Other Green Rating Systems

Concrete’s Role in Sustainable Development
When it comes to green ratings systems, there are many systems to choose from:

- LEED
- GBI Green Globes
- Energy Star
- NAHB National Green Building Standard - draft
- Green Built Home
- ASHRAE Green Guide
- Greening Federal Facilities
- Green Guide for Health Care
- And others.....
Outline

- GBI Green Globes
- EPA Energy Star
- NAHB National Green Building Std – August 2007 Draft
- Green Highways Initiative
Green Globes History

- Developed from a Canadian program of the same name in 2004
- Building Research Establishment's Environmental Assessment Method (BREEAM)
- In 2002, Green Globes for Existing Buildings was introduced in the United Kingdom
Green Globes History

- Work also began to adapt BREEAM Green Leaf for the Design of New Buildings into the online Green Globes for New Buildings.
- 2004, GBI acquired the rights to bring the Green Globes system the United States.
- In 2005, GBI accredited bye (ANSI)
Green Globes

SYSTEM OVERVIEW

- Energy simulation compared to EPA Target Finder
- LCA for materials selection
- Lighting/shading studies
- Progressively more detailed analyses as design progresses

Project Initiation > Site Analysis & Programming > Schematic Design

Preliminary self-assessment rating with feedback reports and recommendations

Design Development

Construction Documents

Conditional final self-assessment rating

Contracting, Construction, Commissioning

ON-SITE POST CONSTRUCTION 3RD PARTY VERIFICATION

INCREASING DETAIL, QUANTIFICATION AND REFERENCE TO STANDARDS
Green Globes areas of assessment

- Energy: 35%
- Indoor Environment: 18.5%
- Emissions: 17.5%
- Resources: 11%
- Environmental Management: 10%
- Water: 8%
Project Management

- 50 Points
  - Integrated Design Process
  - Environmental Purchasing
  - Commissioning
  - Emergency Response Plant
Site

115 Points

- Development Area
- Ecological Impact
- Watershed
- Site ecology Enhancement

Concrete has long been the material of choice for high-rise construction. Pervious concrete is a solution for storm water management. Concrete reduces the heat island effect.
Energy

■ 360 Points
  ■ Energy Performance
  ■ Reduced Demand
  ■ Energy Efficient Features
  ■ Renewable Energy
  ■ Transportation

Concrete can provide high performance wall systems, such as, tilt-up walls, insulating concrete forms, or cast-in-place concrete walls that incorporate high mass and insulation. You can also use exposed concrete ceilings to reflect light deep into interior spaces.

Concrete floor systems can span large distances with shallow floor plates and column free spaces.
Water

- 100 Points
  - Water Performance
  - Water Conserving Features
  - On-site Treatment
Resources

100 Points

- Low impact systems and Materials
- Minimal use of non-renewable materials
- Reuse of existing building
- Durability, adaptability, and disassembly
- Demolition Waste
- Recycling

- Concrete is durable
- Recycled concrete can be incorporated into building systems and components
- SCM’s
- Concrete construction produces very little waste
Emissions, Effluents and Other Impacts

- 75 points
  - Air emissions
  - Ozone Depletion
  - Sewer and Waterway Protection
  - Pollution Control

Concrete provides a material that is pest and mold resistant.
Indoor Environment

- 200 Points
  - Ventilation System
  - Indoor Pollution Control
  - Lighting
  - Thermal Comfort
  - Acoustic Comfort
Green Globes

Once an assessment is verified by a third party, properties achieving a score of 35% or more receive a Green Globes rating based on the percentage of total points (up to 1000) achieved.

<table>
<thead>
<tr>
<th>Rating Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>85-100%</td>
<td>Reserved for select building designs which serve as national or world leaders in energy and environmental performance. The project introduces design practices that can be adopted and implemented by others.</td>
</tr>
<tr>
<td>70-84%</td>
<td>Demonstrates leadership in energy and environmental design practices and a commitment to continuous improvement and industry leadership.</td>
</tr>
<tr>
<td>55-69%</td>
<td>Demonstrates excellent progress in achieving eco-efficiency results through current best practices in energy and environmental design.</td>
</tr>
<tr>
<td>35-54%</td>
<td>Demonstrates movement beyond awareness and commitment to sound energy and environmental design practices by demonstrating good progress in reducing environmental impacts.</td>
</tr>
</tbody>
</table>
The initial access fee for the Green Globes program is $500, similar to the $450 LEED registration fee.

LEED has a pricing scale that can charge anywhere from $1,250 to $17,500 for certification, the most recent Green Globes fee was $4,000.
## Green Globe Certified Buildings

<table>
<thead>
<tr>
<th>Project</th>
<th>Gross sf</th>
<th>Type of facility</th>
<th>Location</th>
<th>Number of Green Globes</th>
</tr>
</thead>
<tbody>
<tr>
<td>RenewAire LLC</td>
<td>37,000</td>
<td>Office/manufacturing</td>
<td>Madison, Wis.</td>
<td>2</td>
</tr>
<tr>
<td>Summit County Recovery Facility</td>
<td>19,000</td>
<td>Recycling plant</td>
<td>Summit County, Colo.</td>
<td>2</td>
</tr>
<tr>
<td>Clinton Presidential Library</td>
<td>150,000</td>
<td>Library/museum</td>
<td>Little Rock, Ark.</td>
<td>2</td>
</tr>
<tr>
<td>Blakeley Hall</td>
<td>7,000</td>
<td>Community center</td>
<td>Issaquah, Wash.</td>
<td>2</td>
</tr>
<tr>
<td>Pfizer, Inc. CRU Building</td>
<td>62,500</td>
<td>Research lab</td>
<td>New Haven, Conn.</td>
<td>3</td>
</tr>
<tr>
<td>Alberici Headquarters</td>
<td>110,000</td>
<td>Office building</td>
<td>St. Louis, Mo.</td>
<td>4</td>
</tr>
</tbody>
</table>
## LEED certified Buildings

<table>
<thead>
<tr>
<th>Category</th>
<th>2001</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local chapters</td>
<td>0</td>
<td>68</td>
</tr>
<tr>
<td>Corp. Members</td>
<td>1,137</td>
<td>+7,600</td>
</tr>
<tr>
<td>LEED Professionals</td>
<td>527</td>
<td>+35,000</td>
</tr>
<tr>
<td>Registered Projects</td>
<td>217</td>
<td>4,926</td>
</tr>
<tr>
<td>Certified Projects</td>
<td>5</td>
<td>669</td>
</tr>
</tbody>
</table>

USGBC has 39 million s.f. of certified projects (completed) with another 750 million s.f. currently registered.
Membership

- The minimum level of membership in Green Globes is $20,000 compared to an average of $5000 for USGBC for similar rights and benefits.

- One must be a member of Green Globes to participate in development process.
Energy star just isn’t appliances!

Money Isn’t All You’re Saving
Energy Star

- ENERGY STAR Homes meet the EPA’s performance guidelines for energy efficiency and receive third party verification from an accredited organization.
Energy Star Home

- These homes are at least 15% more energy efficient than homes built to the 2004 IRC.
- May include additional energy-saving features that typically make them 20–30% more efficient than standard homes.
Energy Star Homes

- Effective Insulation
- High Performance Windows
- Tight Construction and Ducts
- Efficient Heating and Cooling Systems
- Efficient Products
- Third Party Verification
Benefits of Energy Star

- Tax Incentives
- Lower ownership costs
- Higher resale
- Better Performance
- Environmental Benefits
NAHB – National Green Building Standard

- In draft form. 2nd public comment period open in November
- Based upon the NAHB model green home building guidelines
- Working with the ICC to incorporate standard into code
NAHB – National Green Building Standard

- **Scope.** Criteria for rating the environmental impact of construction practices

- **Intent.** Establish practices for the design and construction of green residential buildings.
  - *This Standard is intended to provide flexibility to permit the use of innovative approaches and techniques. This Standard is not intended to abridge safety, health or environmental requirements contained in other applicable laws, codes, or ordinances.*

- **Applicability.** Shall apply to construction of the residential portion(s) of any building not classified as an institutional use in all climate zones within the United States.
National Green Building Standard

### Threshold Point Ratings for Green Buildings

<table>
<thead>
<tr>
<th>Green Building Categories</th>
<th>Performance Level Points*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BRONZE</td>
</tr>
<tr>
<td>1. Chapter 5 Lot Design, Preparation, and Development</td>
<td>37</td>
</tr>
<tr>
<td>2. Chapter 6 Resource Efficiency</td>
<td>31</td>
</tr>
<tr>
<td>3. Chapter 7 Energy Efficiency</td>
<td>30</td>
</tr>
<tr>
<td>4. Chapter 8 Water Efficiency</td>
<td>20</td>
</tr>
<tr>
<td>5. Chapter 9 Indoor Environmental Quality</td>
<td>53</td>
</tr>
<tr>
<td>6. Chapter 10 Operation, Maintenance and Building Owner Education</td>
<td>8</td>
</tr>
<tr>
<td>7. Additional Points from any category</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total Points:</strong></td>
<td>279</td>
</tr>
</tbody>
</table>

* In addition to the threshold number of points in each category, all mandatory provisions of each category shall be implemented.
Lot Design, Preparation and Development

403.5 Storm water is managed using one or more of the following low impact development techniques:

1. Natural water and drainage features are preserved and used.
2. Storm water management plan is developed and implemented that minimizes concentrated flows and seeks to mimic natural hydrology, e.g., vegetative swales, French drains, wetlands, drywells, and rain gardens.
3. Impervious surfaces are minimized and permeable materials are used for driveways, parking areas, walkways, and patios.
**Resource Efficiency**

<table>
<thead>
<tr>
<th>503.5</th>
<th>Storm water is managed using one or more of the following low impact development techniques:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Natural water and drainage features are preserved and used.</td>
</tr>
<tr>
<td>(2)</td>
<td>Storm water management plan is developed and implemented that minimizes concentrated flows and seeks to mimic natural hydrology, e.g., vegetative swales, French drains, wetlands, drywells, and rain gardens.</td>
</tr>
<tr>
<td>(3)</td>
<td>Impervious surfaces are minimized and permeable materials are used for driveways, parking areas, walkways, and patios.</td>
</tr>
</tbody>
</table>

**Addition and Renovation Note:** This item applies only to additions that increase the building footprint on the lot, and to renovations that include hardscape and outdoor living area. The amount of storm water runoff shall not exceed existing conditions.
601.6 Building materials or assemblies that do not require additional site applied material for finishing are utilized. Materials such as the following are used for exterior and/or interior walls, flooring, or other applications:

(1) Pigmented, stamped, decorative, or final finish concrete or masonry.

(2) Trim not requiring paint or stain.

(3) Window, skylight, and door assemblies not requiring paint or stain on exterior and/or interior surfaces.

(4) Wall coverings or systems not requiring paint or stain or other type of finishing application.

- 90% of entire wall or floor area: 7 points
- 50% of entire wall or floor area: 4 points

Trim or millwork that complies with this section but is only a portion of the entire wall, floor, or roof area: 4 points

- Up to seven points with concrete
**Energy Efficiency**

602.8 Termite-resistant materials are used for the structural components and exterior claddings of walls, floors, roofs and exterior decks in geographical areas that have slight to moderate or greater subterranean termite infestation potential determined in accordance with Figure 602.3.

<table>
<thead>
<tr>
<th>Potential</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slight Potential</td>
<td>3</td>
</tr>
<tr>
<td>Moderate Potential</td>
<td>4</td>
</tr>
<tr>
<td>High Potential</td>
<td>7</td>
</tr>
</tbody>
</table>

- Up to 7 points with concrete
Energy Efficiency

- Four points with use of concrete

604.1 Building materials with recycled content are used.

1 A minimum of two recycled content products are used for minor elements of the building, such as all trim, cabinetry, plumbing, ductwork, etc.

4 A minimum of two recycled content products are used in major elements of the building, such as insulation, walls, floors, or roof.
### Energy Efficiency

<table>
<thead>
<tr>
<th>605.2</th>
<th>Onsite recycling measures following applicable regulations and codes are implemented, such as the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Materials are ground or otherwise safely applied onsite as soil amendment or fill. At least 50% (by weight) of construction and land-clearing waste shall be diverted from landfill.</td>
</tr>
<tr>
<td>(2)</td>
<td>Other methods approved by the adopting entity.</td>
</tr>
</tbody>
</table>

**Addition and Renovation Note**: Hazardous waste shall be properly handled and disposed of and be exempted from this section.

- Seven points with use of concrete
Energy Efficiency

605.3 Construction materials, such as wood, cardboard, metals, drywall, plastic, asphalt roofing shingles, concrete, or other are recycled offsite.

<table>
<thead>
<tr>
<th></th>
<th>Max 6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

(1) A minimum of two types of materials are recycled.
(2) Per additional recycled material.

- Up to 4 points with use of concrete
NAHB – National Green Building Standard

- More than 50 points available for concrete use
- Still in draft form
- Participate in public comment period
  - Comments and draft available at www.nahb.org
The Green Highways Partnership
“Collaborating for Progress”

The Green Highways Partnership (GHP) is a voluntary, public/private initiative that incorporates environmental streamlining and stewardship into all aspects of the highway lifecycle.
The Green Highways Philosophy

Meet transportation requirements and apply environmental stewardship so that both are “better than before.”
Green Highways Initiative

What makes a highway Green?

- Superior watershed-driven stormwater management to prevent toxins from leaching into streams and rivers
- Recycled construction materials to prevent landfill usage
- Cutting-edge technologies to protect critical habitats and ecosystems from the encroachment of highway infrastructure
Green Highways Partnership

- **Voluntary – Not Regulatory**
- **Collaborative**
  - a “network of industry, trade, & environmental organizations, private sector (consultants & contractors), and government (local, state, & federal).
- **Public – Private Partnership**
- **Goal is to** *promote innovation, stewardship, streamlining, and regulatory consistency & flexibility.*
- **To provide** *greater incentives for streamlining & environmental stewardship* in transportation.
GHI Pillars - PRO

Partnerships
- Diverse and Growing

Rewards & Recognition
- Recognize programs, projects, and activities for excellence in achieving of “better than before” defined for each focus area.
- Economic efficiencies and regulatory flexibility

Opportunities
- Demonstration Pilots & Research
- Training
- National Networks and Information Access
Green Highways Initiative

- Partnership Development
  - Integrates public/private interests throughout federal/state transportation and regulatory/resource agencies, contractors, materials industry, trade associations, academic institutions, and non-governmental organizations.
  - In order to further GHP goals and ideals, three cross-sector Theme Teams focus on the following areas:
    - Watershed-Based Stormwater Management
    - Recycling and Reuse
    - Conservation and Ecosystem Management
Green Highways Initiative

A Recognition Program

- Finds and recognizes programs, projects, and activities that demonstrate excellence

- Categories are defined through a collaborative process involving key stakeholders and emphasize integrated sustainable planning, design, construction, maintenance, and materials recycling.
Green Highways Initiative

Opportunities Through Pilot Projects

- Increase visibility of creative solutions
- Inspire others to pursue green choices in surface transportation infrastructure
- Pilot projects strengthen partnerships, stimulate creative research, showcase effective solutions, and encourage market-based initiatives.
Green Highways Initiative

1. Biofiltration Swale
2. Porous Pavement Shoulder
3. Environmentally Friendly Concrete
4. Preserved Forest Buffer
5. Restored and Stormwater Wetlands
6. Stream Restoration
7. Wildlife Crossing
8. Soil Amendments
Envisioning the future

Green Highways Initiative

- 80% recycled materials used
- 4,650 wetland acres restored
- Stormwater runoff naturally cleansed
- 10,000 forest acres preserved
- Truckstop diesel emissions reduced 45%
- Alternative fuels available at truckstops
Case study – Green Globes
 Federal Court Building - Toronto

- LOCATION: 180 Queen Street West, Toronto, Ontario
- FLOOR SPACE: 20,907 m² (225,000 ft²)
- BUDGET: $7.5 million CAD
- CONSTRUCTION DATES: 2003-2006

Design Achieved Four Globes

In recognition of leadership in the incorporation of energy and environmental considerations in the planning and construction of this building.
Federal Court Building - Toronto

- Infrastructure for future green roof (i.e. inverted roof membrane with root barrier)
- Selection and specification of concrete structural systems based on a lifecycle assessment of the environmental burden and embodied energy
- Building assemblies including pre-cast concrete panels specified for their durability and low maintenance requirements
- Materials that come from renewable sources or which are locally manufactured and which have undergone a life-cycle assessment
- Generic structural concrete form, readily adaptable to changing requirements
Conclusions

- Several green rating systems or programs are available – there isn’t one single “holy grail”
- Many are currently under development and you have the opportunity to participate in their creation
- Concrete is an exceptional material for meeting the performance requirements of the green rating systems
Resources

- www.thegbi.org
- www.greenhighways.org
- www.nahb.org
- www.energystar.gov