

## **SBTOOLCZ – SUSTAINABILITY RATING SYSTEM IN THE CZECH REPUBLIC**

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### **Summary**

Several methods for complex assessment of building performance are available in Europe. The Czech Republic followed the international group Green Building Challenge since 2005 and participated on development of international assessment framework SBTool. The research centre CIDEAS at the Czech Technical University in Prague in cooperation with International Initiative for a Sustainable Built Environment (iiSBE) provides a localized national version of the tool called SBToolCZ for wide usage in building practice in the Czech Republic.

SBToolCZ provides assessment method for design phase, which shows potential improvements of building design in specific regional conditions of Czech Republic in Central European area. Methodology respects climatic conditions, geomorphology, material and technology basis, available local natural sources, population density, traditions and cultural aspects. SBToolCZ is not just an assessment methodology with a certificate as an output, but it is possible to use it also as a guideline for the better design of a building in a concordance with sustainable construction principles.

**Keywords:** sustainability, assessment, SBToolCZ, LCA, LCC

### **1 Introduction**

Development of systems for complex assessment of buildings and their implementation into construction practice is very comprehensive and complicated, but increasingly important process. Present legislation in many countries does not still requests such these assessment methods. But the progress shows gradual interest, especially in countries with advanced economy. In some countries certification of complex building quality became for some types of building developments obligatory. Consequently work on EU standards within CEN TC 350 is progressing.

Standard approach to building quality assessment includes energy performance assessment, evaluation of daylighting, acoustics, structural assessment, fire safety assessment and other requirements. Requirements and needs of users are gradually changing and it is possible to expect in the near future higher interest of high performance buildings, in spite of potential higher expense. If there will be any higher expenses, the

payback will be guaranteed with lower operation cost or in non-measurable performance qualities – like higher comfort and higher quality of living in building and surroundings.

SBToolCZ provides assessment method for design phase, which shows potential improvements of building design in specific regional conditions of Czech Republic in Central European area. Methodology respects climatic conditions, geomorphology, material and technology basis, available local natural sources, population density, traditions and cultural aspects. SBToolCZ is not just an assessment methodology with a certificate as an output, but it is possible to use it also as a guideline for the better design of a building in a concordance with sustainable construction principles.

Main objectives of SBToolCZ methodology are: sustainable building certification, evaluation of environmental impacts of building, improvement of quality and healthy indoor environment of buildings, support of Energy Performance of Buildings Directive II, promotion of innovative solutions that minimize environmental impact of building stock, evaluation of technical solutions of assessed buildings, reduction of operating costs, improvement of user comfort, informative evaluation of location quality, motivation for producers to provide Environmental Product Declaration (EPDs) in connection with database of environmental impacts of building products Envimat.cz [3], preliminary assessment mode (preSBToolCZ).

The Sustainable Building Centre at the Czech Technical University in Prague together with National Platform SBToolCZ provides a localized version of the SBToolCZ for wide usage in building practice in the Czech Republic. Certificate of complex quality based on SBToolCZ assessment is applicable from 2010 [4].

## **2 Methodology**

SBToolCZ certification scheme [1] is based on the generic framework of SBTool developed by iiSBE (similarly to SBTool<sup>PT</sup> [5]). Criteria benchmarks convert physical measures, indicators and levels onto unified 0–10 scale. Criteria weights setting procedure was developed in concordance with the generic SBTool Method.

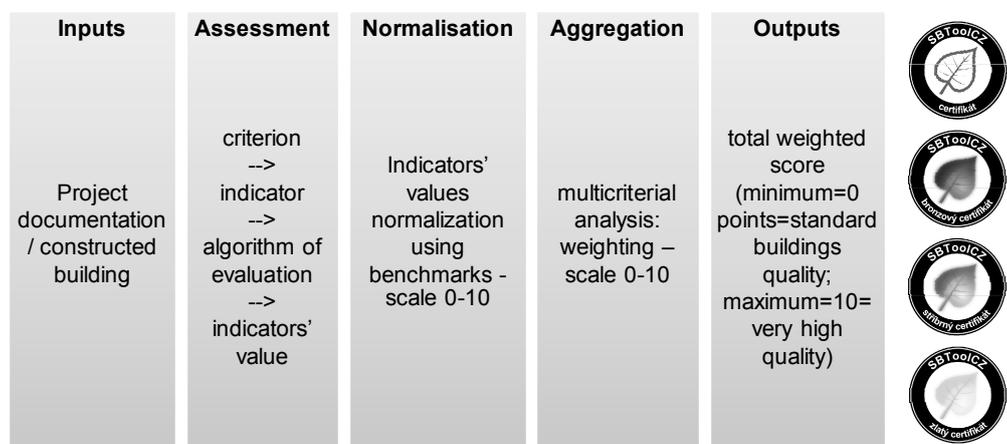
The building and its surroundings are defined by a set of properties and constants that are within the region stable and independent of the building (e.g. these are the emission factors and conversion factors for converting final energy consumption of primary energy). This set of characteristics and constants, which defines the terms of the building and its surroundings, enters the criterion sheets. Criterion sheets are the core of the SBToolCZ methodology and there are described algorithms for the evaluation of the criteria (using the properties and constants).

The value of indicator criteria is calculated using the assessment algorithm described in criterion sheet. Subsequently, the value of indicator is converted using the benchmark to the relative scale of 0 to 10. The value 10 corresponds to the best available technology (BAT), 5 points corresponds to the very good quality of building; 0 expresses the usual condition in the region satisfying minimum legislative requirements (given by standards).

Each criterion has its own weight. Obtained points in particular criterion are multiplied by corresponding weight. The overall result (again in the range 0 to +10) is achieved as a sum of weighted points.

Structure of the set of assessment criteria is divided in accordance with principles of sustainable construction into three basic groups: (1) Environmental; (2) Social;

- (3) Economics and Management. These issue areas are complemented by a fourth group:  
 (4) Locality.



*Fig. 1 Assessment process [6]*

Assessment of the locality (building site and its surroundings) is separated from the building performance evaluation. It means, that Locality group score is not included to the total score. The achieved score is presented separately.

The assessment criteria in SBTToolCZ accords to Czech and European standardization, reflects the outputs of CEN TC 350. Core indicators of SB Alliance are also incorporated.

Setting of SBTToolCZ criteria weights is based on common Panel method using modified SBTTool generic methodology. Panel of experts consists of 30 experts/practitioners from different expert areas [6].

Building performance certificate SBTToolCZ is based on the total score. There are four certification levels: (1) Certified building (score 0–3.9), (2) Bronze certificate (bronze leaf, score 4.0–5.9), (3) Silver certificate (silver leaf, score 6.0–7.9), (4) Gold certificate (golden leaf, score 8.0–10.0).

Moreover minimum requirements in mandatory criteria must be met for achieving silver or gold certificate.

The certification output is the final certificate that comes out along with the detailed charts of building performance. It is shown in three main sustainability issues – environmental, social and economic and separately – locality. The certificate itself displays not only the final score, but also building performance within above-mentioned main issues. Detailed report transparently presenting whole assessment process and details of each criteria evaluation is a part of the final certificate.

### 3 Certification process

An independent SBTToolCZ certification is carried out by two certification bodies – TZÚS Praha, s.p. (Technical and Test Institute for Construction Prague) and VÚPS – Certifikační společnost, s.r.o. (Research Institute for Buildings – Certification Body). Both have a long-term experience in the field of testing, certifying and assessing construction products and in management system certification.

Certification bodies and the Faculty of Civil Engineering in Prague constitute the National Platform SBTToolCZ (NP SBTToolCZ). The main objectives of the NP SBTToolCZ

are support and development of sustainable buildings in the Czech Republic and operation, management and development of the certification system using the national certification system SBToolCZ.

## 4 Conclusions

At the moment are at the Czech market actively present four certification schemes: SBToolCZ, LEED, BREEAM and DGNB. The market shows there are several types of clients. Investors from abroad backed by foreign investment funds often tend to use LEED due to its global presence; investors from UK naturally incline to certification in BREEAM. Czech investors or those really caring about the local context and are aware of the problematic of global tools used in different conditions choose SBToolCZ. There is also a fourth type of investors: they have no clear preferences, but are convinced that their projects need some medal. They can happen to try pre-evaluation in multiple tools and then choose the lowest-hanging fruits.

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