

Green Globes® for New Construction

Better Building Science for Better Results

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Introduction

In today's economy, owners and design professionals are looking to design and construct projects that are environmentally friendly and within budget. Sustainable design or green design has gained significant strength in the last 10 years and is a widely employed element for design and construction professionals. Programs to support green building assessment and certification are now undergoing significant changes. Due to a recent major program update, Green Globes now uses the most advanced building science to support the design and construction of sustainable buildings that can also deliver significantly reduced operating costs.

Why Sustainable Design and Construction?

There are many distinctive and substantial benefits to building sustainable buildings due to the integration of economic, environmental and social goals.

The economic advantages of building sustainable buildings include reduced life cycle operating costs, reduced water consumption, reduced insurance rates, productivity gains, improved image and increased property values.

Ecological benefits are broad and wide reaching, from protecting natural spaces and enhancing existing ecology to reducing water/energy/material use. These measures directly and indirectly result in reductions to greenhouse gas emissions, ecological footprint, climate change impact, natural resource consumption, and strain on infrastructure.

There are also substantial social benefits, including increased occupant comfort and health, increased natural light, the promotion of mass transit, and urban densification.

As you can see, there is a strong business case for green building in the United States when a holistic, long-term view of the benefits and real building costs are considered.

Green Building Rating Systems

There are four green building rating systems at the pinnacle of sustainable design and construction: Green Globes, LEED™, ENERGY STAR® and ASHRAE Building Energy Quotient (bEQ).

Most of the design and construction industry is familiar with the United States Green Building Council's (USGBC) Leadership in Energy & Environmental Design (LEED) certification program. LEED is an internationally recognized green certification program that addresses multiple project types to include new construction, core and shell, and existing building projects to name a few. LEED has proven to be an effective tool in raising the design and construction community's awareness of promoting sustainability in the built environment. The program is continuing to evolve and its users should see several improvements in the soon to be released LEED v4. LEED 2009 will be available as a certification protocol through 2015 and is planned to run as a parallel certification track with LEED v4.

People outside of the design and construction industry are most familiar with the ENERGY STAR logo that can be seen on laptops and home appliances. The ENERGY STAR program

certifies a building based on Energy Use Intensities (EUIs) and rates the project on a scale of 1-100. The performance information used to rate the project is based on information received from the US Energy Information Agency's Commercial Building Energy Survey (CBECS) collected by the EPA. A project team can utilize the ENERGY STAR program to achieve energy performance points in the Green Globes for New Construction certification program.

The ASHRAE Building Energy Quotient is a new certification program that measures both as-designed and in-operation energy performance. ASHRAE bEQ derives its usage and intensity baselines from the ENERGY STAR Target Finder™ Tool (Ravi Srinivasan, 2013) and is one of the four paths a design team can utilize to achieve energy performance points in the Green Globes for New Construction certification program.

The Green Building Rating System at the forefront of sustainable design is Green Globes. Its overall "ease of use, system flexibility, adaptability and transparency" separate Green Globes from LEED as a distinct and effective certification system (Charles J. Kibert, 2012). The overall spirit and intent of sustainable design are most clearly represented within Green Globes. Buildings are essentially a "business" and, as with all sustainable building projects, any sustainable approach/path/technology must make sense and be reasonable to the business community or it will more than likely be rejected.

Green Globes for New Construction

Green Globes traces its origins to the United Kingdom and the BREEAM program (Building Research Establishment Environmental Assessment Method) as one of the first systems to environmentally assess buildings and to rate existing buildings. It helped set the standard for green building and measuring a building's environmental performance.

The Green Globes certification program is available in the U.S through the Green Building Initiative (GBI). In 2005, the GBI became the first green building organization accredited as a standards developer through the American National Standards Institute (ANSI). The GBI developed the ANSI/GBI 01-2010: Green Building Assessment Protocol for Commercial Buildings and used it as the basis for the latest enhancements to the Green Globes for New Construction protocol.

Green Globes for New Construction is part of an integrated design process. It utilizes an online building assessment tool for each design phase from pre-design to construction documents. A third-party assessor is assigned to the project to review the online assessment and construction documents and then perform an on-site inspection. The process is user-friendly, and having an assigned assessor to contact regarding decisions and certification requirements ensures it is transparent and interactive. The GBI also has Green Globes certification programs for existing buildings (called Continual Improvement of Existing Buildings, or CIEB) and CIEB for Healthcare.

Recent enhancements to the Green Globes for New Construction assessment and certification protocol include Building Energy Performance Options and Life Cycle Assessment. These and other updates were made to make sustainability assessments more comprehensive and to give the design team more options to achieve sustainability goals. This concept of flexibility is the spirit of sustainability embodied in Green Globes. It

encourages the design team to create higher performing buildings for their clients by allowing more than one path to achieve the owner’s sustainability goals. It is the opposite of a “one size fits all” approach and results in more building types being recognized for the sustainable measures employed.

Criteria Incorporates Advanced Building Science

The Green Globes certification process has seven environmental assessment areas: management, site, energy, water, materials & resources, emissions, and indoor environment. The energy, materials & resources, and water assessment areas are what separate Green Globes for New Construction from other green certification programs.

Environmental Assessment Areas



FIGURE 1-GREEN GLOBES ENVIRONMENTAL ASSESSMENT AREAS

Energy

The building industry is full of requirements related to energy efficiency, most of which mandate achieving specific reductions in energy use. The latest version of Green Globes for New Construction offers project teams and building stakeholders several options when it comes to assessing and implementing energy performance/efficiency into the design. Up to four paths, each of which has its own specific requirements and point limits, are available in order to achieve points in the Energy Performance section. Each path is proven to assist building stakeholders in decreasing building energy use. These paths are as follows:

Path A: ENERGY STAR Target Finder

Path B: ASHRAE 90.1-2010

Path C: ANSI/GBI 01-2010 Energy Performance Building Carbon Dioxide Equivalent Emissions (CO₂e)

Path D: ASHRAE Building Energy Quotient (bEQ)

Path A: The ENERGY STAR Target Finder offers performance ratings based on Energy Use Intensity, which is extrapolated from actual performance data from related building types and related energy performance. The median building is modeled using data from US Energy Information Agency's Commercial Building Energy Consumption Survey (CBECS) 2003. If your project meets the requirements of the eligible building types that can be entered into the ENERGY STAR Target Finder, this would be the most straightforward approach as compared to the other paths. If your project is not one of the eligible building types, then one of the other three paths should be pursued.

Path B: ASHRAE 90.1-2010 is the path most pursued with LEED projects. It models a baseline building based on the characteristics in ASHRAE 90.1-2010, Appendix G, with a proposed design using the same methodology from Appendix G. The energy performance is measured in the form of energy cost reduction.

Path C: Buildings account for 35% of all Green House Gas (GHG) emissions in North America. The building industry is being called upon not only to reduce energy consumption costs but to help fight climate change by achieving ambitious reduction targets for GHG emissions. The ANSI/GBI 01-2010 Energy Performance Building CO₂e performance path offers teams a way to quantify their reduction in CO₂e as the energy performance metric is provided in CO₂ equivalent emissions. Reducing GHG comes not only from energy efficient design and optimizing the building's energy demand, but also from utilizing low-carbon energy sources with clean/renewable energy generation. One advantage of this energy path is that the baseline building is determined by ENERGY STAR Target Finder, so the energy modeler and design team can spend their efforts on modeling the proposed building as accurately as possible and looking at real energy performance measures instead of spending effort on trying to make the baseline building worse. By comparing to an actual EUI, building stakeholders can look at things in absolute terms rather than using a "better than baseline" based on a fictitious reference.

Path D: The ASHRAE Building Energy Quotient rating program provides rating levels from B (Efficient) to A+ (Net Zero Energy). Similar to ENERGY STAR Target Finder, it utilizes information from CBECS (2003) data for the baseline building. The proposed design is modeled using ASHRAE 90.1-2007 and the energy performance is measured as a reduction in EUI.

The Green Globes for New Construction certification program offers the design team the four energy performance paths described above. This allows the project flexibility to show energy performance on various platforms, from the most familiar (ENERGY STAR) to the most cutting edge (ANSI and bEQ). This flexibility is unique to Green Globes and allows the energy modeler to provide information that helps the designers make informed decisions. In addition, extra credit points are available to project teams who show exemplary performance using Path C or Path D. Green Globes' flexible approach to energy performance provides building stakeholders with the means to achieve a balanced end product that is project specific and more energy efficient.

Similar to the notion that no single energy simulation software can accurately model all building and systems types accurately (i.e. EnergyPlus may model displacement ventilation more accurately than eQuest), no single energy performance path can suit all building types and project specific requirements.

Materials and Resources

Life Cycle Assessment (LCA) is an emerging trend in green building design and is critical to achieving high levels of sustainability. Since its inception, Green Globes has promoted and encouraged LCA as an important part of its program. Green Globes for New Construction includes the building industry’s LCA as a protocol for obtaining a quantifiable measurement of sustainability. Currently, LEED 2009 has LCA as a pilot credit. It appears that LEED has begun to recognize the importance of LCA within their certification programs as it is expected that LEED v4 will offer LCA credits under the Material and Resources section.

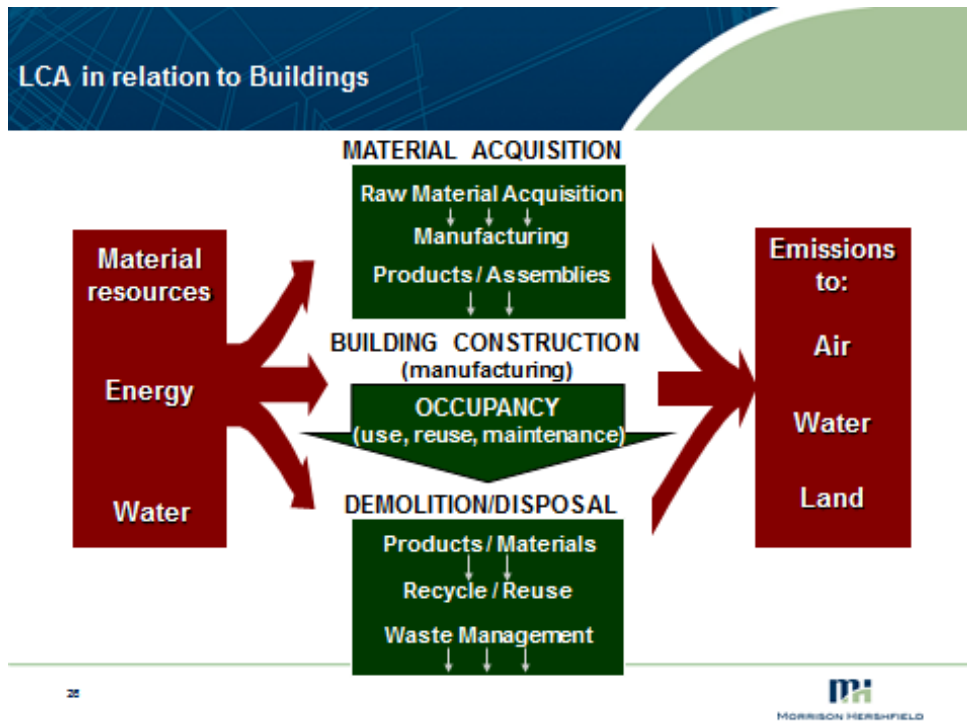


FIGURE 2-LIFE CYCLE DIAGRAM

DIAGRAM COURTESY OF WAYNE TRUSTY, ATHENA MATERIALS INSTITUTE

The Materials & Product Selection section of Green Globes for New Construction is divided into two categories: Building Assembly and Interior Fit-Out. The building assembly includes the core, shell, and envelope whereas the interior fit-out includes all of the finishes and furnishings within the building assembly. Each category can be evaluated using either Path A: Performance Path or Path B: Prescriptive Path. This separation allows different approaches for product selection and evaluation and gives designers options for compliance.

Path A: Performance Path Green Globes for New Construction encourages use of the Athena Impact Estimator and/or other life cycle assessment tools for the Building Assembly and third-party peer reviewed life cycle assessments for the Interior Fit-out. The use of the Impact Estimator allows the design and construction teams to compare design scenarios and

environmental considerations throughout the design process so that sustainable design decisions can be made prior to construction. The Impact Estimator is a “robust life cycle inventory of databases that provides accurate, scientific cradle-to-grave information for building materials and products, transportation, and construction and demolition processes” (Institute, 2013). Life cycle assessment is a sustainable method for comparing building assemblies and their ability to meet project goals.

Path B: Prescriptive Path Currently, the most common method for sustainable product selection is the evaluation of “single attributes” (e.g. VOC’s, recycled content, bio-based, etc.), which is not ideal. To maximize sustainability, materials should be compared and selected based on multiple attributes. There are three such methods to evaluating products. The first is to use Type III Environmental Product Declarations (EPD’s), which are based upon recognized Product Category Rules and ISO Standards 14040, 14044, 14025 and 21930 or EN 15804. There are two classifications of Type III EPDS: Industry Wide EPDs, which are generic to a product type, and Product Specific Declarations, which are manufacturer-specific for a family of products. The second method is to utilize third-party material/product certifications that are based upon multiple attributes, such as NSF International assessment standards, UL Environment sustainability certifications, and sustainable forestry certifications. Multiple attribute standards should be consensus based and issued by an approved standards development organization. The third method is to utilize a third-party certified life cycle product assessment. Path B may be a better choice for interior fit-outs than Path A because “the multitude of different types of proprietary product formulations used for interior products” make it difficult to perform life cycle analysis of an interior fit-out (Jane M. Rohde, 2013). Ultimately, the goal is to select products that are environmentally responsible, durable and meet the functional and aesthetic needs of the client.

Water

Water consumption is an important factor to consider during project design and construction. Both the fixtures used and their installation play a role in how a building consumes and disposes of water. The GBI has created a water calculator that allows clients to gauge a building’s water performance by benchmarking it against a base building. This Excel-based water calculator offers the following features:

1. Input assumptions, such as building size and type, operating hours, and fixture use frequency
2. An output page that displays calculated baseline water use and allows the addition of other water consumption features, such as HVAC systems, pools, water features, commercial kitchens, etc.
3. Project use analysis, which includes water performance improvements over the baseline
4. A parallel program for multi-unit residential buildings

Water is an important resource, and water calculations play a key role in sustainable design and conservation. The GBI Water Calculator simplifies the water calculation process for

building projects and is more accurate than other calculators due to its ability to accommodate additional water consumption fixtures.

Green Globes - The Process

Green Globes for New Construction is at the forefront of sustainability certification programs. Compared to LEED, Green Globes cuts out the bureaucracy, long review times, and complexity. Auden Schendler said it best in his essay “LEED is Broken, Let’s Fix It”:
“We’re concerned that LEED has become expensive, slow, confusing, and unwieldy, a death march for applicants administered by a soviet-style bureaucracy that makes green building more difficult than it needs to be. The result: mediocre ‘green’ buildings where certification, not environmental responsibility, is the primary goal” (Schendler, 2005).

Green Globes for New Construction is the answer for the frustrated LEED project team looking for an alternative green certification process. The excellent customer service, overall ease of use, transparency of the certification process, national recognition, and swift response times surpass LEED.

Any design team working on a sustainable project knows that documentation is of the utmost importance. During design and construction, questions arise and answers are needed in a timely manner to make decisions. Green Globes clients receive answers to those questions very quickly, usually within 1-2 days. Questions can be discussed with GBI staff or a third-party Green Globes Assessor so an informed decision can be made. This is where LEED fails and continues to get worse. LEED questions have to be submitted by email, and technical questions may have an associated cost. It often takes 2-4 weeks to receive a response to a LEED question, and sometimes they go unanswered. The GBI staff aids clients throughout the Green Globes certification process, and their customer service far surpasses that of any other green certification program.

Green Globes for New Construction consists of 6 phases.

Rating & Certification Process

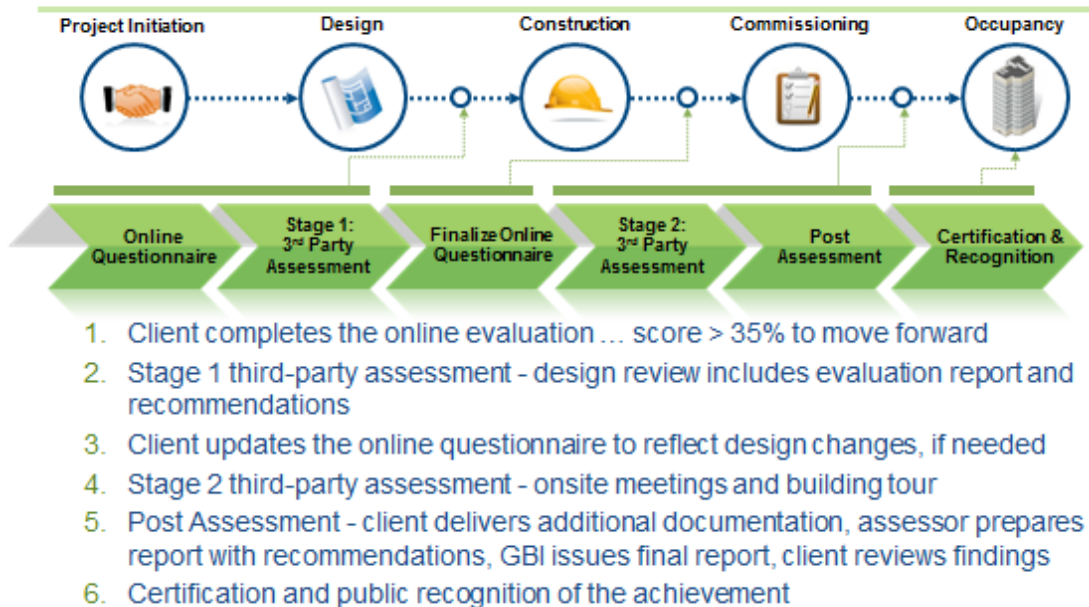


FIGURE 3-GBI RATING & CERTIFICATION PROCESS SUMMARY

Green Globes uses an online questionnaire to streamline the process and get to the overall intent of what sustainable design is all about. The online tool is easy to use, is compatible with any computer, and does not require special software for completion (LEED requires outdated Internet Explorer and Adobe Reader software). Once the questionnaire is complete, the NC Stage I Assessment can begin.

During the Stage I Assessment, a third-party assessor reviews the construction documents and compares them with the client's responses in the online questionnaire. The assessor then composes a Stage I report containing comments, recommendations, and a projected Green Globes score. The report provides the design team with helpful feedback on the current design, itemization of missing documentation, and suggestions to improve sustainability. The assessor is also available to answer any questions the client has about the report contents or projected Green Globes score. The dynamic interaction between the design team and assessor make the certification process easy, enjoyable, and successful.

When construction is essentially complete and the client makes any necessary updates to the online questionnaire, the third-party assessor can complete the Stage II On-Site Assessment. A member of the project team joins the assessor on-site to visually inspect the building and verify information submitted within the questionnaire and construction documents. The assessor may use his/her professional judgment to determine the level of compliance and points awarded. Unlike LEED, Green Globes allows partial points to be awarded if warranted. After the on-site assessment is complete and the client submits any missing documentation, the assessor writes a Stage II report that contains the evaluation results and recommended Green Globes rating. The GBI staff reviews the report and issues it to the client.

Overall, the Green Globes assessment process takes 30-45 days, compared to 120 days for LEED. This is a significant time difference and can be a critical decision factor when choosing

a green certification program. A design team can lose a lot of time with LEED due to failed credit certification and poor response time from the USGBC. The GBI and Green Globes Assessor are dedicated to responding to client concerns quickly and with helpful information that keeps the review process moving forward. The intent of sustainable design is environmental awareness and support of long-term ecological balance, both of which are supported and promoted by Green Globes.

Conclusion

Green Globes for New Construction employs the best building science to deliver sustainable building certification. The certification process is streamlined by an online questionnaire and verified on-site by a 3rd party assessor. Green Globes projects benefit from reduced operating costs and provide real/tangible sustainability results while costing less for certification. Building owners often comment on the cumbersome LEED process, the high cost of certification, and the expense of required building features that do little to improve sustainability. The GBI believes that a client's return on investment in green building certification should outweigh its costs in both time and money spent.

The Green Building Initiative and the Green Globes for New Construction rating system represent the true intent of sustainable design. The GBI uses a proven process for the certification and recognition of sustainable projects and continues to improve along with the design and construction industry. Green Globes is a competitive green building certification program that is at the forefront of building sustainability efforts.

Bios

Donald M. Martin, AIA, NCARB, LEED AP, GGP

Donald Martin has over 12 years of experience in architecture, planning, and consulting and is the Principal of MARSTON design studio. The past 12 years Donald has provided architectural design and consulting to sustainable construction and environmental design on multiple project types. Donald is a consulting Project Architect with Morrison Hershfield and is part of the sustainable services and building consultation team in Atlanta Georgia. Donald oversees the green certification of projects pursuing LEED, Green Globes, and ENERGY STAR. Donald's unique experience in the design and construction industry provides him a unique experience into environmental and sustainable design and the green certification process.

Stevan Vinci, CET, LEED AP BD+C, LEED AP O+M, GGP

Stevan serves as the Sustainability Practice Lead for Morrison Hershfield's Pacific Northwest offices and has provided green building consulting, building envelope/durability and commissioning duties on sustainability projects in Canada and in the US. Further to sustainability, Stevan has over 16 years of building science experience completing several building envelope assessments for building envelope failures as well as design assist services to architects on new construction projects. His experience also includes 3rd party building envelope drawing review, specification writing and construction drawing preparation of

envelope systems. His experience in building envelope contributes to a better understanding of whole-building systems in his work in green buildings.

Dan Prows, LEED AP, CSDP

Dan Prows has over 14 years of experience in construction and business management, including 7 years dedicated solely to sustainable construction and environmentally conscious design. Dan brings with him vast experience in the building sciences of thermal envelope, HVAC, and alternative energy. Dan's work in the Northwest, Intermountain West, and Southeast United States provide him with unique experience to address challenges in multiple climate zones. He is currently Morrison Hershfield's U.S. Buildings Group's Director of Operations and is primarily responsible for the overall development, operation, and growth of sustainable services and building consultation. He teaches sustainable design and green construction methodology to architects, engineers, and construction personnel throughout the country.

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