume an important role as both a source of information and a communication tool. The more cost effective method for transmitting information about tools and resources coming online for construction professionals would be to create awareness using the social and professional organizations that already serve the needs of the construction industry's members.

Dormant (1999) built on Roger's work to propose five renamed stages that people go through when considering the adoption of something new (Table 23). Each stage has a corresponding strategy to maximize the stage's success. What these results suggest is that green building advocates do not need to worry about advertising, but instead can focus their efforts on providing information, demonstrations, training, and support. Any marketing that needs to occur can be done using the pre-existing social networks within the construction industry; data presented earlier in this report supports the notion that this market is likely to occur as a self-sustaining viral campaign of person-to-person contacts. However, this data emphasizes the need for well-designed and robust resources as social networks are equally quick to spread negative assessments as positive.

Nearly half of all respondents indicate a desire to introduce green building practices on a project, but only one out of five indicate that they have the knowledge, resources, or support to be truly effective. In theory, that leaves a significant portion of construction professionals as a viable market for tightly targeted training programs and resources.

A breakdown of the construction industry members by stage suggests the following distribution across the stages of adoption.

This suggests that efforts to generate the adoption of green building are best targeted at providing (Table 23):

- ▶ Information for those just getting started
- ▶ Demonstrations of practice (and financial return) for those actively considering green building
- ▶ Targeted training for those ready to start
- ▶ Support for those already using green building as well as for those who are likely to become active users as other strategies become effective.

It is interesting to note that while only about one-fifth of the respondents see obvious benefits to green building, more than one-quarter suggest

**Table 23: Construction Industry Members and Stage of Adoption**

STAGE OF ADOPTION	CONSTRUCTION INDUSTRY MEMBERS	RECOMMENDED STRATEGY
1. Awareness	Fewer than 5%	Advertise
2. Curiosity	Approximately 75%	Inform
3. Envisioning		Demonstrate
4. Tryout		Train
5. Use	Approximately 18 to 22%	Support

that they encourage their peers and colleagues to use such practices. This may suggest that they see potential long-term benefits to green building and/or that they feel the social benefits make green building worth pursuing. Another possible interpretation is that they desire a more level playing field where a better overall understanding of the basics of green building will allow competitive differentiation via specialty.

Nearly three-quarters of respondents indicated they have a great deal more to accomplish in their professional life. This may suggest why over one-third of the members of this group are not shying away from the complexity of applying new technology to solving difficult and challenging



*Green building practitioners who are most successful tend to use an integrated design approach*

problems but instead may be waiting for the right tools and information to start this problem-solving process. The key to this comes in the form of well-designed tools and information. Adopting a user-centered approach that identifies specific user needs will help reduce and minimize the possibility of user rejection at the later stages of implementation. According to Rogers, a significant portion of innovations fail at the implementation (use) stage because they were not designed based on the needs of the end user. Green building practitioners that are most successful tend to use an integrated design approach where key stakeholders, usually those who most quickly adopt something new, are brought in during the early stages of the design. These people are highly motivated to participate and ensure that the design will best serve their peers because a good deal of their professional and personal reputation is dependent on the success of the innovation. In other words, if those who choose to adopt green building and LEED certification can show the processes to be substantive and meaningful then, as a result, they look good, which raises their ability to further influence others within their social network.

Rogers suggests that people with a higher level of upward mobility are more likely to be innovators and will therefore be quicker to adopt something new. Assuming that the respondents are reasonably representative of the larger population, we can project that enough professionals in the industry are open and interested in developing their skill set to justify investing in a comprehensive set of supportive resources and tools. However, additional research would need to be conducted before this assumption can be validated. Given the available data, a population that fits the demographic profile will be sufficiently innovative so that an investment in developing resources and tools for them would be worthwhile. In business terms, this would be a calculated risk well worth taking.

This income profile indicates that more than half of the respondents fall in the middle to upper-middle income brackets. Rogers points to the availability of material resources as being a strong indicator of innovativeness. That is, the more material resources you have, the less risk averse you are because the consequences of failure will not impact you as much as they would someone with fewer resources.

## Local Government and Construction Industry Members Survey Conclusions

Perhaps the most notable findings are evident when considering the information in both the local government surveys and the construction professional data. There is a general consensus by cities, counties, MSAs and construction industry members that real and perceived costs, as well as costs to retrofit, and the bad economy, are salient barriers to green building in general and LEED certification specifically.

An additional barrier to more widespread adoption of LEED certification by both communities and construction professionals is the paperwork load, and in the case of MSAs, the complexity of certification. There appears to be a significant disconnect between cities, counties and MSAs compared to the construction industry members about the incentives that promote green building. The only factors that both groups agree on were the financial payback and marketability of green building. It is also noteworthy that cities generally find financial payback the No.1 incentive and rank marketability fourth whereas construction industry members rank marketability third and financial payback fifth. In terms of incentives that encourage LEED certification, cities and MSAs agree with construction industry members only on the factor of marketability, while MSAs and construction industry members agree that LEED certification does add brand value. Despite the matchups, financial incentives are ranked higher by cities and lower by construction industry members. This suggests that cities may need to rethink their strategies. Perhaps highlighting the health and social responsibility of green buildings will do more to advance green building than financial incentives. Additionally, this evidence suggests that cities' current approach of not relying on financial incentives but rather low cost inducements such as publicity, demonstration projects, and education is an appropriate strategy. In this way, they may help foster the market transformation of demand for green buildings, which in turn increases the likelihood of a financial payback for a developer.

Alternatively, one might conclude it may be that the financial incentives offered to date are not known

or are insufficient in type or quantity to motivate the construction industry. As a result, construction industry members may still view adoption of green building practices as a progressive move on their part that provides health and social benefits. For those developers, building green without additional inducements may be seen as the right thing to do and can meet the current demand for green buildings by specific segments of the market. Yet, if supply does not keep up with current demand, there may be a need for additional or more robust financial incentives to increase the number of green buildings until there is an overall increase in demand. Ultimately, this means there is more than one way to attract demand for green building from both a developer's and a community's perspective. In communities where there are resources that can help guarantee more green buildings, financial incentives may be the quickest most direct way to achieve green building goals. However, in communities where few financial incentives exist, one way to foster green building is to help developers spread the word of their value to individuals in terms of health and environmental goals to hasten the market transformation for greater demand in green buildings. Clearly communities that can afford to provide incentives or have mandates for green buildings could also benefit from general education and promotion of the benefits of green building as well.

Considering both findings from the surveys in combination with the focus group data, both education and financial incentives can play a key role in meeting green buildings goals. Tables 7, 9 and 10 highlight the developers' perspective of taking a long-term view of green building ranking consumer desire/market demand, lack of education, and consumer education as very important (either first or second on their list) and city professionals in Table 6 ranked education as the top tool for encouraging green building. At the same time, Tables 8 and 9 suggest developers ranked reduced fees and return on investment as their No.1 incentive and certification costs their top barrier. In Tables 2, 3, and 4 cities equally note the importance of cost benefits and incentives that can lower costs for developers less directly than reduced fees, such as expedited approval processes and density bonuses, and awareness of the up-front costs and the economy's potential effect on encouraging green building. Financial incentives are, in theory, a short-term tool for promoting green building because both

developers and cities realize the value of green building but understand a market item cannot and should not be subsidized for long-term sustainability. In the end, increasing consumer demand is the only sure way to guarantee return on the investment. Although cities may recognize that subsidies are not feasible for long-term sustainability, cities also are motivated to use financial incentives to get the ball rolling because of political necessity to meet community needs and priorities. All the while cities demonstrate they value the importance and role of education for all stakeholders for the purpose of meeting long-term goals. Construction professionals also have a role to play in marketing and education and demonstrate that they too recognize its value for long-term sustainability in the market place.

Perhaps not as salient to the overall outcomes, but still noteworthy, is the discrepancy between the local government respondents and the construction professionals in their respective belief of the development community's awareness of green building. Regarding construction professional awareness, cities and counties tend to underestimate the number of construction professionals who are trying out and using green building practices. City estimates indicate that only 15 percent of construction professionals are trying out and using green building practices as compared to the 23 percent reported by construction professionals themselves. Although the MSAs report much more use and experimentation (64%) than the respondent data from construction professionals in the Pacific Northwest, it is difficult to generalize the response from the Pacific Northwest to all MSAs. The differences between local government and construction professionals are noteworthy because they suggest the critical mass necessary to meet a market transformation in green building in the construction industry is further along than anticipated by cities. Additionally, survey data reveal a full 75 percent also appear poised to move to the next stages of trying out and using green building techniques. In the end, the similarities, gaps, and differences between the developers and local government perspectives and capacity for green building help identify some key next steps. ☘



***In the end, increasing consumer demand is the only sure way to guarantee the return on the investment.***





## Next Steps

Based on the gaps and similarities in perspectives and capacities of cities and construction industry members discovered in this study, several best practices are identified that may be appropriate strategies for communities in the Pacific Northwest.

The recommendations fall into four broad categories:

- ▶ Marketing to the public to increase demand
- ▶ Policies and processes for developers to support financial payback
- ▶ Information, demonstrations, and training to enable green-building practices
- ▶ Support for current users of green building and LEED certification to continue green building practices

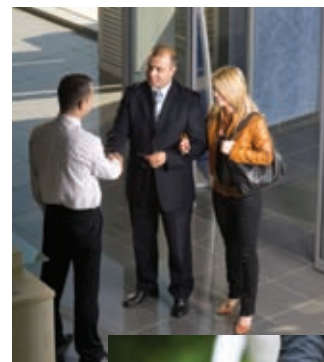
Although the bulk of the leadership for the recommendations falls primarily on the cities, success in meeting green building goals will only be realized by public/private partnerships in terms of the willingness of both groups to take some initiative to advance green building in our communities. The next steps in this section are intended to help cities, counties, utilities, MSAs, developers, building owners, architects, and other construction industry members promote green building in general, and in ways that are beneficial to all involved.

### Marketing to the Public

Both cities and construction industry members listed the creation of additional marketing efforts (presumably to generate additional consumer demand) as something that could drive the adoption of green building. One recommendation,

then, is that cities, utilities, and construction industry members should work with existing networks in construction industry associations and real estate associations to market green buildings of all types to potential government, commercial, non-profit, and residential consumers. While this study did not examine consumer views on green building, the literature on the diffusion of innovations suggests:

- ▶ Buildings that comply with indoor environmental quality standards and guidelines that are part of most green building rating systems tend to provide healthier occupant environments and these health benefits can add directly





to a leasing organization's bottom line through reduced employee illness and greater productivity. The long-term financial benefit can be marketed to consumers of green building space as a way to increase the premium of green building purchases and leases.

- ▶ It may be profitable to focus on the rapid returns on investment that can be realized from energy and water efficiency measures in green buildings, which can eventually exceed any additional up-front costs for green design and construction, as well as what features to look for in green properties to achieve these goals. This information may be particularly effective for those consumers intent on purchasing or leasing building space for longer periods of time.
- ▶ Some secondary benefit might be gained from promoting the purchase, lease, or renting of green buildings for reasons of a contribution to greater social responsibility in the form of improved quality of life for the community and its residents.
- ▶ By working in tandem, cities, the construction industry, and real estate associations may be able to create enough market demand to begin overcoming the negative inertia caused by the poor economy and begin to develop a critical mass of demand for green buildings across market sectors.
- ▶ It may also be useful to work with local, regional, and even national real estate associations to include green building features as search criteria on the multiple listing service (MLS) through which consumers search for property that meet their criteria. Interviews revealed this to be promising practice in Portland, Oregon.

## Policies and Processes to Support Financial Payback

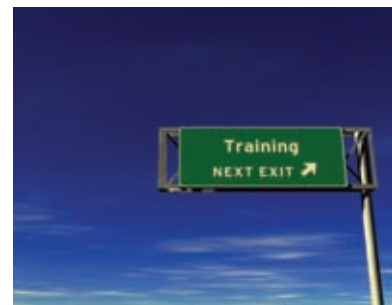
As Yudelson (2007, p. 12) suggests, cities, counties and MSAs should work with construction industry members, both individually and in concert with professional associations, to create policies and processes that help provide financial incentives to adopt green building practices. Any such policies should include the detailed input of construction industry members to increase their acceptance and buy-in. Interviews (2009) revealed, such policies might include but would not be limited to:

- ▶ **Fast Tracking:** Fast tracking permits for green building practices (Interviews 2009).
- ▶ **Incentives for New Construction:** Cities and utilities might provide incentives to developers who build the infrastructure to support the later addition of renewable energy, water saving, and other green financially beneficial building features into their new buildings.
- ▶ **Incentives for the Purchase/Lease of Green Buildings:** Cities might consider providing financial incentives to consumers who purchase green buildings when those buildings result in a decreased load on utilities and other municipal resources. This type of incentive may also be beneficial to creating a synergistic demand through marketing efforts.
- ▶ **Incentives for Retrofits:** Cities and utilities might provide incentives to consumers who retrofit existing buildings with renewable energy, passive energy saving strategies, water saving, and other green features that result in reduced resource use. This type of incentive may also be beneficial to creating a synergistic demand through marketing efforts.
- ▶ **Provide Support for LEED Projects:** Cities might consider providing LEED accredited professionals on their own staff to provide support to construction industry members to reduce the costs associated with the
  - > initial learning curve on green buildings
  - > additional costly paperwork load
  - > identification and planning for the most marketable green building features

## Information, Demonstrations, and Training

Work with construction industry associations to plan, develop, and deliver:

- ▶ **Construction Process/Procedure Information:** Specific and targeted information on the benefits of green building to directly meeting the needs of construction industry members
- ▶ **Marketing Information:** Information and, possibly, training for directly meeting the needs of members of the real estate industry on potential features and financial, health, and social responsibility benefits of green buildings. This option would need an independent professional needs assessment to verify both its feasibility and desirability.
- ▶ **Professional Demonstrations:** Professional demonstrations of green building techniques as requested by construction industry members. These demonstrations should be driven directly





by information needs expressed by builders and developers and could be provided on a regular or semi-regular basis as new building techniques are developed and start to become accepted (Interviews 2009).

- ▶ **Case Studies:** Developing easily accessible case studies showing financial payback and return on investment for green building projects, particularly in local or regional contexts. These cases should be created and disseminated in close cooperation with members of the construction industry. To the extent possible, focus should be on those features of green building / LEED certification that realistically provide the most positive impact on the financial outcomes of the projects. Those features might then be the subject of information and demonstration efforts listed above.
- ▶ **Training:** In those cases where the knowledge and skill gaps of construction industry members cannot adequately be addressed using information or demonstrations, cities, utilities, and construction industry associations may work together or alone to develop targeted training to address more complex skill and/or knowledge gaps. Another option is to contract with outside providers of training that meet the specific needs of construction industry members. Training, because it is expensive and perishable in nature should only be used when less expensive options are unsuitable. In those cases when training is called for, it should be developed by capable instructional designers to ensure it meets the intended learning outcomes and avoids providing ineffective solutions that merely waste participants' time.



### **Provide Support for Current Users of Green Building and LEED Certification**

In order to maintain support and maintain early adopters of green building and LEED, cities should consider providing the following kinds of support:

- ▶ **Local/Regional Green Buildings Supplier Lists:** Construction industry members, in their focus groups and survey results, identified difficulty

in finding or not knowing of regional green building supplies as one obstacle. Providing and maintaining online lists of the suppliers and locations of green building supplies would be one way to support those who have already embraced green building practices.

- ▶ **Local/Regional Green Building Contractor and Sub-Contractor Lists:** Construction industry members, in their focus groups, identified difficulty in finding skilled and knowledgeable contractors and sub-contractors as one obstacle to adopting green building practices. Providing and maintaining online lists of reliable contractors and sub-contractors would be one way to support those who have already embraced green building practices. This might be done using existing mechanisms by having industry associations work with providers of service information such as Angie's List or by creating their own accessible directories that allow for consumer feedback.<sup>8</sup> This kind of list, for contractors, subcontractors, and suppliers of the green building industry would go a long way toward making that information not only accessible, but also easier to prioritize.
- ▶ **Professional Associations with Green Building Information:** Providing lists of professional associations that have networks and communities that are already sharing green building practices would support those already involved in green building.
- ▶ **Best Practice Information on Green Building / LEED Certification:** Providing a clearinghouse of best-practices on green building. This might be provided by professional associations, cities, universities, or other third party providers.
- ▶ **Calendars of Local/Regional Events:** Centralized calendars providing access to local or regional green building demonstrations and training. These might be maintained by any involved in cooperation with interested stakeholder groups. ❧

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<sup>8</sup> Angie's List is a third party vendor that collects information about contractors, service providers, and doctors. Those being evaluated by their customers do not pay to be on the list. Similarly, the data collection for the list is standardized and there are no anonymous reviews.

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# Appendix A

## Green Building Survey

As our communities develop it is important to understand why some green building practices are more accepted by and accessible to cities, developers, planners and other stakeholders. Your responses to this questionnaire are important for understanding more about green building practices and standards which may affect the way our communities grow.

As you complete the survey please keep in mind that *green building* is a term used to describe materials and methods that result in buildings that use less energy, water, and resources; generate less waste; have less impact on the building site; and offer healthier indoor environments for the occupants.

### Section A. General Questions

The following are general questions about factors that may influence a city's engagement in green building practices.

1. Does your city Mayor support green building practices? (PLEASE CHECK ONE)

- Does not Support     
  Somewhat does not support     
  Neither supports nor does not support     
  Somewhat supports     
  Supports     
  Don't Know/ Not Sure

2. How aware are most developers in your city with regard to green building practices in general? (PLEASE CHECK ONE)

- Unaware: Not yet aware of green building practices  
 Curious: Aware but don't yet have much information about green building practices  
 Envisioning: knowledgeable but want to see them in action before they try them  
 Tryout: Ready to actively get training on green building so they can use it on the job  
 Using it: Already using it and want or need support to maintain its use  
 Don't Know/ Not Sure

3. How aware are most developers in your city with regard to using LEED certification standards specifically? (PLEASE CHECK ONE)

- Unaware: Not yet aware of LEED building practices  
 Curious: Aware but don't yet have much information about LEED building practices  
 Envisioning: knowledgeable but want to see them in action before they try them  
 Tryout: Ready to actively get training on LEED building so they can use it on the job  
 Using it: Already using it and want or need support to maintain its use  
 Don't Know/ Not Sure

### Section B. Community Factors

The following questions are about local resources and information available that may influence green building practices.

4. Is there a supplier of LEED certified materials such as wood within a 500 mile radius of your city? (PLEASE CHECK ONE)

- Yes  
 No  
 Don't Know/ Not sure

5. Is there a developer or architect in your city that is familiar with and promotes green building? (PLEASE CHECK ONE)

- Yes  
 No  
 Don't Know/ Not sure

6. Are there buildings in your city that are formally recognized as green buildings that are not LEED certified (e.g., Earth Advantage, EnergyStar, NetZero) in your city? (PLEASE CHECK ONE)

- Yes → **6a. (If yes, approximately how many)** \_\_\_\_\_  
 No  
 Don't Know/ Not sure



**Section C. Economic Tools Use**

7. Has your city ever promoted green building or LEED certification? (PLEASE CHECK ONE)

No → (If no, SKIP to question 8)

Yes

7a. Municipalities have a variety of educational and economic tools at their disposal. Using the scale to the right, please indicate how frequently, if at all, that your City uses the following tools to promote green building. (PLEASE CIRCLE THE BEST RESPONSE).

	Never					Frequ- ently	Don't Know
a. Tax Credits	1	2	3	4	5		0
b. Fee Reduction (reduce/rebate fees for buildings that meet or exceed specified green standards)	1	2	3	4	5		0
c. Grants	1	2	3	4	5		0
d. Infrastructure Improvement (e.g., sewer or water)	1	2	3	4	5		0
e. Zoning (e.g., increased Floor Area Ratio for buildings that meet or exceed specified green building standards)	1	2	3	4	5		0
f. Permitting Assistance (e.g., Fast-track or expedited review)	1	2	3	4	5		0
g. Codes that require specific green building standards	1	2	3	4	5		0
h. Low Cost Loans – by paying some of the interest	1	2	3	4	5		0
i. Low Cost Loans – by covering a portion of the loan at substantially reduced rate	1	2	3	4	5		0
j. Tax Increment Financing	1	2	3	4	5		0
k. Provide publicity for green buildings – (e.g., Mayoral praise, ribbon cutting, general recognition)	1	2	3	4	5		0
l. Provide financial awards for green building	1	2	3	4	5		0
m. Provide educational materials on green building.	1	2	3	4	5		0
n. Provide financial reward once obtain LEED certification	1	2	3	4	5		0
o. Provide training in green building technology	1	2	3	4	5		0
p. Partner to conduct demonstration projects on green building	1	2	3	4	5		0
q. Other	1	2	3	4	5		0

**Section D. Policy Considerations**

The following questions concern decision making resources for green building.

8. Has your city established green building as a goal or priority?

No

Yes, informal/unwritten (e.g., resolution or stated priority)

Yes, formal/written (e.g., created an ordinance or office of sustainable development)

Don't Know/ Not sure

**-Please continue on the next page-**

9. Has your city established policies or guidelines governing green building? (PLEASE CHECK ONE)
- No
- Yes, informal/unwritten (e.g., given more leeway or consideration)
- Yes, formal/written (e.g., adopted as part of a comprehensive plan or functional plan)
- Don't Know/ Not sure

10. How important are the following factors in terms of actually influencing policy on green building in your city? Using the scale to the right, please indicate how much influence, if at all, the following factors have on green building policy in the city. (PLEASE CIRCLE THE BEST RESPONSE)

	No Influence		Very Strong Influence			Don't Know
a. Federal guidance on green building	1	2	3	4	5	0
b. State guidance on green building	1	2	3	4	5	0
c. International Code Council (ICC) or other code drafting body	1	2	3	4	5	0
d. Other neighboring cities engaging in green building	1	2	3	4	5	0
e. Other neighboring cities not engaging in green building	1	2	3	4	5	0
f. The championing of green building by local business leaders	1	2	3	4	5	0
g. The support for green building by elected officials	1	2	3	4	5	0
h. Risk associated with getting the new code standard wrong	1	2	3	4	5	0
i. Risk that the current technology is incorrect	1	2	3	4	5	0
j. Developer pushback (threat that they will take development elsewhere to avoid new standards)	1	2	3	4	5	0
k. Political pushback from developers (encouraging leaders not to adopt new standards)	1	2	3	4	5	0
l. The implications of green building on global warming	1	2	3	4	5	0
m. The Cities for Climate Protection (CCP) Mayor's agreement	1	2	3	4	5	0

11. Is there a lead office or personnel specifically responsible for green building projects or activities in the city? (PLEASE CHECK ONE)
- Yes
- No
- Don't Know/ Not sure

12. How many public works personnel or planners work specifically for the city? (CIRCLE A NUMBER or 00 if you Don't Know)
- 0 1 2 3 4 5 6 7 8 9 10+ Don't Know  
00

13. How many support staff are there for the public works personnel or planners that work for the city? (CIRCLE A NUMBER or 00 if you Don't Know)
- 0 1 2 3 4 5 6 7 8 9 10+ Don't Know  
00

14. How many of the staff are accredited as a LEED AP? (CIRCLE A NUMBER or 00 if you Don't Know)
- 0 1 2 3 4 5 6 7 8 9 10+ Don't Know  
00

15. What are the most important barriers to the use of green building practices in the city? (PLEASE CHECK THE TOP FIVE)

- |   |   |
|---|---|
| <input type="checkbox"/> Confusion among green building programs                | <input type="checkbox"/> Misrepresentation "green washing"  |
| <input type="checkbox"/> Availability of certified resources for green building | <input type="checkbox"/> Lack of regulatory flexibility     |
| <input type="checkbox"/> Cost to retrofit existing buildings                    | <input type="checkbox"/> Bad economy                        |
| <input type="checkbox"/> Resistance by industry and trade unions                | <input type="checkbox"/> Lack of consumer education         |
| <input type="checkbox"/> Process uncertainty                                    | <input type="checkbox"/> Need for new suppliers             |
| <input type="checkbox"/> Building code issues and interpretation of codes       | <input type="checkbox"/> Learning curve costs               |
| <input type="checkbox"/> Perceived costs  | <input type="checkbox"/> Complexity of certification        |
| <input type="checkbox"/> Cost (real) up front vs. Return on investment          | <input type="checkbox"/> Lack of demand for green buildings |
| <input type="checkbox"/> Neighboring city did not adopt green building policies | <input type="checkbox"/> Other _____                        |

**-Please turn the page over and continue the survey-**



16. What are the most important incentives that encourage the adoption of green building in the city? (PLEASE CHECK THE TOP FIVE)

- |  |  |
|--|--|
| <input type="checkbox"/> Expedited reviews (of green projects)                                 | <input type="checkbox"/> High profile champions locally              |
| <input type="checkbox"/> Healthier buildings   | <input type="checkbox"/> Marketability of “green” buildings          |
| <input type="checkbox"/> Reduced impact fees   | <input type="checkbox"/> Public outreach/education                   |
| <input type="checkbox"/> Bank promoting green loans and/or appraisals                          | <input type="checkbox"/> Social Responsibility                       |
| <input type="checkbox"/> Recognition for builders and developers                               | <input type="checkbox"/> Lower life-cycle costs                      |
| <input type="checkbox"/> Citizens’ interest  | <input type="checkbox"/> Increased longevity of buildings            |
| <input type="checkbox"/> Codes that encourage green building                                   | <input type="checkbox"/> Political vision                            |
| <input type="checkbox"/> Higher density/bonus and offsets for green building (risk mitigation) | <input type="checkbox"/> Regulations that provide predictability     |
| <input type="checkbox"/> Education resources (Education materials and training)                | <input type="checkbox"/> Trained staff with green building expertise |
| <input type="checkbox"/> Neighboring city did not adopt green building policies                | <input type="checkbox"/> Financial payback                           |
|  | <input type="checkbox"/> Reduce Carbon                               |
|  | <input type="checkbox"/> Other _____                                 |

**LEED Certification**

17. What are the most important barriers to LEED certified building in the city? (PLEASE CHECK THE TOP FIVE)

- |   |   |
|---|---|
| <input type="checkbox"/> Confusion among green building programs                | <input type="checkbox"/> Misrepresentation “green washing”  |
| <input type="checkbox"/> Availability of certified resources for green building | <input type="checkbox"/> Lack of regulatory flexibility     |
| <input type="checkbox"/> Paperwork load   | <input type="checkbox"/> Bad economy                        |
| <input type="checkbox"/> Resistance by industry and trade unions                | <input type="checkbox"/> Lack of consumer education         |
| <input type="checkbox"/> Process uncertainty                                    | <input type="checkbox"/> Need for new suppliers             |
| <input type="checkbox"/> Building code issues and interpretation of codes       | <input type="checkbox"/> Learning curve costs               |
| <input type="checkbox"/> Perceived costs  | <input type="checkbox"/> Complexity of certification        |
| <input type="checkbox"/> Cost (real) up front vs. Return on investment          | <input type="checkbox"/> Lack of demand for green buildings |
| <input type="checkbox"/> Other _____  |   |

18. What are the most important incentives that encourage the adoption of LEED certification in the city? (PLEASE CHECK THE TOP FIVE)

- |  |  |
|--|--|
| <input type="checkbox"/> Expedited reviews (of green projects)                                 | <input type="checkbox"/> High profile champions locally              |
| <input type="checkbox"/> Healthier buildings   | <input type="checkbox"/> Marketability of “LEED” buildings           |
| <input type="checkbox"/> Reduced fees in general   | <input type="checkbox"/> Public outreach/education                   |
| <input type="checkbox"/> Bank promoting green loans and/or appraisals                          | <input type="checkbox"/> Social Responsibility                       |
| <input type="checkbox"/> Recognition for builders and developers                               | <input type="checkbox"/> Lower life-cycle costs                      |
| <input type="checkbox"/> Citizens’ Interest  | <input type="checkbox"/> Increased longevity of buildings            |
| <input type="checkbox"/> Codes that encourage green building                                   | <input type="checkbox"/> Political vision                            |
| <input type="checkbox"/> Higher density/bonus and offsets for green building (risk mitigation) | <input type="checkbox"/> Regulations that provide predictability     |
| <input type="checkbox"/> Education resources (Education materials and training)                | <input type="checkbox"/> LEED certification as a brand adds value    |
| <input type="checkbox"/> Financial payback   | <input type="checkbox"/> Trained staff with green building expertise |
|  | <input type="checkbox"/> Reduce Carbon                               |
|  | <input type="checkbox"/> Other _____                                 |

19. Are there any topics not treated in this questionnaire that you feel are important for understanding more about what makes green building practices more accepted by and accessible to cities, developers, planners and other stakeholders? If so, please provide the information below or use additional sheets, if necessary.

# Appendix B

## Construction Industry Member Survey

### Section A: General Questions

For the first set of questions, we are asking about green building practices in general. These practices could be any set of that you use in the course of your work such as LEED and Energy Star among others. *There are some questions specific to the U.S. Green Building Council's LEED certification standards*; we have made sure to bold text specific to LEED to help you recognize these questions more easily. Towards the end of this section, there will be some questions about how you approach novel situations.

If there are any questions you do not wish to answer you may leave them blank; however, it will aid in our analysis if you would mark, "I prefer not to say," on the survey.

Please mark the response that best indicates your response.

1. Green building is becoming more important for the competitive edge of my company.

- |  |                                       |  |  |  |                                  |   |
|--|---------------------------------------|--|--|--|----------------------------------|---|
| <input type="checkbox"/> I strongly disagree | <input type="checkbox"/> I disagree   | <input type="checkbox"/> I somewhat disagree | <input type="checkbox"/> I neither agree or disagree | <input type="checkbox"/> I somewhat agree    | <input type="checkbox"/> I agree | <input type="checkbox"/> I strongly agree |
|  | <input type="checkbox"/> I don't know |  |  | <input type="checkbox"/> I prefer not to say |                                  |   |

2. **LEED certification** is becoming more important for the competitive edge of my company.

- |  |                                       |  |  |  |                                  |   |
|--|---------------------------------------|--|--|--|----------------------------------|---|
| <input type="checkbox"/> I strongly disagree | <input type="checkbox"/> I disagree   | <input type="checkbox"/> I somewhat disagree | <input type="checkbox"/> I neither agree or disagree | <input type="checkbox"/> I somewhat agree    | <input type="checkbox"/> I agree | <input type="checkbox"/> I strongly agree |
|  | <input type="checkbox"/> I don't know |  |  | <input type="checkbox"/> I prefer not to say |                                  |   |

3. Please mark the **five** most important **barriers** to the use of green building practices in your work?

- |   |   |
|---|---|
| <input type="checkbox"/> Confusion among green building programs                | <input type="checkbox"/> Bad economy                        |
| <input type="checkbox"/> Availability of certified resources for green building | <input type="checkbox"/> Lack of consumer education         |
| <input type="checkbox"/> Cost to retrofit existing buildings                    | <input type="checkbox"/> Need for new suppliers             |
| <input type="checkbox"/> Resistance by industry and trade unions                | <input type="checkbox"/> Learning Curve Costs               |
| <input type="checkbox"/> Process uncertainty                                    | <input type="checkbox"/> Complexity of certification        |
| <input type="checkbox"/> Building code issues and interpretation of codes       | <input type="checkbox"/> Lack of demand for green buildings |
| <input type="checkbox"/> Perceived costs  | <input type="checkbox"/> Other _____                        |
| <input type="checkbox"/> Cost (real) up front vs. Return on investment          | <input type="checkbox"/> I don't know .                     |
| <input type="checkbox"/> Neighboring city did not adopt green building policies | <input type="checkbox"/> I prefer not to say.               |
| <input type="checkbox"/> Misrepresentation "green washing"                      |   |
| <input type="checkbox"/> Lack of regulatory flexibility                         |   |

4. Please mark the **five** most important **incentives** to the use of green building practices in your work?

- |   |  |
|---|--|
| <input type="checkbox"/> Expedited reviews (of green projects)                  | <input type="checkbox"/> Social Responsibility                                     |
| <input type="checkbox"/> Healthier buildings                                    | <input type="checkbox"/> Lower life-cycle costs                                    |
| <input type="checkbox"/> Reduced impact fees                                    | <input type="checkbox"/> Increased longevity of buildings                          |
| <input type="checkbox"/> Bank promoting green loans and/or appraisals           | <input type="checkbox"/> Political vision  |
| <input type="checkbox"/> Recognition for builders and developers                | <input type="checkbox"/> Regulations that provide predictability (risk mitigation) |
| <input type="checkbox"/> Citizens' interest                                     | <input type="checkbox"/> Trained staff with green building expertise               |
| <input type="checkbox"/> Codes that encourage green building                    | <input type="checkbox"/> Financial payback   |
| <input type="checkbox"/> Higher density/bonus and offsets for green building    | <input type="checkbox"/> Reduce Carbon   |
| <input type="checkbox"/> Education resources (education materials and training) | <input type="checkbox"/> Other _____   |
| <input type="checkbox"/> Neighboring city did not adopt green building policies | <input type="checkbox"/> I don't know .  |
| <input type="checkbox"/> High profile champions locally                         | <input type="checkbox"/> I prefer not to say.                                      |
| <input type="checkbox"/> Marketability of "green" buildings                     |  |
| <input type="checkbox"/> Public outreach/education                              |  |

5. Please mark the **five** most important **barriers** to the use of **LEED certification standards** for buildings in your work?

- |   |   |
|---|---|
| <input type="checkbox"/> Confusion among green building programs                | <input type="checkbox"/> Lack of regulatory flexibility     |
| <input type="checkbox"/> Availability of certified resources for green building | <input type="checkbox"/> Bad economy                        |
| <input type="checkbox"/> Paperwork Load   | <input type="checkbox"/> Lack of consumer education         |
| <input type="checkbox"/> Resistance by industry and trade unions                | <input type="checkbox"/> Need for new suppliers             |
| <input type="checkbox"/> Process uncertainty                                    | <input type="checkbox"/> Learning Curve Costs               |
| <input type="checkbox"/> Building code issues and interpretation of codes       | <input type="checkbox"/> Complexity of certification        |
| <input type="checkbox"/> Perceived costs  | <input type="checkbox"/> Lack of demand for green buildings |
| <input type="checkbox"/> Cost (real) up front vs. Return on investment          | <input type="checkbox"/> Other _____                        |
| <input type="checkbox"/> Misrepresentation "green washing"                      | <input type="checkbox"/> I don't know .                     |
|   | <input type="checkbox"/> I prefer not to say.               |

6. Please mark the **five** most important **incentives** to the use of **LEED certification standards** for buildings in your work?

- |  |   |
|--|---|
| <input type="checkbox"/> Expedited reviews (of green projects)               | <input type="checkbox"/> Social Responsibility                    |
| <input type="checkbox"/> Healthier buildings                                 | <input type="checkbox"/> Lower life-cycle costs                   |
| <input type="checkbox"/> Reduced impact fees in general                      | <input type="checkbox"/> Increased longevity of buildings         |
| <input type="checkbox"/> Bank promoting green loans and/or appraisals        | <input type="checkbox"/> Political vision                         |
| <input type="checkbox"/> Recognition for builders and developers             | <input type="checkbox"/> Regulations that provide predictability  |
| <input type="checkbox"/> Citizens' interest                                  | <input type="checkbox"/> LEED certification as a brand adds value |
| <input type="checkbox"/> Codes that encourage green building                 | <input type="checkbox"/> Trained Staff                            |
| <input type="checkbox"/> Higher density/bonus and offsets for green building | <input type="checkbox"/> Reduce Carbon                            |



- Education resources (education materials and training)
- High profile champions locally
- Marketability of "green" buildings
- Public outreach/education
- Other \_\_\_\_\_
- I don't know .
- I prefer not to say.

7. I frequently hear my colleagues and peers talking about green building practices.

- |  |                                       |  |  |  |                                  |   |
|--|---------------------------------------|--|--|--|----------------------------------|---|
| <input type="checkbox"/> I strongly disagree | <input type="checkbox"/> I disagree   | <input type="checkbox"/> I somewhat disagree | <input type="checkbox"/> I neither agree or disagree | <input type="checkbox"/> I somewhat agree    | <input type="checkbox"/> I agree | <input type="checkbox"/> I strongly agree |
|  | <input type="checkbox"/> I don't know |  |  | <input type="checkbox"/> I prefer not to say |                                  |   |

8. I understand green building practices are.

- |  |                                       |  |  |  |                                  |   |
|--|---------------------------------------|--|--|--|----------------------------------|---|
| <input type="checkbox"/> I strongly disagree | <input type="checkbox"/> I disagree   | <input type="checkbox"/> I somewhat disagree | <input type="checkbox"/> I neither agree or disagree | <input type="checkbox"/> I somewhat agree    | <input type="checkbox"/> I agree | <input type="checkbox"/> I strongly agree |
|  | <input type="checkbox"/> I don't know |  |  | <input type="checkbox"/> I prefer not to say |                                  |   |

9. I am **NOT** considering enrolling in a certification course for a set of green building practices.

- |  |                                       |  |  |  |                                  |   |
|--|---------------------------------------|--|--|--|----------------------------------|---|
| <input type="checkbox"/> I strongly disagree | <input type="checkbox"/> I disagree   | <input type="checkbox"/> I somewhat disagree | <input type="checkbox"/> I neither agree or disagree | <input type="checkbox"/> I somewhat agree    | <input type="checkbox"/> I agree | <input type="checkbox"/> I strongly agree |
|  | <input type="checkbox"/> I don't know |  |  | <input type="checkbox"/> I prefer not to say |                                  |   |

10. I enjoy working with green building practices.

- |  |                                       |  |  |  |                                  |   |
|--|---------------------------------------|--|--|--|----------------------------------|---|
| <input type="checkbox"/> I strongly disagree | <input type="checkbox"/> I disagree   | <input type="checkbox"/> I somewhat disagree | <input type="checkbox"/> I neither agree or disagree | <input type="checkbox"/> I somewhat agree    | <input type="checkbox"/> I agree | <input type="checkbox"/> I strongly agree |
|  | <input type="checkbox"/> I don't know |  |  | <input type="checkbox"/> I prefer not to say |                                  |   |

11. I regularly discuss green building practices with my colleagues and peers.

- |  |                                       |  |  |  |                                  |   |
|--|---------------------------------------|--|--|--|----------------------------------|---|
| <input type="checkbox"/> I strongly disagree | <input type="checkbox"/> I disagree   | <input type="checkbox"/> I somewhat disagree | <input type="checkbox"/> I neither agree or disagree | <input type="checkbox"/> I somewhat agree    | <input type="checkbox"/> I agree | <input type="checkbox"/> I strongly agree |
|  | <input type="checkbox"/> I don't know |  |  | <input type="checkbox"/> I prefer not to say |                                  |   |

12. I think green building practices have significant financial and environmental benefits for our current society and future generations.

- |  |                                       |  |  |  |                                  |   |
|--|---------------------------------------|--|--|--|----------------------------------|---|
| <input type="checkbox"/> I strongly disagree | <input type="checkbox"/> I disagree   | <input type="checkbox"/> I somewhat disagree | <input type="checkbox"/> I neither agree or disagree | <input type="checkbox"/> I somewhat agree    | <input type="checkbox"/> I agree | <input type="checkbox"/> I strongly agree |
|  | <input type="checkbox"/> I don't know |  |  | <input type="checkbox"/> I prefer not to say |                                  |   |

13. I would personally like to see the practice of green building practices expanded.

- |  |                                       |  |  |  |                                  |   |
|--|---------------------------------------|--|--|--|----------------------------------|---|
| <input type="checkbox"/> I strongly disagree | <input type="checkbox"/> I disagree   | <input type="checkbox"/> I somewhat disagree | <input type="checkbox"/> I neither agree or disagree | <input type="checkbox"/> I somewhat agree    | <input type="checkbox"/> I agree | <input type="checkbox"/> I strongly agree |
|  | <input type="checkbox"/> I don't know |  |  | <input type="checkbox"/> I prefer not to say |                                  |   |

14. I feel that I have all the knowledge, resources, and support I need to implement green building practices in the future.

- |  |                                       |  |  |  |                                  |   |
|--|---------------------------------------|--|--|--|----------------------------------|---|
| <input type="checkbox"/> I strongly disagree | <input type="checkbox"/> I disagree   | <input type="checkbox"/> I somewhat disagree | <input type="checkbox"/> I neither agree or disagree | <input type="checkbox"/> I somewhat agree    | <input type="checkbox"/> I agree | <input type="checkbox"/> I strongly agree |
|  | <input type="checkbox"/> I don't know |  |  | <input type="checkbox"/> I prefer not to say |                                  |   |

15. I **DO NOT** intend to find more information about green building practices.

- |  |                                       |  |  |  |                                  |   |
|--|---------------------------------------|--|--|--|----------------------------------|---|
| <input type="checkbox"/> I strongly disagree | <input type="checkbox"/> I disagree   | <input type="checkbox"/> I somewhat disagree | <input type="checkbox"/> I neither agree or disagree | <input type="checkbox"/> I somewhat agree    | <input type="checkbox"/> I agree | <input type="checkbox"/> I strongly agree |
|  | <input type="checkbox"/> I don't know |  |  | <input type="checkbox"/> I prefer not to say |                                  |   |

16. I intend to try applying green building practices on a project.

- |  |                                       |  |  |  |                                  |   |
|--|---------------------------------------|--|--|--|----------------------------------|---|
| <input type="checkbox"/> I strongly disagree | <input type="checkbox"/> I disagree   | <input type="checkbox"/> I somewhat disagree | <input type="checkbox"/> I neither agree or disagree | <input type="checkbox"/> I somewhat agree    | <input type="checkbox"/> I agree | <input type="checkbox"/> I strongly agree |
|  | <input type="checkbox"/> I don't know |  |  | <input type="checkbox"/> I prefer not to say |                                  |   |

17. I have earned certification in a set of green building practices and intend to seek out additional information to aid in my use of them.

- |  |                                       |  |  |  |                                  |   |
|--|---------------------------------------|--|--|--|----------------------------------|---|
| <input type="checkbox"/> I strongly disagree | <input type="checkbox"/> I disagree   | <input type="checkbox"/> I somewhat disagree | <input type="checkbox"/> I neither agree or disagree | <input type="checkbox"/> I somewhat agree    | <input type="checkbox"/> I agree | <input type="checkbox"/> I strongly agree |
|  | <input type="checkbox"/> I don't know |  |  | <input type="checkbox"/> I prefer not to say |                                  |   |

18. I am currently using green building practices on a regular basis.

- |  |                                       |  |  |  |                                  |   |
|--|---------------------------------------|--|--|--|----------------------------------|---|
| <input type="checkbox"/> I strongly disagree | <input type="checkbox"/> I disagree   | <input type="checkbox"/> I somewhat disagree | <input type="checkbox"/> I neither agree or disagree | <input type="checkbox"/> I somewhat agree    | <input type="checkbox"/> I agree | <input type="checkbox"/> I strongly agree |
|  | <input type="checkbox"/> I don't know |  |  | <input type="checkbox"/> I prefer not to say |                                  |   |

19. I **DO NOT** plan to continue to use green building practices in the future.

- |  |                                       |  |  |  |                                  |   |
|--|---------------------------------------|--|--|--|----------------------------------|---|
| <input type="checkbox"/> I strongly disagree | <input type="checkbox"/> I disagree   | <input type="checkbox"/> I somewhat disagree | <input type="checkbox"/> I neither agree or disagree | <input type="checkbox"/> I somewhat agree    | <input type="checkbox"/> I agree | <input type="checkbox"/> I strongly agree |
|  | <input type="checkbox"/> I don't know |  |  | <input type="checkbox"/> I prefer not to say |                                  |   |

20. I am seeing obvious benefits to my use of green building practices both in terms of building performance and in terms of financial results.

- I strongly disagree   
  I disagree   
  I somewhat disagree   
  I neither agree or disagree   
  I somewhat agree   
  I agree   
  I strongly agree  
 I don't know   
 I prefer not to say

22. I actively encourage my colleagues and peers to adopt green building practices.

- I strongly disagree   
  I disagree   
  I somewhat disagree   
  I neither agree or disagree   
  I somewhat agree   
  I agree   
  I strongly agree  
 I don't know   
 I prefer not to say

23. At which of the following stages of adoption would you expect to find most construction professionals with regard to green building practices in general?

- Unaware: Not yet aware of green building practices  
 Curious: Aware but don't yet have much information about green building practices  
 Envisioning: know ledgeable but want to see them in action before they try them  
 Tryout: Ready to actively get training on green building so they can use it on the job  
 Using it: Already using it and want or need support to maintain its use  
 I don't know .  
 I prefer not to say.

24. At which of the following stages of adoption would you expect to find most city planners with regard to using LEED certification standards specifically?

- Unaware: Not yet aware of LEED building practices  
 Curious: Aware but don't yet have much information about LEED building practices  
 Envisioning: know ledgeable but want to see them in action before they try them  
 Tryout: Ready to actively get training on LEED building so they can use it on the job  
 Using it: Already using it and want or need support to maintain its use  
 I don't know .  
 I prefer not to say.

25. I enjoy experimenting with new technology even when I do not need to.

- I strongly disagree   
  I disagree   
  I somewhat disagree   
  I neither agree or disagree   
  I somewhat agree   
  I agree   
  I strongly agree  
 I don't know   
 I prefer not to say

26. I am **NOT** very concerned about the well-being of future generations.

- I strongly disagree   
  I disagree   
  I somewhat disagree   
  I neither agree or disagree   
  I somewhat agree   
  I agree   
  I strongly agree  
 I don't know   
 I prefer not to say

27. I am confident that science and technology actively benefit humanity.

- I strongly disagree   
  I disagree   
  I somewhat disagree   
  I neither agree or disagree   
  I somewhat agree   
  I agree   
  I strongly agree  
 I don't know   
 I prefer not to say

28. I enjoy working through complex problems with no clear or immediate solution.

- I strongly disagree   
  I disagree   
  I somewhat disagree   
  I neither agree or disagree   
  I somewhat agree   
  I agree   
  I strongly agree  
 I don't know   
 I prefer not to say

29. I aggressively seek more information about green building practices.

- I strongly disagree   
  I disagree   
  I somewhat disagree   
  I neither agree or disagree   
  I somewhat agree   
  I agree   
  I strongly agree  
 I don't know   
 I prefer not to say

30. I can clearly imagine complex goals and the path to reach them.

- I strongly disagree   
  I disagree   
  I somewhat disagree   
  I neither agree or disagree   
  I somewhat agree   
  I agree   
  I strongly agree  
 I don't know   
 I prefer not to say

31. My professional colleagues **DO NOT** regularly seek my opinion about new developments in our field.

- I strongly disagree   
  I disagree   
  I somewhat disagree   
  I neither agree or disagree   
  I somewhat agree   
  I agree   
  I strongly agree  
 I don't know   
 I prefer not to say

32. There is still a great deal more I have yet to accomplish in my professional life.

- I strongly disagree   
  I disagree   
  I somewhat disagree   
  I neither agree or disagree   
  I somewhat agree   
  I agree   
  I strongly agree  
 I don't know   
 I prefer not to say

33. I have a large social and professional network that includes people outside my local area.

- I strongly disagree       I disagree       I somewhat disagree       I neither agree or disagree       I somewhat agree       I agree       I strongly agree
- I don't know       I prefer not to say

### Section B: Demographics

The following demographic questions will help us better understand who has responded to our survey. We will combine your answers with those of everyone else to give us a big picture view of the professionals involved in the construction industry regarding green building practices. We will not identify individuals. If there are any questions you do not wish to answer you may leave them blank; however, it will aid in our analysis if you would mark, "I prefer not to say," on the survey.

34. What is the highest degree either of your parents have earned:

- High School       Doctoral Degree  
 Associates Degree       Post-Graduate Certifications  
 Bachelors Degree  
 Technical Certificate       I don't know .  
 Masters Degree       I prefer not to say.

35. I participate in professional and social organization functions:

- Never     1-2 times per year     3-4 times per year     5-6 times per year     1-2 per month     3-4 times per month     5-6 times per month
- I don't know       I prefer not to say

36. I travel for professional purposes (e.g., business trips and conferences):

- Never     1-2 times per year     3-4 times per year     5-6 times per year     1-2 per month     3-4 times per month     5-6 times per month
- I don't know       I prefer not to say

37. I have contact with outreach representatives of organizations promoting green building practices:

- Never     1-2 times per year     3-4 times per year     5-6 times per year     1-2 per month     3-4 times per month     5-6 times per month
- I don't know       I prefer not to say

38. Highest Level of Education you have completed:

- High School       Masters Degree  
 Associates Degree       Doctoral Degree  
 Bachelors Degree  
 Technical Certificate       I don't know .  
 Post-Graduate Certifications       I prefer not to say.

39. Mark the main media sources you use for information **more than once a week**, this would include both hardcopy and electronic sources:

- Newspaper       Trade Journals  
 Professional Blogs       Academic Journals  
 Newsletters       Webinars  
 Television       Other \_\_\_\_\_  
 Podcasts  
 Internet video and radio       I don't know .  
 Books       I prefer not to say.  
 Magazines

40. Mark the methods of communication you use **multiple times** during the week:

- Email       Teleconferencing  
 Telephone       Video Conferencing  
 Cell Phone       Other \_\_\_\_\_  
 Text Messaging  
 Social Networking Sites       I don't know .  
 Online Discussion Boards       I prefer not to say.  
 Face-to-Face meetings

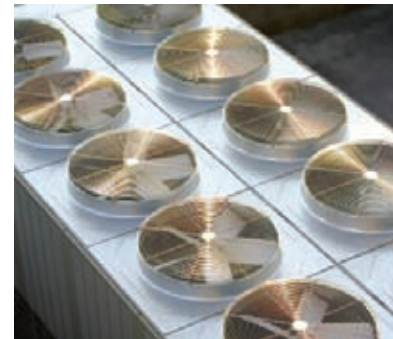
42. Please estimate your annual income:

- Less than \$20,000       More than \$75,000 but less than \$100,000  
 More than \$20,000 but less than \$30,000       \$100,000 or more  
 More than \$30,000 but less than \$40,000  
 More than \$40,000 but less than \$50,000       I don't know .  
 More than \$50,000 but less than \$75,000       I prefer not to say.



## List of Tables and Figures

- 6 Figure 1: Mr. Ames, 9th grade physics student built a 27 x 27 X 27 cube
- 17 Table 1: Summary of Main Points from Reviewed Research
- 18 Table 2: Ranking Values for Focus Group Responses
- 19 Table 3: City Planners and Public Works Professionals' Ranking of Factors that Encourage Green Building
- 19 Table 4: City Planners and Public Works Professionals' Ranking of Incentives that Encourage Green Building
- 20 Table 5: City Planners and Public Works Professionals' Ranking of Barriers to Green Building
- 20 Table 6: City Planners and Public Works Professionals' Ranking of Tools that Encourage Green Building
- 21 Table 7: Members of the Development Community's Ranking of Factors that Encourage Green Building
- 21 Table 8: Members of the Development Community's Ranking of Incentives that Encourage Green Building
- 22 Table 9: Members of the Development Community's Ranking Barriers to Green Building
- 22 Table 10: Members of the Development Community's Ranking of Tools that Encourage Green Building
- 23 Table 11: Comparison of the Top Five Factors for Developers and Cities
- 25 Table 12: City and County Survey Response Rate by State
- 26 Table 13: Construction Professional Survey Response Rate by State
- 26 Table 14: Mayor/County Commissioner Support for Green Building Practices
- 27 Table 15: Cities' Perceptions of the Awareness of Green Building by Developers
- 27 Table 16: Community Factors that Support Green Building
- 29 Table 17: Use of Economic Tools to Promote Green Building
- 29 Table 18: Policy and Guidelines for Green Building
- 30 Table 19: Factors and their degree of influence on green building policy
- 31 Table 20: Staff and LEED AP Accredited Staff by City, County and MSA
- 32 Figure 2: Top Five Barriers for Green Building
- 32 Figure 3: Top Five Incentives for Green Building
- 33 Figure 4: Top Five Barriers for LEED
- 33 Figure 5: Top Five Incentives for LEED
- 35 Figure 6: Top Five Barriers
- 35 Figure 7: Top Five Incentives
- 37 Table 21: Summary of Construction Industry Survey Data
- 38 Table 22: Adoption Level and Strategy
- 39 Table 23: Construction Industry Members and Stage of Adoption



Paper used for the production of this report is FSC Certified.

"This report provides important and timely feedback on the perceptions of developers, design professionals, the construction industry and members of government within our local cities and counties. The impact of the built environment is significant, and this report outlines critical factors necessary for market transformation: namely education, incentives and a holistic and integrated approach to design and construction. We have the opportunity to use this information to overcome barriers and establish common ground to create more sustainable buildings with lower lifecycle costs and healthier indoor environments that benefit rather than burden our society."

Sharon Patterson

Chair of the Board, USGBC Idaho Chapter, LEED AP BD+C and Homes

"The report is a thorough overview of many issues confronting the green building market as it continues to grow and mature. It clearly illustrates how the simple concept of sustainability has layers of complexity when the various stakeholders look at it from their own perspective. The snapshot it presents provides guidance to anyone who is attempting to apply sustainable concepts to the built environment."

Bruce Poe, AIA, LEED AP  
Modus Architecture



OFFICE OF  
SUSTAINABILITY  
AND THE PUBLIC  
POLICY CENTER

Published  
February, 2010