# ARL 054 - Eco-labels, Environmental Product Declarations, Sustainability and Sustainable Building and Certificates

## Contents



For further questions, our technical Service is gladly at your disposal (phone: 0043/5242/6922-190, Mail: info@adler-lacke.com).


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# 1 General

The concept of sustainability has gained considerable importance in recent years. Especially in the context of construction products, this can be assumed to be a key factor for future success. After all, the construction and real estate sector has a major impact on the environment, as large amounts of energy and raw materials are consumed here. A wide variety of assessment systems have been developed with the aim of coming closer to sustainable building. The current EU Construction Products Regulation (BauPVo, Regulation EU 305/2011) also focuses on sustainability aspects. In this respect, properties with explicit sustainability requirements are increasing. The aim is therefore to provide an overview of the various building certification systems available on the market.

# 2 Sustainability

Historically, the concept of sustainability dates back to the 17th century and originally meant living off the yield without touching substance. One example is sustainable forest management, in which only as much wood is removed as will grow back.

"No more trees should be felled than can grow back."
Carl von Carlowitz, 1645 - 1714

Today, this purely ecological consideration is no longer sufficient in construction planning. Rather, all aspects of sustainability - economic, ecological, socio-cultural and technical functionality - must be taken into account in order to ensure quality of life in the future.

## 2.1 Ecological sustainability

- Minimisation of energy and resource consumption (no overexploitation of nature)
- Reduction of land consumption
- Drinking water consumption and wastewater generation
- As little impact as possible on the natural environment during the life cycle of the property

## 2.2 Economical sustainability

- Optimisation of the total costs (Life cycle costs)
- Economic optimisation of the timing for investment, replacement and maintenance cycles

## 2.3 Socio-cultural sustainability

- Urban planning and landscape integration – aspects for the care of monuments
- Functional and other aspects pertaining to human beings such as comfort, accessibility, design, etc.
- Aspects from the environment & society, the international community and the employees: Child labour, equality, occupational accidents, strikes, integration, etc.


**Fig. 2.1: The aspects of sustainability**

# 3 Requirements and certificates for construction products

As a basis for certification of construction products in Austria and Germany, product information is required from construction product manufacturers that describes important sustainability criteria over the entire product life cycle (manufacturing phase, construction stage, utilisation stage, subsequent use and recycling potential). In order to obtain the environmental impact, a so-called EPD (Environmental Product Declaration) is prepared in accordance with DIN ISO 14025 as well as prEN 15804 in most cases. Prior to this, however, the respective product must be assigned to a certain category. This is recorded in a PCR (Product Category Rule).

## 3.1 PCR (Product Category Rule).

According to EN ISO 14025, a PCR defines the boundary conditions and rules for the preparation of an EPD that make sense for the product group. The regulations illustrate calculation and assessment methods in order to analyse the effect of construction products across the life cycle (= Eco balancing).

## 3.2 Eco balance – LCA, life cycle assessment:

This means a systematic analysis of the environmental impact of products during the entire life history ("From the cradle to the grave"). This includes all environmental impacts (raw material and energy consumption, waste water, exhaust air, waste, etc.) during the production, the utilisation phase and the disposal of the product, as well as the associated upstream and downstream processes (e.g. production of raw materials, auxiliary and operating materials, transport).

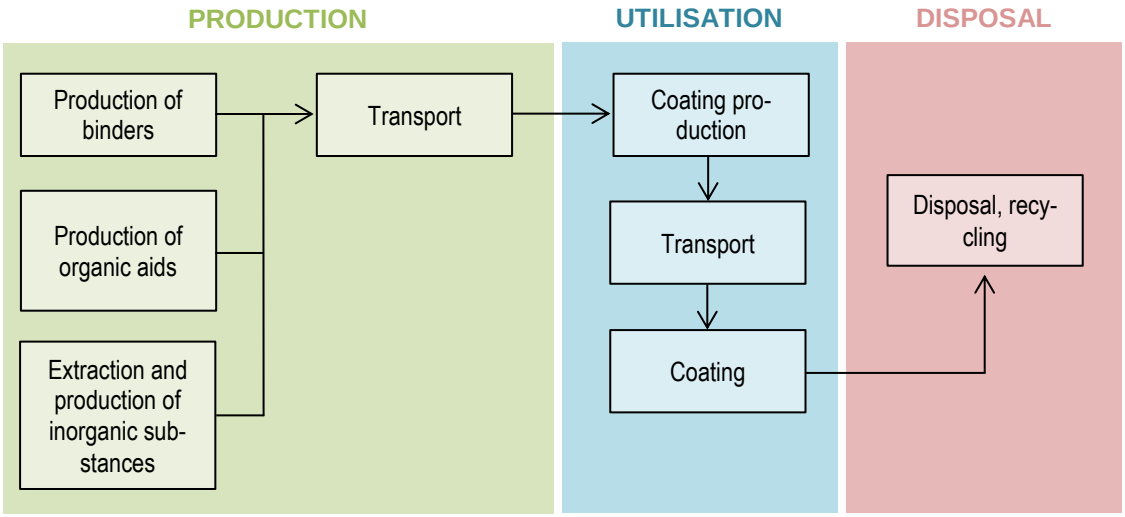


**Fig. 3.1: Life cycle of a wood coating**

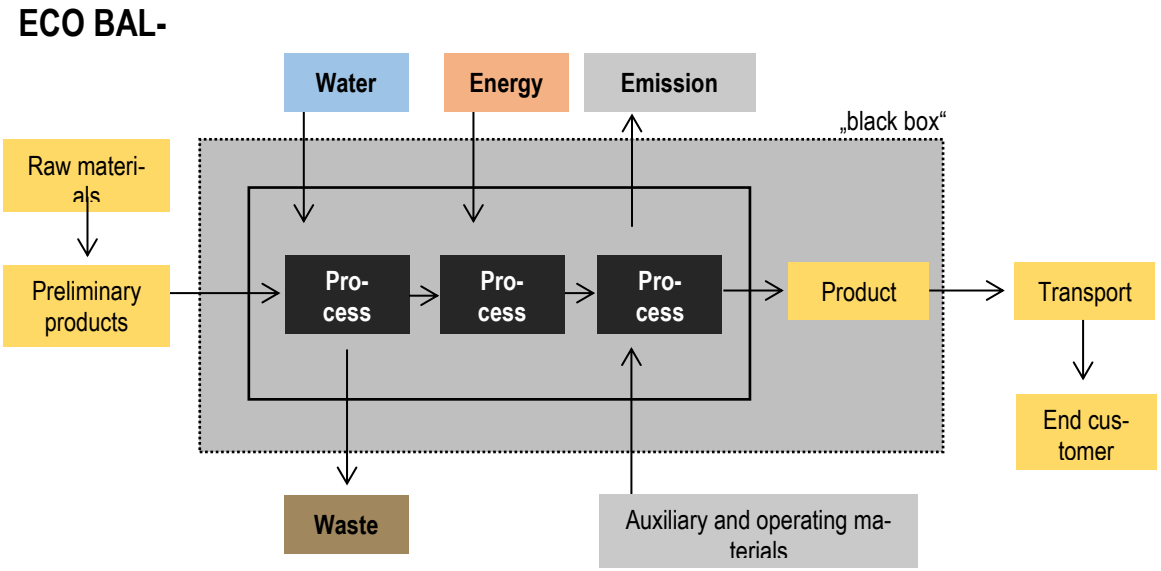


**Fig. 3.2: ECO BALANCE**

## 3.3 EPD (Environmental Product Declaration)

The quantitative determination of the environmental impacts is carried out within the framework of an EPD according to EN ISO 14025. The basis for this is a so-called PCR and the preparation of a eco balance (according to DIN EN ISO 14040 and EN ISO 14044). Content of the EPD:

- Primary energy from renewable and non-renewable energies
- Global warming potential
- Ozone depletion potential
- Acidification potential of air and water
- Eutrophication potential
- Summer smog potential

Only mandatory statements about production are required in an EPD ("cradle to gate"). The remaining life cycle phases ("gate to grave" - from the factory gate to the grave) can be considered optionally (but are mandatory for DGNB - German Sustainable Building Council and BNB - Assessment System for Sustainable Building!). Environmental impacts are presented without valuation.

A1 – A3 Mandatory information

A1 – D Optional information

| PRODUCTION-PHASE | | | CONSTRUCTION-PHASE | | UTILISATION-PHASE | | | | | | | DISPOSAL-PHASE | | | | Advantages and burdens |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| Raw material supply | Transport | Production | Transport | Construction/installation | Usage | Maintenance | Repair | Replacement | Reconstruction, renewal | Operational energy usage | Operational water usage | Demolition | Transport | Waste management | Disposal | Reuse-, recovering-, recycling potencial |

**Fig. 3.3: Content of the EPD:**

The multitude of criteria and systems often makes it difficult to identify all the necessary data. So-called average EPDs, which are based on average data for the industry, are helpful here. The second, more elaborate option is the creation of a product- or company-specific EPD, in which all data must be collected and evaluated individually and company/product-specifically.

In Germany, the Institute for Building and Environment (http://bau-umwelt.de), as a manufacturers' association, offers a closed external presentation of Environmental Product Declarations (EPD).

### 3.4 Product Carbon Footprint, PCF

Basically, this means the greenhouse gas emissions in relation to the product. The most important greenhouse gases are carbon dioxide, nitrous oxide and methane. These and other greenhouse gases are quantified according to their climate change potential as indicator GWP (Global Warming Potential) in the unit carbon dioxide equivalents (CO2).

## 4 Building certification

Buildings are usually used for a very long time. Therefore, only the consideration of the entire life cycle "from the cradle to the grave" can provide information about the actual quality of a building. All life phases of a building must therefore be analysed with regard to the different aspects of sustainability and optimised in their interaction. With regard to the building material or building product level, the life cycle assessment of a building is divided into the following individual phases:

- Raw material extraction,
- Product manufacturing,
- Construction,
- Usage (operation),
- Maintenance, renovation, etc.
- Deconstruction and recycling

The assessment of the durability or usage period of a building, the building components and the building component layers is therefore of particular importance in the evaluation of sustainability.

Green or blue-building is defined as a building that makes particularly responsible use of resources such as energy, water and materials, while minimising harmful effects on health and the environment. Certification systems have been created to assess these aspects. Unfortunately, there are now very many different systems that can only be compared with each other to a limited extent or not at all. The most important ones are described in chapter 4 below.

**In general, the certifications listed below only assess the building itself and not the construction products. The construction product contributes only indirectly by receiving corresponding points in the respective rating system. The data from this comes from an EPD, for example. Ultimately, there cannot be a sustainable product per se even without specifying the concrete intended use.**

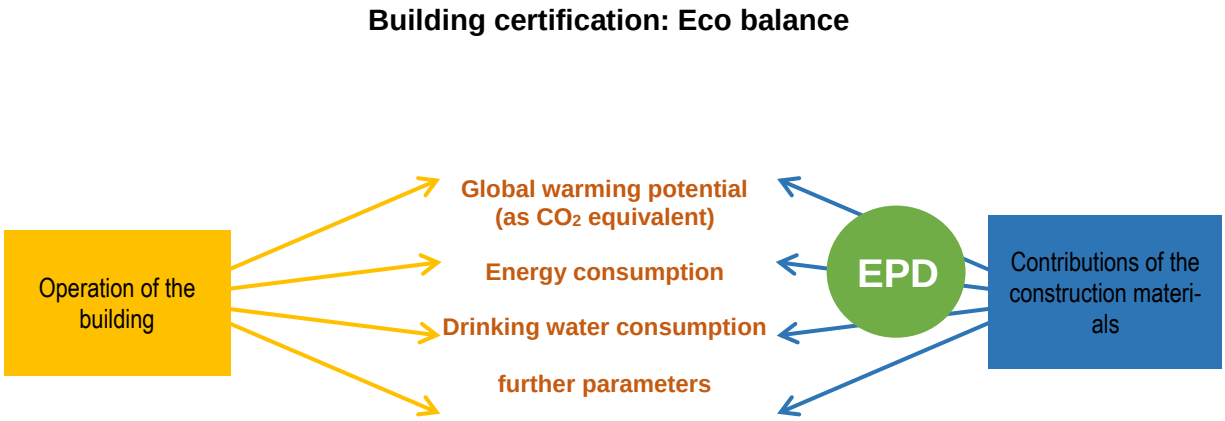


**Fig. 4.1: Sub-areas of the life cycle analysis (eco balance) of a building within the framework of building certification**

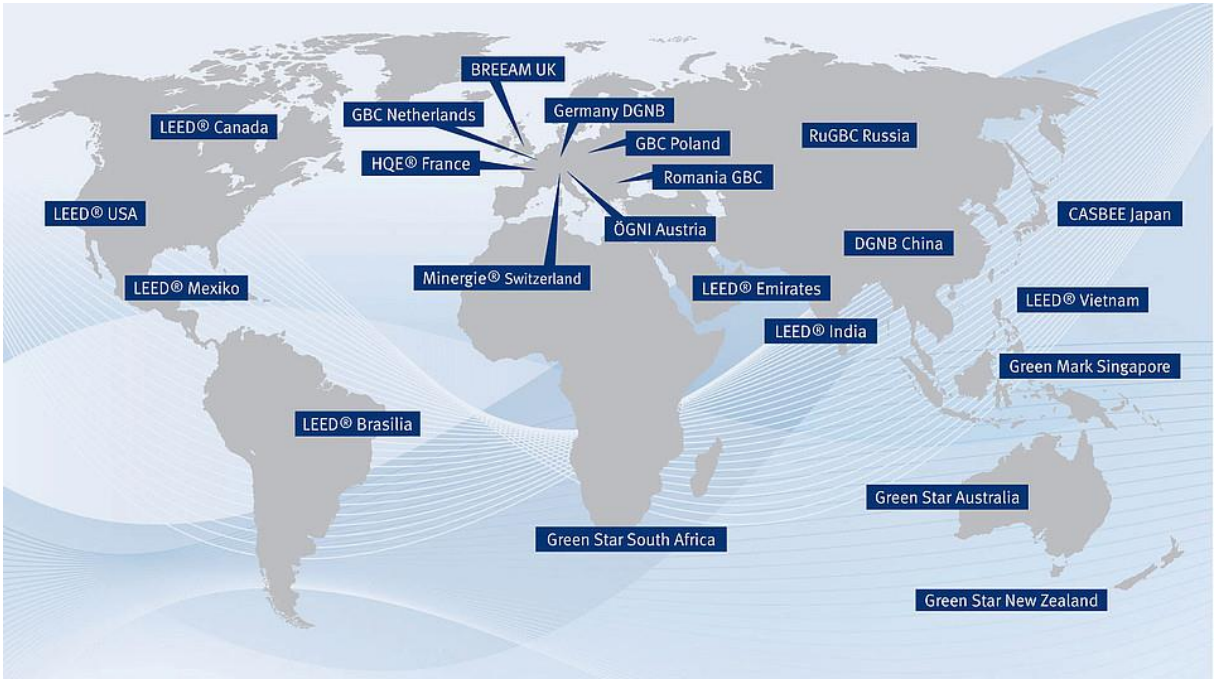


**Fig. 4.2: Overview of the most important green building certification systems worldwide (SOURCE [www.dreso.at](http://www.dreso.at) 2020)**

# 5 International standards for building certification

## 5.1 BREEAM (England)

was founded in 1990 by BRE (Building Research Establishment Ltd.) and means BRE Environmental Assessment Method. BREEAM only assesses ecological criteria. The evaluation is based on the system of "benchmarking", in which the currently best products and processes achieve the maximum score. Depending on the score, the building is rated "certified", "good", "very good", "excellent" or "outstanding".

BREEAM rates and weights buildings according to the following categories:
Management (12%), health and comfort (15%), energy (19%), transport (8%), water (6%), materials (12.5%), waste (7.5%), land ecology (10%), pollution (10%) and innovation additional criteria for exceptional performance (10%). The focus of BREEAM is primarily on energy and the environment. However, life cycle costs (management category) and life cycle assessment (materials category) are also taken into account with the Green Guide to specification.

BREEAM assessments can be carried out for different building types: Office buildings, commercial buildings, educational buildings, industrial buildings, hospital buildings, prisons, courthouses, residential buildings, urban planning/quarter development. In addition to the BREEAM standard systems, there are also BREEAM Other Buildings (UK) and BREEAM International Bespoke (outside the UK) for the assessment of buildings that do not fall under the standard categories (e.g. hotels, sports centres, etc.) or for the certification of any building worldwide.

BREEAM has also been adapted for various countries such as Spain (BREEAM ES) or the Netherlands (BREEAM NL). BREEAM assessments have already been carried out in Belgium, Brazil, the United Emirates, France, Poland, Russia, Scandinavia, Germany, the Baltic States and Turkey, among others.

**Further information**
http://www.breeam.org
http://www.bre.co.uk

## 5.2 LEED (Leadership in Energy & Environmental Design, USA)

LEED was developed in 2000 by the US GBC (Green Building Council) and is based on the BREEAM system. LEED includes and weights the following sustainability categories: Sustainable Land (25%), energy & atmosphere (35%), water efficiency (10%), materials & resources (14%), indoor climate quality (15%), innovation and design process (6%) and regional focus (4%). As can be seen from the name of the certification system, LEED focuses mainly on energy and the environment. LEED covers the following areas in the planning and realisation of new buildings: Commercial interiors, shell & building envelope (core & shell), schools, retail buildings, healthcare buildings, residential houses, neighbourhood development. For existing buildings, an assessment of operation and maintenance is carried out.

**Further information**
http://www.usgbc.org
http://www.gbci.org

LEED is mainly used in its place of origin, the USA, but is also increasingly appearing on the international market. Switzerland also already has LEED-registered buildings. Adaptations of LEED have been made for Brazil, Canada, India, Mexico, the United Arab Emirates and Italy, among others.

The LEED certificate is currently the system with the strongest international significance. Depending on the number of points, a "silver", "gold" or "platinum" certificate is awarded.

## 5.3 CASBEE (Comprehensive Assessment System for Building Environmental Efficiency, Japan)

The JSBC (Japan Sustainable Building Consortium) has developed CASBEE, which classifies the ecological performance of buildings according to their application. It is composed of four assessment tools corresponding to the life cycle of a building: CASBEE for design, new construction, existing buildings and renovations. Each tool is intended for a separate application with its own usage objective and has been designed for different use cases (office buildings, schools, flats, etc.).

## 5.4 HQE (Haute Qualité Environmentale, Frankreich)

The HQE method has been tested in construction projects (residential and other building construction) since 1994 and was finally structured by the HQE Association in 1997. Knowledge of the ecological impact of construction products is based on an EPD and the selection is included in the ecological criteria. The same is required for health aspects (e.g. emissions and indoor air). HQE covers three phases in the assessment: Order, design and execution.

## 5.5 BNB (Assessment System for Sustainable Building, www.nachaltigesbauen.de)

As the available international rating systems are not suitable for an objective and more quantitative assessment, the Federal Ministry of Transport, Building and Urban Affairs in Germany has developed its own sustainability rating system. Here, ecological (follow from the EPD), economic, socio-cultural and technical qualities as well as the location and process quality are considered over the entire life cycle (a total of over 40 criteria from life cycle costs, greenhouse potential to room acoustics and design).

Often, additional verifications are required in addition to the EPD to describe the product qualities (e.g. for accessibility, sound insulation, ventilation, fire resistance, burglary protection, etc.). According to the ministry's specifications, the system is to be introduced for all public buildings from 2011. Depending on the degree of fulfilment, an award/medal is given in "bronze", "silver" and "gold".

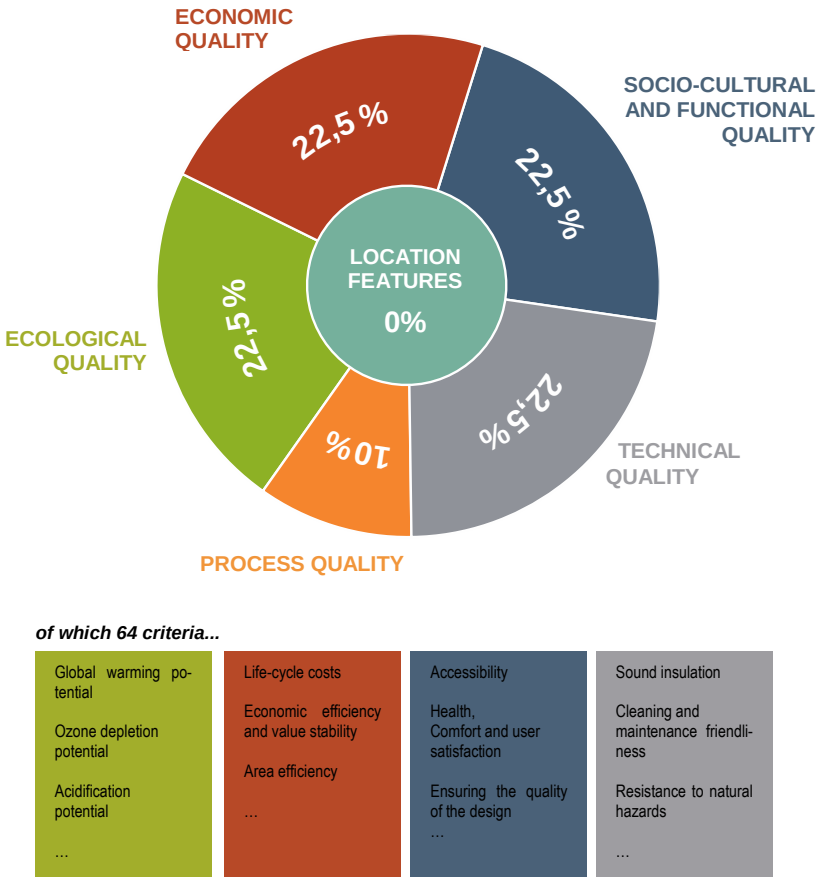


**Fig. 5.1: BNB, DGNB assessment scheme incl. weighting factors of the criteria**

## 5.6 DGNB (German Sustainable Building Seal of Approval )

The DGNB (German Sustainable Building Council, www.dgnb.de) certificate is based on a common foundation with the NBB and was introduced in 2008. However, the DGNB has included other criteria in the rating system, such as resistance to hail, storms and floods. The award is given exclusively for office and administration buildings. These additional criteria currently require further evidence in the course of describing the product qualities. Depending on the degree of fulfilment, an award/medal is given in "bronze", "silver" and "gold".

**Further information**
http://www.dgnb.de
http://www.sgni.ch

## 5.7 ÖGNB

The Austrian Sustainable Building Council is an official partner organisation of the Austrian climate protection initiative klima:aktiv The ÖGNB guarantees to keep its evaluation systems 100% compatible with those of klima:aktiv as before. If the minimum criteria of klima:aktiv are met, the klima:aktiv building assessment can be carried out in parallel to the ÖGNB building assessment without additional costs and without providing additional evidence.

## 5.8 Minergie

The Minergie association was founded in 1998. In 2001, the association introduced a standard for passive houses, Minergie-P, as a complement to Minergie. The Minergie-A building standard was launched in March 2011. The certification is based on the determination of the total heat balance of a building. In addition, care is taken to ensure that the energy input is predominantly supplied from renewable sources. The additional requirements depend on the SIA building category and concern the energy efficiency of electrical appliances, lighting, ventilation efficiency, waste heat recovery and renewable energy for water heating. The various Minergie standards are primarily Swiss labels. However, Minergie and Minergie-P are now also being used in parts of France.

**Further information**
www.minergie.ch

## 5.9 MinergieEco

This was followed in 2006 by the introduction of Minergie-ECO, a more comprehensive label that also takes into account aspects of building biology and resource efficiency. In addition to a favourable energy balance of a building, the ecological construction of a building is also assessed. The MinergieEco certificate can only ever be obtained as an addition to the Minergie certificate. The general conditions for MinergieEco certification are:

- Comfort
- Health
- Building ecology
- Energy efficiency

| Criterion | German Sustainable Building Council | BNB-Assessment System for Sustainable Building | LEED | BREEAM |
|---|---|---|---|---|
| Global warming potential (GWP) | | | | |
| Ozone Depletion Potential (ODP) | | | | |
| Photochemical Ozone Creation Potential (POCP) | | | | |
| Acidification potential (AP) | | | | |
| Overthinning potential (EP) | | | | |
| Risks to the local environment (risk to groundwater, surface water, soil and air) | | | | |
| Other effects on the global environment (sustainable material recovery) | | | | |
| Microclimate (heat island effect) | | | | |
| Primary energy demand non-renewable ($Pe_{ne}$) | | | | |
| Primary energy renewable ($Pe_{e}$) | | | | |
| Fresh water consumption usage phase | | | | |
| Land use | | | | |
| Building-related life cycle costs | | | | |
| Thermal comfort (summer, winter) | | | | |
| Accessibility | | | | |
| Sound insulation, cleaning and maintenance | | | | |
| Quality of planning and construction | | | | |

HIGH
AVERAGE
LOW

**Fig. 5.2: Overview of some important systems and their significance and the importance of individual criteria in the assessment scheme**

### 5.10 Sentinel-Haus Institut SHI (concept for healthy living spaces), Germany

The word sentinel comes from medieval English and means "guardian". The Sentinel-Haus Institute sees itself as a guardian of the building against unwanted pollutants or structural damage. Accordingly, the SHI guarantees that the indoor air quality is harmless.

A building can be assessed with the SHI Health Passport (since 2005). The instrument can be used by a contractor to contractually agree on a specified indoor air quality with the client or investor in advance.

Prerequisites for a certification:

- Comprehensive building component description with naming of health-relevant materials
- Comprehensive product lists with health relevance from each trade
- Proof that only SHI-qualified companies were involved in the construction process.

The criteria for building products are the principles for the health assessment of construction products indoors of the German Institute for Building Technology for the approval of building materials and the assessment schemes of the AgBB (Committee for health-related evaluation of building products).

## 6 Product certifications or eco-labels that support building certification requirements

### 6.1 Austrian Ecolabel

The Austrian Ecolabel has existed since 1990 and is awarded to products, tourism businesses and educational institutions. Relevant for ADLER are the guidelines UZ 01 (varnishes, stains and wood sealing coatings), UZ 06 (wooden furniture), UZ 07 (wood and wood-based materials), UZ 17 (wall paints) and UZ 56 (floor coverings).

### 6.2 Baubook

The web platform baubook (www.baubook.at) supports the implementation of sustainable buildings. For this purpose, it offers ecological criteria for product evaluation, which are based on the Austrian Eco-label.

**Ecological criteria for the client and the renovation of public buildings incl. product catalogue can be found at www.baubook.at/oea. "ÖkoKauf Wien" and the Vorarlberg Environmental Association with its partners eza! - Energy and environment centre Allgäu and Energy Tyrol have harmonised their ecological criteria for the building and interior construction sector in this regard. The harmonisation also took into account current developments in the "Austrian Ecolabel". Other users are the Austrian Society for Sustainable Building (ÖGNB) and klima:aktiv.**
**At www.baubook.at/vlbg you can find the criteria and the product catalogue of the ecological housing subsidy Vorarlberg, which partly differ from those of the public buildings.**

## 6.3 ECO-Label

The Eco-label or European Eco-label is awarded to products and services throughout Europe. The award was introduced in 1992 by the European Commission and is now awarded independently by national institutes in the participating countries. In Austria, the awarding process is handled by the Ministry of the Environment and the Ministry of Life.

## 6.4 RAL UZ (blue angel)

The Blue Angel is the world's first and oldest environmental label for products and services. It was established in 1978 on the initiative of the Federal Minister of the Interior and by decision of the federal and state environment ministers in Germany. Since then, it has been a market-conforming instrument of environmental policy with which the positive characteristics of offers can be labelled on a voluntary basis. The RAL UZ-12a guideline (low-pollutant paints and varnishes) is used for awarding coating sproducts.

## 6.5 Emicode

The Emicode test mark evaluates low-emission installation materials, adhesives or construction elements. In addition to adhesives and fillers, sealants, underlays, adhesive tapes and water-based parquet coatings are also tested to determine whether they release volatile organic substances (emissions) into the indoor air and lead to odours. For parquet coatings, a distinction is made between the classes EC1 or EC2, whereby EC1 requires lower VOC values.

## 6.6 natureplus

natureplus is the international quality label for sustainable housing and building products, tested for health, environment and function. The label is primarily intended to provide consumers, but also architects, craftsmen, construction companies and all those involved in building with reliable guidance on sustainable products, i.e. products that are environmentally compatible and harmless to health. For paints and varnishes, this means, among other things, that they must consist of 95% by mass of renewable or mineral raw materials and water.

## 6.7 Cradle to Cradle

"Cradle to Cradle" is a radical counter-proposal to our throwaway society: an economic system without waste. "Cradle to Cradle" describes the principle of two continuous cycles. Consumables are biodegradable and return to the natural nutrient cycle. After their use, consumer goods are broken down into unmixed raw materials and fed into a technical cycle. Corresponding product certifications exist in the gradations: "Basic", "Bronze", "Silver", "Gold" or "Platinum". The product is evaluated according to the following criteria:

- Material health
- Material cycle
- Renewable energies and climate
- Water management
- Social responsibility

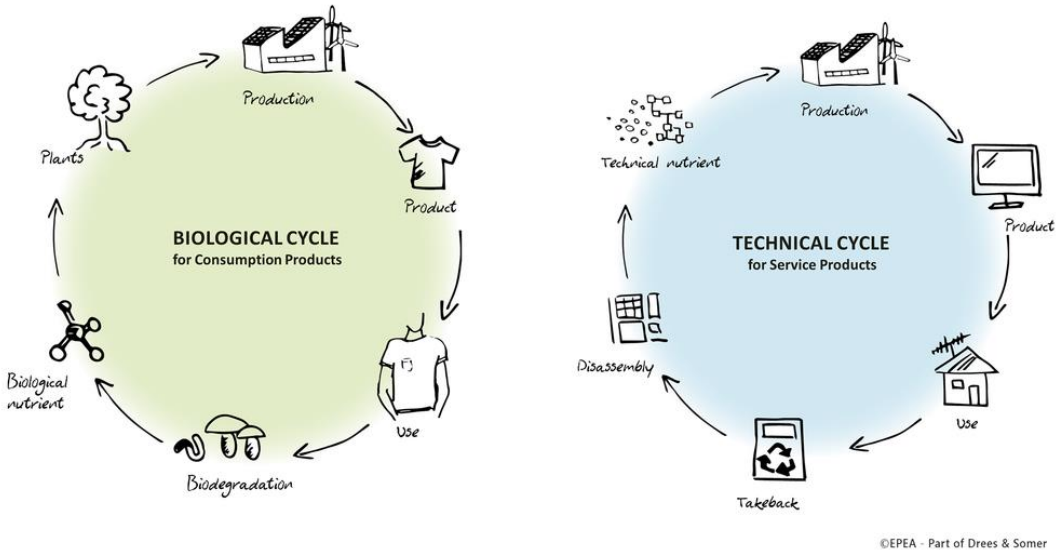


**Fig. 6.1:** Basis of a circular economy, source: **EPEA GmbH 2020**

# 7 General requirements that are met by all ADLER products

By finishing building products with our coating materials, ADLER products also contribute indirectly to sustainable building certification. By, for example, generally refraining from using toxic or carcinogenic, mutagenic and reprotoxic raw materials (T and CMR substances of categories 1 and 2 according to the Chemicals Ordinance 1999 - BGBl. II Nr.81/2000 idF BGBl. II No. 186/2002), our coating materials fulfil the essential points of the above-mentioned evaluation systems. Many of our coatings are formulated to meet the requirements of the Austrian Ecolabel, DGNB, LEED, etc. The better usability of building products made of wood as a renewable raw material also has a very positive influence on the overall assessment. However, detailed aspects must be considered separately in each case.