



# New Solutions

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## Special Report: Part 1

# LEEDing from Behind: The Rise and Fall of Green Building

**Editor's Note:** The purpose of this, the first of three parts of our Special Report, is to show the history of the dialogue about LEED energy performance. Part II will specifically discuss LEED additional building costs and energy performance obtained from these costs. It will also analyze the USGBC marketing efforts around this topic. Part III will suggest options to the LEED rating system. Part II will be published in June, 2009.

## Introduction

Language sometimes obscures an issue. Certain “branding” terminology is selected with a particularly concise set of words which form the core of a slogan or slogans around which a philosophy can be formed, money can be raised and products marketed. One such term that is intended to make us feel we are addressing the challenges of Peak Oil and Climate

Change is “green.” Green is used in many ways and forms – as a noun “green is good,” as an adjective “green building” or “green society,” and a verb “we must green the economy.” It also includes the slang version of the verb in the frequent uses of phrases such as “go green,” “green it” and “green up.”

In the late 1980s interest in energy efficiency and the environment increased. The 1987 UN Brundtland Commission’s report defined “sustainable development.” In 1992 the U.S. government’s Energy Policy Act included policies for building efficiency. This act called for a 20 percent reduction in energy consumption per square foot relative to the 1985 baseline consumption in federal buildings. The government adopted the term “green,” passing several executive orders including three in 1998, 1999, 2000 entitled respectively *Greening the Government through Waste Prevention, Recycling and Federal Acquisition*, *Greening the Government through Energy Efficient Management*, and *Greening the Government through Leadership in Environmental Management*.

At the UIA/AIA (International Union of Architects and American Institute of Architects) World Congress of Architects held in Chicago in June 1993, the presidents of the two organizations signed the “Declaration of Interdependence for a Sustainable Future.” This convention is recognized as a turning point in the history of the green building movement even though the word used was sustainable, not green. It is important to note that sustainable and green are in many cases synonymous.

Green has become a word that can be applied to almost anything e.g., a green lifestyle. Its widespread use makes it very difficult to come up with measurements that are vital to determining the energy inputs and the waste products of buildings. An old saying, “If you can’t measure it, you can’t manage it,” is highly appropriate to describe the state of our



understanding of energy relative to buildings. It is unfortunate that green became the word of choice for buildings, since there is terminology available that does a better job of communicating the environmental and energy considerations with which we are concerned – *energy-efficient, high-performance, energy rating, low-energy, energy savers*, etc. Of great importance is that these are measurable and comparable.

Using the color green instead of measurements may have led to an unnecessary delay in taking steps to resolve fossil fuel depletion and environmental issues. The term “green-wash” has appeared as a result. Green-wash refers to the fact that the word “green” has become a marketing and sales slogan to increase product sales based on a theme of doing good to save the planet.

Possibly the term *energy efficiency* might have been a good choice and have provided a more focused direction for setting baseline standards for energy use. In physics the term efficiency is clearly used in a variety of contexts, including efficient energy use, energy conversion efficiency, energy conservation, electrical efficiency, fuel efficiency, lighting efficiency, mechanical efficiency, volumetric efficiency and thermal efficiency. If energy efficiency were used, it would be easy to provide a wide range of measurements that define in physical terms how efficient a building is, such as BTUs per square foot or kWh per square meter.

At the core of any kind of genuine building science is a precise scientific terminology that is easy to understand and could be simplified for general use. Unfortunately, with the use of “green,” the whims of market considerations prevailed, leaving the population without the tools to understand the energy and climate implications of its purchasing decisions. It may be that efficiency as a term is not robust enough since we often squander the savings on bigger houses and bigger (and more) appliances.

## The U.S. Green Building Council

The U.S. Green Building Council<sup>1</sup> (USGBC) was founded in 1993, the same



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year that the World Congress of Architects initiated the Declaration of Interdependence for a Sustainable Future. USGBC is a non-profit organization, comprised of design professionals and corporations, many from the giant building materials industry. Its objective is to “promote buildings that are environmentally responsible, profitable and healthy places to live and work.” Its mission is “to transform the way buildings and communities are designed, built and operated, enabling an environmentally and socially responsible, healthy and prosperous environment that improves the quality of life.” The USGBC is a well-funded organization with major corporations and architectural firms on its advisory board. Its 2007 revenues were \$46,000,000.

The Natural Resources Defense Council (NRDC) was involved in the formation of the USGBC, which began with an alliance between a real-estate developer, David Gottfried, and a senior scientist for NRDC, Rob Watson. Richard Fedrizzi, the current CEO of USGBC is quoted as saying, “The great majority of environmental organizations had invested in keeping companies on the other side of a fence. David [Gottfried] thought that we could do things differently. If we could invite business to the table, we could develop standards relative to building performance, get buy-in at the very top, and be able to *transform the marketplace* (italics mine) toward sustainable buildings.”<sup>2</sup> The term “market transformation” is frequently used by USGBC promoters.

USGBC invented and manages the Leadership in Energy and Environmental Design (LEED) rating system, used to certify buildings as “green.” Green building – as defined by USGBC – is the practice of increasing the efficiency with which buildings use resources – energy, water and materials – while reducing building impacts on human health and the environment during the building’s lifecycle, through better site placement, design, construction, operation, maintenance, and removal.<sup>3</sup>

LEED has several rating systems,<sup>4</sup> including:

**New Construction** – for high performance commercial and institutional projects

**Existing Buildings – Operations and Maintenance** – for already built structures

**Commercial Interiors** – for tenant improvements

**Core & Shell** – for sustainable design choices for new core shell construction

**Schools** – for K-12 schools and other school spaces

**Retail** – for special needs of retail spaces

**Healthcare** – for high performance healthcare facilities

**Homes** – for residential construction

**Neighborhood Development** – for smart growth and new urbanism developments

The LEED system is used to measure the degree of “greenness” of a building. For new construction it is a simple checklist with a certain number of points (69 in LEED 2.2, 110 in LEED 2009).<sup>5,6</sup> To achieve the lowest certification, labeled “*certified*,” at least twenty-six points are required in LEED 2.2 and forty points in LEED 2009. The highest certification, labeled “*platinum*,” requires at least fifty-two points in LEED 2.2 and eighty points in LEED 2009. Note that the larger number of points in LEED 2009 does not reflect a higher level of performance but rather a changing of the numerical weightings assigned to various options. Table 1 shows the breakdown of the older and newer versions. The percent column shows the different distribution of the LEED classifications between the newer and older versions.

## LEED Building History – Number of Units and Square Feet

Since the formation of the USGBC in 1993 to the end of 2008 the organization claims to have certified about 2,100 commercial buildings with a total area of about 283 million square feet.<sup>7</sup> There are about 5 million commercial buildings in the U.S. with a total area of about 74 billion square feet.<sup>8</sup> In the fifteen years of USGBC history certified LEED buildings represent about 0.04 percent of the total number of existing buildings and about 0.4 percent of the existing square footage. This is not to deny any progress to LEED but to point out that the installed base of conventional commercial buildings dwarfs the number of so-called “green” buildings.

In Table 2, the values of certified projects and millions of square feet were estimated from charts that are part of the USGBC presentation entitled “About LEED” on the USGBC website.<sup>9</sup> Note: the referenced charts do not contain a scale.

Other sources show that LEED certifi-

cation began before 2004. A March 2008 New Buildings Institute (NBI) report on LEED Energy Performance<sup>10</sup> (partially funded by USGBC) shows a less robust growth rate (Table 3) than that noted in Table 2.

The data sets in Tables 2 and 3 are not identical. The NBI data shows that the number of buildings certified between the years 2000-2004 (5 years) is 148 units while the USGBC presentation shows 266. The USGBC graphics show an impressive first year jump while the NBI report shows a more gradual buildup. The NBI report shows 165 units and 240 units for 2005 and 2006 respectively while the USGBC shows 266 and 361 for the same two years.

This difference is clarified somewhat in an April 2009 LEED report *Green Building by the Numbers*.<sup>11</sup> This report, updated monthly, breaks down buildings certified into the main LEED building categories.<sup>12</sup> The LEED for New Construction rating system was first released in 2000. LEED for Commercial Interiors and Existing Buildings became available in 2004 and LEED for Core & Shell became available

in July 2006 for spec developments. LEED for Neighborhood Development, Retail and Healthcare recently became available. Information from that report is shown in Table 4.

**Table 4: Breakdown of LEED Programs**

LEED Program	# of Certified Projects
New Construction (NC)	1,600
Commercial Interiors (CI)	479
Existing Buildings (EB)	200
Core and Shell (CS)	157
Neighborhood Development (ND)	13
Schools	4
Retail	36
<b>Total</b>	<b>2,476</b>

The early LEED-certified buildings were only in the new construction (NC) division while commercial interiors and existing buildings are included in later programs. A comparison of new construction only would provide a more realistic growth rate and explain part of the difference between USGBC and NBI data. This *New Solutions* deals principally with the energy performance for New Construction.

## LEED Ratings

LEED ratings are not given by any popularly used metrics (such as BTUs of energy consumed per square foot per year) but by names of metals including *silver*, *gold* and *platinum* for the levels of certification. Bronze was the original rating for the lowest level but was replaced with the term “*certified*.” Uses of metal names to make an association with Olympic sports prizes rather than some more scientific way of rating makes measuring and comparing difficult. Jerry Yudelson, in his book *The Green Building Revolution*, says “Since Americans are competitive and obsessed with keeping score, the LEED system is particularly well suited to our culture.”<sup>13</sup>

As stated above, LEED has multiple ratings which are essentially “grades of greenness.” One might compare LEED ratings to school grading with *platinum* being an A, *gold* a B, *silver* a C, and *certified* a D. This nomenclature is somewhat confusing since the term certification, which includes all buildings in the four grades, is also the

**Table 1: Comparison of Two Versions of LEED**

Version	LEED 2.2		LEED 2009	
	Points	%	Points	%
Energy and Atmosphere	17	25%	35	32%
Indoor Environmental Quality	15	22%	15	14%
Sustainable Sites	14	20%	26	24%
Materials and Resources	13	19%	14	13%
Water Efficiency	5	7%	10	9%
Innovation and Design Process	5	7%	6	5%
Regional Bonus Credits	0	0%	4	4%
<b>Totals</b>	<b>69</b>	<b>100%</b>	<b>110</b>	<b>100%</b>

**Table 2: Number of LEEDS Certified Projects and Millions of Square Feet**

Year	Yearly Number Built	Cumulative Number Built	Yearly Footage (millions sq.ft)	Cumulative Footage (millions sq.ft.)
2004	266	266	40.5	40.5
2005	266	532	35.4	75.9
2006	361	893	55.7	131.6
2007	722	1615	78.4	210
2008	513	2128	73.4	258

**Table 3: New Buildings Institute Data**

Year	2000	2001	2002	2003	2004	2005	2006
Number	1	4	16	44	83	165	240

title of the lowest grade (*certified*). Thus certified is used in two ways that can be confusing, e.g. the LEED building was certified *gold* or the LEED building was certified as “*certified*.”

The USGBC provides an online database of LEED projects. The February 2009 database is in the form of an Excel file of projects, identified by an ID number.<sup>14</sup> The summary of this Excel spreadsheet showed 19,836 registered buildings and 4,118,182,283 registered gross square feet. Sorting on the “Points achieved” column and then discarding the entries with no points, left 2,196 certified projects. These were sorted into the categories of *certified*, *silver*, *gold* and *platinum*. The numbers from this sorted spreadsheet for each category are more or less congruent with LEED presentations mentioned earlier and are summarized in Table 5, which shows the average points for each category along with the average square feet.

Table 6 shows the distribution of points within each category. The second column (Range of Points) shows the point range for each of the four categories. The third column in this table shows the point spread per category – 7 for *certified*, 6 for *silver*, 13 for *gold*, and 18 for *platinum*. It is not clear why the *certified* and *silver* categories have such a narrow spread compared to the *gold* and *platinum*. One could combine *certified* and *silver* to reduce the categories to three, with more equivalent

point spreads of 13, 13 and 18.

The fourth column (Average [Calculated]) is the calculated average value of each of the four ranges. The fifth column (Average [Actual]) is the actual average points achieved of the buildings from the fourth column (Average Points) of Table 5. This shows that most LEED buildings come in near the bottom of the point range.

The actual point average for all the buildings is 34.6 points. This is just two-and-one-half points above the top points of the *certified* category. This illustrates the weakness of using a large number of categories and setting a range rather than using a more simple numeric scale like the Home Energy Ratings System (HERS)<sup>15</sup> index. LEED buildings are being certified within a particular category by achieving the smallest number of points within the category range and this is not apparent without a numeric value for each building.

## Concerns about LEED: 2005–2006

The first LEED certified building was completed in 2000. Only a small number were built in the first few years. As more LEED buildings appeared concerns began to be expressed. In April 2005, Ted Bowen wrote an article, “New Rating Systems for Green Houses Draw Both Interest and Conflicts,”<sup>16</sup> in which Bowen asks who should define “green” and noted that

LEED has taken root at the federal, state, and local levels, mostly through design standards for public projects, and showed signs of migrating to national building codes.

The National Association of Home Builders (NAHB) and an industry consortium, the North American Coalition<sup>17</sup> on Green Building, have been critical of the USGBC standards setting processes, which, they say, do not support legislative and regulatory enforcement of sustainability measures. Bowen says the coalition was established in 2003 by General Electric and trade groups representing manufacturers, forestry and wood-products companies, chemical companies, vinyl producers, and others dissatisfied with USGBC. He quotes Jerry Schwartz as saying that the coalition contends that USGBC’s policies limit the influence of individual companies (though some coalition member companies are also USGBC members) and undercut claims of a consensus-based process. USGBC’s efforts have not been embraced throughout the building industry, partly because it seeks to set standards that might better be done in a more consensual manner and involve organizations that establish building codes.

In August 2005 Randy Udall (one of the founders of the Association for the Study of Peak Oil-USA) and Auden Schendler wrote an article entitled “LEED Is Broken – Let’s Fix It.”<sup>18</sup> The authors point out that prior to LEED “green building” was all in the eye of the claimant. They suggest that green building has a robust future but LEED may not. They compare the market transformation results of Energy Star, which LEED aspires to but has not achieved.

They then discuss their own experience in building two LEED-rated buildings and conclude that certification rather than environmental responsibility is the focus of LEED. They compliment LEED for its popularity and for creating the first standard but noted that the USGBC is not receptive to constructive criticism. They summarize their own experiences in a few succinct points:

1. LEED certification costs too much.

**Table 5: April 2009 LEED Data**

Category	Total Units	Total Points	Total Square Footage	Average Points	Average Square Footage
Certified	650	17,712	72,112,657	27.2	110,943
Silver	744	24,838	98,197,819	33.4	131,986
Gold	686	27,118	91,700,148	39.5	133,674
Platinum	116	6,253	11,139,696	53.9	96,032
<b>Total</b>	<b>2,196</b>	<b>75,921</b>	<b>273,150,320</b>	<b>34.6</b>	<b>124,385</b>

**Table 6: LEED 2.2 Calculated Average Ratings Comparisons to Actual Ratings**

Category	Range of Points	Spread of Points	Average (Calculated)	Average (Actual)
Certified	26-32	7	29.0	27.2
Silver	33-38	6	35.5	33.4
Gold	39-51	13	45.0	39.5
Platinum	52-69	18	60.5	53.9
<b>All</b>			<b>37.9</b>	<b>34.6</b>



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2. There is "point mongering," an obsession with getting credits. (They list the frequent criticism that LEED certification is possible without getting any energy points.)
3. LEED energy modeling is very complicated.
4. There are too few credits for saving energy.
5. There is excessive bureaucracy.
6. Overblown claims of green building benefits are misleading, particularly improved worker productivity.

The authors suggest that the USGBC analyze the U.S. Department of Energy (DOE) "Building America" program which they point out is less a PR label and more of a real specification.

Some months later other commentaries began, including an article in the *Wall Street Journal* in October 2005 by Alex Frangos entitled "Is it Too Easy Being Green?"<sup>19</sup> The author notes that while there are no tax credits or other financial incentives, builders like the friendly "LEED" moniker. Goldman Sach's 42-story LEED certified building was highlighted, noting that it only scored 27 on a 69 point scale, one point over the minimum of 26 required for LEED's lowest level of certification (*certified*). The building does little to cut energy use or pollution. Frangos points out that builders get one point for a bike rack or electric vehicle charging rack while obtaining 5 percent of the building energy from renewables also gets one point. Installing a simple and rela-

tively inexpensive floor grate (to keep dirt and debris from entering a building) also earns one rating point. The much more expensive and important step of saving heating and cooling energy in the building by a full 10 percent earns only two rating points. Clearly reducing operating energy consumption is not highly ranked in the LEED rating system.

In the same month Ted Bowen published another essay, "Constructive Criticism: LEED Green-building Program Confronts Critics and Growing Pains."<sup>20</sup> He refers to the Udall/Schendler article and points out the very low number of LEED certified buildings. He too touches on the money a builder must spend to obtain the LEED certification for a project and that the basic LEED certification (*certified*) is not much more than meeting local building codes. He repeats the argument that LEED is weak in energy efficiency and notes that large industry players lobby to influence the direction of LEED.

The final 2005 complaint about LEED was by the North American Coalition on Green Building.<sup>21</sup> This group was created in 2003 and consists of 34 organizations with an interest in the green building movement. The group thinks the government should not rely solely on LEED as a means to ensure building efficiency. They argue that green standards should be developed through accredited standards development organizations and suggest a consensus process that provides transparency and ensures meaningful opportunity for participation by all groups that will be affected by the standard. The coalition notes that the American National Standards Institute (ANSI) is the coordinator of the U.S. standards process and that the Green Building Institute (GBI) is the only green building organization recognized by ANSI as an accredited national standards developer for buildings. The group believes that lifecycle analysis should be key in setting building standards. In summary the group says that the USGBC process is not consensus based and that it is not grounded in objective scientific criteria with appropriate consideration of lifecycle analysis. The group offered to cooperate in achieving such goals.

More debate came in 2006 as the USGBC continued pushing LEED. In June Charles Lockwood, who has been active in supporting LEED, published an article in the *Harvard Business Review* entitled "Building the Green Way."<sup>22</sup> It extols the virtues of LEED and quotes Turner Construction chairman Thomas C. Leppert as saying that four industry studies of more than 150 sustainable buildings across the United States show that, on average, it costs only 0.8 percent more to achieve basic LEED certification than to construct a standard building. (It does not say if this is the category of *certified, silver, gold* or *platinum*). Lockwood does not spell out the performance gain from this investment. He offers some history by noting that the USGBC was a coalition of more than 6,000 real estate professionals, government agencies, non-profits and schools.

In July of 2006 Jeff Rominger published a paper for the Environmental and Energy Study Institute entitled "Federal Green Building Policy and the USGBC."<sup>23</sup> This was a survey for an academic thesis that did an excellent job of evaluating green buildings as well as the various government programs concerning energy. He notes the popularity of LEED is, in part, due to the fact that the government has no guidelines of its own. LEED also provides a foolproof checklist, with easy steps and a sort of "roadmap" to LEED's version of green construction. Rominger summarizes his view of LEED's four main areas of weakness:

1. The high costs of registration and certification.
2. The complexity and bureaucratic requirements for certification.
3. A lack of rigor in the rating system.
4. A lack of lifecycle analysis after the initial certification.

Rominger reviews the publications of Bowen, Schendler and Udall and provides useful cost information. He notes that some builders spend the money that would have to be allocated to LEED certification on building improvements, foregoing the LEED label but getting a better building.

He discusses the inconsistency between the points awarded in the LEED rating system and actual environmental benefit. He says that a point could be awarded for a heat-recovery system or for providing bike-commuters a place to store their bikes.

One interesting observation is that many government agencies, most notably the General Services Administration and the Environmental Protection Agency, found it easier to incorporate LEED into their building policies than to come up with their own standards. Rominger suggests that the U.S. government involve itself in addressing the many shortcomings of LEED, referring to the Sustainable Building Industry Council's lobbying for a "whole building" design approach, wherein it is understood that all the systems of a building are interrelated.

He also recommends that the USGBC add lifecycle analysis to its rating systems as well as address issues of the cost and efficiency of the certification process. He concludes that the USGBC should use its leadership position in the green building industry to make its rating system both more efficient and rigorous. He goes on to say that as the world's largest energy consumer, the federal government has the inherent responsibility to lead and should take an active role in developing green building guidelines for its agencies, rather than deferring to a third-party's voluntary standards. He summarizes by saying that while any progress at all in increasing energy efficiency and "greening" buildings is positive, uniformity and perfecting of the rating system is vital.

## Concerns about LEED: 2007–2008

In April 2007, Rik Master, in an article, "To Lead or Just LEED,"<sup>24</sup> said "The goal of sustainable design is to reduce a building's energy use, yet, according to the USGBC, reduced operations energy is one of the LEED credits least used in certified buildings." Next he notes that operating energy use accounts for 90 percent of the energy consumed over the life of the building. He says that most guidelines, including LEED, focus on the small part

of energy related to materials (embodied energy). These and many other examples illustrate the fact that the LEED rating system is not performance- or science-based, but is more prescriptive.

Charles Lockwood, previously mentioned green real estate authority and consultant, again pushed USGBC green building in an article "Why Commercial Green Is Growing"<sup>25</sup> which was part of a special *Wall Street Journal* Green Real Estate Special section in October, 2007. He notes optimistically that "In less than a decade, green has created the biggest transformation of the U.S. commercial real estate market since the invention of the skyscraper" and quotes USGBC's president as predicting a 10 percent market share by 2010. Lockwood includes comments under the heading "Debunking the 'Green Costs More' Myth," supporting the USGBC position of low or no additional costs to "go green."

Next was an article in November 2007, "Shades of Green: LEED Certification May Be Flawed, But Even Critics Concede It's Not Wasted,"<sup>26</sup> by David Lewis. Lewis begins with the statement "It's hard to avoid hype and spin about LEED." He comments that the hype and hope have vastly surpassed its accomplishments, noting how few LEED buildings there are in Colorado. He quotes builders who say they had already been building in an energy efficient way and now must pay money to be certified. LEED requires only paperwork, not an actual building inspection, as is required by the Green Building Initiative, a USGBC competitor. Some cost increments over conventional building were noted with LEED *certified* being less than 1 percent and LEED *platinum* being 7 percent. Lewis concludes that many people found benefit in LEED in spite of its weaknesses.

In December 2007 *Fast Company* magazine published an article entitled "The Green Standard?"<sup>27</sup> by Anya Kamenetz. Her organization had recently moved into a LEED *gold* building and she wondered what it meant. After beginning to research green building she noted that her study "exposes some serious cracks in the world's biggest green-building brand name

– Leadership in Energy and Environmental Design, or LEED – as well as a very human tendency to reach for easy solutions to difficult problems." She said that LEED critics say the standard falls short of what is possible in energy savings.

She goes on to say that the LEED 25-30 percent improvement in energy use over conventional buildings (a figure that was challenged a year later) is well below the 50 percent target adopted by those who have signed on to the Architecture 2030 initiative. She discusses the objectivity of the USGBC along with its business influence pointing out the large revenues it receives from certification. Kamenetz notes that the non-profit USGBC has a 116-member staff and earns 95 percent of its near \$50 million annual budget. She notes that forty-two thousand people paid \$250 to \$350 and passed exams to become "LEED-accredited professionals." (This number is much higher now.)

Kamenetz points out that the limitations of LEED proceed from its design. The categories are not weighted, so that a bike rack, to use an oft-cited example, can get a building the same point as buying 5 percent of its energy from renewable sources. David White, a climate engineer with the German firm Transsolar, is quoted as saying "I think people have the idea that sustainability is just a collection of exciting ideas that you can peel and stick onto your building. Unfortunately, the exuberant creative stuff – the expensive buzz words such as 'geothermal,' 'photovoltaic,' 'double facade,' and 'absorption chiller' – only makes sense when the basic requirements, such as a well-insulated, airtight facade with good solar control, are satisfied." Kamenetz quotes Rob Watson's (sometimes referred to as the father of LEED) acknowledgement of global warming when he said, "Over the last 10 years, the gravity of the global environmental situation has become more obvious. And so I think, if anything, we need to redouble our efforts, and not only go for greater market share but increased stringency at the same time."

Following on the *Fast Company* article (still in December 2007) was one in *Slate* entitled "It's Way Too Easy Being Green"<sup>28</sup> by Daniel Brook. Brook begins by describ-

ing a home (called Antilia) under construction by an East Indian billionaire which will be 24 stories high and which includes three helipads and a 168-car garage. Despite its 38-to-1 car-to-person ratio, the huge building has been billed by its American architects as a “green” building. Antilia’s architects, Perkins+Will of Chicago, plan to evaluate its greenness based on the LEED criteria. Brook notes critics of LEED see a system that’s easy to manipulate and has more to do with generating good PR than saving the planet. He notes that the growth of green design renders the loopholes in LEED more serious than ever and that its point system creates incentives to design around a checklist. A \$395 bike rack is worth the same under the LEED checklist system as installing a \$1.3 million environmentally sensitive heating system, Brook says.

Brook points out that the LEED certification process may seem woefully oversimplified, yet it doesn’t even have the benefit of being cheap. Certification can cost more than \$100,000 with all the paperwork and consultants, a lot of money for smaller firms and nonprofits. He asks if these dollars might be better spent on features that actually make a building green (meaning lower energy use) rather than simply winning certification. Brook thinks that just closing the loopholes in the checklist will only take the USGBC so far. In Europe, which has had baseline standards for energy efficiency since the mid-1990s, *all* new buildings are green buildings to some extent.

The controversy increased dramatically upon the release of a March 2008 paper entitled “Energy Performance for LEED for New Construction Buildings,”<sup>29</sup> funded by the USGBC and the EPA. It was prepared by Washington State based New Building Institute (NBI). The conclusion of NBI was that LEED buildings used 25-30 percent less energy. In August 2008 Henry Gifford, who does high performance remodeling of multi-family residential buildings in New York city, released a report entitled “A Better Way to Rate Green Buildings.”<sup>30</sup> Gifford claims that the NBI report was inaccurate and that it overstated the energy savings of LEED buildings. He notes that the authors



...a bike rack, to use an oft-cited example, can get a building the same (LEED) point as buying 5 percent of its energy from renewable sources...

compared the mean (or average) of a set of LEED buildings with the median of a set of conventional buildings. The report had analyzed 121 of the approximately 553 buildings that had LEED certification at the time of the survey, and Gifford notes this was a small sample and that it excluded some of the poorer performing buildings in its final analysis. USGBC responded that Gifford’s assertions were based on serious misrepresentations of the data<sup>31</sup> and said that Gifford “combined different building types.” They denied a bias and claimed transparency and a good faith effort. NBI also replied to Gifford with a more measured response by adding a section to their web site entitled “Energy Performance of LEED for New Construction Buildings – Frequently Asked Questions about the Study.”<sup>32</sup>

Charles Lockwood weighed in again in a May/June article entitled “Green Real Estate: What You Really Need to Know.”<sup>33</sup> Lockwood said that efficiency and a reduced carbon footprint don’t make a building or a corporate campus green. He notes they are important but that they are only two components of a much larger sustainable whole. He then describes all the other LEED programs and characteristics. This comment supports the argument that LEED is too diffuse and that energy and CO<sub>2</sub> are secondary in LEED programs to other considerations like materials, water and air quality.

In June, Jerry Yudelson penned an article “If it Ain’t Broke, Break It! LEED Is Changing in 2009.”<sup>34</sup> This article compared the current LEED ratings to new

ones that would be forthcoming in 2009. Yudelson quotes Tom Peters, a popular business writer, who says that things need to be thrown out and redone to make significant progress. This is used to justify the changes in the new LEED rating system.

Gifford had generated controversy with his August article and Nadav Malin responded in September 2008 with an article “Lies, Damn Lies, and... (Another Look at LEED Energy Efficiency).”<sup>35</sup> Malin is the chair of the Materials and Resources Technical Advisory Group for the USGBC, a LEED Faculty Member, and a LEED Accredited Professional. He analyzes Gifford’s paper in detail discussing the mean/medium issue. He chides Gifford for attacking the study, saying that it is a distraction from the more important issue about how LEED is being used. Malin says the good news is that LEED insiders share many of those same concerns, and are working on them. He says that everyone agrees that it’s the actual performance, not the prediction, that really matters, and that more has to be done to improve that actual performance. Malin thinks the energy savings is about 24 percent.

Gifford responded to this article in the form of a blog comment to the original by noting that LEED is based on the idea that anyone can take an eight-hour class, pass a test to become an accredited professional, and use a checklist or points system to improve the way buildings are designed, built, and operated. Gifford says this is too simplistic and that the issue is not if LEED is being used properly, but that LEED has created the image of energy efficiency without actually saving energy. In this response Gifford again criticizes NBI’s removal of the worst-performing 16 percent of the buildings from one dataset and its comparison to a dataset which hasn’t had any buildings removed, saying this is like a tobacco company study that removes the people who died of lung cancer before doing an analysis. Commentators on Gifford’s statements on this site noted that LEED certifies design, not performance. Other comments point out that few architects, mechanical engineers and energy simulators actually look at the measured performance of their projects after comple-

tion. If LEED were to give certification based on the second year's data, design teams would be more concerned about actual performance.

The debate continued in a September weblog entry "LEED under Scrutiny."<sup>36</sup> This article discussed the views of Dr. Joseph Lstiburek, principal of Massachusetts-based Building Science Consulting, who says LEED-certified buildings are no more efficient than typical structures built in the 1960s. Lstiburek and other critics complain the system puts relatively mild building improvements (such as installing bike racks and being close to mass transit) on the same level as aggressive energy-saving features. He notes that the interest is in obtaining LEED points and not saving energy. Lstiburek challenges the idea of having a green program that does not have energy at the center. He says LEED buildings have too much glass (50 to 70 percent) and argues that a building's outside walls should be no more than 30 percent glass. Glass brings a lot of daylight into a building, but it is a very poor insulator.

Lstiburek concludes that the LEED building-rating system is "a sham." He says that LEED certified buildings are no more efficient than typical structures built in the 1960s. He calls poorly designed LEED-certified structures (including Seattle City Hall and a building at Yale University) "energy pigs." Lstiburek also says "Put that bike rack in front, and you are going to get LEED points....That's what it's all about, chasing points and not saving energy."

The article also cites Michael Zatz, manager of the commercial building program for Energy Star. "Does green certification necessarily mean (a building) will be energy efficient? The simple answer is a very clear 'no.'" Zatz noted that it is "possible to have a green-certified building that is not energy-efficient." Kevin Dickens, of Jacobs Engineering's St. Louis office, is quoted as saying, "One of the things about LEED that might be a misnomer or misunderstood is that people think it's primarily about energy savings." He says that this is not the case even though LEED raises awareness about energy efficiency.

September was a busy month. Dustin



...Version 2.2 of LEED allows certified buildings to skirt energy performance, since only 10 of the 69 credits are what (Vivian Loftness) calls "hard-nosed energy credits."

Block wrote a long article entitled "LEED's Green Promise Sometimes Fall Short."<sup>37</sup> He begins by talking to Juli Kaufmann, co-owner of the green-building firm Pragmatic Construction in Milwaukee, Wisconsin who says, "It depends on your definition of green. Truly, I would not accept anything less than *gold* (as proof) you're really doing (green) things. Anything less is tinkering around the edges or tacking things on." She adds that LEED's two lowest certifications (*certified* and *silver*) don't require builders and clients to stretch further than standard construction.

Block next talks to R. Peter Wilcox, who is building two of the greenest buildings in the world – one a condo and one that will use almost no energy. Both will get the same LEED rating. Wilcox will live in the condo but acknowledges "it's far, far from a truly sustainable building. Here's a building that will be LEED *platinum*, but it still has a huge, ongoing carbon footprint."

Block notes that critics say the USGBC has sacrificed its potential for bold leadership that could force builders to reach above the low-hanging green fruit in order to protect its own growth. He says that James Hansen, Al Gore's adviser on global warming, calls the USGBC's approach "business as usual" disguised as green building. Hansen described LEED as "almost meaningless" in the fight to stop global warming. Block also discusses Ed Mazria and Architecture 2030's stance. Mazria is pushing governments to adopt standards

that require buildings to use zero energy from fossil fuels by 2030. Mazria wants the USGBC to adopt them into LEED.

In October the prestigious *Scientific American* published an article by Daniel Brook entitled "LEED Compliance Not Required for Designing Green Buildings."<sup>38</sup> Brook begins by looking at a LEED certified green gas station and comments on how limited LEED certification can be as an indicator of a building's environmental benignity and says that too often LEED can reward building planners for taking some environmentally progressive steps while ignoring deeper problems. He notes that there are no enforcement mechanisms such as spot checking to verify the estimates or checkups after a building opens to make sure the qualifying equipment or operations have not changed.

Brook says that critics complain that the system can be manipulated for PR purposes. By erecting a single green building, huge companies can gain considerable media attention. The larger denunciation is that the program is trained so intently on specific design features of individual buildings that it misses the big picture about energy.

Brook also says that many LEED critics are architects who have been designing so called green buildings before LEED came into being. Philadelphia architect Bob Nalls points out that LEED gives up to two points for letting natural light into interior spaces to reduce demand for electric lighting but goes on to say that more sunlight might drive up air-conditioning demand. "To say I'm going to be able to answer that question by getting a point or not getting a point is naive," Nalls is quoted as saying. Auden Schendler, executive director of Community and Environmental Responsibility at the Aspen Skiing Company and coauthor with Randy Udall of the 2005 article "LEED Is Broken – Let's Fix It," says this kind of "LEED brain" thinking occurs when builders are more concerned with certification than helping the environment.

As noted earlier, some architects bypass the cost of LEED certification and invest in greater energy efficiency instead. Douglas

Kelbaugh, a professor of architecture at the University of Michigan at Ann Arbor is overseeing a large addition to one of the school's main buildings. Brook quotes him as saying that instead of spending an estimated \$100,000 on LEED it makes more sense to spend that \$100,000 on photovoltaics or better windows or insulation. Kelbaugh is designing to a better standard, the American Institute of Architects' 2030 Challenge. This program, according to Kelbaugh, "is simpler, it's free, and it focuses on the sweet spot of reducing carbon footprint."

Also in October Edward Keegan wrote "Promise vs. Performance: A Deeper Shade of Green"<sup>39</sup> for *Architect Magazine*. Keegan emphasized that the high 2008 gasoline prices led America to wake up to the reality of energy restraints. He restates the high percentage of energy consumed by buildings. He says that from a marketing and political perspective, the green movement has won major battles but must now "deliver." He discusses the NBI report and says it raises questions about the profession's awareness of building science issues that will be central to solving our side of the global warming equation. He quotes architect and USGBC board member Vivian Loftness as saying, "This disconnect – between actual building performance and design-phase energy modeling – offers the most important and challenging lesson for the USGBC, architects, engineers, owners, and other building professionals." Loftness also acknowledges that the current Version 2.2 of LEED allows certified buildings to skirt energy performance, since only 10 of the 69 credits are what she calls "hard-nosed energy credits."

A month later, in November 2008, Alex Beam penned an article "Green Building and Its Discontents."<sup>40</sup> Beam reported on the 2008 GreenBuild Conference saying, "I spent a few hours ogling soy-based resin toilet bowls at GreenBuild, the international conference of the U.S. Green Building Council, earlier this week. All the green celebs have signed up to speak: Bill McKibben, E.O. Wilson, and Desmond Tutu. The exhibition hall is a veritable Predators' Ball

of huge corporations neck-deep in green-washing hype: Dow Chemical, Honeywell, Waste Management, General Electric, Office Depot. Everybody's green now."

Beam quotes Joseph Lstiburek as saying, "The current green and sustainability craze can be summed up as architects and engineers behaving badly." Beam says Lstiburek is deeply concerned with reducing energy use and attacks the architecture profession's current use of glass fronting that uses more energy, purportedly energy-saving double facades, and roofs planted with vegetation. Lstiburek is further quoted as saying "The architectural profession is in a state of collapse right now because they're all talking about saving the planet and social justice. It's such hypocrisy because their buildings are so pitiful."

Stephen Del Percio also commented in November in his article "The Ugly, the Bad, & the Good: Thoughts on GreenBuild 2008."<sup>41</sup> He begins by noting that failing to educate our industry about emerging green building risks is a huge mistake, particularly as we head into what will likely continue to be a particularly brutal economy through 2009. He also comments on the NBI study. Del Percio says "it's clear that, because points with respect to energy consumption are being awarded based on a predictive model and not actual, performance-driven data, LEED buildings are not performing as well as they should in terms of energy savings, and the building science experts who have spent decades analyzing building performance are being vilified for pointing out the shortcomings of the LEED system."

Towards the end of November, Lstiburek weighed in again with an article that summarizes his thoughts, entitled "Prioritizing Green: It's the Energy Stupid."<sup>42</sup> Lstiburek notes many green buildings don't save energy because they are over-ventilated, leak, have thermal bridges and do not rely on physics. Like others, he thinks the problems are beginning to endanger the "green brand." He says many of the LEED points given are basic to conventional ways of building and reward good conventional building features such as

durability and air quality. He notes the key to global warming and energy security is energy conservation. A real green building that saves energy is the key factor. He says to first use less glass. Next avoid over ventilating, i.e., "build tight – ventilate right." He criticizes the common use of floor supply plenums and challenges double facades, arguing one should build one good exterior wall. He notes that green roofs with grass are not energy-efficient. Lastly he challenges carbon offsets as a way to cover up a poor building design.

A separate article by Lstiburek called "Mis-LEED-ing"<sup>43</sup> explains the history of averages, means and medians. He notes that the NBI study used information from the Commercial Building Energy Consumption Survey (CBECS) and quotes the study's assertion that the LEED mean is better than the CBECS median. But he argues that the comparison should have been to the CBECS buildings built in the same period as the LEED buildings, 2000-2003. He notes if *mean alone* were compared rather than *mean to median* then the improvement would have been about 15 percent, not the 24-33 percent claimed.

Lstiburek further expounded on his ideas in a special advertising section in the December issue of *GreenBuilder for Environments for Living*, an online magazine introduced by Masco Corporation with the assistance of two building science companies – Advanced Energy Corporation and Lstiburek's Building Science Corporation. He says that green building is first and foremost about energy. "Eighty percent of all environmental damage on the planet deals with energy one way or another – finding it, transporting it, creating it, or using it." He says green building must focus on three main topics – energy efficiency, water efficiency and material efficiency. He notes, "Of the three topics, I think energy is 80 percent of the deal. If you want a green sustainable building... it has to be ultra energy efficient first." He then says that builders have to shift from a focus on the building appearance to delivering a building that works, including air and duct tightness.

## Concerns about LEED: 2009

As the debate moved into 2009, the USGBC announced its changes to the LEED rating system (see Table 1). In a January 2009 article, “The New LEED: All About Weightings,”<sup>44</sup> author Penny Bonda describes the first step of a major change to the LEED rating system. Bonda notes that the ratings represented scientifically grounded reevaluations that place an increased emphasis on energy use and carbon emission reductions. She notes that the USGBC recognized that not all building considerations are of equal importance, and that this drove the reorganization of LEED 2009. She uses the familiar example of the bike rack, pointing out that a project team gets one point if it spends \$1,500 on bike racks and the same one point if they spend \$20,000 for LEED certification fees.

Bonda mentions that the value of credits are now determined through a basic weightings equation which brings together information on building impacts, building functions and the performance of individual credits. She says the tool is complex but also a logical, transparent framework that incorporates the best available science. As noted in Table 1, Energy and Atmosphere have gone from 25 percent to 32 percent of the credits.

LEED 2.2 put similar emphasis on Energy (17 points), Indoor Environment (15 points), Sustainable Sites (14 points), and Water Efficiency (13 points). LEED 2009 allocates a greater percentage of points to Sustainable Sites, Water Efficiency and, in particular, to Energy and Atmosphere. Bonda asks, “Are the impacts of materials and the importance of human well-being in buildings being diminished or are they rightly overshadowed by the critical importance of climate and carbon?” She quotes Scot Horst, chair of the LEED Steering Committee, who admitted that little attention had been paid to the Material and Resources credits during the weightings exercise because of ongoing work on a lifecycle assessment approach that will significantly alter how materials are considered in projects.

Henry Gifford was back in the news in March. He was part of a panel of experts

including Brendan Owens from USGBC’s LEED Technical Program, Maureen Mahle from Steven Winter Associates, Duncan Prah from IBACOS, a home quality and performance company, and energy modeler Maria Karpman from Karpman Consulting who debated at a Northeast Sustainable Energy Association (NESEA) meeting held in Boston. The topic was the question “What’s Right and What’s Wrong With LEED?”<sup>45</sup> Blog comments began to appear soon after the debate.

In a March 13, 2009 entry entitled “Is the LEED Program a Fraud?”<sup>46</sup> Kevin Ireton quotes Gifford as saying the LEED rating system is a tragedy and a fraud perpetrated on those U.S. consumers who are trying their best to achieve true environmental friendliness. Ireton also says, “Launching LEED and then waiting 10 years before studying the actual performance of certified buildings hardly qualifies as ‘leadership’.”

Michael Prager commented on the debate in a blog entry entitled “LEED Controversy.”<sup>47</sup> He begins by noting there are some municipalities that are incorporating LEED standards into building codes, which was a concern to some participants. He also points out that LEED has no performance requirements. Brendan Owens of the USGBC is quoted as saying “I agree with Henry that before this research was done, there was a leap of faith involved, but the characterization of this as a scandal and a con is really unfortunate.” Owens also says “LEED is an assessment of potential for a building to perform. That’s all it is,” and “We could do better to educate the public that the model isn’t good enough yet. We haven’t really gone through and said ‘this is the first step in a 6- or 7- or 8-step process’.” Prager also quotes Chris Benedict, a New York architect who often works with Gifford, who says “I would like LEED to go away, and I would like the USGBC to disappear from the face of the earth” and “LEED has distracted the public, and devalued the work of people who’ve been working on making good buildings for 20 years. Now, unless they have ‘LEED AP’ after their name, they might not even get hired.”

Gifford’s analysis of LEED entitled



“LEED has distracted the public, and devalued the work of people who’ve been working on making good buildings for 20 years. Now, unless they have ‘LEED AP’ after their name, they might not even get hired.”

“A Better Way to Rate Green Buildings,”<sup>48</sup> along with his suggestions for an alternative, was published in the Spring 2009 issue of the *Northeast Sun*, the magazine of NESEA. He closes his article with the comment, “The LEED system is not only ineffective, but is harmful to the environment, to the prosperity of the country, and to effective energy saving methods, which are ignored in favor of the image of energy efficiency. LEED should be abandoned and be replaced with a system that is based on actual verifiable energy use measurements.”

## Conclusion

There has been concern with the LEED rating system relative to energy and CO<sub>2</sub> since its inception. Numerous articles have been written and debates have occurred. “Sustainability” and “green” address issues other than energy and CO<sub>2</sub>, some of which are not measurable. These are important but not nearly as critical as energy and its byproducts. LEED has failed to lead in the important areas that are measurable. Initially they adopted a weak status relative to energy consumption. They did not recognize and incorporate accountability and verification, unfortunately wasting years that could have provided important feedback relative to energy use. They have also not clearly and honestly communicated that LEED is not an exemplary indication of energy performance.

– Pat Murphy

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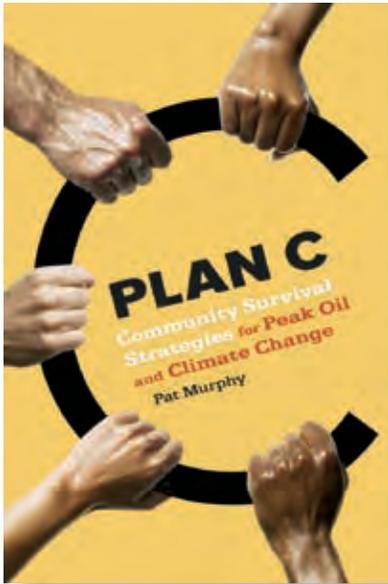
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