# Adaptation of DGNB-Methodology to Austria - Lessons Learned from the first Certificates

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## Summary

The Austrian Green Building Council (ÖGNI) was founded in 2009. Thereby the German certification system for sustainable buildings (DGNB) has been adapted to Austria. This paper focuses on the adaptation process, caused by different building regulations, building standards and guidelines between Germany and Austria. Furthermore it is indispensable to set the benchmarks for national levels to ensure the fulfilment of local functional and technical requirements in an adequate way as well as a transparently evaluation of the holistic building quality.

20 buildings have been labelled by the DGNB-Austria certificate until April 2011 and for about 30 further buildings the audit is in progress. Lessons learned from the Austrian certification process are being presented and the DGNB International Board is also addressed in this paper.

**Keywords**:ÖGNI, DGNB, Sustainable building certification, National building regulations in Austria, National benchmarks for sustainable construction

## 1. Introduction

The construction sector and the real estate economy are currently in a state of change. Climate change, energy efficiency, scarcity of resources as well as human health and life cycle costing and value retention are the upcoming challenges. Sustainability in general is a crucial topic at the present time. But sustainable development is only possible if ecological, economic and social goals are equally emphasized and equally addressed.
The influence of the construction sector is of high relevance regarding sustainable development, as the construction sector plays a key role in the consumption of energy and resources as well as in solid waste accumulation [1] and [2]. It is therefore of high importance to quantify the environmental performance of buildings in order to communicate their potential environmental impacts.[3]
To apply the concept of sustainable development to the construction sector, quantifiable measurement methods for an assessment are needed, and these have been developed since the early 1990s. The International Standardization Organization (ISO) prepared the first standards that intended to address specific issues and aspects of sustainability relevant to construction works. These standards refer to the Life Cycle Assessment methodology (LCA) defined in ISO 14040 series.

On the basis of this ISO work, the European Committee for Standardization (CEN) is currently working on a set of standards to harmonize the methodology for a sustainability assessment of buildings. These standards will include the environmental, economic and social performance of buildings, and are related to the technical and functional performance of a building.
Beside this standardization work, a growing number of green/sustainable building certification systems have been emerging in the market [4] [5] in the past few years and endorse green and sustainable buildings. Recently, there has been an increasing demand for such labels .

### 1.1 DGNB - German Sustainable Building Council

The German Sustainable Building Council (DGNB) together with the Federal Ministry of Transport, Building and Urban Affairs (BMVBS) developed a voluntary certification system for sustainable buildings in 2007. It was developed by experts from the complete value chain of the construction and real estate sector and gives a clear orientation for this future-oriented economical sector.[6]
The task of the German Sustainable Building Council as a member of the World Green Building Council is to point out and advance paths and solutions for sustainable building. This includes the planning, construction and operation of buildings. The DGNB considers itself to be the central German organization responsible for exchange of knowledge, professional training and for raising public awareness of this future-oriented part of the building sector. [7]

### 1.2 ÖGNI – Austrian Green Building Council

In 2009, the Austrian Green Building Council (Österreichische Gesellschaft für Nachhaltige Immobilienwirtschaft - ÖGNI) [8] was founded with 125 members. Due to a cooperation agreement with the DGNB signed in June 2009, a substantial basis for the operation of the council was established with the aim of adapting the German sustainable Building Certificate (DGNB) to the Austrian system. As a non-profit organization ("gemeinnütziger Verein") in Austria, the aim of ÖGNI is to support the development of sustainable buildings and sustainable construction in the country.

### 1.3 DGNB/ÖGNI Assessment Methodology

The DGNB/ÖGNI Certificate is a transparent and comprehensible rating system, which is based on the CEN/TC350 approach. It defines the performance of buildings in a comprehensive way – with 5+1 topics, and enables auditors to conduct an evaluation systematically and independently.
The building's performance, by reaching a defined degree of performance, is assigned a bronze, silver or gold award. Furthermore, grades are given for the total performance of the building as well as for the individual topics.

The DGNB/ÖGNI certification scheme criteria-set includes five weighted topics (main criteria groups): Ecological Quality (22.5%), Economic Quality (22.5%), Social Quality (22.5%), Technical Quality (22.5%), Quality of Process (10%) and one additionally not weighted, separately evaluated topic (main criteria group) – Quality of the Location.

Each of these topics is divided into several assessment criteria. For instance, the Global Warming Potential, Total Primary Energy Demands and Proportion of Renewable Primary Energy, Thermal Comfort in Winter and Summer or Energetic and Moisture Proofing Quality of the Building's Shell are considered for the evaluation of a building. For each criterion, measurable target values are defined, and a maximum of 10 points can be assigned. The measuring methods for each criterion are clearly defined.

At the same time, each criterion has a weighting factor which defines the importance for the evaluation of its respective topic. In this way, for instance, the energy consumption of an office building is of more importance than the acoustical comfort. The weighting factor can also be zero – the consideration of motorway bridges does not require the criteria for indoor air quality. [9]

The certificate follows the concept of integral planning that defines the aims of sustainable construction with the related building performances at an early design stage. This means sustainable buildings can be designed which are based on the latest state of technology, and their performance can be communicated with the relevant criteria in the pre-certificate at the planning stage and in the certificate after completion.

The consulting auditor accompanies the owners during the certification process and prepares an accompanying planning and construction documentation in accordance with the specifications of the documentation guidelines. Having completed the building, the auditor compares and checks the building specifications with the realized project.

Finally DGNB/ÖGNI reviews the entire certification process and performs a conformity inspection based on the documentation guidelines, makes plausibility checks and takes control samples, and checks whether everything was executed properly according to the documentation. If all requirements are fulfilled, the owner receives a certificate.[8]

# 2. Adaptation of DGNB-Methodology to Austria

The first task was to set up a structure with national experts to identify the main tasks for the adaption of DGNB-assessment methodology to Austria. The Technical Committee (ÖGNI's certification system committee) was therefore founded and began with the adaptation of the DGNB system to Austria's standards and regulations. The need for an adaptation to the Austrian system was mainly brought about by individual building regulations, national building standards and national guidelines both in Germany and Austria that have not yet been harmonized at the EU level. For a building certification scheme it is also indispensable for the benchmarks to be set at national levels to ensure that local functional and technical requirements are fulfilled in an adequate way and that the building quality is evaluated transparently to ensure the best performance of buildings.

## 2.1 The systematics of the Adaptation

The systematics of the adaptation applies as follows: identification of different (national) standards and building regulations, identification and definition of design limits and reference values on the basis of national standards and regulations, definition of target values and definition of minimum requirements for DNGB-Austria, definition of relevance factors and country-specific factors with the completion of the pilot phase.

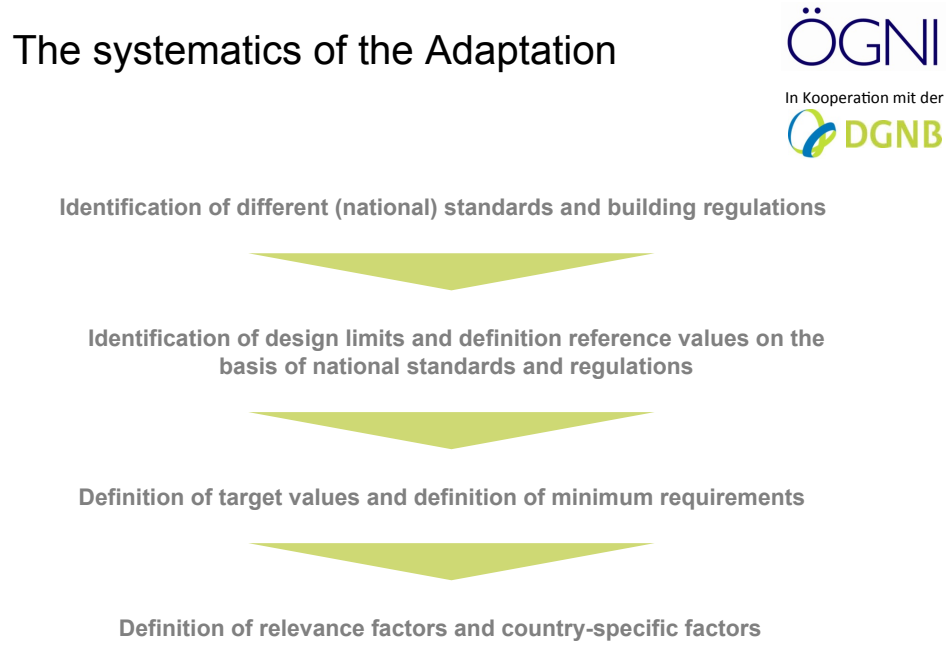


Figure 1: Systematic of the adaptation [10]

With a pre-estimation of the required workload a first time line was defined. Several working groups were installed and worked on the adaptation of the 56 individual rating criteria. The work was split into the main topics and according to the main responsibilities of the expert group.

## 2.2 Standard of evaluation

The first step was to identify which assessment criteria were applicable directly without adaptation and which were not.

The DGNB assessment methodology is based on 3 values: the minimum performance limits – limit value (indicated as G in Figure 2), the reference values (black triangle) and the target values (Z).

For the evaluation, it is now important at which level the building regulations and/or national standards set the limit values in Austria in comparison with Germany.

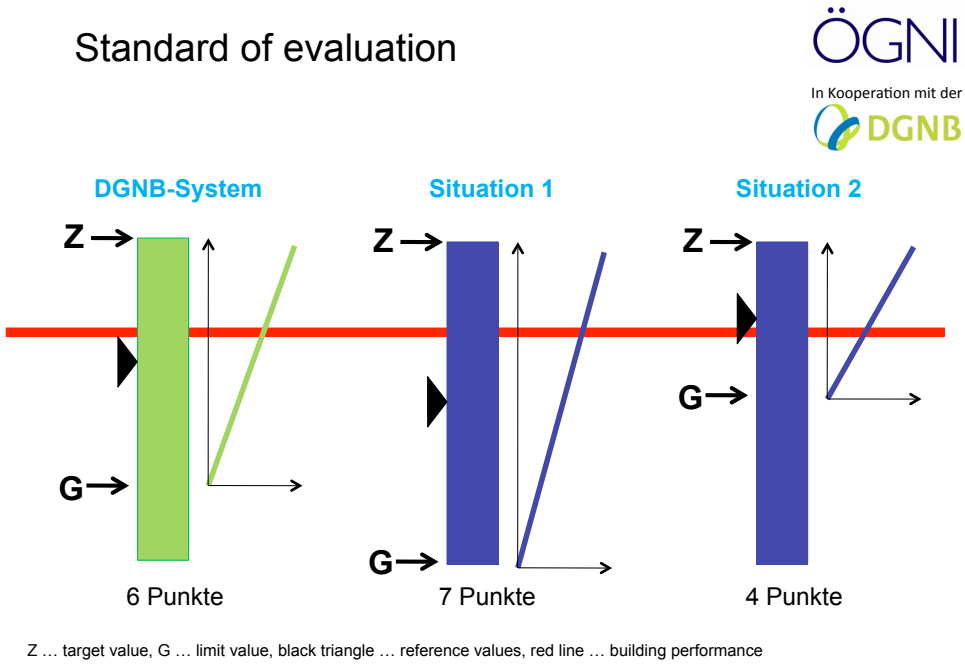


Figure 2: Determination of the assessment scale [10]

Assuming a lower minimum requirement (G) than in Germany, but the same target value (Z), this would result in a broader range for the assessment (see situation 1 in Fig. 2).
In situation 2 building regulations such as e.g. the acoustic performance as in [ÖNORM B 8115-2] could be on a higher level than in Germany which leads to a very narrow range for the evaluation and rating of this performance criterion.

National benchmarks needed to be defined for the Life Cycle Assessment criterion, as well as for the criterion related to the economic and energy performance of a building. Examples would be: “Building-related Life Cycle Costs”, “Thermal Comfort during the winter and summer“, “Acoustic Comfort“, ”Fire Protection“, ”Noise Protection“, “Energetic and Moisture-Proofing Quality of the Building’s Shell“ and many others. These examples should illustrate why it is that important to adapt an assessment methodology to a national level.

In Austria, this applies especially to the high quality requirements for noise protection, fire protection and thermal protection. The variety of national electricity producers had a big influence on the adjustment of the benchmarks for the environmental life cycle assessment (LCA) indicators. The Austrian electricity producers have about 50 % renewable energy sources and therefore the LCA-benchmarks are considerably lower than in Germany. The Austrian framework for the calculation of the energy demand (OIB directive 6) does not include a reference building as do the German regulations (EnEV). Therefore, the LCA-benchmarks are absolute values and not dependent on the technical equipment of the building. Absolute benchmarks also have the advantages of international comparability.

The situation where European standards or regulations already exist and/or no direct performance level is required for the assessment are explained as follows. E.g. assessment criterion “Risks for the Local Environment“, where the risks for the local environment are minimized through a

purposeful choice of building materials during the operation of the building. The materials and substance types that can cause environmental risks are queried individually and on a per-product basis. Substance types that are considered are halogens, heavy metals, organic solvents and substances and products that fall under the biocide and REACH guidelines. The assessment is carried out by four defined action-levels that build on each other. The requirements of a higher action-level include the successful implementation of all requirements of the level below it. Each action-level contains a list of materials and products to be avoided. The more action-levels that can be fulfilled, the lower the risks for the local environment. Proof for the successful implementation includes declarations for the required materials and products, submission of material and product lists, and a test certificate that confirms the compliance of the declared and used products and materials with the requirements.[11]

The same principal applies to the assessment criterion “Other Impacts on the Global Environment“, ”Potable Water Consumption and Sewage Generation“, ”User Influences“, “Roof Design“, “Safety and Failure Risks“, “Accessibility“, “Assurance of the Quality of Design and Urban Development in Competition“, “Art within Architecture“, “Ease of Cleaning and Maintenance of the Structure“, “Integral Planning“, “Optimization and Complexity of the Approach to Planning“, “Evidence of Sustainability during Bid Invitation and Awarding“, “Establishing Preconditions for an Optimized Use and Operation“, “Construction Site / Construction Process“ and the assessment topic for “Quality of the Location”.

### 2.3 Occupancy profiles

It could be recognized that the DGNB’s certification system is suitable for easy and quick adaptation to the requirements of other countries and building cultures. After just a few months, the certification of the first offices and administrative buildings began. In May 2010, the first certificates for the Austrian version of the DGNB (DGNB-Austria) system were awarded for the certification version office and administration buildings with DGNB-Austria bronze, silver and gold.
The certification methodologies for residential buildings, retail buildings, industrial buildings and hotel buildings were adapted during 2011 and the adaptation for educational buildings and modernization is still in progress (August 2011).

The practical experience gained during the initial certification stage, several comments from professionals and new legal requirements (e.g. OIB directive 6, 2012 [13]) have been incorporated in the DGNB-Austria 2012 version.

## 3. Lessons Learned from the first Certificates

### 3.1 International board

Parallel to the adaptation of the DGNB-Methodology to Austria, an international board was founded to set up an international core system. This international system is based on the EU‘s sustainability targets, CEN standards and EU regulations and serves as the basis for future developments. This approach offers various benefits, e.g. if a certain criterion does not include a country-specific standard, the European requirement in the international core system can be taken and does not need to be adapted. According to the DGNB [12], the international core system has one major benefit for international users: it can be largely adapted to country-specific building cultures, and this increases acceptance and minimizes the work required for an international portfolio to be certified. At the same time, buildings in one country can still be compared to buildings in another. One important aspect in the process is that the requirements for a DGNB bronze certificate are based on common building practice in the country in question. In contrast, the DGNB gold certificate is based on an international standard that is the same for all countries. In this way, the assessments are still meaningful on an international scale. [12]

### 3.2 Lessons learned

The DGNB-methodology was easily adapted to Austria and worked well for the first certificates. A correlation between the assessment results and the energy performance could be observed. Five buildings have been awarded with gold certificate and four of them fulfil the Passive House Standard. The energy performance and thermal protection of a building made a high impact on the assessment results because they influenced several criteria of the ecological, economic, socio-functional and technical quality.

The assessment of life cycle costs (LCC) worked well with the Austrian cost classification system. A further improvement of the LCC-assessment could be helpful for the certification of small buildings. Smaller buildings have higher construction costs e.g. due to the unfavourable ratio of expensive building shell to usable area. This has already been taken into account by the requirements of the Austrian housing subsidy scheme and could also be implemented in the LCC-benchmarks.

The assessments of building chemicals and of indoor air quality should be further adjusted to the high Austrian quality recommendations and proposals for an improvement have been derived.
Legal requirements for buildings as well as measures, technologies and components to achieve sustainable buildings are being permanently improved. Therefore it is necessary to keep the methodology transparent and flexible and to establish a learning system with the participation of experts. Technical working groups with representatives from science and industry have been started to further develop the assessment criteria for the next relaunch of the Austrian methodology. Altogether, the introduction of the DGNB Certification in Austria has helped to raise the awareness of planners and developers for all the sectors of sustainability.


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