A Beginner's Guide to Green Building:
What the Forest Sector Needs to Know About USGBC & LEED

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Background

The Green Building movement is a significant and growing phenomenon both domestically and internationally. The leading program for evaluating and recognizing green buildings is the *Leadership in Energy and Environmental Design* (LEED) Green Building Rating System of the United States Green Building Council (USGBC). At the end of 2004, there were more than 1,700 LEED-registered buildings and this number is predicted to grow to nearly 10,000 by the end of 2009[1]. With standards for everything from water conservation to material selection, the USGBC's LEED program is already having significant impact on nearly all sectors of the building industry, including forest products.

The U.S. Green Building Council is the nation's foremost coalition of leaders from across the building industry working to promote buildings that are environmentally responsible, profitable and healthy places to live and work.

www.usgbc.org

The LEED (Leadership in Energy and Environmental Design) Green Building Rating System ® is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings

www.leedbuilding.org

An Introduction to the USGBC and LEED

The United States Green Building Council (USGBC) was founded in 1993 and is a national, not-for-profit, membership organization headquartered in Washington, DC with 67 local chapters, affiliates and organizing groups. The USGBC aims to be the "leading organization representing the entire industry on environmental building matters."[2] The USGBC has more than 5,300 member companies and organizations. Membership is broad and diverse and includes several categories[3]:

- Building Product Manufacturers
- Building Owners, Managers, Users and Brokers
- Financial and Insurance Firms
- Press
- Professional Societies
- Design, Architectural, Engineering and Professional Firms
- Contractors and Builders

[1] http://www.greenbiz.com/news/news_third.cfm?NewsID=27375
[2] http://www.usgbc.org/DisplayPage.aspx?CategoryID=1
[3] http://www.usgbc.org/DisplayPage.aspx?CMSPageID=39&

- Nonprofit Organizations
- Utilities
- Universities, K-12 School Systems, and Research Institutes
- State, Local and Federal Governments
- Building Control Service Contractors and Manufacturers

The USGBC does not allow trade associations to be members and dues are based on gross annual sales and range from $300 to $12,500.

The USGBC initiated the LEED (Leadership in Energy and Environmental Design) Green Building Rating System ® in 1998. This system is a "voluntary, consensus-based national standard for developing high-performance, sustainable buildings."[4] The LEED system was created with a variety of goals in mind, including to: define green building with a common standard, promote integrated design practices, recognize environmental leadership, stimulate green competition, raise consumer awareness, and transform the building market. It is valuable to recognize that LEED places a high priority on its "leadership" role, in that the goal of the program is not to certify all buildings but rather to consistently represent the top 25% of environmental performers in the construction market. [5]

Both the private and public sector have adopted the use of the LEED standards. The federal government uses LEED in a variety of sectors including the General Services Administration, U.S. Air Force, Department of Energy, and the Environmental Protection Agency. About 10% of LEED registered projects are Federal Government buildings. Nearly 20 states and local governments make use of LEED standards, including: California, Oregon, Maryland, Chicago, Seattle, San Francisco and Portland[6]. Internationally, there are LEED-registered and certified projects in a number of countries outside the United States, including Canada and India and additional LEED activity in more than 10 other nations, including China. In addition, the USGBC has trained and accredited more than 7,800 LEED professionals worldwide.[7]

'Green' law aims at public buildings

High energy, water standards signed by governor at school

HEATHER WOODWARD
THE OLYMPIAN
Saturday, April 9, 2005

Washington became the first state in the country Friday to enact a law requiring public buildings to be constructed with standards encouraging energy conservation and recycling.

Gov. Christine Gregoire signed the historic bill into law at Washington Middle School in Olympia, which will be among the first buildings in the state to incorporate the "green" standards.

http://www.theolympian.com/home/news/20050409/southsound/122219.shtml

[4] http://www.leedbuilding.org
[5] http://www.edcmag.com/CDA/ArticleInformation/features/BNP__Features__Item/0,4120,103633,00.html
[6] http://www.usgbc.org , Powerpoint presentation, October 2004
[7] http://www.edcmag.com/CDA/ArticleInformation/features/BNP__Features__Item/0,4120,128639,00.html

The USGBC & LEED Structure

The USGBC programs are committee based. The USGBC has three Administrative Committees: Executive, Governance and Finance[8]. There are a number of Organizational Committees that oversee education, an annual Greenbuild convention, accreditation, and other membership related operations. There are 13 committees associated with LEED. The LEED Committees include a Steering Committee as well as specific committees for each LEED product such as LEED for New Construction, LEED for Existing Buildings, and LEED for Homes. There are also Technical Advisor Groups for the LEED Credit Categories: Sustainable Sites, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, and Water Efficiency. Details about committee responsibilities, committee members and contact information are available at the USGBC website.

The LEED Products

Currently, there are six different LEED Green Building Rating Systems[9]. The oldest and most widely applied is LEED for New Construction that was launched in March 2000.

LEED for New Construction

LEED-NC is designed for rating new and major renovations of existing commercial and institutional buildings. As the oldest LEED standard and in the absence of more specific standards, LEED-NC has been applied to a wide variety of projects including schools, libraries, hotels, restaurants, and multi-unit residential buildings such as apartments and dormitories. In LEED-NC, after which the other LEED systems are modeled, there are a total of 69 possible points and four levels of certification.

LEED-NC Version 2.1

69 total points possible

Certified	26-32 points
Silver	33-38 points
Gold	39-51 points
Platinum	52-69 points

LEED for Existing Buildings

LEED-EB was released in October 2004 and is a set of performance standards for building operations and systems upgrades in existing buildings where the majority of interior or exterior surfaces remain unchanged. It addresses whole-building cleaning and maintenance, indoor air quality, energy and water efficiency, recycling programs, exterior maintenance, and systems upgrades. Before being endorsed through a member vote, the system was piloted with 99 registered buildings in 28 states, 2 Canadian provinces and Brazil[10].

LEED for Commercial Interiors

LEED-CI addresses the specifics of tenant spaces in office, retail and institutional buildings and was introduced in November 2004 after a piloting phase and a vote of

[8] http://www.usgbc.org/aboutus/committees.asp?CMSPageID=132
[9] http://www.usgbc.org/DisplayPage.aspx?CategoryID=19
[10] http://www.usgbc.org/News/usgbcnews_details.asp?ID=1072

endorsement from the USGBC membership[11]. The LEED-CI system addresses performance areas such as selection of tenant space, efficiency of water usage, energy performance, resource utilization, and indoor environmental quality.

LEED for Core and Shell
LEED-CS is currently in the pilot-testing phase of development and is scheduled to launch in 2005. This system will cover base building elements such as the structure, envelope, and build-level systems[12].

LEED for Homes
LEED-H is in the development stage and also scheduled for launch in 2005. This program is being developed with input from local and national stakeholder groups and is intended to be a "voluntary initiative promoting the transformation of the mainstream home building industry toward more sustainable practices."[13] While recognizing the large number of local and regional green home building programs, LEED for Homes intends to provide national consistency and enable builders from around the country to participate.

LEED for Neighborhood Developments
LEED-ND is the newest area of LEED standards development. It is in the very early stages of formation and is intended to emphasize smart growth aspects of development such as density, proximity to transit, mixed use and mixed housing.

Additional Areas of Work
There are additional committees exploring LEED for Multiple Buildings, Healthcare, Labs, Lodging, Retail, and Schools.

The LEED Process

There are several steps to participating in the LEED system. These steps include: Registration, Documentation, Application and Certification[14]. Once a project is registered there is no requirement that it complete the certification process. Thus, today building projects are using LEED standards in a variety of ways, ranging from simply as guidelines, to registration without certification, to full certification at the varying levels. As such it is a very flexible tool for designers, developers and builders. To earn LEED certification, the project must collect a range of information and document all aspects of the project related to the LEED standard. The complete application and materials are reviewed and audited through the USBGC technical review process. Applicants have 30 days to appeal the findings of the technical review before the certification is finalized. The fees for project registration and certification vary depending on the size of the building (square feet) and USGBC membership status. Registration fees range from $750 to $3,750. Certification fees range from $1,500 to $7,500[14].

[11] http://www.usgbc.org/News/pressreleases_details.asp?ID=1141
[12] http://www.usgbc.org/DisplayPage.aspx?CMSPageID=146
[13] http://www.usgbc.org/DisplayPage.aspx?CMSPageID=147
[14] http://www.usgbc.org/DisplayPage.aspx?CMSPageID=64

LEED Standards

Each LEED product varies somewhat in the criteria that is addressed, but all products generally have six categories: Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources, Indoor Environmental Quality, and Innovation & Design Process.

The distribution of points for LEED-NC is illustrated in Table 1. There are several points related to the forest sector, shown in Table 2.

Table 1. LEED-NC Version 2.1 Point Distribution

Sustainable Sites	14 points, 1 prerequisite
Water Efficiency	5 points
Energy & Atmosphere	17 points, 3 prerequisites
Materials & Resources	13 points, 1 prerequisite
Indoor Environmental Quality	15 points, 2 prerequisites
Innovation & Design Process	5 points
TOTAL	*69 points, 7 prerequisites*

Table 2. LEED-NC Credits Relevant to the Forest Sector

Materials & Resources	
Credit 2.1 & 2.2	Construction Waste Management
Credit 3.1 & 3.2	Resource Reuse
Credit 4.1 & 4.2	Recycled Content
Credit 5.1	Local/Regional Materials (manufacturing)
Credit 5.2	Local/Regional Materials (harvesting)
Credit 6	Rapidly Renewable Materials
Credit 7	Certified Wood
Indoor Environmental Quality	
Credit 4.4	Low-Emitting Materials, composite wood & agrifiber

Although only two of the credits in Table 2 are specific to wood, all of these credits are relevant to the forest sector because of the potential for building project suppliers to package their services in a manner that addresses multiple, closely related LEED credits. For example, Armstrong (Armstrong World Industries, Inc.) markets ceiling tiles with recycled content, directly relevant to the Materials & Resources Credit 4.1, and Armstrong also offers to collect and dispose of construction waste for their customers in order to help them also receive Credit 2.1. By understanding the LEED system and the specific credits, suppliers can go beyond just offering customers the materials they need and instead start to offer the service of "helping them achieve LEED". Providing this service does present a learning curve challenge to the industry, but it also represents a significant value-added opportunity.

LEED-NC Materials & Resources Credits

The Materials and Resources Credits of the LEED system have the greatest relevancy to the forest sector. This section of the system includes one prerequisite that requires LEED buildings to include a storage and collection system for recyclable materials.

The MR 2.1 & 2.2 Credits recognize construction waste management efforts with 2.1 providing one point for diverting at least 50% of construction, demolition and land clearing debris from landfill disposal and credit 2.2 provides an additional point if the project achieves 75% diversion.

The MR 3.1 & 3.2 Credits recognize the use of salvaged, refurbished or reused materials, products and furnishing. The MR 3.1 credit offers 1 point for reuse for at least 5% of building materials and 3.2 offers an additional point if 10% reuse is achieved.

The MR 4.1 Credit offers a point for the "use of materials with recycled content such that the sum of post-consumer recycled content plus one-half of the post-industrial content constitutes at least 5% of the total value of the materials of the project." Similarly, MR 4.2 provides an additional point if 10% recycled content is achieved.

The MR 5.1 Credit provides one point when "a minimum of 20% of the building materials and products are manufactured within a radius of 500 miles." This credit is complicated by the definition of the term "manufactured". For the purposes of this point, the location where the final assembly occurs is considered the manufacturing location. Therefore, products may be composed of a variety of parts that are sourced from locations outside of the region, but so long as the final assembly occurs within 500 miles of the project they can be counted towards this Credit. The MR 5.2 Credit is related to MR 5.1. For MR 5.2 the requirement is that "of the regionally manufactured materials documented for MR Credit 5.1, a minimum of 50% of the materials are extracted, harvested or recovered (as well as manufactured) within 500 miles of the project site."

The MR Credit 6 provides one point for the use of rapidly renewable building materials that are

Potlatch Honored with Top-10 New Green Building Products Award for its FSC Certified Lumber and Plywood

SPOKANE, Wash.--(BUSINESS WIRE)--Nov. 10, 2004--BuildingGreen, Inc., publisher of Environmental Building News and GreenSpec(R), the leading directory of green building products, today named Potlatch Corporation's Forest Stewardship Council(R) (FSC) certified lumber and plywood products as one of 2004's Top-10 BuildingGreen products. Potlatch's FSC-certified lumber and plywood products were selected from hundreds of environmentally friendly residential and commercial building materials and applications. The annual Top-10 Green Building awards, presented this year at the U.S. Green Building Council's November 10 Greenbuild Conference in Portland, Oregon, recognize the most innovative and exciting green building products added to the GreenSpec(R) Directory during the past year.

http://www.usgbc.org/News/usgbcinthenews_details.asp?ID=1177&CMSPageID=159

defined as having a ten-year or shorter harvest cycle. To earn this point, 5% of the total value of all building materials and products would need to come from rapidly renewable sources.

The MR Credit 7 provides a point for the use of certified wood and to earn this point at least 50% of the wood-based materials and products must be certified under the Forest Stewardship Council (FSC) system.

LEED-NC Indoor Environmental Air Quality Credit Relevant to Wood

The EQ Credit 4.4 provides a point for projects that use composite wood products that do not contain any added urea-formaldehyde resins.

LEED in the United States

In the United States, the adoption and application of LEED certification has been growing dramatically. Predictions are that growth rates will remain at or above 30% per year for LEED project registrations and that LEED will represent a $30 billion market by 2010.[15] In 2004, new LEED registrations accounted for about $7.15 billion or 2.7% of the total U.S. nonresidential building construction market.[15]

A number of studies have been completed demonstrating both the affordability of building projects designed to meet the LEED standards and the long term potential for cost saving during building operation. These studies have indicated that there is no statistical difference in cost between green buildings and non-green buildings. Additionally, anecdotal evidence and case studies suggest that any additional cost of building green is directly proportional to the point in the process "green" is implemented. Projects that have implemented green early in the design phase tend to show insignificant cost increases and sometimes, if reduced operating costs are considered, a net savings.

LEED & Green Building Around the Globe

In addition to the USGBC program in the United States, there are several other green building programs around the world. In 1999, the World Green Building Council (WorldGBC) held its founding meeting with the U.S., Australia, Spain, Canada, Japan, India, and Mexico participating[16]. The WorldGBC aims to bring together Green Building Councils in order to "share knowledge, resources and common principles to advance the development of green buildings" and also help countries start green building programs[17].

In North America, both Canada and Mexico have green building programs. In Canada, the Canada Green Building Council (CaGBC) was launched in 2003 and has adapted the LEED program for use in certifying buildings in Canada[18]. Canada also has

[15] Yudelson, Jerry. "The 2005 Outlook for Green-Building Markets" eco-structure March/April 2005
[16] http://www.worldgbc.org/default.asp?id=10
[17] http://www.worldgbc.org/default.asp?id=9
[18] http://www.cagbc.org/news_events/news.php?id=5&press=1&draw_column=3:3:2

"GreenGlobes", a web-based green building performance tool that is considered to be a competing system to LEED. GreenGlobes was initiated in 2002 in Canada has also been modified for use in the United States and is being introduced to the U.S. market this year.[19] The Mexico Green Building Council (MexicoGBC) announced its launch in November 2004[20].

Other Green Building Programs

There are several other programs besides LEED that offer systems for evaluating and recognizing green buildings, especially homes. Numerous states have some type of green building program. The Vermont Star Homes program of Efficiency Vermont[21] is focused on energy use; the Green Star program[22] in Alaska has a Green Star Award for waste reduction and an Air Quality Award program; and the New York State Green Building Initiative[23] provides tax credits for green building.

The Austin Energy Green Building Program[24] was started in 1990 and provides standards for residential, commercial and multi-family projects. They are currently working on a rating tool for remodeling.

The Wisconsin Green Built Home program, founded in 1999, is a "voluntary green building initiative that reviews and certifies homes that meet sustainable building and energy standards"[25]. Their standards recognize materials with a variety of attributes including domestically grown, recycled content, regionally produced, reused, formaldehyde free, and Forest Stewardship Council (FSC), SmartWood or equivalent certified. A number of checklists of their requirements are available from the Green Built Home website (www.greenbuilthome.org), including versions for New Homes, Remodeling, and Waterfront Property.

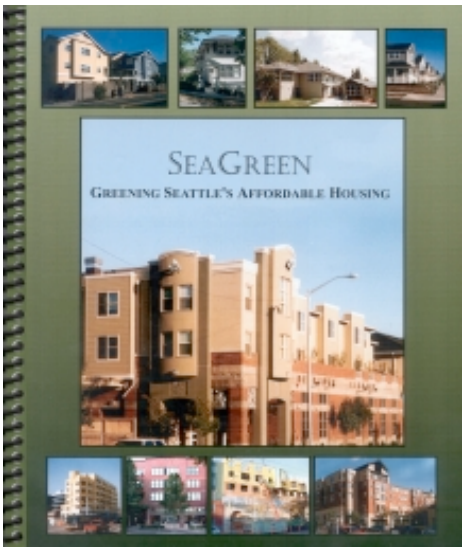
There is also the BuiltGreen™ Program of the Master Builders Association of King and Snohomish Counties in Washington State. BuiltGreen is designed to "help homebuyers find quality, affordable homes that offer opportunities to protect the health of their families and the Northwest environment" and provides four ratings systems for homebuilders, remodels, multifamily and communities.[26]

An extensive list of green home building programs is available at the USGBC website (http://www.usgbc.org/DisplayPage.aspx?CMSPageID=147).

Green Affordable Housing is another area of green building activity. SeaGreen is a program in Seattle focused on affordable housing standards. There is also the Green

[19] http://www.buildinggreen.com/auth/article.cfm?fileName=140304b.xml
[20] http://www.usgbc.org/News/pressreleases_details.asp?ID=1142&CMSPageID=164
[21] http://www.efficiencyvermont.com/
[22] http://greenstarinc.org
[23] http://www.dec.state.ny.us/website/ppu/grnbldg/
[24] http://www.ci.austin.tx.us/greenbuilder/
[25] http://www.greenbuilthome.org/
[26] http://www.builtgreen.net

Affordable Housing Coalition in the San Francisco Bay Area. The *SeaGreen Affordable Housing Guide* was printed in November 2002 and is available on line (http://www.ci.seattle.wa.us/housing/07-FreePublications/SeaGreen.pdf). The SeaGreen program was developed to "promote energy conservation, operational savings, and sustainable building practices in affordable multifamily housing projects" and was designed to be compatible with the BuiltGreen™ Program. The standards recognize "3rd-party certified sustainably harvested" wood products in the Materials Efficiency category with specific reference to the Rainforest Alliance, Scientific Certification Systems (SCS), and the Forest Stewardship Council (FSC). The program also emphasizes regionally manufactured materials (within 500 miles). Recently, the Enterprise Foundation established the Green Communities program, a five-year $550 million initiative to build more than 8,500 green homes for low-income families across the U.S[27]. This program has a number of criteria including a Resource Conservation section that recognizes salvaged wood, FSC certified materials, and engineered framing materials.



http://seattle.gov/housing/SeaGreen/

In January 2005, the National Association of Home Builders (NAHB) introduced their "NAHB Model Green Home Building Guidelines" with the goal of helping mainstream homebuilders participate in green building without significant cost increases.[28] The NAHB program awards points for the use of certified wood and recognizes a number of certification systems including FSC, the Sustainable Forestry Initiative (SFI), the Canadian Standards Association (CSA), the Programme for the Endorsement of Forest Certification schemes (PEFC), and the American Tree Farm System (ATFS). More information, including a free download of the guidelines is available at the NAHB website (www.nahb.org).

Conclusion

The green building movement offers tremendous opportunities for the forest sector. While this movement is still evolving in many ways, it is growing significantly and influencing the building industry. There are at least eight potential credits within the LEED-NC point system that offer opportunities for the forest sector to play a role in assisting projects that are seeking recognition through the LEED program.

Kathryn has a B.S. degree in Forest Resources from the University of Minnesota and also studied at the College of Saint Benedict in St. Joseph, MN and Sheldon Jackson College in Sitka, Alaska.

[27] http://www.greencommunitiesonline.org/
[28] http://www.buildinggreen.com/auth/article.cfm?fileName=140203c.xml

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