

World Sustainable Built Environment Conference 2017 Hong Kong
Transforming Our Built Environment through Innovation and Integration:
Putting Ideas into Action
5-7 June 2017

Special Session 2.14

The Assessment System for Sustainable Building BNB by Taking the Example of the Complete Refurbishment BNB Module for Educational Buildings



Guideline for Sustainable Building

- ▶ introduced 2001
- ▶ since 2013 mandatory for all federal buildings
- ▶ since 2014 available in english

- ▶ sets principles
- ▶ describes requirements and assessment criteria
- ▶ identifies benchmarks and aims
- ▶ offers tools and supporting documents



Interaction between Guideline and Assessment System (BNB)



Guideline

Part A
Basic Principles of Sustainable Building

Part B
Sustainable Building Projects

Part C
Recommendations for the Sustainable Use and Operation

Part D
Refurbishment of Buildings

Assessment System



BNB_New Construction

BNB_Use and Operation

BNB_Complete Refurbishment

Outdoor Facilities

Office and Administration Building

Educational Building

Laboratories

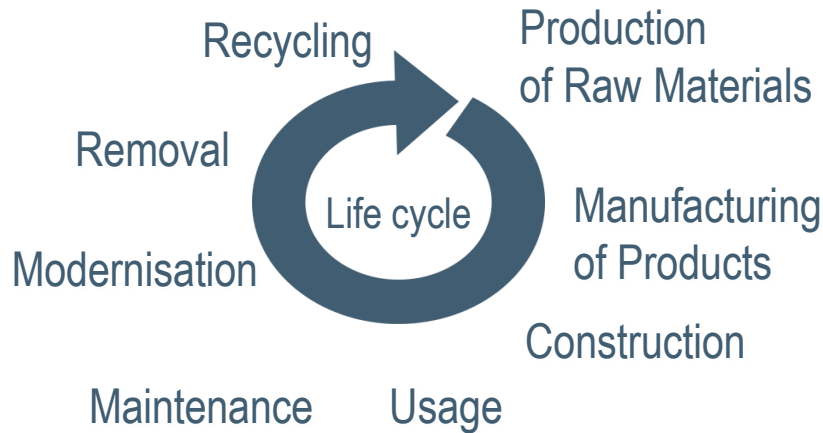
Office and Administration Building

Office and Administration Building

Educational Building



Assessment System for Sustainable Building (BNB)



- ▶ holistic tool for sustainability assessment
- ▶ covering the entire life cycle
- ▶ addresses equally all three sustainability dimensions & the cross-sectional qualities Technical and Process Quality



Use Typologies and Requirements of Educational Buildings



- ▶ high degree of user satisfaction
- ▶ flexible and synergistic use of building structures
- ▶ spatial qualities inside and outside
- ▶ public accessibility



Complete Refurbishment BNB module

Complete Refurbishment

- ▶ Characteristics of the structure and the building services largely identical to new buildings
- ▶ Repair work in order to achieve more or less the same service life of the building components as new buildings
- ▶ Adaption of the physical structure to new requirements
- ▶ Dedicated rules and benchmarks for listed buildings

Criteria | Educational Building System Variant | Refurbishment

Economy

2.1.1 Building-related Life Cycle Costs

1.2.4 Land Consumption

1.2.3 Drinking Water Demand & Quantity of Wastewater

1.2.1 Primary Energy Demand

1.1.7 Sustainable Material Extraction / Biodiversity

1.1.6 Risks to the Local Environment

1.1.5 Eutrophication Potential

1.1.4 Acidification Potential

1.1.3 Photochemical Ozone Creation Potential

1.1.2 Ozone Depletion Potential

1.1.1 Global Warming Potential

Ecology

2.2.2 Adaptability

3.1.1 Thermal Comfort

3.1.3 Indoor Air Quality

3.1.4 Acoustic Comfort

3.1.5 Visual Comfort

3.1.6 Influence of the User

3.1.7 Use Qualities

3.1.8 Safety

3.1.9 Indoor quality

3.2.1 Barrier-free Building

3.2.4 Accessibility

3.2.5 Mobility Infrastructure

3.3.1 Design and Urban Quality

3.3.2 Art in Architecture

Sociocultural

4.1.1 Sound Insulation

4.1.2 Heat Insulation and Protection against Condensate

4.1.3 Heat Insulation and Protection against Condensate

4.1.4 Dismantling, Waster Separation and Utilisation

4.1.5 Resistance to Natural Disasters

4.1.6 Maintenance Friendliness of Building Systems

Technology

Process

5.1.1 Project Preparation

5.1.2 Integrated Design and Planning

5.1.3 Complexity and Optimisation of Planning

5.1.4 Invitation to Tender and Contract Awarding

5.1.5 Preconditions for Optimum Utilisation and Management

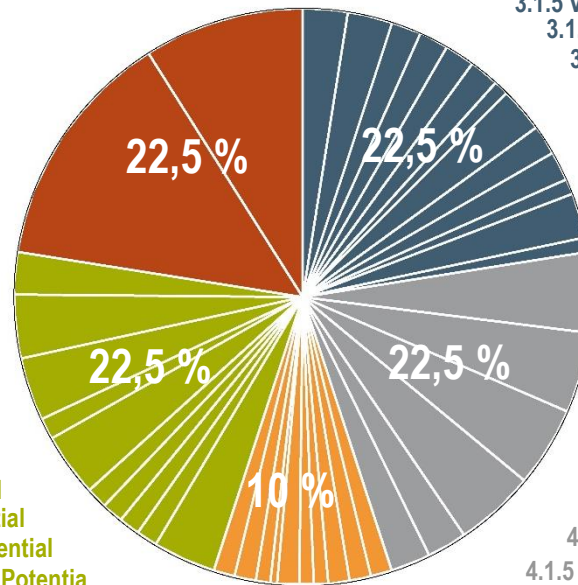
5.1.6 Stock Taking

5.1.7 Demolition Planning

5.2.1 Building Site / Building Process

5.2.2 Quality Assurance of Building Construction

5.2.3 Controlled Commissioning



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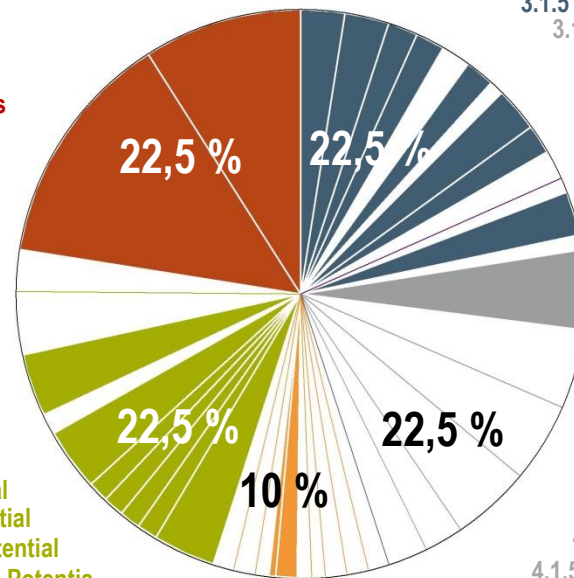
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Process



Complete Refurbishment BNB module for Educational Buildings – V2017



Ecological Quality

ECOLOGICAL QUALITY	22.5 %
Effects on Global and Local Environment	
1.1.1 Global Warming Potential (GWP)	
1.1.2 Ozone Depletion Potential (ODP)	
1.1.3 Photochemical Ozone Creation Potential (POCP)	
1.1.4 Acidification Potential (AP)	
1.1.5 Eutrophication Potential (EP)	
1.1.6 Risks to the Local Environment	
1.1.7 Sustainable Material Extraction/Biodiversity	
Demand of Resources	
1.2.1 Primary Energy Demand	
1.2.3 Drinking Water Demand and Quantity of Wastewater	
1.2.4 Land Consumption	

} **Eco-Balance**



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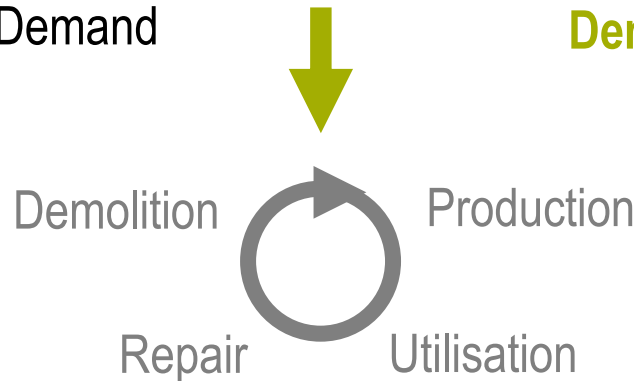
Ecological Quality - Eco-Balance (1.1.1-1.1.5, 1.2.1)

- ▶ Global Warming Potential
- ▶ Ozone Depletion Potential
- ▶ Photochemical Ozone Creation Potential
- ▶ Acidification Potential
- ▶ Eutrophication Potential

**Effects on the Local and the
Global Environment**

-
- ▶ Primary Energy Demand

Demand of Resources



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Economic Quality

ECONOMIC QUALITY	22.5 %
Life Cycle Costs	
2.1.1 Building-related Life Cycle Costs	
Wirtschaftlichkeit und Wertstabilität	
2.2.1 Space Efficiency	
2.2.2 Adaptability	

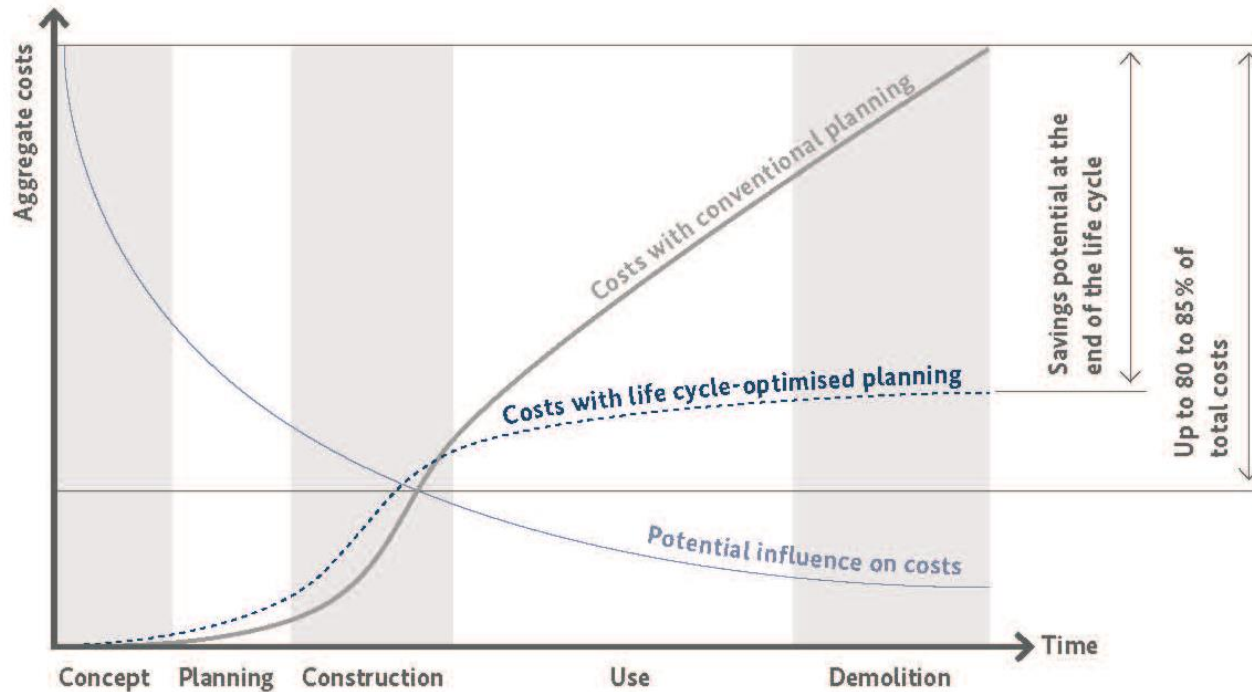


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Economic Quality

► Lifecycle Costs (2.1.1)



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Sociocultural and Functional Quality

SOCIOCULTURAL AND FUNCTIONAL QUALITY	22.5 %
Health, Comfort and User Satisfaction	
3.1 Thermal Comfort	
3.1.3 Indoor Air Quality	
3.1.4 Acoustic Comfort	
3.1.5 Visual Comfort	
3.1.6 Influence of User	
3.1.7 Use Qualities	
3.1.8 Safety	
3.1.9 Use flexibility and operation	
Functionality	
3.2.1 Barrier-free Building	
3.2.4 Accessibility	
3.2.5 Mobility Infrastructure	
Ensuring Design Quality	
3.3.1 Design and Urban Quality	
3.3.2 Art in Architecture	

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Sociocultural and Functional Quality – Health, Comfort, User Satisfaction

▶ Indoor Air Quality (3.1.3)

- ▶ Avoidance of emissions of construction products
 - ➔ indoor air measurements
- ▶ Minimisation of the CO₂-concentration
 - ➔ max. 1000 ppm
for mechanical and window ventilation
- ▶ Analysis of the microbiological situation
 - ➔ mould growth , moisture damage , thermal bridges



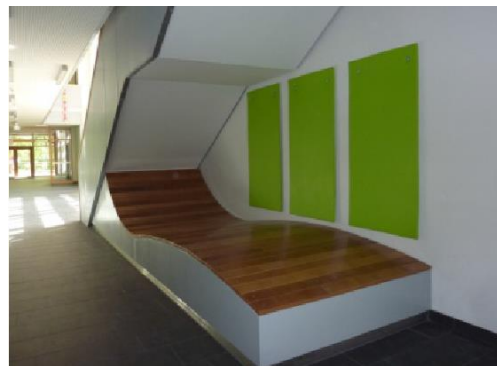
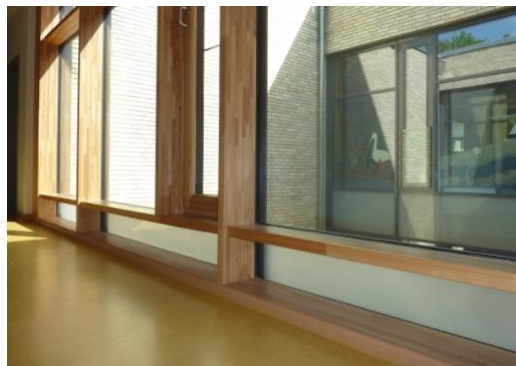
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Sociocultural and Functional Quality – Health, Comfort, User Satisfaction

► Use Qualities (3.1.7)

- Qualities of circulation areas
- Inner visibility
- Flexibility of space utilization
- Storage options



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Process Quality – Management and Design

PROCESS QUALITY

Management and Design

5.1.1	Project Preparation
5.1.2	Integrated Design and Planning
5.1.3	Complexity and Optimisation of Planning
5.1.4	Invitation to Tender and Contract Awarding
5.1.5	Preconditions for Optimum Utilisation and Management
5.1.6	Stock Taking
5.1.7	Demolition Planning

Building Construction

5.2.1	Building Site/Building Processes
5.2.2	Quality Assurance of Building Construction
5.2.3	Controlled Commissioning

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Process Quality – Management and Design

- ▶ Stock Taking (5.1.6)
 - ▶ Demolition Planning (5.1.7)
-



Further Information



Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit

Suchbegriff eingeben

Bewertungssystem Nachhaltiges Bauen (BNB)

Bewertungssystem | BNB Unterrichtsgebäude | Kriterien - BNB Unterrichtsgebäude - Neubau (BNB_UN)

Kriterien - BNB Unterrichtsgebäude - Neubau (BNB_UN)

Version 2013

Das BNB System Neubau Unterrichtsgebäude wurde aus der Systemvariante BNB_BN_2011_1 für Büro- und Verwaltungsgebäude entwickelt und unterscheidet sich hiervon durch – der Nutzungsart „Unterricht“ – angepassten, entfernten und neu hinzugefügten Kriteriensteckbriefen. Die wesentlichen Unterschiede zwischen der aktuellen Version BNB_UN_2013 zu BNB_UN_2011 (Entwurf) bzw. zu BNB_BN_2011_1 können Sie der folgenden Tabelle entnehmen:

- BNB-Bewertungsmethodik
- BNB Bürogebäude
- BNB Außenanlagen
- **BNB Unterrichtsgebäude**
- Kriterien - BNB
- **Unterrichtsgebäude - Neubau (BNB_UN)**
- FAQ

www.bnb-nachhaltigesbauen.de

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**Thank You for
Your Patient Attention**

