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## Providing Sustainability in Big Companies: an Example of DGNB Certification

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**Abstract.** *It is stated in the paper that the DGNB certification system is the first of the second generation of certification systems. The evaluation is characterized by a complex assessment of a building's lifecycle, not just its ecology. The international certification systems BREEAM, LEED, and DGNB evaluate ecological, economic, and social aspects with different weightings using a specified catalog of criteria and take into account the entire life cycle from planning to construction, operation, and dismantling of the building. For DGNB, socio-cultural quality is of crucial importance, as it can influence employee satisfaction. It is emphasized that the advantages of building's sustainability are not only monetary (cost reduction, increase in return, value retention), but include not only economic but also ecological (environmental and resource conservation) and socio-cultural aspects (consideration of the human factor and the environment).*

**Keywords:** *sustainability, big companies, DGNB, certification system, a life cycle of a building.*

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### 1 Introduction

Since it was founded in 2007, the German Society for Sustainable Building has set itself the task of presenting content and possible solutions for environmentally and resource-saving and economically profitable planning, execution, and use of living spaces. In addition to ecological and economic qualities, health, comfort, performance and general user satisfaction should also be promoted (Stender, 2019). The advantages of such sustainability are not only monetary (cost reduction, increase in return, value retention), but also ecological (environmental and resource conservation) and socio-cultural aspects (consideration of the human factor and the environment).

The purpose of the article is to investigate the role of DGNB certification in large companies' sustainability.

### 2 Methodology

The specifying method was used for describing the main features of the DGNB certification system (Kronschabl, 2012). An analogy method was applied to make a primary comparison of BREEAM, LEED, and DGNB certification systems. Structural analysis was a tool for taking into account different aspects of sustainability (ecological, economic, and social) with different weightings. Synthesis was used for the comprehensive consideration of three main pillars of sustainability. Induction was used

to get from certain facts on sustainability to the general understanding of sustainable development processes. The deduction was also applied.

### 3 Results

The ecological quality is included in the overall assessment with a weighting of 22.5 percent. The focus is on the one hand on reducing the primary energy requirement of non-renewable energies and on the other hand on expanding the use of renewable energies.

Besides, both the need for drinking water and the volume of wastewater are to be reduced through suitable technologies and design. Sealing of areas through building gaps should generally be reduced.

Especially in large cities with correspondingly unfavorable climatic situations and relief conditions, summer overheating or fine dust pollution can contribute to significant ecological and health problems, which can also damage the location economically in the long term. The aspects of global warming potential and ozone formation potential of the DGNB certificate aim precisely at this (Lemaitre, 2012).

The focus in economic quality is on reducing construction and operating costs, maintaining value, and minimizing life cycle costs. This is significant with 22.5 percent of the overall grade.

Third-party usability is a prerequisite for achieving a high price. Not least because of the budget restrictions imposed by the public sector,

this criterion should be given a lot of attention. The long-term increase in cost efficiency can be taken into account through a life cycle cost analysis, since the follow-up costs are accorded a correspondingly high relevance. To determine the usage costs, all usage cost groups such as cleaning and care, supply and disposal, maintenance/inspection, and maintenance of the technical systems are included in the calculation (in euros per square meter of GFA).

The challenge of the certification system lies in this category because the socio-cultural aspects are among the “soft” criteria and are therefore not stringently objectively measurable or quantifiable.

The socio-cultural quality is of crucial importance for office and administration buildings, as it can influence employee satisfaction. In order to increase user satisfaction, criteria of well-being and comfort, health, and indoor air quality can be appropriately assessed. The measurement of comfort results, for example, from the factors of thermal, acoustic, and visual comfort or interior hygiene.

This main criteria group is also weighted with a share of 22.5 percent of the overall grade.

In terms of technical quality, reference is made to the property's recyclability. Natural resources should be used sparingly (Schlegl et al., 2019). The waste input and the other waste should be disposed of properly and environmentally friendly. Necessary cleaning and maintenance measures

should be able to be carried out simply and in a targeted manner, whereby the service life of the materials used can be extended to a maximum.

The technical quality, like the process quality, is to be regarded as a summary of the three main dimensions, economic, ecological, and socio-cultural quality, and also influences the overall rating by 22.5 percent.

The process quality mainly reflects the procedures in the planning and construction process. It represents the basis for a high-quality building with minimized energy consumption, increased comfort, improved acceptance, and increased efficiency of the building.

The process quality thus combines many sustainability aspects under one heading, but with a rating of 10 percent of the overall grade, it is given less weight.

Here the macro and micro-location and the resulting risks are analyzed and assessed, but this assessment is not included in the overall assessment.

The evaluation system is characterized by the comprehensive consideration of the entire life cycle of buildings, taking into account the ecological, economic, socio-cultural criteria as well as the technical and procedural aspects and is based on European and international standards.

The basis for DGNB certification is a scoring system. In this case, the evaluation catalog comprises around 50 criteria, which are divided into 5 main groups. Also, there are 6 criteria for

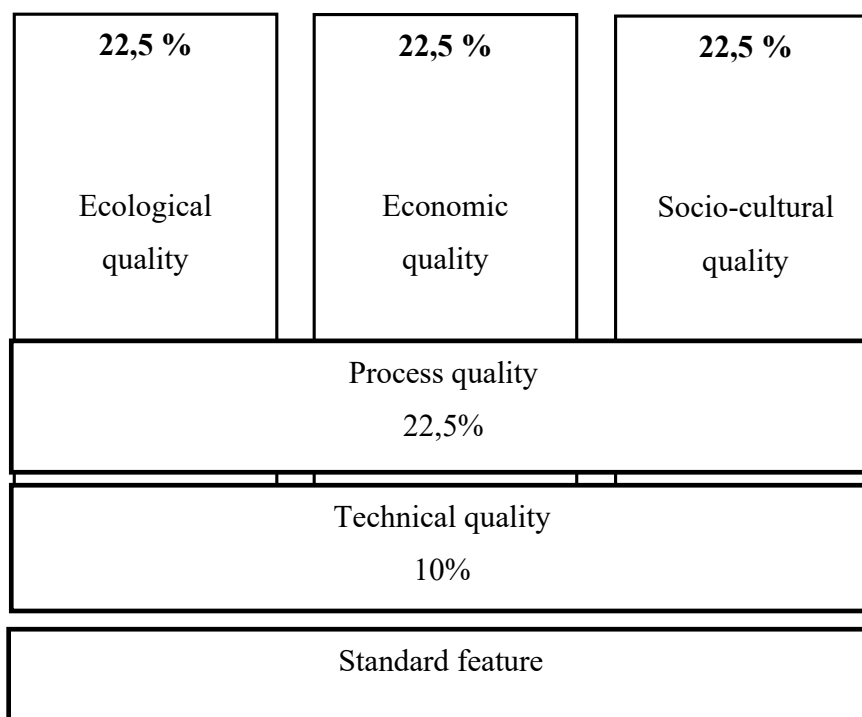


Figure 1 Topic areas and weighting of the DGNB assessment

site assessment, which, however, are not included in the overall result, but are shown separately.

Each topic is divided into individual categories. A maximum of 10 points can be achieved in the specified measuring method. Besides, each category has a weighting factor that is included in the evaluation of the topic. For example, the energy demand of an office building is more important than the quality of the outside space.

The image and condition of the building, accessibility by local public transport, and the infrastructure in terms of quality and distance are analyzed. The risks at the micro-location play an important role here. Assessments of the risks from weather and nature such as storms, earthquakes, or avalanches are made at the macro location.

The three-pillar model described above is fulfilled by sustainable real estate at the product level. Various certificates have been developed internationally as proof of the level of certification (Głuszek, 2015). The certification systems differ both in terms of their origin and in terms of their requirements. As a result, the certificates can only be compared to one another to a limited extent.

The international certification systems BREEAM, LEED, and DGNB evaluate ecological, economic, and social aspects with different weightings using a specified catalog of criteria and take into account the entire life cycle from planning to construction, operation, and dismantling of the building.

An essential difference between the German seal of approval and the Anglo-American competitors is the expansion of the evaluation matrix to include economic, technical, process, and location qualities.

The world is in a state of change associated with significant environmental changes. Energy transition, nuclear phase-out, climate legislation – sustainability is transforming from a trending topic to the epitome of structural changes.

In order to determine the degree of sustainability of real estate, various certification systems have been developed over the last few decades, with BREEAM, LEED, and the DGNB seal of approval currently being the most relevant for the German market.

The DGNB certificate is the first certification system of the second generation. The assessment basis is not just the ecology, but the complex consideration of the entire life cycle of a building.

The earlier sustainability criteria are taken into account in the real estate life cycle, the greater the resulting leverage. Buildings that are built and/or operated according to certain sustainability criteria are considered to be more forward-looking. The advantages are not only monetary (cost reduction, increase in return, value retention), but include not only economic but also ecological (environmental and resource conservation) and socio-cultural aspects (consideration of the human factor and the environment). Therefore, holistic planning with the participation of all essential planning disciplines and above all the active participation of the future users is of decisive importance.

When looking at the life cycle, sustainable building has clear economic advantages. It has a positive effect on the environment and the health of users. Concerning this, certification makes sustainability an objectively measurable parameter and sets transparent quality standards.

#### 4 Conclusion

DGNB certification is the first certification system of the second generation. The assessment basis is not just the ecology, but the complex consideration of the entire life cycle of a building. The international certification systems BREEAM, LEED, and DGNB evaluate ecological, economic, and social aspects with different weightings using a specified catalog of criteria and take into account the entire life cycle from planning to construction, operation, and dismantling of the building. The socio-cultural quality is of crucial importance for office and administration buildings, as it can influence employee satisfaction. The benefits of building's sustainable development are not only monetary (reduced costs, increased return, and price retention), but also ecological (environmental and resource conservation) and socio-cultural in nature (consideration of the human factor and the environment). As a result, comprehensive planning with involvement from all essential planning disciplines, as well as active participation from potential users, is critical.

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