

The WorldGBC and green building rating tools

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Green building (also known as **green construction** or **sustainable building**) refers to a structure and using process that is environmentally responsible and resource-efficient throughout a building's life-cycle: from siting to design, construction, operation, maintenance, renovation, and demolition.

Who we are: WorldGBC

The WorldGBC is a union of national Green Building Councils from around the world, making it the largest international organization influencing the green building marketplace.

Our Mission

To be the global voice for Green Building Councils and to facilitate the global transformation of the building industry towards sustainability

What We Do

We foster and support new and emerging Green Building Councils by providing them with the tools and strategies to establish strong organizations and leadership positions in their markets.

Once established, we work closely with councils to advance their common interests by promoting local green building actions as solutions to address global issues such as climate change.

By driving collaboration between international bodies and increasing the profile of the green building market, we work to ensure that green buildings are a part of any comprehensive strategy to deliver carbon emission reductions.

Our ongoing projects to further the green building agenda include:

- World Green Building Day,
- Common Carbon Metrics project, and
- Collaborating with international bodies such as UNEP SBCI, Sustainable Buildings Alliance (SBA) and the International Union of Architects (IUA).

Introduction

There is little dispute now that buildings are substantial CO2 emitters and contribute substantially to climate change (Reed and Wilkinson, 2008; Wilkinson, Reed, and Cadman, 2008). This argument is based on the large environmental footprint of buildings, especially when considering the high reliance on resources due to an increased reliance on air conditioning and heating.

The problem therefore lies with how to distinguish the level of environmental sustainability within a building, which will facilitate the ability to directly compare one building to another. This is where sustainability rating tools can potentially play a major role. Many countries have introduced new rating tools over the past few years in order to improve the knowledge about the level of sustainability in each country's building stock. On one hand, it can be argued that the individual characteristics of each country, such as the climate and type of building stock, necessitate an individual sustainability rating tool for that country. The downside is that to varying degrees the rating tools for different countries are constructed on different parameters. This in turn has created complications for stakeholders, including property investors, who purchase buildings in different countries; an understanding of the many differences between each market has been increasingly harder to understand (Dixon et al., 2008).¹

In the 2003 the Organisation of Economic Co-operation and Development (OECD) defined green buildings as those buildings that have minimum adverse impacts on the built and natural environment, in terms of the buildings themselves, their immediate surroundings, and the broader regional and global setting.²

¹ International Comparison of Sustainable Rating Tools Richard Reed, Anita Bilos, Sara Wilkinson, and Karl-Werner Schulte 2009

²Organisation of Economic Co-operation and Development, 2003 publication Environmentally sustainable buildings: challenges and policies

Impact of buildings

Energy Consumption and GHG Emissions

Buildings currently account for 40% of energy use in most countries, putting them among the largest end-use sectors. The International Energy Agency (IEA) has identified the building sector as one of the most cost effective sectors for reducing energy consumption, with estimated possible energy savings of 1 509 million tonnes of oil equivalent (Mtoe) by 2050. Moreover, by reducing overall energy demand, improving energy efficiency in buildings can significantly reduce carbon dioxide (CO₂) emissions from the building sector, translating to possible mitigation of 12.6 gigatonnes (Gt) of CO₂ emissions by 2050 (IEA, 2010)³.

Environmental Impacts

Green building practices aim to reduce the environmental impact of buildings. Buildings account for a large amount of land.

- 17% of fresh water consumption
- 25% of wood harvest
- 33% of CO₂ emissions
- 30 – 40% of energy use
- 40 – 50% of raw materials use

While the practices, or technologies, employed in green building are constantly evolving and may differ from region to region, there are fundamental principles that persist from which the method is derived:

- energy (and CO₂ emissions)
- water
- waste
- materials
- indoor environment

A critical component of green building is an optimization of these principles. Therefore, with an integrated approach to its design individual green building initiatives and technologies may work together to produce a greater cumulative effect.

Social and Economic Factors

- thermal comfort
- acoustic comfort
- visual comfort
- indoor air quality

- handicapped accessibility
- public access
- safety and security
- quality of outdoor spaces

What is a rating tool?

A green building rating tool sets standards and benchmarks for green building, and enables an objective assessment to be made as to how "green" a building is. The rating system sets out a "menu" of all the green measures that can be incorporated into a building to make it green. Points are awarded to a building according to which measures have been incorporated, and, after appropriate weighting, a total score is arrived at, which determines the rating.⁴

The term Assessment Method is a technique that has building environmental assessment as one of its core functions but which may:

- Be accompanied by third-party verification before issuing a performance rating or label.
- Include reference to or use of a number of tools.
- Offer supporting educational programmes for design professionals.

The terms 'system' or 'scheme' are often used interchangeably with 'method'.

Assessment methods generally have recognizable 'frameworks' that organize or classify environmental performance criteria in a structured manner with assigned points or weightings. More importantly, assessment methods are managed by and operate within known organizational contexts. (e.g.: The German Sustainable Building Council (DGNB) developed and operates a "second generation" rating tool, the DGNB System; the Building Research Establishment Environmental assessment Method (BREEAM) is operated by the UK Building Research Establishment; the Leadership in Energy and Environmental Design (LEED®) green building rating system by the US Green Building Council).⁵

The DGNB System is a "second generation" rating tool which has a holistic building evaluation approach. The certificate assesses the building's overall performance and not individual measures. The great strength of the DGNB System is its ability to adapt to future technical and societal developments. In the

⁴South Africa GBC website

<http://www.gbcsa.org.za/greenstar/greenstar.php>

⁵ Ray Cole BUILDING ENVIRONMENTAL ASSESSMENT METHODS A Review of International Developments, 2008

³ International Energy Agency – Energy Performance Certificate of Buildings (Policy Pathway). 2010

same way, the system allows for adaptation of the evaluation criteria to the specific climatic, cultural, legal, and local building characteristics of different regions. This is achieved through the future-oriented alignment with the legal directives, standards, and technical policies of the European Union. Furthermore the Life Cycle Assessment (LCA) and the Life Cycle Costing (LCC) are part of the DGNB assessment criteria.

Suggest WGBC Rating tools standards and guidance

A WGBC standard should include the following:

A range of indicators need to be established by the WGBC to recognition suitable tools created / adapted / used by a GBC against the following key indicators:

- energy (and CO2 emissions)
- water
- waste
- materials
- indoor environment

Any tool that does not comprehensively address these indicators will not be recognized by the WGBC.

Baseline

To underwrite the common indicators there could be an identification of what the key baseline requirements may be for each category or issue (indicator). Any tool that sets a baseline lower than the one established by the WGBC will not be recognized.

Benchmarks

To support and reinforce the common indicators mentioned.

e.g. 4 stars / 5 stars / 6 stars – what do you have to achieve to be awarded this rating and how does it compare to other tools.

Standardization

What buildings will be included – recognized tool will need to have sort of standard content to comply with – how that in turn relates to an overall score must be discussed by the WGBC Tools Committee.

Local Context

The tools must be allowed to have an element of flexibility to incorporate issues and factors that are specific to the local context for that country (and or region / area).

The tool must also state clear in what country or region it has been developed for and what standards (including legislation – such as building regulations) have been incorporated into the tool.

Normalization

There needs to be some kind of normalization factor to 'issues' or indicators that are not common or standardized.

Issues

Recognizing the variable factors between one country and another is a complex and difficult undertaking – it is recommended that a standard process be established by the WGBC to review and 'audit' the tool being considered.

A short summary and history of key rating tools

1990	<p>BREEAM (Building Research Establishment's Environmental Assessment Method) created by the BRE (Building Research Establishment) originally for the UK.</p> <p>BREEAM was established as a tool to measure the sustainability of new non-domestic buildings in the UK.</p> <p>The measures used represent a broad range of categories and criteria from energy to ecology. They include aspects related to energy and water use, the internal environment (health and well-being), pollution, transport, materials, waste, ecology and management processes.</p>
1995	<p>Energy Star (USA) launched by the US-EPA as part of an energy efficient labeling program for products.</p> <ul style="list-style-type: none"> In 1995 the voluntary program was expanded to include new buildings
1996	<p>BREEAM Canada for Existing Buildings (adapted by the Canadian BC) in 2000</p>
1996	<p>HQE – (High Quality Environmental Standard*) for the voluntary assessment of green buildings in France. (created by HQE Association and the French GBC - in partnership with CSTB and Certivea)</p>
1998	<p>LEED (Leadership in Energy & Environmental Design), USA</p> <p>Internationally recognized green building certification system, providing third-party verification that a building was designed and built using strategies intended to improve its environmental performance. Metrics used include energy savings, water efficiency, CO₂ emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts.</p> <p>Developed by the U.S. Green Building Council (USGBC), LEED is intended to provide building owners and operators a concise framework for identifying and implementing practical and measurable green building design, construction, operations and maintenance solutions.</p>
1998	<p>SBEM (the Simplified Building Energy</p>

	<p>Model) developed for the UK Government in compliance with EPBD.</p> <ul style="list-style-type: none"> Is a program that provides an analysis of a building's energy consumption and carbon emissions
1998	<p>NABERS (the National Australian Built Environment Rating System)</p> <ul style="list-style-type: none"> A performance-based rating system for existing buildings
1999	<p>EEWH is the green building certification system in Taiwan. EEWH comprises nine indicators that fall into four categories - ecology, energy saving, waste reduction and health - hence the name EEWH.</p>
2003	<p>Green Star, Australia</p> <p>Voluntary environmental rating system for buildings in Australia.</p> <p>Launched in 2003 by the Green Building Council of Australia.</p> <p>Nine categories are assessed with the Green Star tools:[1] management, indoor environment quality, energy, transport, water, materials, land use & ecology, emissions, innovation.</p>
2001	<p>CASBEE (Comprehensive Assessment System for Building Environmental Efficiency) in Japan</p> <p>CASBEE (Comprehensive Assessment System for Built Environment Efficiency) is a Japanese assessment and certification tool for buildings that covers:</p> <ol style="list-style-type: none"> Energy efficiency Resource efficiency Local environment Indoor environment
2005	<p>Green Mark in Singapore (created by Singapore BCA)</p>
2007	<p>LEED for India (adapted by IGBC)</p>
2007	<p>Green Star for New Zealand (adapted by NZGBC)</p>
2007	<p>BRE Global registers BREEAM as a Certification Standard under UKAS requirements.(UKAS – United Kingdom Accreditation Service)</p>
2007	<p>The Code for Sustainable Homes (created by BRE and the UK Government)</p>
2008	<p>DGNB for Germany (created by the German Sustainable Building Council)</p> <p>The DGNB System is a "second generation" rating tool which has a holistic building</p>

	evaluation approach. The certificate assesses the building's overall performance and not individual measures. The great strength of the DGNB System is its ability to adapt to future technical and societal developments. In the same way, the system allows for adaptation of the evaluation criteria to the specific climatic, cultural, legal, and local building characteristics of different regions. This is achieved through the future-oriented alignment with the legal directives, standards, and technical policies of the European Union. Furthermore the Life Cycle Assessment (LCA) and the Life Cycle Costing (LCC) are part of the DGNB assessment criteria.
2008	Green Star for South Africa (adapted by GBCSA from Green Star)
2008	Green Building Certification Institute (established by USGBC)
2009	Malaysian GBI – Green Building Index for (created by Malaysian GBC)
2010	DGNB International The DGNB System is a “second generation” rating tool which has a holistic building evaluation approach. The certificate is based on the three pillars of sustainability and assesses environmental, economical as well as sociocultural and functional aspects. The great strength of the DGNB System is its ability to adapt to future technical and societal developments. In the same way, the system allows for adaptation of the evaluation criteria to the specific climatic, cultural, legal, and local building characteristics of different regions. This is achieved through the future-oriented alignment with the legal directives, standards, and technical policies of the European Union. Furthermore the Life Cycle Assessment (LCA) and the Life Cycle Costing (LCC) are part of the DGNB assessment criteria.

adapted by local GBCA (with assistance from tool provider) for specific country (e.g. Green Star for South Africa)

Adopted – established assessment / rating tool used by local GBC with minor customization for specific country being used in. (e.g. BREEAM Europe for Austria)

World Rating Tools

Australia: NABERS / Green Star

Austria: DGNB / TQB

Brazil: AQUA / LEED Brasil

Bulgaria: DGNB

Canada: LEED Canada / Green Globes / Built Green Canada / BREEAM CA

China: GBAS

Denmark: DGNB

Finland: PromisE

France: HQE / BREEAM FR

Germany: DGNB

Hong Kong: HKBEAM

India: Indian Green Building Council (IGBC)/ GRIHA

Indonesia: Green Building Council Indonesia (GBCI) / Greenship

Italy: ProtocolloItaca / Green Building Council Italia

Japan: CASBEE

Korea: KGBC

Malaysia: GBI Malaysia

Mexico: LEED Mexico

Netherlands: BREEAM Netherlands

New Zealand: Green Star NZ

Philippines: BERDE / Philippine Green Building Council

Portugal: Lider A

Republic of China(Taiwan):Green Building Label

Singapore: Green Mark

South Africa: Green Star SA

Spain: VERDE / LEED

Switzerland: DGNB / Minergie

Definitions:

Created – assessment / rating tool developed by local GBC in specific country (e.g. LEED created by the USGBC)

Adapted – assessment / rating tool based on established tool in another country, but has been

United States: LEED / Living Building Challenge / Green Globes / International Green Construction Code / International Green Construction Code (IGCC)

United Kingdom: BREEAM / SBEM / Code for Sustainable Homes

United Arab Emirates: Estidama

IAPGSA Pakistan Institute of Architecture Pakistan Green Sustainable Architecture

Jordan: EDAMA

Czech Republic: SBTool-CZ

The Committee is made up of the following WorldGBC members:

- Romilly Madew (Committee Chair) and Andrew Aitken, GBCAustralia
- Bruce Kerswill, GBC South Africa
- Jeffrey Neng, Singapore GBC
- Peter Moesle, DGNB (Germany)
- Anna Surgenor, UKGBC
- Brendan Owens, USGBC
- Michelle Malanca, WorldGBC

WorldGBC Rating Tools Committee

In 2011, the WorldGBC Board approved the establishment of a WorldGBC Rating Tools Committee.

The Objectives of the Committee include:

- Developing criteria for rating tools – develop guidance notes for WorldGBC members in developing and maintaining rating tools against agreed principles and methodologies;
- Development of a socio-economic category that WorldGBC members can use as an overlay to existing rating tools or including in new tools;
- Development of a Common Carbon Metric project;
- Creating forum for sharing ideas and information on WorldGBC members rating tools;
- Identify potential research and development opportunities.

In order to achieve its objectives, the Committee will undertake specific activities including:

- Research members needs with respect to rating tools;
- Develop an annual Strategy and Action List;
- Develop and maintain working dialogues with relevant academic & professional associations and institutes, in support of the WorldGBC's aims and activities;
- Update WorldGBC website;
- Secure WorldGBC representation at relevant forums / roundtables and conferences.

WorldGBC Rating Tools Committee Priorities (detail)

To be determined by the committee.

Key strategic question for the WGBC and its Rating Tools Committee

Who is the key audience for this paper?

Should the WGBC create the following?

A 'technical standard' for the content of green building assessment/rating tools – covering:

- Energy (and GHG emissions)
- Water
- Waste
- Materials
- Other (what other categories / issues?)

Should the WGBC create a 'Roadmap' for developing GBCs to create or adapt green building assessment/rating tools?

- Guidance for the development of green building assessment/rating tools – specific process

Note

Could be similar guidance to that established for setting up a new GBC.

How will this standard and supporting guidance relate back to common international and regional (continental) best practice standards?

How will the standard and supporting guidance take into account country specific buildings regulations – such as Section J in Australia and Part L in the UK?

Who would be the key audience for the creation of such a technical standards and supporting guidance?

Is the WGBC going to create a 'roadmap' document for the creation of 'recognised' rating tools that GBC's can follow (similar to roadmap for starting up a GBC)

What are the core principles for the rating tool guidance documentation?

What constitutes a recognised rating tool?

What should the mandatory content requirements be for 'recognised' rating tools?

What should the assessment and certification process be for 'recognised' rating tools?

Will this guidance and paper be primarily focused on buildings?

What 'other' tools are out there that are currently not recognised?

How will the WGBC ensure that both new and existing rating tools comply with these requirements?

Common Carbon Metrics

Key parameters – within the common carbon metrics:

1. The unit of measurement is kgCO₂-e/m²/annum.
2. carbon emissions for the operation of buildings
3. simple to measure (developing AND developed nations)
4. It addresses the bottom-up approach (individual buildings).
5. It will be relevant for any type of building