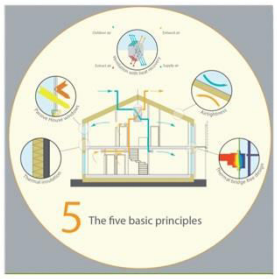
Building Sustainability Assessment and Benchmarking

An Introduction



UN HABITAT
FOR A BETTER URBAN FUTURE

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GNSH GLOBAL NETWORK FOR SUSTAINABLE HOUSING

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GLOSSARY

Assessment tool	A methodology that aims to measure absolute values of a building's impact (energy consumed, GHGs emitted, etc.) without giving a comparative value judgment.
Benchmarking tool	A methodology that, firstly, assesses a building along a set of criteria; secondly, rates its performance against a given standard (e.g. reference sets of rated buildings, set criterion values or standards, national averages, modelled/simulated building behaviour, or other methods of comparison); and thirdly, communicates a value judgment about its performance.
BEST	Built Environment Sustainability Tool, developed by Dr. Jeremy Gibberd, Smart and Sustainable Built Environments Group W116 at CIB.
BREEAM	Building Research Establishment Environmental Assessment Method, developed by the UK-based Building Research Eastablishment (BRE).
BSA	Building sustainability assessment.
CCM	Common Carbon Metric, a UN-Environment protocol for measuring energy use and reporting GHG emissions from the operational phase of buildings.
CEN/TC 350	Comité Européen de Normalisation/Technical Committee 350, standards committee mandated with the development of a harmonized European assessment methodology.
DECoRuM	Domestic Energy, Carbon Counting and Carbon Reduction Model, developed by Pr. Rajat Gupta, Oxford Institute for Sustainable Development (OISD).
DfD	Design for Disassembly; the process of designing products so that they can easily, cost-effectively and rapidly be taken apart at the end of the product's life so that components can be reused and/or recycled.
DGNB	Deutsche Gesellschaft für Nachhaltiges Bauen, German Sustainable Building Council.
EF	Ecological Footprint.
EPD	Environmental product declaration, a standardized way of quantifying the environmental impact of a product or system, allowing the easy comparison of the environmental impact of different products and services. EPDs are calculated following product category rules (PCR).
ESUCO	European Sustainable Construction database.
EN 15804	European standard which provides core product category rules (PCR) for Type III environmental declarations for any construction product and construction service.
EN 15978	European standard which defines the rules for evaluating and reporting on the life-cycle impact of a building.
HDI	Human development index.
HQE	High Quality of Environment, Cerway certification scheme originating in France.
ISO 13790:2008	Provides calculation methods for the assessment of the annual energy use for space heating and cooling of a residential or non-residential building.
ISO 14040:2006	Describes the principles and framework for life-cycle assessment (LCA).
ISO 14044:2006	Specifies requirements and provides guidelines for all phases of life-cycle assessment (LCA).
LCA	Life-cycle assessment.
LCCA	Life-cycle cost analysis.

LCEA	Life-cycle energy analysis.
LCEM	Life-cycle energy modelling.
LCI	Life cycle inventory.
LEED	Leadership in Energy and Environmental Design, U.S. Green Building Council certification scheme.
PCR	Product Category Rules, common and harmonised LCA calculation rules for particular product groups to ensure that similar procedures are used when creating environmental product declarations (EPDs), enabling the comparability of EPDs of different products within the same product group.
POE	Post-occupancy evaluation.
QSAND	Quantifying Sustainability in the Aftermath of Natural Disasters, developed by the International Federation of the Red Cross and Red Crescent Societies.
SBAT	Sustainable Building Assessment Tool (SBAT), developed by Dr. Jeremy Gibberd, Smart and Sustainable Built Environments Group W116 at the Council for Research and Innovation in Building and Construction (CIB).
SBMI	Sustainable Building Materials Index, developed by Dr. Jeremy Gibberd, Smart and Sustainable Built Environments Group W116 at the Council for Research and Innovation in Building and Construction (CIB).

EXECUTIVE SUMMARY

Buildings, the majority of which are in residential use (Buildings Performance Institute Europe, 2011), accounting for 19 per cent of global total final consumption (IEA, 2014), are a major contributor to environmental degradation. The building sector is estimated to consume 40 per cent of the world's energy and materials while the construction industry, and its supporting industries, account for 16 per cent of the world's water used (Hoffman & Henn, 2008; Roodman, Lenssen, & Peterson, 1995; Dixit, Fernández-Solís, Lavy, & Culp, 2010). On a business-as-usual trajectory, **energy demand from the building sector is expected to rise by 50 per cent by 2050** (IEA, 2013).

At the same time, the building sector's potential for reducing GHG emissions is considered the largest of all sectors—a mitigation opportunity not to be missed. In addition, the built environment has the potential to contribute positively towards social-economic development along a range of indicators. But what are the real obstacles to action, especially given the urgency yet again made clear in the Sustainable Development Goals, the Paris Agreement, and the 'New Urban Agenda'[1]?

For one, the large number of stakeholders involved in the production and consumption of buildings creates coordination problems with competing interests. Due to their long lifespan and the long-lasting effects of associated climate pollutants, sub-optimal decisions at the design stage of building processes can cast in concrete unsustainable usage patterns and lower the quality of life for building users for generations.

The building sector is a complex issue-focused, multi-stakeholder system (Feige, Wallbaum, & Krank, 2011). In order to positively influence decisions of this system's stakeholders, the **scientific, accurate and meaningful assessment** of existing and new buildings along a wide range of indicators has developed as a credible tool for achieving this objective.

Over the past 30 years, the number, scope and complexity of tools for assessing the environmental impact of buildings has increased dramatically. Examining the emergence of building sustainability assessment and benchmarking as a global phenomenon as well as some of their political and practical barriers can be useful in order to understand their possible role in realizing objectives of the 'New Urban Agenda' and the policies to be influenced by it.

Historical background

The potential of building assessment and benchmarking is no recent discovery. Section 69 e) of the *Habitat*