

# Healthy Buildings: Green Building Standards, Benefits, and Incentives

Shannon D. Sentman

## ABSTRACT

In 1984, the World Health Organization released a report suggesting that up to 30% of new and remodeled buildings worldwide may be linked to symptoms of sick building syndrome. About a decade later, the green building movement began in the U.S. While many viewed the movement's primary focus as minimizing the impact of buildings on the natural environment, the movement also focused on promoting healthy work environments. This article discusses what makes a building "green," and how being "green" often means being healthy. It also discusses how the green building movement is being bolstered by policy and by the benefits attributable to green design and operations.

## INTRODUCTION

With the Clinton years waning and George W. Bush poised to take his place as the 43rd president of the United States, few could foresee the forthcoming shift in the real estate industry. Fewer still would have guessed that the man who lost the election to soon-to-be President Bush would be a key player in this shift. That man, of course, was Former Vice President Al Gore, whose star swept the U.S. and the world as he marched with a single-minded determination to educate the masses of the calamity that befell our natural environment if the world's people and governments failed to address climate change. Mr. Gore placed the blame for climate change squarely on human-caused greenhouse gas (GHG) emissions, and, according to Mr. Gore, addressing this issue meant altering human behavior to reduce these emissions.

As the principal culprits for GHG emissions, the sectors of industry, transportation, and buildings came into sharp focus. In the U.S., of these three sectors, buildings are responsible for the highest level of GHG emissions—39% of the nation's total. These emissions result from the energy consumed by building, which includes 70% of the electricity produced in the U.S. and 40% of the nation's total energy.<sup>1</sup>

The new green consciousness spurred by Mr. Gore impacted the commercial real estate industry from several angles. For one, local governments, impatient with the lack

of a Federal response to climate change, began creating incentives to encourage the development of green buildings, while also passing mandates to force the development of green buildings. At the same time, market demand for green buildings began to swell. Exposed to these factors, and in the midst of an unprecedented boom, the commercial real estate industry saw green buildings grow from a niche market to a major segment of the industry.

Although Former Vice President Gore's central mission was to reduce GHG emissions, there was a side effect to his actions. Many in the real estate industry, and many real estate users, began to take a closer look at the impact of green buildings on the health and productivity of occupants of these buildings. With stories of "sick buildings" becoming more prevalent, the industry began to realize that green buildings are healthy buildings, and the companies occupying these buildings were receiving a financial benefit in the form of enhanced worker health and productivity. This benefit, along with other more tangible bottom-line benefits, is a key factor in overcoming the biggest hurdle to green building—the increased costs associated with these projects, known as the "green premium."

As businesses better understand the benefits of green buildings, the demand for greener buildings will continue the shift that is already well underway in the real estate market. To understand why this shift will continue, even in the face of a green premium, requires an understanding of

Shannon D. Sentman, LEED AP®, is an attorney and strategic consultant in the Washington, D.C., office of Holland & Knight LLP, where his practice focuses on assisting clients navigate the terrain surrounding all aspects of sustainability—e.g. public policy, risk mitigation, public and private incentives, renewable energy, etc. Mr. Sentman is a nationally recognized expert in the field of green building/sustainable development, on which topic he regularly writes, speaks and teaches, and is frequently interviewed as a legal expert.

COPYRIGHT © 2009 BY  
THE JOURNAL OF BIOLAW & BUSINESS



WWW.BIOLAWBUSINESS.COM

In addition to his law degree, Mr. Sentman's educational background includes a Masters in Real Estate Development from the Carey Business School at Johns Hopkins University, and the LEED Accredited Professional designation from the U.S. Green Building Council, which he was the 7th attorney in the nation to earn. He is currently on the Executive Committee for the USGBC National Capital Region chapter, and the lead editor of the forthcoming American Bar Association publication "Green Building & Sustainable Development: The Legal Guide." He is also an adjunct professor for the Colvin Institute of Real Estate Development at the University of Maryland.

Cite as: Shannon D. Sentman, *Healthy Buildings: Green Building Standards, Benefits, and Incentives*. The Journal of Israel Innovation (Special Supplement: Israel Edition of J.BioLaw & Bus.) 2009.

green buildings and how they compare to conventional buildings.

## SICK BUILDING SYNDROME

Most have heard the term “sick building syndrome” (SBS), but few understand what it means. This lack of understanding is akin to terms like “soft-tissue damage,” and often met with the similar skepticism. The skepticism results from the anomalous nature of sick building syndrome. As defined by the Environmental Protection Agency, the term “sick building syndrome” describes “situations in which building occupants experience acute health and comfort effects that appear to be linked to time spent in a building, but no specific illness or cause can be identified.”

Despite any skepticism that may exist, institutions like the World Health Organization and the U.S. Environmental Protection Agency view sick building syndrome as a serious problem. According to a report released in 1984 by the World Health Organization, up to 30% of new and remodeled buildings worldwide may be the subject of excessive complaints related to indoor air quality (IAQ), which is the primary culprit for sick building syndrome. Combine this with consideration of the amount of time adult Americans spend indoors—90% of their time according to the EPA—and the problem becomes clearer.

For businesses, sick building syndrome can impact the bottom-line in numerous ways—increased absenteeism, liability for ailments, increased health costs, lost productivity, etc. According to the EPA publication “An Office Building Occupant’s Guide to Indoor Air Quality,” “poor indoor air may cost the nation tens of billions of dollars each year in lost productivity and medical care.”

## GREEN BUILDINGS, HEALTHY BUILDINGS

When defining what makes a building “green,” indoor air quality is one of several factors considered. Generally, green buildings, as distinguished from their conventional peers, are developed and operated to minimize negative impacts on the natural environment, and on building occupants. In addition to improved indoor air quality, other key attributes of green buildings include environmentally-sensitive siting, efficient use of natural resources, and increased use of natural light.

Because the general/conceptual definition of green buildings does not offer a threshold distinction from

conventional buildings, the real estate industry has struggled to distinguish real green buildings from those employing “green” merely as a marketing tool. To resolve this issue, various groups developed green building standards in hopes of creating a common definition.

## Green Building Standards

Unlike most building standards, which typically focus on specific aspects of a building (*i.e.* indoor air quality, energy efficiency, fire safety, etc.), green building standards are comprehensive in nature, taking many aspects of a building’s development and operation into consideration. In fact, many green building standards or ratings systems are actually a compilation of a number of specific standards. Unlike green building standards, building standards like Energy Star, which focuses solely on energy efficiency, do not look at a building holistically. While energy efficiency is important for green buildings, absent consideration of indoor air quality and other environmental impacts, energy efficiency alone does not necessarily make a building green.

Although numerous green building standards exist in the U.S. and abroad, the clear leader in the domestic commercial real estate market is the Leadership in Energy and Environmental Design Green Building Rating System (LEED) developed by the United States Green Building Council (USGBC). Founded in 1993, USGBC is a non-profit trade organization whose membership consists primarily of building industry stakeholders with a mission to promote sustainable design, construction, and operation throughout the real estate industry.

“Although numerous green building standards exist in the U.S. and abroad, the clear leader in the domestic commercial real estate market is the Leadership in Energy and Environmental Design Green Building Rating System (LEED) developed by the United States Green Building Council (USGBC). Founded in 1993, USGBC is a non-profit trade organization whose membership consists primarily of building industry stakeholders with a mission to promote sustainable design, construction, and operation throughout the real estate industry.”

mission to promote sustainable design, construction, and operation throughout the real estate industry.

Five years after its founding, USGBC released the LEED 1.0 pilot program. In developing this first version of LEED, early council members (informed by existing green building standards—UK’s BREEAM<sup>2</sup> and Canada’s BEPAC<sup>3</sup>) endeavored to create a custom, voluntary system for U.S. buildings. Ultimately, the goal in creating LEED was to stimulate market demand for greener buildings. By most standards, LEED has achieved this goal. As of February 18, 2009, there were 2,271 LEED certified buildings worldwide, with another 17,723 buildings registered for certification.

The success of the LEED Rating System is due in part to the constant refinement of the system. Since its inception, the LEED Rating System has not only grown from one standard for new construction to a comprehensive system covering almost the full gamut of project types,<sup>4</sup> it has also seen numerous versions of the criteria underlying many of the various systems.

Despite this refinement, the six major areas that LEED addresses remain consistent—Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials and Resources, Indoor Environmental Quality, and Innovation in Design Process. The first five of these six areas are the environmental categories, with the latter acting primarily as a catch-all for sustainable practices otherwise unaddressed by the other categories.

Within each of the categories are various criteria classified as either Prerequisites or Credits.<sup>5</sup> Although the criteria differ depending on the specific LEED Rating System applicable to a given project, certification under each system requires that the project satisfy all of the Prerequisites plus a threshold number of Credits. For each Credit that a project achieves, it earns a certain number of points toward certification. If a project earns the minimum threshold of points, USGBC awards the project with certification. To provide incentive to projects that push beyond the minimum certification requirements, USGBC awards projects one of four rating levels—Certified, Silver, Gold, or Platinum—each more onerous than the prior. The total number of points that a project earns is the basis for the rating level awarded. USGBC recognizes LEED rated buildings with a mountable plaque.

## GREEN PREMIUM

Undoubtedly, the single biggest hurdle to a market-wide shift to developing green buildings has been the perceived high cost of designing and constructing these buildings as compared to their conventional peers. This perception is, at least in part, a relic of the early years of the LEED-era of green building (the late-90s and early in this decade), when green building developers often paid high premiums for projects due to, among other things, lack of experience and knowledge among the building professions and the high costs of “green” building materials from niche manufacturers.

As experience among the professions grew and green building materials became readily available on the mass market, the cost of developing green projects decreased rapidly. The results of numerous studies comparing the cost of green building to conventional building show the “green premium” as ranging from zero to ten percent, with most buildings falling below a two percent increase as compared to a conventional building. In a frequently cited 2003 study by Gregory H. Kats, the green premium for the various LEED certification levels of 33 buildings were as follows: 0.66% for LEED Certified, 2.11% for LEED Silver, 1.82% for LEED Gold, and 6.5% for LEED Platinum.<sup>6</sup> This translated to a total increase of \$3.00–\$5.00 per square foot. Further, a 2006 study of 221 buildings by Davis Langdon concluded, “there is no significant difference in average costs for green buildings as compared to non-green buildings.”<sup>7</sup>

Despite these studies, the perception of the “green premium” remains high among many in the real estate industry. In a 2007 survey by Building Design &

Construction, 41% of the responding architects, engineers, contractors, and developers/owners believed the overall cost of green building was 11% or more above the cost of conventional building.<sup>8</sup>

Although the perception of the green premium may be exaggerated, most green building advocates will admit that green projects do cost at least marginally more to develop than their conventional counterparts. Because most building owners must answer to financing sources—lenders, investors, stockholders, taxpayers, etc.—projects are unlikely to include such increased green investments unless the market shows them as prudent. For the market to show them as prudent, typically requires higher tenant demand for these buildings and higher rents.

## RETURN ON GREEN

Additional investment in green features is prudent when the benefits of these features offset any green premium—*i.e.* the return on investment justifies the increased initial investment. Applying the findings from the Kats study, for most projects, the required return on investment must justify a premium of \$3.00–\$5.00 per square foot. The benefits most frequently cited as resulting in increased returns for green buildings, include decreased operating expenses resulting from reduced consumption of energy and water, reduced waste, insurance savings, enhanced worker productivity and health, decreased capital investment requirements due to available incentives, decreased risk of governmental policy impact, expedited construction permitting and entitlement procedures in some localities, and increased operating revenue due to higher rent, increased occupancy, and net metering.

Of these benefits, decreased operating expenses are the most tangible. In his 2003 study, Kats estimated that the commissioning associated with LEED certified buildings, together with reduced consumption of energy and water, results in a savings of \$1.16 per square foot annually, for a 20-year present value of \$14.77 per square foot based on a 5% discount rate. This alone seems to justify the \$3.00–\$5.00 per square foot premium.

In addition to operating savings, which are easily quantified with standard building valuation metrics, green building advocates tout the less quantifiable benefits of green buildings as their real selling point. These include increased worker retention, and enhanced productivity, health and wellbeing, resulting in reduced health care and insurance costs. Numerous studies support this point, showing that the improved indoor air quality and the increased natural light associated with green buildings make for better work environments. From the standpoint of the average building user, the cost of facilities (renting/owning and operating real estate) accounts for only a small percentage of overall company expenses, in comparison to personnel-related costs. Given the cost of personnel, any enhancements resulting from green buildings likely justify higher rents.

To support the proposition that green buildings enhance

worker productivity and health, a study by Lawrence Berkeley National Laboratory concluded that American businesses could save as much as \$58 billion in lost sick time and \$200 billion in worker's performance by making improvements to indoor air quality.<sup>9</sup> Additionally, studies by Herman-Miller found worker productivity increased by up to 7% in green, day-lit facilities.<sup>10</sup> Essentially, these and numerous other studies support the proposition that green buildings are the counterpoint to those buildings blamed for sick building syndrome. Altogether, these benefits also purportedly result in greater worker loyalty and retention for the "green" employer.

In valuing the personnel-related benefits of green buildings, Kats estimated that a mere 1% increase in productivity (approximately 5 minutes per day) for an employee receiving annual compensation of \$66,478.00 results in a productivity gain of approximately \$665.00 per employee, or \$2.96 per square foot annually.<sup>11</sup> Applying Kats' life-cycle analysis, improved personnel health and productivity result in a 20-year present value of \$36.89 per square foot for LEED Certified and Silver buildings and \$55.33 for LEED Gold and Platinum buildings.<sup>12</sup>

## GREEN BUILDINGS INCENTIVES

In addition to operating benefits, owners developing green buildings and tenants occupying green buildings may benefit

from local, state, and federal incentives. All 50 states, the federal government, and many local jurisdictions offer various incentives for energy efficiency, renewable energy, or specifically for green buildings. To name a few, these incentives come in the form of tax credits and deductions, grants, low cost loans, reduced property taxes, expedited permitting, and reduced fees. Due to appropriations and other issues, many view these incentive programs with due caution.

Owners and tenants interested in learning about specific incentives available for green buildings should refer to the following two databases: (1) Database of State Incentives for Renewables & Efficiency available at [www.dsireusa.org](http://www.dsireusa.org),<sup>13</sup> and (2) USGBC's Public Policy Search available at <http://www.usgbc.org/publicpolicy/searchpublicpolicies.aspx?pageid=1776>.

## SUMMARY

Although climate change considerations spurred the LEED-era green building movement, the health of these buildings may be the primary impetus for the demand that drives the continued shift within the real estate industry. In light of liabilities associated with "sick buildings" and benefits associated with healthy buildings, conscientious owners and tenants should continue to move away from conventional offerings.

### ENDNOTES

1. U.S. Energy Information Administration, *U.S. Energy Information Administration Annual Energy Review 2007* June 23, 2008, available at <http://www.eia.doe.gov/aer/> (last visited Feb. 8, 2009).
2. BREEAM is the acronym for Building Research Establishment's Environmental Assessment Method. Created in 1990, BREEAM is the prevailing green building rating system in the UK.
3. BEPAC is the acronym for Building Environmental Performance Assessment Criteria, which is a building evaluation standard developed in Canada in 1993.
4. Currently, the suite of LEED Rating System products includes: LEED for New Construction and Major Renovations (LEED-NC), LEED for Existing Buildings: Operations & Maintenance (LEED-EBOM), LEED for Commercial Interiors (LEED-CI), LEED for Core & Shell (LEED-CS), LEED for Schools, LEED for Retail, LEED for Healthcare, LEED for Homes, and LEED for Neighborhood Development (LEED-ND).
5. Like the environmental categories, the Innovation in Design Process category includes various Credits. However, it does not include any Prerequisites.
6. Gregory H. Kats, *The Costs and Financial Benefits of Green Buildings—A Report to California's Sustainable Building Task Force*, Oct. 2003, available at <http://www.cap-e.com/ewebeditpro/items/O59F3259.pdf> (last visited Feb. 8, 2009).
7. Lisa Fay Matthiessen & Peter Morris, *Cost of Green Revisited*, Davis Langdon (2007), available at <http://www.davislangdon.com/USA/Research/ResearchFinder/2007-The-Cost-of-Green-Revisited/> (last visited Feb. 8, 2009).
8. *Green Buildings Research White Paper*, Building Design+Construction, at 7 (Oct. 2007), available at [http://www.bdcnetwork.com/contents/pdfs/BDC\\_07\\_WhitePaper.pdf?nid=2073](http://www.bdcnetwork.com/contents/pdfs/BDC_07_WhitePaper.pdf?nid=2073) (last visited Feb. 8, 2009).
9. William J. Fisk, *Health and Productivity Gains from Better Indoor Environments*, Lawrence Berkeley National Laboratory, Nov. 2000, available at <http://arjournals.annualreviews.org/doi/abs/10.1146/annurev.energy.25.1.537> (last visited May 1, 2008).
10. Judith Heerwagon, *Do Green Buildings Enhance the Well Being of Workers?*, Environmental Design and Construction Magazine, July/August 2000.
11. Kats, *supra* note 6, at 68.
12. *Id.*
13. The Database of State Incentives for Renewables & Efficiency is maintained by The North Carolina Solar Center and Interstate Renewable Energy Council and funded by the United States Department of Energy. It is a comprehensive source of information on statSubmitted to Journal of Biolaw & Business.

Green buildings have many benefits and have a great impact on the environmental, economic, and social levels. The design of the building depends on the use of renewable energy as well as bio-resources and recyclable or renewable materials. And the benefits of these buildings on the social level are numerous, sustainable buildings improve the quality of the environment and life by enhancing the health and comfort of the people around them due to the use of sound and heat insulation techniques and improving the management of lighting and energy. Green building (also known as green construction or sustainable building) refers to both a structure and the application of processes that are environmentally responsible and resource-efficient throughout a building's life-cycle: from planning to design, construction, operation, maintenance, renovation, and demolition. This requires close cooperation of the contractor, the architects, the engineers, and the client at all project stages. The Green Building practice expands and complements the classical... Green buildings aren't just great for the environment. Read on to find out how your mental and physical health can also benefit from green buildings.Â Green buildings save money. The initial construction costs for a green building might be a bit higher, but they are cheaper to operate and maintain, which ultimately makes them a good long term investment. According to the California Sustainable Building Task Force, a two percent investment in green design will save you more than ten times that investment in the long run. So, if you have a \$1 million building project and invested \$20,000 in green design, it will lead to \$200,000 in savings over 20 years.