

THE GREENING *of the* BUILDING CODES



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I. INTRODUCTION

Building codes are the “minimum requirements” to safeguard public health, safety, and general welfare through structural strength, means of egress facilities (emergency exits), stability, sanitation, adequate light and ventilation, energy conservation, and safety to life and property. These codes protect the public from fire and other hazards attributed to the built environment and provide safety to fire fighters and emergency responders during emergency operations.

As stated, building codes and related regulations exist to safeguard the public from fire and other health and safety hazards attributed to the building environment. Prior to 2000, at least three standard building codes were utilized throughout the United States. The International Council of Building Officials (ICBO) first published the Uniform Building Code in 1927. The Building Officials Conference of America (BOCA) was founded in 1915 and published the BOAC/Basic Building Code. The Southern Building Code was published in 1940 by the Southern Building Code Congress International (SBCCI).

In 2000, the International Code Council (ICC) was created by the merger of the three previously mentioned organizations. In that same year, the ICC published the International Building Code (IBC) that replaced the three existing building codes. Most of the cities and/or counties in all of the fifty states, as well as the District of Columbia, now utilize the IBC as a reference code and publish supplements to the code for their own communities. Federal agencies including the Architect for the Capital, General Services Administration, National Parks



Services, Department of State, U.S Forest Services, Veterans Administration, as well as the Department of Defense, all reference the International Building Code as the building regulatory system.

These building regulatory systems have provided standards that minimize risks commonly associated with buildings such as fire, structural integrity, and means of escape in an emergency; however, these building regulations are widely acknowledged to inhibit innovation due to their complexity and preponderance of prescriptive-based rather than performance-based provisions. Yet almost all codes have provisions for alternative designs, materials, and methods of construction that allow for alternative or innovative approaches to building.

II. HOUSTON BUILDING CODE

After the introduction of the ICC building code, the City of Houston formally adopted it as its standard with local amendments. In fact, the city adopted the ICC 2003 building code but made amendments to reflect the ICC 2006 updates as well as including its own local amendments. Generally, the local amendments for the City of Houston affect areas within the building envelope that either relax or enhance certain standards.

For example, the ICC standard code specifies that all high-rise buildings must be fully fire-sprinkled as well as require the duct dampers to be automatically closed. The Houston code, on the other hand, requires that all high-rise buildings must be fully fire-sprinkled, but does not require the duct dampers to be automatically closed. Other amendments follow local building customs and traditions such as requiring that all finished floor elevations on new buildings be at least 12" above the nearest sewer manhole or if there is no manhole, 4" above the crown of the street. Another example is the Houston building code that establishes a minimum regulation governing the design and construction of driveways, sidewalks, parking lots, and alleys.

The City of Houston usually updates its building code every three years, and it is understood that the 2009 update will adopt the ICC 2006 standard even though ICC will issue a 2009 update to its standard code.



III. HOUSTON BUILDING CODE REGARDING EXTREME WEATHER AND NATURAL DISASTERS

The only modification to the City of Houston Building Code resulting from a natural disaster occurred after Hurricane Alicia in 1983. When Hurricane Alicia blew through downtown Houston, the gravel and rock ballast on the downtown building roofs was dislodged, shattering windows throughout downtown and causing millions of dollars in damages. As a result, the city amended its building code to eliminate gravel and rock ballast for roofs within the downtown district. Additionally, the design standard for wind resistance was modified to increase the maximum design wind speed from a 90-mile-per-hour wind speed to a 90-mile-per-hour sustained wind speed and a 110-mile-per-hour wind gust for a three (3) second period of time. This last amendment seems meaningless if one considers the likelihood of experiencing a wind gust of 110 miles per hour for only three (3) seconds.

No other amendments have been proposed to the Houston building code as a result of the recent hurricanes Rita and Ike that also caused millions of dollars in damage to Houston.

IV. THE DEVELOPMENT OF GREEN STANDARDS

In recent years, there has been much discussion about “green” building codes. So, what are “green codes?” Technically, there is no such thing. There are building codes, fire codes, energy codes, mechanical (HVAC) codes, gas codes, electrical codes, accessibility codes, plumbing codes. There are no green codes.

What has prevented most municipalities from adopting “green” standards is the fact that building codes generally specify minimum standards to protect public health, safety, and general welfare from fire and other hazards attributed to the building environment. Changing these minimum standards to provide for “green” alternatives is difficult to do.

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What has been occurring for almost 30 years is an uncoordinated and localized process of introducing innovative and alternative approaches to build more sustainable or “green” building and development projects. As early as 1990, the International Council for Local Environmental Initiatives (ICLEI) was founded as an international association of local governments and national and regional local government organizations that made a commitment to sustainable development. The ICLEI’s Cities for Climate Protection™ (CCP) Campaign was initiated in 1993 to assist cities in adopting policies and quantifiable measures implemented to reduce local greenhouse gas emissions, improve air quality, enhance urban living, and promote sustainability in buildings.

Fortunately, the process of changing local building codes for alternative designs, materials, and methods of construction to make buildings more sustainable and “green” is becoming easier. Historically, green building efforts never achieved broad market acceptance or critical mass until the advent of the United States Green Building Council (USGBC). The USGBC developed a third-party building certification program for the design, construction, and operation of high performing buildings. This program is known as Leadership in Energy and Environmental Design, or LEED® (LEED). The LEED Green Building Rating System (GBRS) is a voluntary, consensus-based national rating system for developing high-performance, sustainable buildings. LEED applies to all building types and emphasizes state-of-the-art strategies in five areas: sustainable site development, water savings, energy efficiency, materials and resources selection, and indoor environmental quality. According to the Environmental Information Administration, as of 2008, U.S. buildings consume 40% of primary energy usage, 72% of electricity consumption, and 13% of potable water consumption and contribute 39% of CO2 emissions.

According to the USGBC, there are LEED-certified projects in all 50 states and in 91 countries. As of December 2008, there were 283.3 million square feet of commercial LEED-certified projects. As of January 2009, there were 2,122

certified projects and another 17,450 registered projects. The USGBC reports that every business day, \$464 million worth of construction is registered with LEED.

Early evidence of a fundamental shift in green building influenced by the LEED GBRS came in late 2003. At this time, a trend was developing with large cities and the federal government requiring that certain types of public buildings attain some level of LEED ratings. The following year, additional support came from larger cities to the point that LEED had become the de facto rating system for green buildings.

Since December 2007, several major U.S. cities have adopted LEED standards for city-owned buildings, including Austin, Boston, Kansas City, New York City, Portland, Salt Lake City, Seattle, and San Diego. Additionally, several states have passed LEED and/or Sustainability Design Laws.



V. THE CITY OF HOUSTON'S EFFORTS TO GO GREEN

V.A. *Green Building Resolution*

The City of Houston has not adopted LEED or any “green” building standards within its building code. However, one of Houston’s efforts to “go green” occurred on June 23, 2004, when the Houston City Council adopted the Green Building Resolution, which set a target of Silver level LEED certification for new construction, replacement facilities, and major renovations of City of Houston-owned buildings and facilities with more than 10,000 square feet of occupied space. The Building Services Department is implementing this policy in the management of its projects in the City's Capital Improvement Plan.

Utilizing sustainable design practices is intended to significantly reduce operations and maintenance costs of buildings as well as decrease any negative impacts on the occupants of City of Houston-owned and occupied buildings.

The planning, design, construction, and operation of the City of Houston's LEED certified buildings, facilities, and leaseholds should have a significant positive effect on Houston's air quality, water quality, and quality of life, while contributing to the environmental and economic sustainability of the city.

V.B. *The City of Houston’s “Quick Start” Program*

The City of Houston’s standard commercial building plan review time for projects within the city’s jurisdiction has been significantly impacted. In fact, for 90% of all commercial plan reviews, the city’s turnaround time has been reduced to 11 days. This was a result of an initiative conducted by the Mayor’s Taskforce on Permit Reform. This plan-review process improvement puts Houston at the forefront of reduced permit processing times for large cities in the U.S.

In addition, in an effort to encourage LEED Certification, the Code Enforcement division of the City of Houston offers a Quick Start service for any project that has registered for LEED certification, regardless of construction cost and/or size. This Quick Start service involves one meeting with the various code enforcement officials, as opposed to separate meetings, to review and approve the final set of design drawings for the proposed structure. The Quick Start process used to be limited to projects that exceeded \$1 million in value, but it is now open to any size project. Instead of resubmitting plans for subsequent reviews, LEED projects go directly to the meeting process.

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The city charges a Quick Start fee for this service based on the value of the project; however, the City of Houston offers financial incentives for LEED certified buildings. On LEED certificate-seeking projects, the developer or contractor can

qualify for a graduated rebate of the Quick Start fees. The rebate is based on the level of achievement as follows:

- Platinum Level – 100%
- Gold Level – 75%
- Silver Level – 50%
- Certificate Level – 25%

The Quick Service process begins when the developer or contractor declares its intent to gain LEED certification in the first plan review. The review is done through the normal submittal process. Then, as long as the developer or contractor sends in a complete set of construction plans and has its “outside”



department approvals, it qualifies for the Quick Start meeting process. By opting to pay an additional fee of 65% of the permit cost, the final plan review is completed in a face-to-face conference-like meeting with the reviewers, designers, and owners. The Quick Start program is intended to eliminate at least one plan resubmittal, thus saving the builders valuable time and money. After the project is constructed and occupied and when LEED certification is achieved, the applicant must present the certificate from the USGBC to the city’s

Code Review Department to confirm the level of achievement and the refund will be made based on the level of certification. The application for the Quick Start rebate must be made within 90 days of the date of certification.

The City of Houston is allowing broader access to the plan review for LEED projects and offering to rebate the additional charge. In doing so, the city believes it is providing a significant benefit to those who undertake the worthy goal of LEED construction and operation. The costs savings to builders are an attractive incentive to encourage Houston business and industry leaders to build LEED-certified buildings.

The following are City of Houston Projects currently pursuing LEED Certification and their estimated construction costs:

1. HPD Service Animal Facility – \$6.5 million
2. Looscan Neighborhood Library - \$5.9 million
3. HPD Property Room - \$10.5 million
4. Fire Station 8 – \$7.2 million
5. South Post Oak MultiService Center/Vinson Library – \$9.2 million

6. Parks Department Headquarters – \$6.9 million
7. Bracewell Branch Library – \$4.4 million
8. Kendall Branch Library – \$6.4million
9. South Right of Way Fleet Maintenance Facility - \$10.7 million
10. Clayton House Library Complex – \$5.5 million
11. African American Library at the Gregory School – \$5.0 million
12. Fire Station 37 – \$3.8 million
13. Frank Branch Library – \$2.3 million
14. Westside Command Station – \$8.3 million
15. Northeast MultiService Center – \$6.2 million
16. Southwest Environmental Center - \$2.9 million
17. Oak Forest Branch Library Renovation – \$3.0 million
18. Kashmere MultiService Center Renovation – \$3.0 million



V.C. Adoption of the IECC 2001 Energy Code

Houston’s other effort to “go green” occurred in August 2008 when the city adopted the International Energy Conservation Code (IECC) 2001 version. This code was developed and maintained by the IECC to set a comprehensive and coordinated national model construction code that is intended to save energy over the useful life of a building and contains energy specifications for residences and commercial buildings. Standard specifications address construction guidelines and material recommendations for roofs, insulation, lighting, heat, ventilation, air conditioning, windows, and doors. These standards will allow architects to develop energy efficient projects.

VI. 81ST LEGISLATIVE REGULAR SESSION – STATE OF TEXAS 2009

On February 17, 2009, Representative Harold Dutton of Houston introduced House Bill 303 that would exempt from sales tax the labor to install certain tangible personal property (equipment and material) in buildings that obtain LEED certification. If the tangible personal property is installed in a building that is designed, constructed, and operated so that it obtains certification under the LEED GBRS, the taxpayer would be entitled to a credit or refund. The bill would take effect October 1, 2009, and provisions of the bill would apply only to construction or renovation of a building for which design services are entered into on or after October 1, 2009. Currently this bill is awaiting action in the Ways and Means Committee with no prediction of its passage.

On March 16, 2009, Representative Eddie Lucio III of San Benito introduced House Bill 431 that would establish standards for new state building construction or renovations whose construction costs are more than 50% of the value of the state building. This bill would apply to buildings larger than 10,000 square feet. The bill exempts institutions of higher education, the Texas Department of Transportation, the Parks and Wildlife Department, and other agencies per Section 2166.003, Government Code. The bill would take effect September 1, 2009, and provisions of the bill would apply only to construction or renovation of a building for which design services are entered into on or after September 1, 2009. Currently the bill is progressing through the House State Affairs Committee with no prediction of its passage.



VII. LEED RATING SYSTEM

The following discussion describes what is involved the USGBC LEED certification process. The LEED certification process is composed of a rating system that classifies projects within various groups or “tracks” that have been developed to cluster similar buildings or projects. Within each track there are a number of categories describing the various green building elements that are evaluated in the certification process.

VII.A. LEED Tracks

LEED is not a single rating system, but rather groups or tracks of rating systems depending on the type of building. As of this writing, there are six LEED tracks for certification with four tracks in the pilot stage.

VII.A.1. U. S. Green Building Council in Use

The USGBC has six LEED rating system tracks that are currently in use at this time.

VII.A.1.a. LEED for New Construction (and Major Renovations)

This track is developed to guide the design and construction of high-performance commercial and institutional projects, including office buildings, high-rise residential buildings, government buildings, recreational facilities, manufacturing plants, and laboratories.

LEED is not a single rating system, but rather groups or tracks of rating systems....

VII.A.1.b. LEED for Existing Buildings: Operations & Maintenance

This track measures operations, improvements, and maintenance of buildings on a constant scale, with the goal of maximizing the operational efficiency of the building while minimizing environmental impacts of the building. LEED for Existing Buildings addresses whole-building cleaning and maintenance issues (including the use of chemicals), recycling programs, exterior maintenance programs, and systems upgrades.

VII.A.1.c. LEED for Commercial Interiors

This track is a measure for the tenant improvement market relative to green products. It is the recognized system for certifying high-performance green interiors that are less costly to operate and maintain and have a reduced environmental footprint.

VII.A.1.d. LEED for Core & Shell

This track measures base building elements such as structure, envelope, and the HVAC system. LEED for Core & Shell is developed to complement the LEED for

Commercial Interiors rating system, as both rating systems establish green building criteria for developers, owners, and tenants.

VII.A.1.e. LEED for Schools

This track measures the unique nature of the design and construction of K-12 schools. Based on LEED for New Construction, it addresses issues such as classroom acoustics, master planning, mold prevention, and environmental site assessment.

VII.A.1.f. LEED for Homes

This is the only track that measures the design and construction of high-performance green homes.

VII.A.2. U. S. Green Building Council in Pilot Phase

The USGBC currently has four LEED rating system tracks in pilot phases that should be launched later this year.

VII.A.2.a. LEED for Neighborhood Development

This development track is intended to bring together the principles of smart growth, urbanization, and green building into the first national system for neighborhood design. LEED for Neighborhood Development is a partnership among the USGBC, the Congress for the New Urbanism, and the Natural Resources Defense Council. The pilot program, which began in the summer of 2007 and was tested on nearly 240 projects, is now closed and awaiting implementation.

VII.A.2.b. LEED for Healthcare

This development track is developed to meet the unique needs of the healthcare system infrastructure, including inpatient care facilities, licensed outpatient care facilities, and licensed long-term care facilities. LEED for Healthcare may also be used for medical offices, assisted living facilities, and medical education and research centers. The first public comment period for LEED for Healthcare is now closed awaiting implementation.

VII.A.2.c. LEED for Portfolio Program

This development program enables companies and building owners to integrate LEED into their new and existing building projects on a volume scale with a cost-effective, streamlined certification process. The LEED for Portfolio Program pilot was launched in November 2006 and the comment section is closed awaiting implementation.

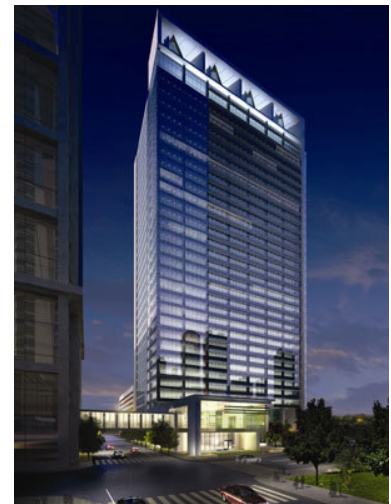
VII.A.2.d. LEED for Retail New Construction and Commercial Interiors

This development program recognizes the unique nature of the retail environment and addresses the different types of spaces that retailers need for their distinctive product lines. The pilot program for LEED for Retail New Construction and Commercial Interiors is no longer accepting expressions of interest for participation.

VII.B. LEED Categories

LEED is a point-based certification system in which projects earn points for satisfying specific green building criteria. There are a total of six categories that are evaluated and rated. Within each of the six LEED credit categories, projects must follow particular prerequisites and earn points.

- Sustainable Sites (SS): This category involves the location of the building, preservation of the site, restoration practices for the site, and limiting the environmental impact of buildings on local ecosystems.
- Water Efficiency (WE): This category focuses on water efficiency and water use reduction.
- Energy & Atmosphere (EA): This category addresses the reduction in energy use and the use of renewable energy resources.
- Materials & Resources (MR): This category involves the reuse of materials and the use of local renewable resources to minimize natural resource consumption.
- Indoor Environmental Quality (EQ): This category involves minimizing the off-gassing of harmful chemical compounds, as found in adhesives, paints, carpets, wood products, and furniture in the indoor environment.
- Innovation in Design (ID): This category provides design teams the opportunity to be awarded points for exceptional performance of the building above the LEED requirements and/or awards points for innovative performance.



As of April 27, 2009, the meaning of “green building,” at least in a technical sense, changed depending on where you live. USGBC launched the third version of its LEED rating system for green buildings that includes a few key updates. Among them is a new regional bonus point system that is intended to address some of the criticism of earlier versions, which claimed it used a one-size-fits-all metric for buildings in very different settings.

Environmental concerns differ among various regions of the country. The regionally-specific credits give LEED a way to directly respond to diverse, regionally grounded issues. The inclusion of these regional LEED credits is the Council’s first step toward addressing regional environmental issues.

In the new rating system, projects that incorporate at least one of six green building strategies identified as regional priorities (based on a project’s zip code) can receive up to four “bonus points” toward LEED certification – one point per regional element.

In parts of Los Angeles, California, for example, new construction projects can receive an extra point for reducing water use, while in Amherst, New Hampshire, there’s a bonus for brownfield redevelopment. In rural Michigan, the USGBC has set up extra credit for elements meant to further the local priorities of preserving prime agricultural land, reducing light pollution in neighboring natural habitats and minimizing the amount (and improving the quality) of storm water gushing into the Great Lakes. In urban Florida, on the other hand, it’s largely about solar power, with bonus points designed to encourage use of abundant solar resources and decreased reliance on fossil fuels.

VII.C. LEED Point Allocation

Each LEED track allocates points to each of the six categories depending on the unique aspects of each track. The bonus is then applied to the Regional Priority track. Additionally, several categories include prerequisites. Failure to meet a single prerequisite in any category will preclude building certification. The following example shows point allocation for LEED New Construction 2009:

Point Category	Prerequisites	Possible Points
Sustainable Sites	1	26
Water Efficiency	1	10
Energy & Atmosphere	3	35
Materials & Resources	1	14
Indoor Environmental Quality	2	15
Innovation in Design		6
Regional Priority Credits		4
Total Possible Points		110

VII.D. LEED Certification Levels

The number of points a project earns determines the level of LEED certification it obtains. LEED certification is available in four levels: Certified, Silver, Gold, and Platinum:

Certification Level	Point Threshold
Certified	40
Silver	50
Gold	60
Platinum	80

At this time, the significance of the level of certification is more pride of ownership than anything else. The USBGC hopes that eventually federal and state governments and municipalities will reward attainment of higher certification levels with greater incentives based on the level achieved.

VII.E. Benefits of LEED

In addition to the environmental benefits of protecting ecosystems, improving air and water quality, and conserving natural resources, LEED also has several economic benefits. Though the overall economic impact of LEED development is unknown, several cost benefits have been established.

VII.E.1. Tax Incentives

A variety of federal, state, and municipal incentives are available for green buildings.

- Federal: At the federal level, the Energy Efficient Commercial Buildings Tax Deduction, which is a corporate deduction up to \$1.80 per square foot, is available to the owner. Previously, there was also an accelerated depreciation deduction allowed utilizing the Modified Accelerated Cost-Recovery System (MACRS) methodology; however, this bonus depreciation expired December 31, 2008, but the five-year accelerated depreciation remains in effect.¹
- State: Currently, the only state incentive is through the Oregon Business Energy Tax Credit (BETC). This credit is available to those who invest in energy conservation, recycling, renewable energy resources, and cleaner transportation fuels in their trade or business. The traditional BETC is equal to 35% of the eligible project costs, or the incremental cost of the system or equipment that is beyond standard practice. The credit can be used to offset

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Oregon individual or corporate income or excise tax. The credit is taken over five years: 10% in the first and second years and 5% each year thereafter.ⁱⁱ

- Municipal: In 2008, New York passed legislation that provided a one-time property tax credit up to \$100,000 for building owners in New York City who install green roofs on at least 50% of available rooftop space.ⁱⁱⁱ

VII.E.2. Lower Operating Costs

A recent New Buildings Institute study concluded that new LEED-certified buildings were consuming, on average, 25-30% less energy than non-LEED-certified buildings.^{iv} For Gold and Platinum LEED certified buildings, the average energy savings was approaching 50%.^v The 2008 Green Building Impact Report by Greener World Media indicates that, since the inception of LEED, more than half of projects categorized as New Construction or Core & Shell projects have delivered at least a 30% reduction water usage, with 20% of the savings from those projects categorized as Existing Buildings Operations & Maintenance.

Almost 90% of projects categorized as New Construction and those categorized as Core & Shell projects have achieved 50% reduction in water use for landscaping.^{vi}

VII.E.3. Marketability

A recent study by the CoStar Group determined that sustainable green buildings outperform non-green buildings in specific areas such as occupancy, sale price, and rental rates.^{vii} According to the CoStar study, LEED buildings command rent premiums of \$11.33 per square foot over their non-LEED buildings and have 4.1% higher occupancy.^{viii} Additionally, rental rates in Energy Star buildings represent a \$2.40 per-square-foot premium over comparable non-Energy Star buildings and have 3.6% higher occupancy. As mentioned in Turner Construction Company's 2008 "Green Building Market Barometer," more than 80 % of real estate executives said they would be "extremely" or "very likely" to seek LEED certification for new projects in the next three years.^{ix}

VII.E.4. Tenant Comfort and Health

Greener World Media reports that, in 2008, companies operating in LEED-certified buildings achieved annual employee productivity gains of over \$170 million as a result of improved indoor environmental quality – a cause and effect that has been difficult to quantify.^x That figure is predicted to jump well into the billions by 2015 as the number of employees in LEED buildings grows more than 10-fold.^{xi}

VII.F. Criticisms of LEED

While LEED is praised for its many benefits, there are others that criticize the reliance on LEED within municipalities building codes. The International Council

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of Shopping Centers has identified several problems with municipalities adopting LEED certification as a building code requirement.

- If local building codes adopt LEED certification standards by reference only, the public codes will be subject to change by every decision the U.S. Green Building Council develops. Representatives of the USGBC itself have argued against imposing LEED certification through building codes.
- LEED was intended to be a “cutting edge” standard. It was never intended as a base-line requirement or as a prerequisite for a building permit. LEED was intended to “push the envelope” and describe the most environmentally conscience use of materials. Building codes are properly intended to establish a minimum standard for safety and other purposes. Therefore, there appears to be a conflict in the compatibility of these two goals.
- LEED requirements can be in conflict with building codes in critical building code categories. Municipalities that mandate sustainability requirements may not understand the unintended consequences and impacts to the design and construction process as well as the resulting increases in time for approval and overall project costs.
- Final LEED Certification is only granted after a building has been completed or even after a building’s mechanical systems have been operational for a certain period of time. It is not clear what the effect would be on a building permit if a building is not ultimately certified at the mandated level. Some agencies require up to a \$2 million bond as a Certification Compliance Guarantee. There is no clear appeal process for disputes regarding final certification approval except through the USGBC itself.
- Even though the USGBC does not charge for its certification standards (beyond a registration fee), the lengthy process can be an expensive one for developers. The USGBC trains and licenses third-party certification experts who charge for their services. Although costs can vary greatly, achieving LEED certification can add approximately \$50,000 to the development of a small retail project. This additional expense does not cover all increases including those associated with design, material, or equipment changes driven by the LEED guidelines. In addition, adopting LEED certification as part of a municipal building code effectively gives a monopoly to LEED Accredited Professional Certified examiners.



- In recent years, the USGBC has intensely advertised building and site certification programs despite having only a limited capacity to handle the resulting demand. More than 17,400 projects have been registered, yet only about 2,100 have been processed (certified) to date. The certification process is now seriously overloaded, and the USGBC is having difficulty handling the demand even as it continues to change the rules for new projects. Because the USGBC has insufficient staff resources for the influx of new certification requests, most requests are handled by other third-party consulting firms – and their individual decisions to accept or reject various sustainable designs are effectively final. As demand increases, the USGBC process could collapse under the weight of its own success with no foreseeable agency to replace it or maintain the process.
- LEED standards do not apply directly to all types of construction. For example, the LEED certification standards for retail buildings are only now moving beyond the pilot phase (2008). And multiple site “portfolio” certifications, which can greatly reduce the per-unit cost of certification for national chains, have yet to be approved.
- The entire LEED certification process is undergoing significant changes for 2009. This is partially in response to the one-size-fits-all metric for buildings in very different settings. It also demonstrates that LEED certification is a moving target that can greatly complicate compliance efforts.



VIII. ALTERNATIVE TO LEED

We have discussed the LEED green building certification program, but there is another well-established green building certification program in the market and it is known as Green Globes, a product of the Oregon-based Green Building Initiative (GBI). Like LEED, Green Globes features an on-line interface and an escalating system of rewards based on achieving an increasing number of points under its system. Green Globes offers a self-assessment option that does not offer certification but allows the building owner to grade its facility. This self-assessment is an on-line questionnaire regarding the green components of a building and transmitted to Green Globes for evaluation with return comments on how to upgrade the building. However, under Green Globes, a building can only receive recognition after a site visit and inspection by a certified verifier. LEED does not currently require on-site verification. Once an assessment is verified, properties receive a Green Globes rating based on the percentage of total points (up to 1,000) achieved. The reward system provides an increasing number of “globes” based on the verifier’s analysis, as follows:



- Four (4) Globes are awarded to projects obtaining 85-100% of available Green Globes points. The “4 Globes” level of certification is reserved for select building designs that serve as national or world leaders in energy and environmental performance. The project also introduces design practices that can be adopted and implemented by others.
- Three (3) Globes are awarded to projects obtaining 70-84% of available Green Globes points. The “3 Globes” level of certification demonstrates leadership in energy and environmental design practices and a commitment to continuous improvement and industry leadership.
- Two (2) Globes are awarded to projects obtaining 55-69% of available Green Globes points. The “2 Globes” level of certification demonstrates excellent progress in achieving eco-efficiency results through current best practices in energy and environmental design.
- One (1) Globe is awarded to projects obtaining 35-54% of available Green Globes points. The single “Globe” level of certification demonstrates movement beyond awareness and commitment to sound energy and environmental design practices by demonstrating good progress in reducing environmental impacts.



IX. COMPARISON BETWEEN LEED AND GREEN GLOBES

IX.A. Cost

Green Globes requires an initial \$500.00 fee for each self-assessment. If an applicant wishes to obtain formal certification, it must obtain third-party verification, which runs an average additional total cost of \$4,000 to \$5,000. This includes a conditional verification—at the construction documents stage—and final verification after a site inspection is conducted. In contrast, the initial LEED registration fee for a project is \$450 for USGBC members and \$600 for non-members. LEED certification fees vary by project size, but the average certification cost is \$2,000. Total LEED or GBI costs vary from project to project but can range from 1 to 8+% of total construction costs, depending on the level of certification and/or points pursued.^{xii}

IX.B. Program Fundamentals

Green Globes can be used as a guide without committing to verification, but LEED cannot. To receive Green Globes certification, the applicant must obtain third party, on-site verification. LEED certification requires only a paper review by the USGBC. In addition, LEED requires certifications (potential warranties) from designers, but Green Globes has no similar requirement. Unlike LEED (in its current version), Green Globes does not hold projects accountable for inapplicable strategies (e.g., for a project with no exterior lighting, the applicant can select “N/A,” which removes those points from the total number available).



In addition, the Green Globes appeals process is not articulated, whereas LEED has a fully developed point appeals process that includes an on-line database of prior rulings. Unlike LEED,

Green Globes does not favor Forest Stewardship Council (FSC) over Sustainable Forest Initiative (SFI) forest certification. Finally, Green Globes has no prerequisite points, whereas LEED has numerous prerequisite points in a number of categories.

X. CONCLUSION

As discussed in this paper, building codes are the “minimum requirements” to safeguard public health and safety to life and property from fire and other hazards attributed to the built environment and to provide safety to fire fighters and emergency responders during emergency operations. Building codes include standards to address fire safety, energy usage, mechanical (HVAC), gas, plumbing, and electrical requirements and accessibility standards. Building codes do not contain green building standards; however, the federal and state governments and municipalities are recognizing the need to address green standards.

As the environmental impact of buildings becomes more apparent, green, or sustainable, building will be recognized as the practice of creating and using environmentally friendly and more resource-efficient models of construction, renovation, operation, maintenance, and demolition.

The process of changing local building codes for alternative designs, materials, and methods of construction to make buildings more sustainable and “green” is becoming easier. Due to the broad acceptance of the USGBC LEED Green Building Rating System, the building market is more readily embracing the movement to become green. Though LEED is voluntary and not totally exclusive, it has supported efforts by federal and state governments and municipalities to formulate their own green standards by which to develop buildings in which we live, work, and play – standards that will protect us from nature's extremes and protect our health and environment.



XI. NOTES

- ⁱ See Database of State Incentives for Renewables & Efficiency: <http://www.dsireusa.org/library/includes/genericfederal.cfm?CurrentPageID=1&state=us&ee=1&re=1>
- ⁱⁱ “Business Energy Tax Credits Technical Requirements,” Oregon Department of Energy, June 20, 2008.
- ⁱⁱⁱ Green Roof Property Tax Abatement (A.11226).
- ⁱⁱⁱⁱ Mark Frankel and Cathy Turner, “Energy Performance of LEED for New Construction,” *New Buildings Institute* (March 4, 2008).
- ^v *Ibid.*
- ^{vi} “State of Green Business,” *Greener World Media* (January 2008).
- ^{vii} Andrew C. Burr, “CoStar Study Finds Energy Star, LEED Bldgs. Outperform Peers,” (March 26, 2008).
- ^{viii} *Ibid.*
- ^{ix} “Green Building Market Barometer” Turner Construction Co. (2008).
- ^x “State of Green Business” *Greener World Media* (January 2008).
- ^{xi} *Ibid.*
- ^{xii} See Green Building Initiative website at <http://www.greenglobes.com/about-faq.asp#cost> and Peter Morris, “What Does Green Really Cost?,” *PREA Quarterly* (Summer 2007): 55-60.

XII. BIO: PHILIP D. BARNARD, PE, CCE

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