

The Green Building Initiative

Post-frame construction and the Green Globes environmental assessment and rating system

Each issue of Frame Building News includes a technical article by experts in areas important to the growth and development of the post-frame industry. This explanation of the Green Globes system by the Green Building Initiative explains how post-frame construction may be affected by various green building initiatives.

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Over the past decade, the green building movement has experienced an explosion of activity as designers and builders have sought to make their projects more sustainable. Practices that were once considered fringe are fast becoming standard — and show no sign of being sacrificed, despite an economic downturn that has deeply affected the rate of construction over all.

Although it seems counter-intuitive since high performance buildings tend to cost between three and five percent more to build, difficult economic times are all the more reason to adhere to the tenets of green, such as energy efficiency, wise resource use, reduced waste, durability and adaptability. Of course, all of these things are associated with post-frame structures.

At the same time, the building sector's economic challenges also accentuate the need for practical and affordable tools that encourage widespread adoption of green building practices. This is the focus of the Green Building Initiative (GBI) and its environmental assessment and rating system for commercial buildings — Green Globes.

A not-for-profit organization based in Portland, Oregon, the GBI was established in 2004 to fill what it perceived as a gap in tools for mainstream design and building professionals. Through its com-



mitment to offering interactive solutions that make even the most sophisticated processes practical and accessible, it has since become one of the country's leading green building organizations.

The Green Globes system

Unique among green building rating systems, Green Globes features an assessment protocol and guide for integrating environmentally friendly design into commercial buildings. Web-based and interactive, it includes modules for New Construction and the Continual Improvement of Existing Buildings and facilitates recognition of completed projects through third-party assessment.

Green Globes is one of the premier green rating tools in North America. It is recognized in legislation, regulation or executive order in 18 states, and it is an accepted industry standard. It is also poised to become the first green building standard for commercial structures accredited by the American National Standards Institute (ANSI).

GBI embarked upon the internationally recognized ANSI process to give Green Globes the benefit of a true consensus-based process. The system has undergone a thorough review by more than 75 building science experts who comprise the ANSI Technical Committee and subcommittees, including representatives from (among others) the US Environmental Protection Agency, American Institute of Architects and American Forest and Paper Association.

Certain aspects of the tool will change when it is released later this year as an ANSI standard. It will be the only green building rating system to fully incorporate life cycle assessment (LCA), for example, which it currently does to a lesser degree. It will also incorporate a calculator allowing users to project water consumption based on their project designs, and carbon dioxide (CO₂) will be used as the basis for calculating energy efficiency instead of the current kBtu/square foot/year. However, the system will retain those characteristics that have made it such a valuable tool for practitioners who want a combination of environmental design guidance, assessment and certification in a format that's user-friendly and affordable.

At each stage of the design process, users are guided through a logical sequence of questions that provide guidance for integrating important elements of sustainability. Projects are awarded up to 1,000 points based on their performance in seven areas of assessment:

1. Project management: 50 points

The Green Globes system places an emphasis on integrated design, an approach that encourages multi-disciplinary collaboration from the earliest stages of a project while also considering the interaction between elements related to sustainability. Most decisions that influence a building's performance (such as site, orientation, form, construction and building services) are made at the start of the project and yet it's common, even for experienced designers, to focus on environmental performance late in the process, adding expensive technologies after key decisions have been made.

To ensure that all of the relevant players are involved, the system tailors

questionnaires so that input from team members is captured in an interactive manner, even on those issues which may at first appear to fall outside their mandate. For example, while site design and landscaping may come under the purview of the landscape designers, the questionnaire prompts the electrical engineer to get involved with design issues such as outdoor lighting or security. Thus the Green Globes format promotes design teamwork and prevents a situation where, despite strong individual resources, the combined effort falls short.

Also included under project management are environmental purchasing, commissioning and emergency response.

2. Site: 115 points

Building sites are evaluated based on the development area (including site selection, development density and site remediation), ecological impacts (on ecological integrity, biodiversity, air and water quality, microclimate, habitat and fauna and flora), watershed features (such as site grading, storm water management, pervious cover and rainwater capture), and site ecology enhancement.

3. Energy: 470 points

To simplify the process of energy performance targeting, information submitted to the Green Globes system is routed seamlessly to the Energy Star Target Finder software, which generates a realistic energy target. As a result, an aggressive energy performance goal can be set and used as a benchmark for comparison with modeled energy data.

Green Globes is the only green building rating system to use energy data generated through the Commercial Buildings Energy Consumption Survey (CBECS), which is widely considered to be the most accurate and reliable source of energy benchmarking information.

In addition to overall consumption, projects are evaluated based on the objectives of reduced energy demand (through space optimization, microclimatic response to site, daylighting, enve-

lope design and metering), integration of “right sized” energy-efficient systems, on-site renewable energy sources and access to energy-efficient transportation.

4. Water: 100 points

Projects receive points for overall water efficiency as well as specific water conservation features (such as sub-metering, efficiency of cooling towers and irrigation strategies), and on-site treatment (of grey water and waste water).

5. Resources: 100 points

Of particular relevance to post-frame construction, the resources section covers building materials and solid waste. It includes points for materials with low environmental impact (based on life cycle assessment), minimal consumption and depletion of resources (with an emphasis on materials that are re-used, recycled, bio-based and, in the case of wood products, certified as having come from sustainable sources), the re-use of existing structures, building durability, adaptability and disassembly, and the reduction, re-use and recycling of waste.

6. Emissions, effluents and other impacts

Points in this section are awarded in six categories, including air emissions, ozone depletion and global warming, protection of waterways and impact on municipal waste water treatment facilities, minimization of land and water pollution (and the associated risk to occupants’ health and the local environment), integrated pest management, and the storage of hazardous materials.

7. Indoor environment: 200 points

According to the US Environmental Protection Agency (EPA), indoor air can be up to 10 times more polluted than outdoor air, even in cities where the quality of outdoor air is poor. This has obvious health implications, but the consequences are also economic. A study by Lawrence Berkeley National Laboratory found that improving indoor air at work could save US businesses up to \$58 billion in lost sick time each year, with

another \$200 billion earned in increased worker performance.

This section evaluates the quality of the indoor environment based on the effectiveness of the ventilation system, the source control of indoor pollutants, lighting design and the integration of lighting systems, thermal comfort and acoustic comfort.

Although projects that achieve a score of 35 percent or more currently become eligible for a Green Globes rating of one, two, three or four globes, the new version of the system will introduce a minimum percentage in each area of assessment. In both cases, buildings cannot be promoted as having achieved a Green Globes rating until the information submitted has been assessed by a qualified third party.

Green Globes assessment is completed in two stages. Stage I can be initiated by the design team as soon as the Construction Documents questionnaire is finalized. The completed questionnaire is assessed against the documentation generated throughout the design process and, once complete, the design team receives a Certificate of Achievement. However, a final rating cannot be achieved until after Stage II, which occurs post-construction and includes an on-site inspection by a qualified assessor. This stage can be initiated as soon as construction is complete.

Life cycle assessment

In terms of material selection, GBI has been at the forefront of a shift within the green building movement, away from a “prescriptive” approach — which assumes that certain “prescribed” practices are better for the environment — toward the scientific evaluation of actual performance. An example of this that is relevant to the post-frame industry would be awarding points for a product with recycled content without taking into account the embodied energy required to extract, manufacture, transport, install and maintain that product over time.

At the heart of this shift is LCA, which is a method of scientifically analyzing

building materials and assemblies over the course of their entire lives — from extraction through manufacturing, transportation, installation, use, maintenance and disposal or recycling — and assigning an unbiased score based on a full range of environmental impact indicators. By allowing designers to impartially evaluate and compare design scenarios based on their environmental attributes, LCA helps to ensure that buildings meet their sustainability objectives without influence from pre-existing biases that have long been an accepted part of green building.

To integrate LCA more fully into Green Globes, GBI commissioned a software tool that provides instant LCA results for hundreds of common building assemblies. Developed by the Athena Institute in cooperation with Morrison Hershfield Consulting Engineers, the tool takes a complex and time consuming process and makes it accessible for regular use by mainstream designers. Recognizing the value of the tool to the broader sustainable design community, GBI also supported the development of a generic version — the ATHENA EcoCalculator for Assemblies — which is available free of charge from the Athena Institute, www.athenasmi.ca.

All green building rating tools weigh the environmental impacts of building materials, and it's safe to say that few have been as controversial as wood products. However, the growing emphasis on LCA is resulting in greater recognition of wood's environmental attributes — in areas such as embodied energy, air and water pollution, and global warming potential.

Green Globes and post-frame buildings

Points relevant to post-frame construction within the current version of Green Globes include the following:

Life cycle assessment: 10 points

each for using LCA tools to choose building systems or assemblies

Renewability: 5 points for the proportion of materials that are bio-based, such as green insulation, natural fibers and natural structural materials

Forest certification: 5 points for lumber and timber panel products that originate from sustainable sources and are certified through one of the following systems: Sustainable Forestry Initiative (SFI), the Forest Stewardship Council (FSC), the Canadian Standards Association's Sustainable Forest Management Standard (CSA), or the American Tree Farm System (ATFS)

Locally produced materials:

Potential advantages of locally manufactured materials are captured in preference for materials that have undergone LCA

Other possible points: 5 points for environmentally preferable products and equipment that are third-party certified

For those using steel in their post-frame structures, Green Globes also awards up to two points for incorporating materials with recycled content.

Get involved – Support healthy competition

There are many reasons to get involved in the green building movement.

With more than 100 million buildings expected to be operational in the United States by 2010, the strides we make now, in all types of construction, have the

potential to create a tremendous positive impact. Equally important, governments at all levels are making decisions related to various aspects of sustainable construction.

For example, there are numerous pieces of legislation being proposed that would stifle competition among green building rating systems by mandating the use of LEED (Leadership in Energy and Environmental Design) only — which could have serious negative consequences for green building in general and the post-frame industry in particular.

As in other areas of society, GBI believes that healthy competition among rating systems, standards and other green building tools will continue to drive improvements and lower costs. It's good for design and building professionals, who benefit from an increasing range of options that meet the needs of every building type, size and budget, and for building owners and developers, who have access to a greater number of green building professionals — at a greater range of price points. It's also the most direct route to a greener built environment because it encourages more people to design, build and buy sustainable structures.

To this end, the GBI offers numerous ways to get involved and make your voice heard, from basic membership to participation on the Board of Directors. For more information on the options available, please visit www.thegbi.org. ■

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