

# **OPEN HOUSE – INSTRUMENT FOR ASSESSING THE SUSTAINABILITY PERFORMANCE OF BUILDINGS IN EUROPE**

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## **Summary**

Standardized assessment and rating methods are necessary to assess and certify the sustainable performance of buildings. These instruments should contain a high level of detail and be as clear as possible and easy to understand for the user. There are already several international and national approaches for the assessment of the sustainable building quality, such as BREEAM (Building Research Establishment Environmental Assessment Method, GB), LEED (Leadership in Energy and Environmental Design, USA) and DGNB (German Certificate for Sustainable Buildings, Germany), or methodologies, like the SBTool (Sustainable Building Tool, World Green Council, international) or LEnSE (Label for Environmental, Social and Economic Buildings, Europe). The abstract will give an overview about international planning instruments for sustainable buildings, will define their different methodologies and will show the further development in Europe. Therefore an overview about the OPEN HOUSE project will be given. OPEN HOUSE is a methodology for assessing the ecological, economical and social performance of buildings in Europe, that will be developed by an European consortium of 19 stakeholders for the EU Commission in the seventh framework programme, to show the gaps of the existing assessment methods and to give an overview about minimum standards for sustainable buildings in Europe.

**Keywords:** Certification of Buildings, Assessment of the Sustainability Building Performance, Assessment and Rating Methods, DGNB (German Certificate for Sustainable Buildings), OPEN HOUSE (Project of the EU, FP7 R&D)

## **1 Planning Instruments for Sustainable Buildings**

A great variety of complex planning and assessment tools are presently available for sustainable architecture at an international level. The following list gives a survey of available tools and aids, which can be used to assess buildings:

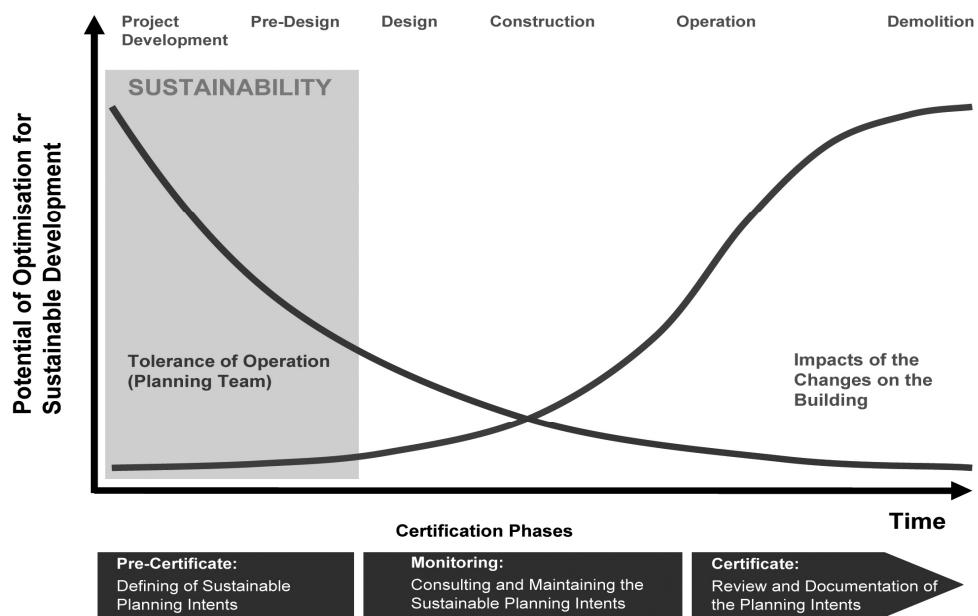
- Product declarations (EPD): building products and auxiliary building materials (e.g. environmental product declarations)
- Building components: functional units after installation
- Tendering aids: ecologically oriented technical specifications
- Energy performance certificates: describing and assessing the energy efficiency
- Checklists and guidelines: specification of objectives, principles and overall concepts (e.g. Guideline for Sustainable Building, issued by German Federal Ministry of Transport, Building, and Urban Affairs (BMVBS))

- Tools for holistic planning and assessment (LCA, LCC): instruments for decision-making (e.g. environmental evaluation for life-cycle assessment and life-cycle costs)
- Building performance labels, building evaluation resp. certificates: building assessment (e.g. LEED, BREEAM, DGNB etc.)

## 2 Methods for assessing and certifying the sustainable performance of buildings

An important progress regarding sustainability assessment is based on the development of building labels and certificates. These labels permit the comprehensive assessment of the quality of building and planning. In the early planning phases they provide planners and builders with an assessment of the project (pre-certificate), which may enable them to improve a building's sustainability performance already in the design phase (**Fig. 1**).

On the international level a great multitude of very different assessment methods is currently represented. The British BREEAM label (the pioneer from the 90s) and the American LEED method have been internationally established. Due to its perfected marketing concept, this method has already been adapted for assessment by several countries, for instance LEED Canada, LEED India etc. The internationally oriented methodology of the SBTool (formerly GBTool) provides a frame tool for new assessment methods, like VERDE (Spain), Protocollo ITACA (Italy), SBTool CZ (Czech Republic) and SBTool Portugal. To assess the sustainability performance of building also the German Certificate for Sustainable Buildings (DGNB) was developed last year.



**Fig. 1** Certification Process: Importance of the Project Development and Design

In general, the assessment methods can be assigned to two categories: in assessment tools of the first and second generation. The assessment methods of the first generation include those tools which were the first systems to be developed in the 1990s, attributing priority to evaluating the "green" or environmental and energy-efficient building performance criteria (like BREEAM, LEED or CASBEE), i.e. featuring the Green-Building-Approach. Second-

generation assessment methods include those tools which do not only consider environmental criteria but also the entire performance of the whole building over its life-cycle, namely also economic, socio-cultural and technical aspects or aspects related to site and process quality (Sustainable-Building-Approach) (**Tab. 1**). These systems were mainly developed in the last few years. They are based on the experience gained with the first-generation tools. This category is represented by the SBTool, the LEnSe method or the new German DGNB Certificate for sustainable buildings, which was introduced in 2008.

To ensure the comparability of the various assessment labels in future, international and European bodies have begun to develop requirements and standards for the assessment of sustainable buildings. These standards, which are still in their developing stages, should provide a uniform calculation strategy or methodology. At an international level, standardization is to be continued with international standard ISO TC59SC17 "Sustainability in Building Construction". At the European level, the document prepared by CEN/ TC 350 "Sustainability of construction works – Framework for assessment of buildings" will be authoritative.

**Tab. 1** Comparison of the assessment methods DGNB (Version Office Buildings, NC V 2008), BREEAM (Version BREEAM Offices 2008) and LEED (Version NC V 2009)

Criteria:	DGNB (%)	BREEAM (%)	LEED (%)
1. Ecology	16	38	31
2. Energy	14	27	40
3. Comfort and well-being	16	17	20
4. Economy	23	0	0
5. Social-cultural aspects	3	2	6
6. Functional aspects	3	3	0
7. Design	4	0	3
8. Technical aspects	9	1	0
9. Process/ Management	12	12	0
10. Site	*separate	*separate	*separate

Experience shows, that buildings, which have been built in consideration of sustainable criteria, have many advantages compared to conventional buildings:

- Higher competitiveness during the whole life cycle of a building [1]
- Reduction and control of the environmental impacts of buildings [2]
- Tools for definition of sustainable planning intents
- Securing the comparability of the buildings on an international level
- Improvement of the transparency of the planning process through characterization of sustainability quality of the buildings and through the provision of information for operators and users of the buildings [3]
- Promotion of the quality standards of the international construction of buildings by accelerating the introduction on the market of new and energy efficient technologies and ecological materials for the construction of buildings [4]
- Guarantee of the implementation of sustainable building quality of buildings through monitoring und promotion of the integrative planning process [5]
- Lower life cycle-costs [6]

### 3 OPEN HOUSE

The existing assessment systems and methodologies are based on different building standards, regulations and benchmarks. To define the gaps and minimum standards for assessment methods in Europe, the European Commission gave out a project under the framework of a FP7 R&D programme to benchmark and label the sustainability performance of European buildings. Therefore the project OPEN HOUSE was established. The OPEN HOUSE tool will be developed by an European consortium of 19 stakeholders (from February 2010 to January 2013). The overall objective of OPEN HOUSE is to develop and to implement a common European transparent assessment methodology, complementing the existing ones, for the planning and construction of sustainable buildings by means of an open approach and technical platform.. The baseline and final methodology will be defined by a transparent and consensus process involving all the European sustainable buildings' value chain, mainly through the OPEN HOUSE platform network. In order to test and to improve the methodology it will be applied and tested in a total of 68 case studies carrying out by consortium partners and by external organizations. The methodology will be structured in the 3 main sustainability categories: Environment, Economic and Social. Each of them will be divided into several quantitative and qualitative criteria and indicators, which at the same time will be defined by parameters. The development and implementation of this methodology in buildings will stimulate providers and owners to improve the building's sustainability performance by means of incentives and giving an added value to their buildings. On the other hand the methodology will supply information to the decision makers during the design stages and to deliver objective measurements of the building's impact at environmental, social and economical level. Further information about OPEN HOUSE will be found under: <http://www.openhouse-fp7.eu/>

### References

- [1] LECHNER, R. et al. *Immo-Rate, Leitfaden für das Immobilienrating nachhaltiger Wohnbauten*. Melk/ Donau, 2006 [cit. 2008-05-20]. [www.ecology.at/files/berichte/E08.458.pdf](http://www.ecology.at/files/berichte/E08.458.pdf)
- [2] U.S.GREEN BUILDING COUNCIL. *LEED. New Construction & Major Renovation. Version 2.2. Reference Guide*. Washington, 2006
- [3] HAUSER, G. *Mehrwert und Marktchancen von Zertifikaten im Vergleich zu Energieausweisen*. Proceedings of the ENRESO Workshop 2008, Frankfurt, 2008; pp.76-84 [cit. 2008-05-24]. [www.enreso2020.de/fileadmin/enreso/downloads/statements/Statement\\_Hauser.pdf](http://www.enreso2020.de/fileadmin/enreso/downloads/statements/Statement_Hauser.pdf)
- [4] DEUTSCHE ENERGIEAGENTUR GmbH. *Green Building, Energieeffizienz in Nichtwohngebäuden*. Berlin, 2006 [cit. 2008-05-20]. [www.green-building.de/fileadmin/Greenbuilding/gb\\_redaktion/downloads/GreenBuilding-Broschuere\\_deutsch.pdf](http://www.green-building.de/fileadmin/Greenbuilding/gb_redaktion/downloads/GreenBuilding-Broschuere_deutsch.pdf)
- [5] COLE, R.J. *Building environmental assessment methods: Clarifying intentions*. in Building Research and Information, 27/1999, pp.230-246
- [6] BRAUNE, A. et al. *Kurzstudie. Potenziale des Nachhaltigen Bauens in Deutschland: Analyse der internationalen Strukturen*. Leinfelden – Echterdingen, 2007, p. 4 [cit. 2007-01-23]. [www.gesbc.org/fileadmin/downloads/potenziale\\_nachhaltiges\\_bauen\\_in\\_deutschland.pdf](http://www.gesbc.org/fileadmin/downloads/potenziale_nachhaltiges_bauen_in_deutschland.pdf)