Federal Ministry
of Transport, Building
and Urban Development

Building the future - Sustainable Building Strategies

Welcome to the German Pavilion of the Federal Ministry of Transport, Building and Urban Development

Tervetuloa Saksalaiseen Paviljonkiin Liikenteen Rakentamisen ja Kaupunkikehityksen Liittoministeriöltä

Herzlich Willkommen im Deutschen Pavillon des Bundesministeriums für Verkehr, Bau und Stadtentwicklung

Dr. Peter Ramsauer
Federal Minister of Transport, Building and Urban Development

"The sustainable development has worldwide an outstanding meaning as model for the future, especially in civil engineering. The Federal Government has a special responsibility, because their buildings are in the public eye. Government recognizes its role model as awarding authority for building. The Federal Ministry of Transport, Building and Urban Development supported significantly the development of zero and plus energy houses with holistic solutions to connect modern architecture and electro mobility within the context of the research initiative Future Building. The buildings of future produce more energy as they need for their own operating, by integrating renewable energy extraction systems. The exhibition shows the high state of the technical development and gives suggestions for the implementation in practice."

The Federal Ministry of Transport, Building and Urban Development supplies with the reworked "Guideline for Sustainable Building" an obligatory practical aid for sustainable planning, building and building of federal real property and buildings.

The Federal Building Authority has, with the "Assessment System for Sustainable Building", a planning tool available, which implies and assesses sustainable aspects already in the beginning of the planning phase and over the buildings entire life cycle. Sustainability is thereby no topic just for exclusive buildings, but an indispensable social concept.

Planning of the New Construction
Umweltbundesamt, Berlin
Reference: Braun, Kerbl, Löffler

Besides functionality, safety and efficiency, important political aims of building activities are the quality of architecture as well as sustainable and energy-efficient building design. This applies also the application of building materials, technologies and procedures, monument protection and art in architecture. All this aspects should be implemented with the Federal Buildings.

Reference: TU Darmstadt, T. Ott

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within the Federal Office for Building and Regional Planning

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Centre of Competence Sustainable Building

within the Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR)

- Scientific consultance and assistance to the Federal Ministry of Transport, Building and Urban Development (BMVBS), the "Round Table of Sustainable Building" and the task groups and committees
- Development, implementation and further advancement of the „Assessment System for Sustainable Building" for the buildings of the Federal Government (BNB) including office buildings, residential and educational buildings
- Scientific attendance of BNB pilot projects
- Education of „BNB-Coordinators"
- Public Relation
  - Support of the information platform "Sustainable Building" (www.nachhaltigesbauen.de)
  - Preparation and implementation of exhibitions
  - Scheduling and realisation of conferences and events, including documentation and publication
  - Transfer of knowledge through public lectures
- Organisation of the "Round Table of Sustainable Building"

e-mail contact:
nachhaltiges-bauen@bbr.bund.de

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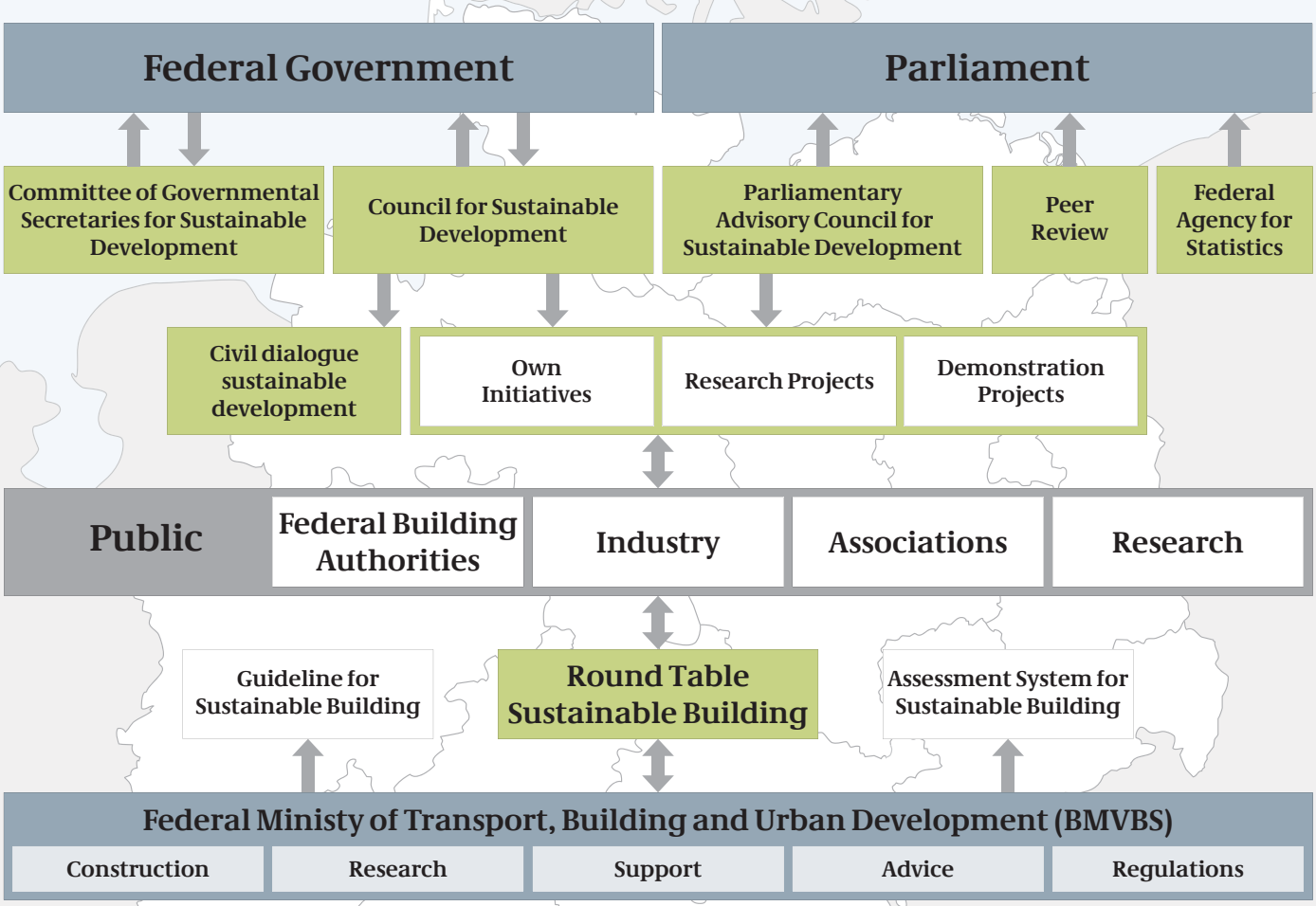
National Sustainability Strategie by the German Federal Government



In 2002 the Federal Government passed the national Sustainability Strategy under the title „Perspectives for Germany". Targets are the areas „generational equality", „quality of life", „social cohesion" and „international responsibility". Furthermore the four fields of action energy and climate protection, transport, agriculture as well as global responsibility measures were named.

Already 2001 the Council for Sustainable Development was founded by the Federal Government. The Councils maintasks are to advise the Federal Government in Sustainability and the dialogue with the different interest groups. The Council gives recommendations to the Federal Government and names concrete fields of action. The Council gives statements about current topics, gives scientific studies in order and helps spreading the model of Sustainability in the public. The public is invited to participate actively in the „civil dialogue sustainable development" to develop the national Sustainability Strategy further on.

To support the Federal Ministry of Transport, Building and Urban Development in implementing sustainable building activities, the Round Table Sustainable Building was founded in December 2001. It consists of representatives of the building sector, industry, chambers of architects and engineers, relevant building authorities and the sciences.

The „Committee of Governmental Secretaries for Sustainability Development" implement the national sustainability strategy into concrete action. To its tasks it also belongs to develop the national Sustainibility Strategy further on its content and to check the state of implementation. Moreover the committee is the main person of contact for the governmental advisory council for sustainable development, which was constituted in 2010, for the Federal States and the national local-authority organisations.

By means of 21 indicators, the sustainability will be constantly observed and assessed by the Federal Agency for Statistics. At regular intervals progress reports and indicator reports are created. In 2009 a peer review was instructed, the report „Sustainability - Made in Germany" was created by experts of Sustainability, climate and economy from seven countries with organisational support by the Council for Sustainable Development.

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The responsibility for the Federal Government´s civil building in Germany and overseas lies with the Federal Ministry of Transport, Building and Urban Development. This includes the initiation of research projects, the supply of funding, the advice of Federal states and communes as well as the development of rules.

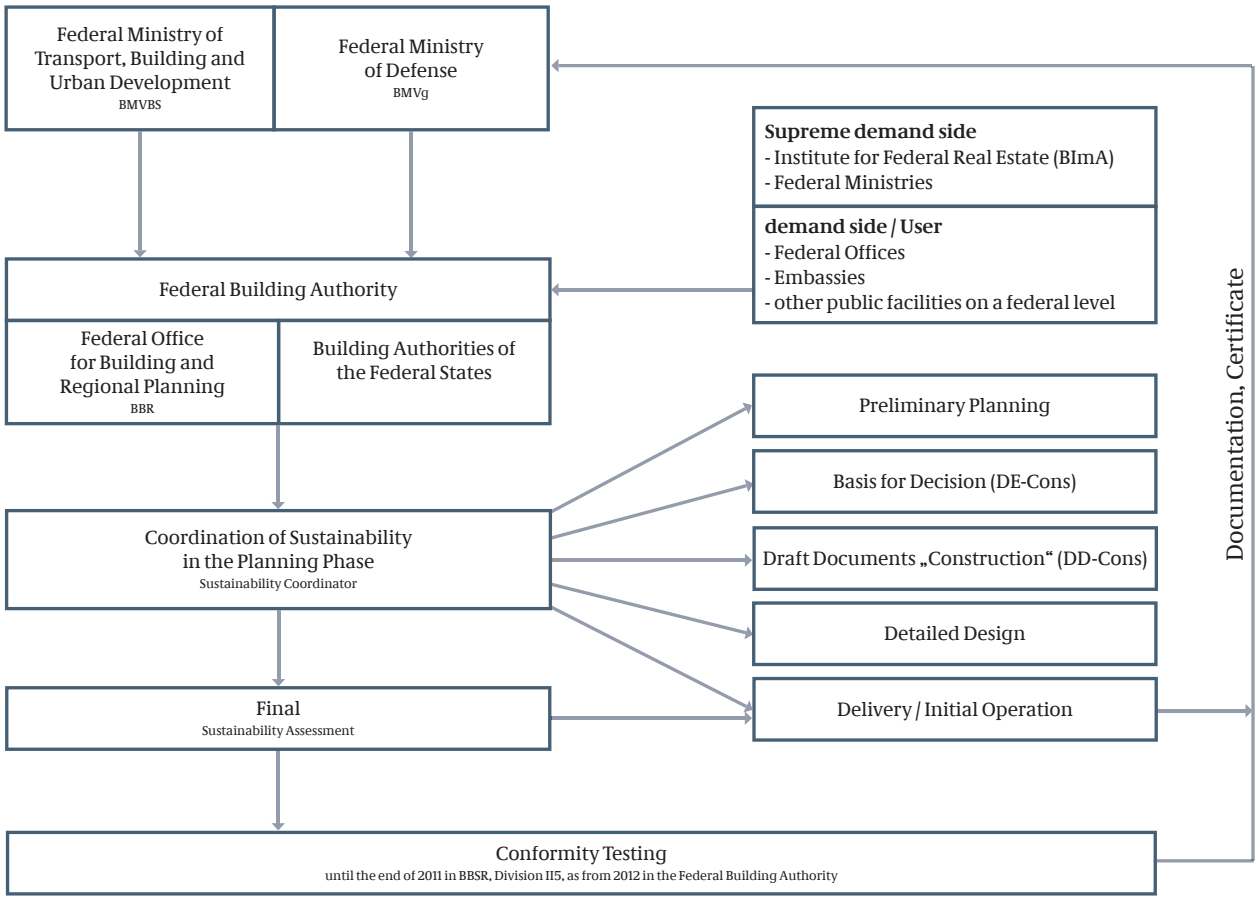
An important issue is the development of sustainable buildings, because the main parts of our energy- and resource consumption, of the emissions but also of the consumption of our constructed area are determined by real estate and transport.

At the same time the federal buildings are in public interest, thus lending them a special function as role models.

The "Guidelines for the Realisation of Federal Building Measures" (RBBau) set out the responsibilities and procedure for federal building measures.

The Federal Office for Building and Regional Planning (BBR) is responsible for building matters for the constitutional bodies, the highest federal authorities and civil building matters overseas as well as for buildings in Berlin and Bonn.

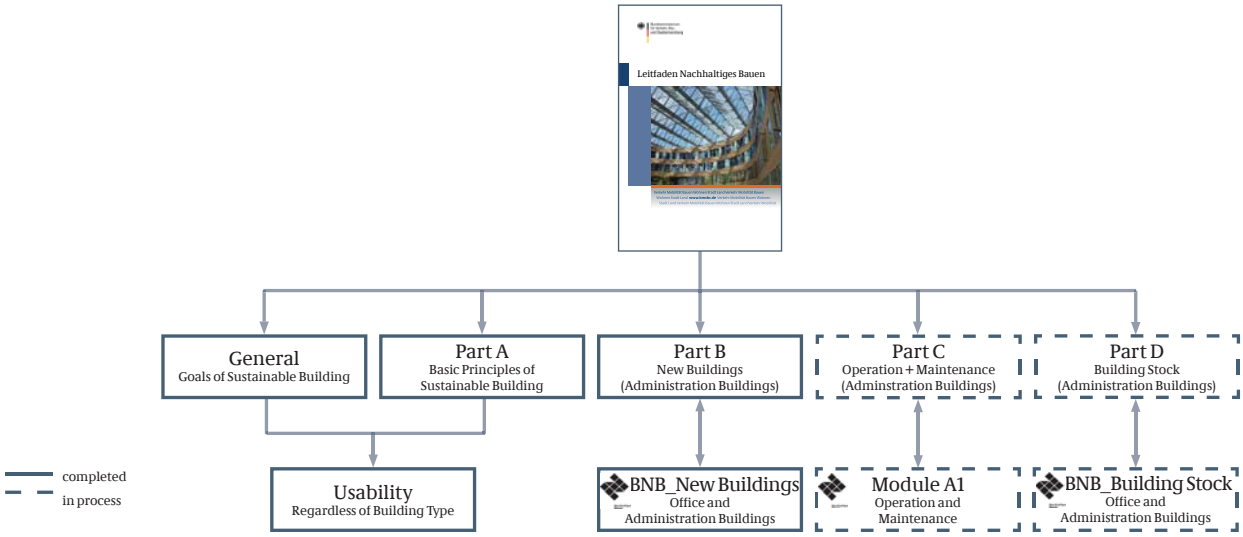
All other federal buildings in the german territory are dealt with by the building authorities of the federal States by means of administrative agreements between the Federal Government and the Federal States (based on fiscal administration law).



The performance of the coordination of sustainability in the planning phase, the assessment and the conformity testing is an ongoing task of the Federal Building Authority. Until the end of 2011 the BBSR executes the conformity testing on an interim basis.

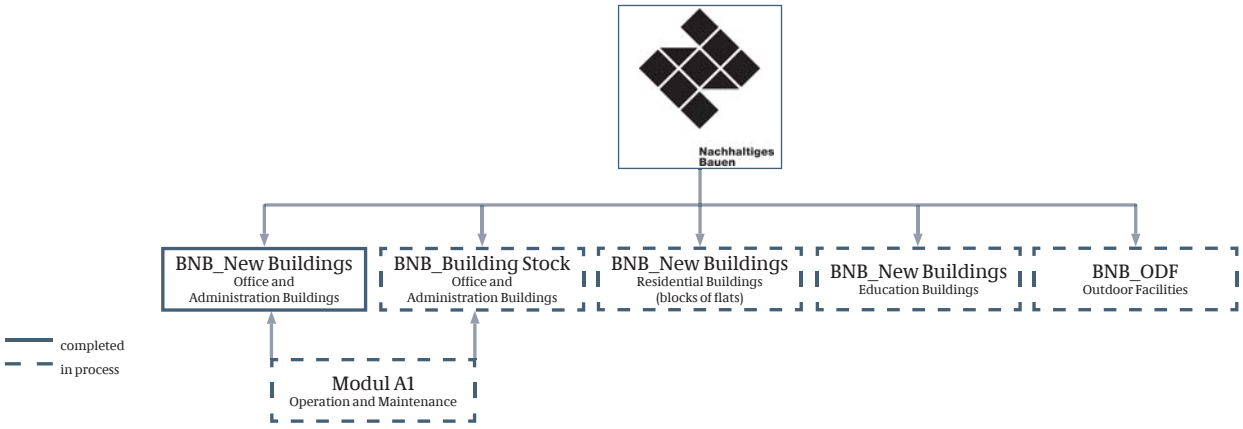
Within the framework of the implementation of the Guideline and the Assessment System for Sustainable Bulding, further training was offered to users in the respective operative building authorities.

Guideline and Assessment System for Sustainable Building



In the year 2001 the Federal Ministry of Transport, Building and Urban Development (BMVBS) introduced the first "Guideline for Sustainable Building" which provides a clear statement of requirements for the building sector, influenced by the final report of the committee of inquiry "Protection of People and the Environment" in 1998. The Guideline for Sustainable Building updated in 2011 offers in a first step a concrete practical aid for the planning and the construction of federally owned properties. The structural maintenance, the operation and the utilisation (Part C and D) are still in process and the imlementation of these parts is planned for the first half of 2012. Moreover it serves as a working aid for the implementation of the holistic approach in connection with federal building activities for which the application of the guideline is mandatory. It can also be used by other awarding authorities for construction, such as the Federal States, municipalities or the private sector.

The reissue of the Guideline for Sustainable Building integrates a method for a sustainable assessment - the BNB - for the first time and defines the silver-level as a minimum requirement.



The BNB is an "Assessment System for Sustainable Building" especially for federal buildings. The existing assessment profil for new office and administrative buildings will be further developed for application with other types of buildings and kinds of utilisation. Consequently, benchmarks and specific requirements for new built residential buildings, educational buildings and outdoor facilities are being developed, as well as a system for existing buildings. Furthermore, it shall be continuously revised to reflect results of current research and to accommodate changes in the area of statutory regulations, standardisation and the "Round Table Sustainable Building".

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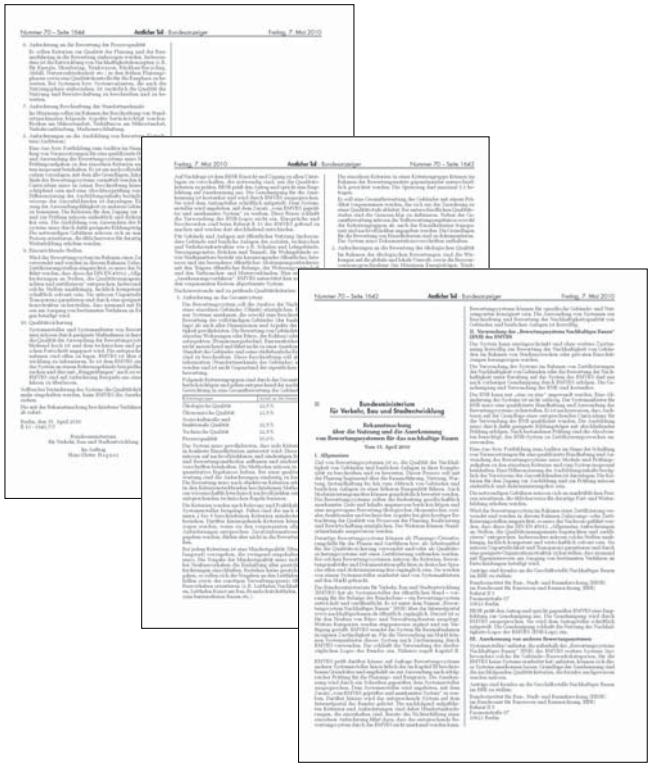
National Quality Requirements for Assessment Systems

Announcement about using and acceptance of assessment systems for sustainable building

In April 2010 the Federal Ministry of Transport, Building and Urban Development has announced several informations about the using-conditions of the BNB-System for provider of the private sector and rules for acceptance and recommendation of private assessment systems for sustainable buildings by the ministry. The idea of the announcement is the installation of a high standard of sustainability to the building sector in germany. The review and recommendation of private assessment systems by the Federal Government, is the first effort for a transparent policy and quality control.

The announcement is structured in three main-parts:

- General
- Using-conditions of the Assessment System for Sustainable Building (BNB)
- Acceptance of different assessment systems



Part I: General

- Information about complexity of assessment systems
- Informations about the holistic approach
- Informations about the BNB and using the logo (“N”) for private stakeholders
- Conditions of review BBSR / BMVBS
- Acceptance of different building profiles
- Requirements for not acceptance

Part II: Using-conditions of the Assessment System for Sustainable Building (BNB)

- Requirements for the education of auditors
- Requirements for certifying bodies
- Using the logo (“N”)
- Quality Control

Part III: Acceptance of different assessment systems

- Requirements for the hole assessment system
- Ecological quality requirements
- Economical quality requirements
- Social-cultural and functional quality requirements
- Technical quality Requirements
- Requirements for the assessment of the process quality
- Requirements for the describtion of local profiles
- Requirements for the education of auditors
- Requirements for certifying bodies
- Quality control

Accepted Stakeholders

- for part II: Steinbeis-Transfer-Institut, BNB
- for part III: German Sustainable Building Council (DGNB), building profile for new office buildings

In verification

- for part III: German Sustainable Building Council (DGNB), building profiles for new hotels, office building refurbishment, new industrial and retail buildings

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Federal Sustainable Buildings “Made in Germany”

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Federal Sustainable Buildings "Made in Germany"

Implementation and application of the Assessment System for Sustainable Building

In 2008, the Federal Ministry of Transport, Building and Urban Development (BMVBS), in co-operation with the German Sustainable Building Council e. V. (DGNB), and with the scientific support of the Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR), developed a national assessment system for the new construction of office and administration buildings. With the introduction of the revised Guideline for Sustainable Building 2011, the federal government undertakes to apply the Assessment System for Sustainable Building (BNB) for the new construction of non-military federal building projects.

A degree of fulfilment of 65%, corresponding to Category Silver, is targeted. Starting from the basis of the present system, sustainability assessment will be further developed for additional utilisation categories, building stock, outdoor facilities and for the utilisation and operation of buildings and properties. These systems are evaluated in pilot applications. The existing assessment system for the new construction of office and administration buildings is individually adjusted to the special prerequisites, requirements and objectives of the various categories. The results will be published on the information portal www.nachhaltigesbauen.de.

BNB_New Buildings
Office and Administration Buildings

The assessment system was evaluated in two pilot phases with a total of eight government buildings. With the introduction of the Guideline, the BNB is currently being applied in nine new building projects, starting with the early planning phase.

1	Paul-Wunderlich-Haus	Eberswalde	Completion 2007
2	Regionshaus	Hannover	Completion 2007
3	Umweltbundesamt	Dessau	Completion 2005
4	Bundesamt für Strahlenschutz	Berlin	Completion 2009
5	Bundesministerium für Gesundheit	Bonn	Completion 2007
6	Institutsgebäude	Darmstadt	Completion 2004
7	Hauptzollamt	Rosenheim	Completion 2007
8	Justizzentrum	Chemnitz	Completion 2008
9	Hauptzollamt	Hamburg	Completion 2011
10	Bundesministerium für Bildung und Forschung	Berlin	Completion 2014
11	Umweltbundesamt	Berlin-Marienfelde	Completion 2019
12	Bundesamt für Strahlenschutz, Extension Building	Salzgitter	Planning stage
13	Umweltbundesamt, Extension Building	Dessau	Planning stage
14	Deutsches Zentrum für Luft- und Raumfahrt	Köln	Planning stage
15	UN Campus	Bonn	Planning stage
16	Bundesamt für Justiz	Bonn	Completion 2016
17	Finanzamt	Garmisch-Partenkirchen	Completion 2011

BNB_New Buildings_Education Facilities

The BNB was adjusted for the assessment of education facilities. The pilot phase involving a total of seven buildings is expected to be completed in the first quarter of 2012.

18	Technologiezentrum Holz	Hamburg	Completion 2011
19	Lehrsaalgebäude Uckermark-Kaserne	Prenzlau	Under construction
20	Bildungs- und Gemeinschaftszentrum	Hamburg	Completion 2011
21	Campus Handwerk	Bielefeld	Completion 2015
22	Grundschule	Lünen	Completion 2011
23	Volks- und Musikhochschule /Studienzentrum	Neuss	Completion 2011
24	Hörsaal- und Laborgebäude	Erfurt	Completion 2011
25	Hörsaal- und Verfügungsgebäude	Regensburg	Completion 2011

BNB_Building Stock
Office and Administration Buildings

The pilot phase for the assessment of comprehensive measures involving existing buildings with a total of three projects is expected to be completed at the beginning of 2012. Two buildings currently undergoing renovation will be monitored by the system.

26	Umweltbundesamt	Berlin-Bismarckplatz	Planning stage
27	Bundessozialgericht	Kassel	Completion 2010
28	Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz	Bonn	Completion 2002
29	Bundesamt für Landwirtschaft und Ernährung	Bonn	Completion 2004
30	Deutsche Botschaft	Washington	Completion 2014

BNB_Module_Operation and Maintenance

The evaluation of the system is taking place at three projects which had already been assessed in 2008 in the first pilot phase. Intriguing findings are anticipated from the assessment, e.g. of actual consumption under real-life conditions, which is expected to be published at the beginning of 2012.

31	Umweltbundesamt	Dessau	Completion 2005
32	Bundesamt für Strahlenschutz	Berlin	Completion 2009
33	Bundesministerium für Gesundheit	Bonn	Completion 2007

BNB_Outdoor Facilities on Federal Properties

Five projects are included in the evaluation of the newly developed assessment system for outdoor facilities on federal property. The results are expected to be presented at the beginning of 2012.

34	Umweltbundesamt	Berlin-Marienfelde	Completion 2019
35	Bundesministerium für Wirtschaft und Technologie	Berlin	Completion 2000
36	Innenhofgestaltung Deutscher Bundestag	Berlin	Completion 2011
37	Bundesamt für Naturschutz	Bonn	Completion 2006
38	Pinonierschule	Ingolstadt	Completion 2009

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Information Portal Sustainable Building | www.nachhaltigesbauen.de

A wide variety of information on the subject of sustainable building is available at the Internet portal www.nachhaltigesbauen.de of the Federal Ministry of Transport, Building and Urban Development (BMVBS).

Here, general explanations and statements regarding sustainable building can be found as well as information about federal guidelines and working aids. Furthermore, the Assessment System for Sustainable Building is explained alongside extensive data for use as a basis for sustainability assessment. This offering is supplemented by information regarding research topics, current events and an array of good examples for sustainable building.

The information is as a rule available public. For the members of the Round Table of Sustainable Building there is a seperate login access available for additional information.

- News
- Sustainable Building
- Guidelines and Working Aids
- Building Material and Building Data
- Assessment System for Sustainable Building (BNB)
- Research
- Standardisation of Sustainability in Building
- Lead Market Initiative for Europe (LMI)
- Conferences and Events
- Best Practice
- Internal Member Area “Round Table”

GUIDELINES & WORKING AIDS

Different federal guidelines and working aids with various topics, e.g.

Sustainable Building
Fire Protection
Recycling

...and many more

LIFE CYCLE DATA BASES

ÖKOBAU.DAT.

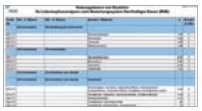
Data base with generic information on the ecological quality of building material (environmental indicators)

Link to Envirionmental Product Declarations (EPD)

by the Institute Construction and Environment e.V.
Data base with proved manufacturer based information on the ecological quality of building material (environmental indicators)

USEFUL LIFE

Data base with generic information on the average useful life of building material (environmental and economical indicators)



WECOBIS

Webbased ecological building material information system

Information to sanitary and ecological aspects of building material
Integration of the EPD-Data
Integration into other design and evaluation tools
Linkage to further information and data sources (e.g. WINGIS)

ASSESSMENT SYSTEM

Evaluation procedure for the comprehensive examination and of sustainability aspects of buildings

Assessment Method
Main criteria groups
Weighting
Parameter of relevance
Profiles of Criteria

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Guidelines and Working Aids of the Federal Government

Guideline for Sustainable Building 2011

Design Principles
Ecological Assessment
Efficiency
Health, Comfort and Socio-Cultural Issues
Tender / Building Construction
Operation, Use, Maintenance
Quality Management
Implementation of the Guideline

GUIDELINE FOR FIRE PROTECTION

contains advices and guidelines for the staff of the Federal Government Building Authorities and for the commissioned consultants.

GUIDELINE FOR ART IN ARCHITECTURE

contains guidelines for the cooperation with artists within civil works of the Federal Government.

Aims: Promoting the engagement for building culture and to strengthen art in architecture.

GUDELINE FOR ENERGY CERTIFICATES

contains basic information, representative buildings, calculation system, model calculation, plausibility check, result documentation and typical problems.

Appendix: Checklist, etc.

GUIDELINE FOR ENERGY-SAVING CONTRACTING

contains advice on call for tender, submisson preparation and -appraisal, contracting, work phases and procurement instruments.

PPP-MANUAL: GUIDELINE FOR PUBLIC PRIVATE PARTNERSHIPS

overview on essential measurements in PPP-projects (preparation, economic feasibility study, placing, contract management, ...).

FLOOD PROTECTION READER

contains codes of practice and guidelines for building precaution for concerned citizens, principles and documents for preventive flood protection.

GUIDELINE FOR INDOOR HYGIENE

contains hygienic requirements on everyday life at schools, indoor air pollution at schools, requirements on construction and indoor climate, guidelines and procedures for reconstruction.

WORKING AID FOR WASTEWATER

includes the design of wastewater systems, registration, appraisal and maintenance of existing wastewater systems of the existing properties of the Federal Government.

WORKING AID FOR SOIL AND GROUNDWATER PROTECTION

guideline for the planning and execution of the restoration of dangerous soil modification and groundwater pollution in the building stock of the Federal Government.

WORKING AID FOR RECYCLING

contains scopes and aims, definitions, legal foundations, deconstruction, new construction, handling of construction waste.

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Web-based Ecological Building Material Information System (WECOBIS)

WECOBIS

WECOBIS- Web-based Building Material Information System

A substantiated assessment and choice of construction products during the planning and construction phases is one of the main challenges for sustainable planning, construction and management of buildings.

WECOBIS has provided users with a comprehensive update since 2009. The system offers online links with further sources of information and data. WECOBIS offers structured and neutral information to health and ecological aspects of construction products. The system supports the observation of life cycle phases providing information for building product categories regarding the relevant raw material, production and manufacturing process, use and re-use of the products.

The webpage of wecobis, which has its origins already in 2000, is operated by the BMVBS in co-operation with the Bavarian Chamber of Architects (BayAK), and is organised by the office of BBSR.

Data content

WECOBIS provides comprehensive information on health, environmental and technical parameters as well possible applications with 165 data sheets for the following building product categories and basic construction materials. This allows a building material classification of most components of a building.

Building products category

- Building Boards
- Flooring
- Insulation
- Seals
- Timber and derived timber products
- Adhesives
- Solid Construction
- Mortar and Screeds
- Surface treatments
- Glazing

Basic Construction materials

- Binders
- Aggregates
- Plastics
- Metals

User Friendliness

The user friendliness of WECOBIS has a high priority. In future, more practical information for architects and planners will be offered:

- Tendering assistance
- Risk tables regarding environmental hazards
- Comparisons of sets of building product

The online presentation will allow for continuous updating. Technically this is achieved through a network of editors.

Online links

WECOBIS is linked to the Hazardous Materials Information System of the BG Bau (WINGIS) and other environmental information services.

Office

The WECOBIS administrative offices has been set up in the BBSR, Division II 6 – Civil Engineering – Construction and Environment.

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Life Cycle Analysis – Information and Tools

The German assessment methodology BNB uses a holistic assessment procedure which considers the life cycle of a building and a comprehensive quantification. This evaluation of sustainable construction requires the most diverse basis data. BMVBS therefore provides essential data, guidelines and practical tools for life cycle analysis, which ensure that sustainability criteria are included in planning and construction processes, and are comprehensively documented.

Ökobau.dat

Ökobau.dat was the first German database developed for construction products and processes providing information on their environmental impacts. At present 650 so-called stylesheets developed with support of the German construction materials industry offer information on the global and ecological effects and provide a simplified basis for data for the ecological evaluation of buildings. If IBU/ECO EPDs are available, these data are integrated in the Ökobau.dat. These data are usually used for further lifecycle assessment of building systems or the entire building.

Ökobau.dat is continuously updated, e. g. further stylesheets are implemented, background information (energy mix etc.) is adapted, and provided data will be adjusted to upcoming European Standard EN 15804.

Ökobau.dat is provided as free download on the German webpage of Sustainable Construction of BMVBS (www.nachhaltigesbauen.de).

Example: Data sheet Gypsum stone

Process data set: Gypsum stone (CaSO4-dihydrate); underground and open pit mining; production mix, at plant; grinded and purified product (en)	
Table of Contents: Process information - Modelling and validation - Administrative information - Inputs and Outputs	
Process information	
Key Data Set Information	
Location	DE
Reference year	2005
Name	Base name; Treatment, standards, routes; Mix and location types; Quantitative product or process properties Gypsum stone (CaSO4-dihydrate); underground and open pit mining; production mix, at plant; grinded and purified product
Use advice for data set	The data set represents a cradle to gate inventory. It can be used to characterise the supply chain situation of the respective commodity in a representative manner. Combination with individual unit processes using this commodity enables the generation of user-specific (product) LCAs.
Classification	Class name / Hierarchy level Materials production / Other mineralic materials
General comment on data set	The data set covers all relevant process steps / technologies over the supply chain of the represented cradle to gate inventory with a good overall data quality. The inventory is mainly based on industry data and is completed, where necessary, by secondary data. Copyright? Yes Owner of data setY (contact data set) PE INTERNATIONAL

Environmental Product Declarations

Environmental Product Declarations (EPD) offer the relevant basic data of environmental features of a product and hence, for assessing buildings on an ecological level. These manufacturer-orientated data are examined by an independent advisory board. Thus, a reliable and secure source of data is given for environmental and health related issues for construction products. The declaration testifies to what extent a product contributes to

- greenhouse effect,
- acidification,
- overfertilization,
- destruction of the ozone layer,
- smog,
- use of energy and resources.

Institute Construction and Environment

In Germany the examinations conducted by the Institute Construction and Environment e.V. (IBU), ensure that EPD are based on ISO standards and the currently established ECO EPD comply with the European Standard EN 15804.

Service Life of Construction Elements (Table)

For the sustainable buildings assessment the service life of construction elements predicted is decisive, as this determines the frequency calculated for the replacement of construction elements within a specified period.

Information regarding the service life of construction elements is given in the Guideline for Sustainable Building 2001. This information is continuously updated and provided as free download on the German webpage of Sustainable Construction of BMVBS (www.nachhaltigesbauen.de).

At the moment, the information given in the Guideline for Sustainable Building 2001 or the updated information given by BMVBS via its webpage has to be used within the BNB system for the evaluation of federal buildings, if no exact details are available from the planners or the product manufacturers.

Example: 340 Interior Wall (specified period of 50 years)

Code No.	Construction Element / Material	a	Replacement within 50a
	343 Interior Column		
343.111	Masonry Column	> 50	0
343.211	Concrete Column	> 50	0
343.311	Wood Column	> 50	0
343.411	Steel Column	> 50	0
	344 Interior doors and windows - interior door		
344.111	standard: wooden door, derived timber product, aluminium, synthetic material, steel, stainless steel	> 50	0
344.211	special door: glass, sound-proof, smoke control	> 50	0
344.311	fireproof door	> 50	0
344.312	special door: damp location	40	1
344.113	special door: sliding revolving	30	1
344.114	special door: automatic door	20	2

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Assessment System for Sustainable Building

Nachhaltiges Bauen


Zertifikat

SILBER

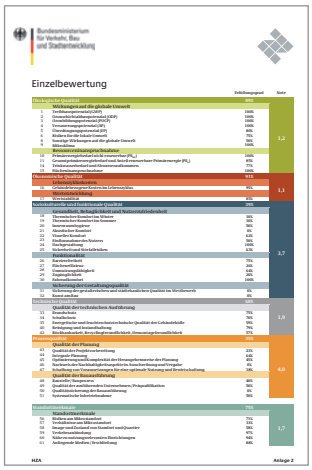
Nachhaltiges Bauen

Kategorie — Neubau Büro- und Verwaltungsgebäude
Version — 2008 - konsolidiert
Objekt — Hauptzollamt Rosenheim - Erweiterungsbau
Standort — Rosenheim
Fertigstellung — 2007
Bauherr — Bundesrepublik Deutschland
Auditor — Dipl.-Ing. Nicolas Kerz, Bundesinstitut für Bau-, Stadt- und Raumforschung im BBR
Architekt / Planer — Staatliches Bauamt Rosenheim

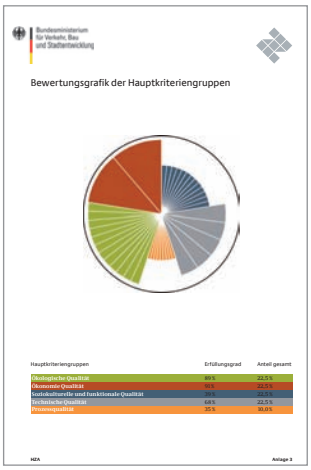
Bewertungsnummer ausgestellt am — V 2008_ kon_ 0001 16.02.2010

Günther Hoffmann
Leiter der Abteilung Bauwesen, Bauwirtschaft und Bundesbauten im BMVBS

Certificate, Cover Sheet


Einzelbewertung

Certificate, Appendix 2


Bewertungsgrafik der Hauptkriteriengruppen

Certificate, Appendix 3

The Federal Ministry of Transport, Building and Urban Development (BMVBS) has developed, as part of a two-year collaboration with the German Sustainable Building Council (DGNB), an initial criteria checklist for the comprehensive assessment of sustainability aspects for building.

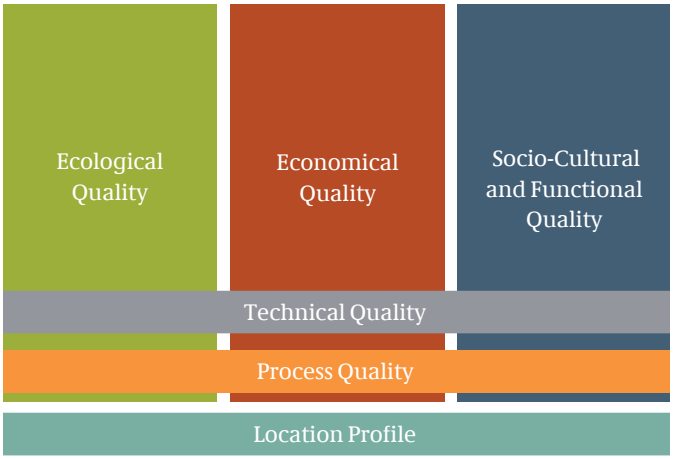
The "Assessment System for Sustainable Building" of the BMVBS for the building stock of the Federal Government is an overall assessment procedure for newly built office and public administration buildings. The assessment system is published and updated on the website "Sustainable Building" of the BMVBS (www.nachhaltigesbauen.de).

The planning-based assessment system is distinguished for its comprehensive consideration of the entire life cycle of buildings. Not only ecological, economical, social and cultural qualities are evaluated, but also technical and procedural aspects.

For the main grading (mark) the building is considered as the system boundary. The assessment of building qualities is accomplished in accordance with transparent rules and objective, essentially quantitative methods.

The aim of sustainable building is the protection of common property such as environment, natural resources, health, culture and capital. The classical three dimensions of sustainability – ecology, economy and the socio-cultural aspects - which also influence the quality evaluation of buildings - deduce from these subjects of protection.

Furthermore, the technical qualities and process qualities have to be considered, which influence the entire scope of sustainability.



Ecological Quality	22,5 %
Economical Quality	22,5 %
Sozio-Cultural and Functional Quality	22,5 %
Technical Quality	22,5 %
Process Quality	10,0 %
Location Attributes	-- %

This six qualities are exactly defined by criteria profiles and organised in main criteria groups. The weighing of the criteria against one another is accomplished with the aid of a factor of relevance. According to the achieved degree of performance, a certificate can be obtained in bronze, silver and gold.

The site characteristics are identified in a separate note.

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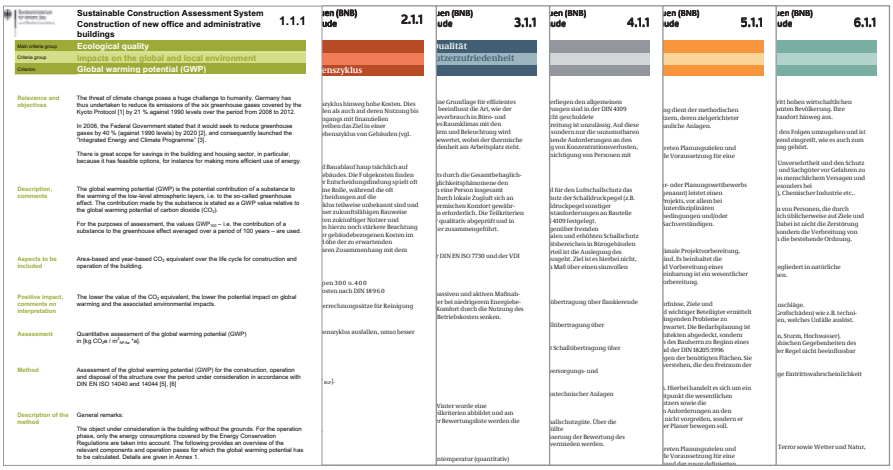
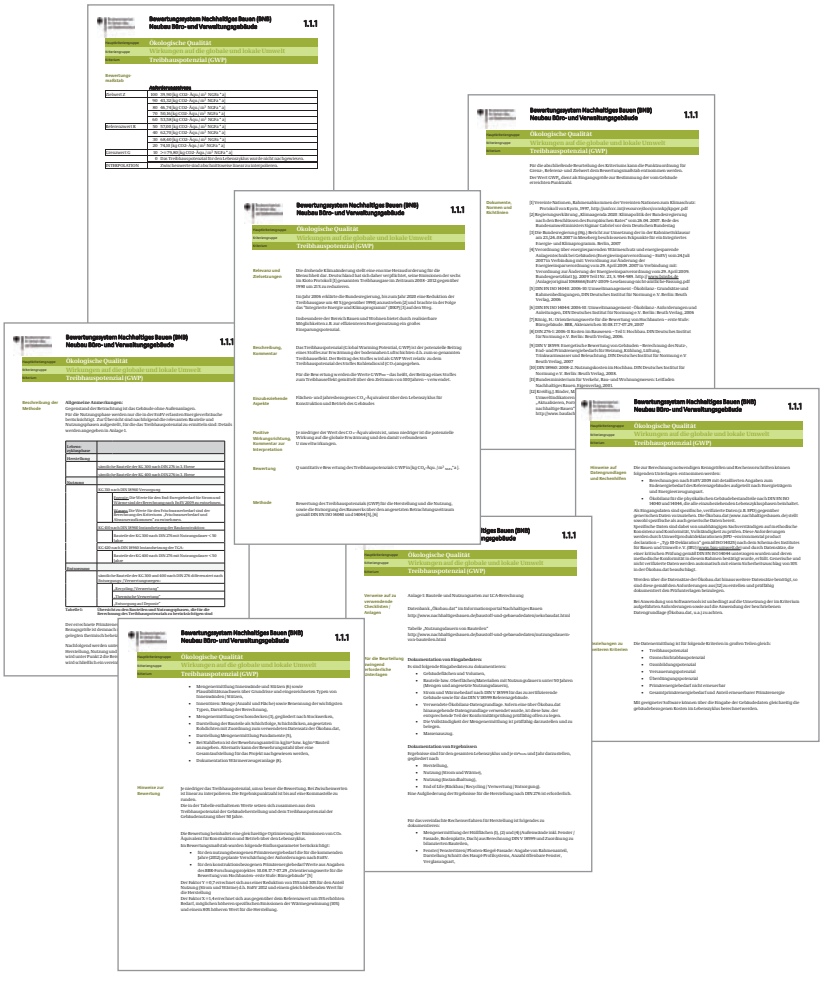
Assessment System for Sustainable Building | Profiles of Criteria

The specific quality requirement of Sustainable Building are described and assessed by 46 individual criteria embedded within the 6 Main Criteria Groups:

- Ecological Quality
- Economical Quality
- Socio-Cultural and Functional Quality
- Technical Quality
- Process Quality
- Location Profile





Structural Setup of Criteria

Relevance and Objectives
Description, Comments
Positive Total Effects
Assessment
Method of Assessment
Documents, Standards, Guidelines
Information on Datasets, Calculation Aids
Mandatory Documents
Scale of Assessment
Appendices

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Assessment System for Sustainable Building | Criterias

6 Main Criteria Groups

- Ecological Quality
- Economical Quality
- Socio-Cultural and Functional Quality
- Technical Quality
- Process Quality
- Location Profile

11 Criteria Groups

- Effects on Global and Local Environment
- Demand of Resources and Amount of Waste
- Life Cycle Costs
- Performance
- Health, Comfort and User Satisfaction
- Functionality
- Ensuring Design Quality
- Technical Execution
- Management and Design Process
- Building Construction Process
- Location Profile

46 Criteria_New Buildings: Office and Administration Buildings (Version 2011_1)

Ecological Quality

Effects on Global and Local Environment

- 1.1.1 Global Warming Potential (GWP)
- 1.1.2 Ozone Depleting 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 Logging / Wood

Demand of Resources and Amount of Waste

- 1.2.1 Primary Energy Demand Not Renewable (PE_{ne})
- 1.2.2 Total Primary Energy Demand (PE_{ges}) and Amount of Renewable Energy (PE_{e})
- 1.2.3 Fresh Water Demand and Quantity of Wastewater
- 1.2.4 Demand of Space

Economical Quality

Lifecycle Costs

- 2.1.1 Building-related Life Cycle Costs

Performance

- 2.2.1 Value Stability

Socio-Cultural and Functional Quality

Health, Comfort and User Satisfaction

- 3.1.1 Thermal Comfort in Winter
- 3.1.2 Thermal Comfort in Summer
- 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 Building-related Outdoor Quality
- 3.1.8 Safety and Incident Risks

Functionality

- 3.2.1 Barrier-free Building
- 3.2.2 Space Efficiency
- 3.2.3 Capability of Conversion
- 3.2.4 Public Accessibility
- 3.2.5 Bicycle Comfort

Ensuring Design Quality

- 3.3.1 Design and Urban Quality
- 3.3.2 Art in Architecture

Technical Quality

Technical Execution

- 4.1.1 Sound Insulation
- 4.1.2 Heat Insulation and Protection against Condensate
- 4.1.3 Cleaning and Maintenance
- 4.1.4 Dismantling, Separation and Utilisation

Process Quality

Management and Design

- 5.1.1 Project Preparation
- 5.1.2 Integrated Design
- 5.1.3 Optimisation and Complexity of Planning
- 5.1.4 Sustainability Issues in Tender and Placing
- 5.1.5 Requirements for an Optimal Utilisation and Management

Building Construction

- 5.2.1 Building Site / Building Process
- 5.2.2 Quality Assurance of the Building Construction
- 5.2.3 Controlled Commissioning

Location Profile

Location Profile

- 6.1.1 Risks at the Micro-Site
- 6.1.2 Conditions at the Micro-Site
- 6.1.3 Image and Character of Location and Quarter
- 6.1.4 Public Transport Connections
- 6.1.5 Vicinity to Use-Specific Services
- 6.1.6 Supply Lines / Site Development

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Assessment System for Sustainable Building | Further Development

BNB_New Buildings: Education Facilities

Pilot phase August 2011 - December 2011

1.1.1	Global Warming Potential
1.1.2	Ozone Depletion Potential
1.1.3	Photochemical Ozone Creation Potential
1.1.4	Acidification Potential
1.1.5	Eutrophication Potential
1.1.6	Risks to the Local Environment
1.1.7	Sustainable Logging / Wood
1.2.1	Primary Energy Demand Not Renewable (PEnre)
1.2.2	Total Primary Demand (PEtot) and Amount of PEre
1.2.3	Fresh Water Demand and Quantity of Wastewater
1.2.4	Demand of Space
2.1.1	Building-related Life Cycle Costs
2.1.2	Prevention of Vandalism
2.2.1	Stability of Value
3.1.1	Thermal Comfort in Winter
3.1.2	Thermal Comfort in Summer
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	Building-related Outdoor Qualities
3.1.8	Safety and Incident Risks
3.1.9	Interior Qualities
3.1.10	Flexibility of Use and Ease of Accustomisation
3.2.1	Barrier-free Building
~~3.2.2~~	~~Space Efficiency~~
~~3.2.3~~	~~Capability of Conversion~~
3.2.4	Public Accessibility
3.2.5	Bicycle Comfort
3.3.1	Design and urban Quality
3.3.2	Art in Architecture
~~4.1.1~~	~~Sound Insulation~~
4.1.2	Heat Insulation and Protection against Condensate
4.1.3	Cleaning and Maintenance
4.1.4	Dismantling, Separation and Utilisation
5.1.1	Project Preparation
5.1.2	Integrated Design
5.1.3	Optimisation and Complexity of Planning
5.1.4	Sustainablity Issues in Tender and Placing
5.1.5	Requirements for Utilisation and Management
5.2.1	Building Site / Building Process
5.2.2	Quality Assurance of the Building Construction
5.2.3	Controlled Commissioning
~~6.1.1~~	~~Risks at the Micro-Site~~
6.1.2	Conditions at the Micro-Site
~~6.1.3~~	~~Image and Character of Location / Quarter~~
6.1.4	Public Transport Connections
6.1.5	Vicinity to Use-Specific Services
6.1.6	Supply Lines / Site Development

BNB_Building Stock: Office and Administration Buildings

Pilot phase August 2011 - December 2011

1.1.1	Global Warming Potential
1.1.2	Ozone Depletion Potential
1.1.3	Photochemical Ozone Creation Potential
1.1.4	Acidification Potential
1.1.5	Eutrophication Potential
1.1.6	Risks to the Local Environment
1.1.7	Sustainable Logging / Wood
1.2.1	Primary Energy Demand Not Renewable (PEnre)
1.2.2	Total Primary Demand (PEtot) and Amount of PEre
1.2.3	Fresh Water Demand and Quantity of Wastewater
1.2.4	Demand of Space
2.1.1	Building-related Life Cycle Costs
2.2.1	Stability of Value
3.1.1	Thermal Comfort in Winter
3.1.2	Thermal Comfort in Summer
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	Building-related Outdoor Qualities
3.1.8	Safety and Incident Risks
3.2.1	Barrier-free Building
3.2.2	Space Efficiency
3.2.3	Capability of Conversion
3.2.4	Public Accessibility
3.2.5	Bicycle Comfort
3.3.1	Architectural Competition
~~3.3.2~~	~~Art in Architecture~~
3.4.1	Cultural Value
3.4.2	Design and Urban Quality
4.1.1	Sound Insulation
4.1.2	Heat Insulation and Protection against Condensate
4.1.3	Cleaning and Maintenance
4.1.4	Dismantling, Separation and Utilisation
5.1.1	Project Preparation
5.1.2	Integrated Design
5.1.3	Optimisation and Complexity of Planning
5.1.4	Sustainablity Issues in Tender and Placing
5.1.5	Requirements for Utilisation / Management
5.1.6	Building Diagnosis and Dismantling Strategy
5.1.7	Dismantling
5.2.1	Building Site / Building Process
5.2.2	Quality Assurance of the Building Construction
5.2.3	Controlled Commissioning
6.1.1	Risks at the Micro-Site
6.1.2	Conditions at the Micro-Site
6.1.3	Image and Character of Location / Quarter
6.1.4	Public Transport Connections
6.1.5	Vicinity to Use-Specific Services
6.1.6	Supply Lines / Site Development

BNB_Module: Operation and Maintenance

Pilot phase August 2011 - December 2011

The supplementary module is included in the classifications of the BNB New Buildings Certification as a process quality in accordance with 5.1 "Quality of planning" and 5.2 "Quality of execution", with the sequence number 5.3 "Process quality in utilisation". The success of the planning will thus be additionally tested under real-life conditions.

5.3.1	Analysis of User Satisfaction
5.3.2	Energy and water consumption monitoring
5.3.3	Cost Controlling
5.3.4	Inspection, Maintenance and Security Measures
5.3.5	Cleaning with Respect to Health and Environment
5.3.6	Qualification of Staff
5.3.7	Object Documentation regarding Life Cycle
5.3.8	Information and Motivation of Users
5.3.9	Thermal Energy Consumption
5.3.10	Power Consumption
5.3.11	Fresh Water Consumption
5.3.12	User Satisfaction
5.3.13	Electric / Thermal Energy consumption related CO2-Emission
5.3.14	Indoor Air Quality

BNB_Outdoor Facilities on Federal Properties

Pilot phase August 2011 - December 2011

1.1.1	Environmental Impacts
1.1.2	Risks to the Local Environment
1.1.3	Vegetation
1.1.4	Biodiversity
1.1.5	Logging
1.2.1	Energy
1.2.2	Soil
1.2.3	Water
2.1.1	Outdoor Facilities related Life Cycle Costs
2.2.1	Cost-optimised Use
3.1.1	User's comfort in Outdoor Facilities
3.2.1	Pedestrian and Bicycle Comfort
3.3.1	Dealing with Infrastructural Facilities
4.1.1	Care and Maintenance
4.1.2	Re-use and Recycling
4.1.3	Sustainable Material and Construction
5.1.1	Project Preparation and Inventory
5.1.2	Integrated Design
5.2.1	Building Site / Building Process
5.2.2	Quality Assurance of the Building Construction
5.3.1	Quality of Outdoor Facilities´ Management
6.1.1	Conditions and Risks at the Micro-Site
6.1.2	Diversity of Exterior
6.1.3	Public Integration and Accessibility

System variants for the building stock and additional utilisation categories are being developed on the basis of the fundamentals of BNB_ New Buildings_Office and Administration Buildings.

The system is being adjusted thereby to the prerequisites and special features of the different utilisation categories. New criteria were developed for the assessment of additional modules such as the sustainable operation and maintenance of real estate property and the planning of outdoor facilities. The system variants presented are being tested on measures which have already been implemented.

The assessment of further utilisation categories and the expansion of the assessment to include existing buildings are planned.

Criterion adopted | Criterion modified | Criterion new | ~~Kriterium~~ Criterion dropped

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Assessment System for Sustainable Building | Federal Enviroment Agency

Nachhaltiges Bauen

Federal Enviroment Agency Dessau

Client	Federal Republic of Germany
Architect	Sauerbruch Hutton, Berlin
Auditor	Holger König, Dr. Günter Löhnert, Prof. Thomas Lützkendorf, Prof. Alexander Rudolphi
Completion	2005
Gross Floor Area	36.623 m²

Cost

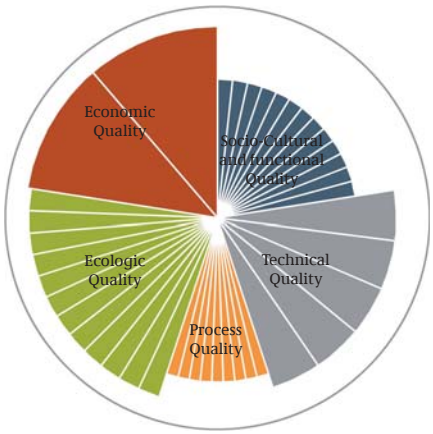
Building Cost Total	68,3 Mio. €
Life Cycle Cost	
Production Cost	1.311 €/m² GFA
Cash Value of Occupancy Cost	1.097 €/m² GFA

Energy / Ecology

Primary Energy Demand / DIN V 18599	73,1 kWh/(m² a)
Energetic Quaility of the Building Closure HT	0,57 W/(m² K)

Life Cycle Analysis

Total Primary Energy Demand PEges	157 kWH/(m² NFAa)
Primary Energy Demand not Renewable PEne	136 kWH/(m² NFAa)
Amount of Renewable Energy Demand PEe	13,3 %
Global Warming Potential	27,6 kg CO_2-Äqu/(m² $_{NFA}$a)



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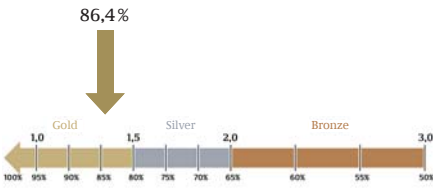

Degree of Performance

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Federal Ministry
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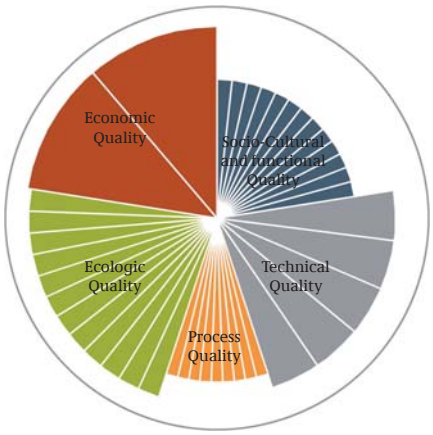
Assessment System for Sustainable Building | Paul-Wunderlich-Haus

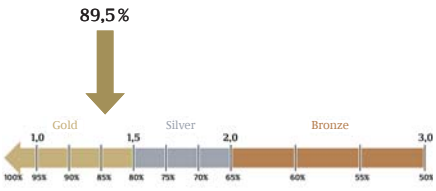
Nachhaltiges Bauen

Paul-Wunderlich-Haus Eberswalde

Client	District administration Barnim
Architect	GAP Gesellschaft für Architektur & Projektmanagement mbH, Berlin
Auditors	Holger König, Dr. Günter Löhnert, Prof. Thomas Lützkendorf
Completion	2007
Gross Floor Area	22.218 m²
Cost	
Building Cost Total	24,9 Mio. €
Life Cycle Cost	
Production Cost	945 €/m² GFA
Cash Value of Occupancy Cost	893 €/m² GFA
Energy / Ecology	
Primary Energy Demand / DIN V 18599	100,8 kWh/(m² a)
Energetic Quality of the Building Closure HT	0,35 W/(m² K)
Life Cycle Analysis	
Total Primary Energy Demand PEges	157 kWH/(m² NFAa)
Primary Energy Demand not Renewable PEne	130 kWH/(m² NFAa)
Amount of Renewable Energy Demand PEe	17 %
Global Warming Potential	25,6 kg CO_2-Äqu/(m² $_{NFA}$a)



BNB_Neubau_V2008



Degree of Performance

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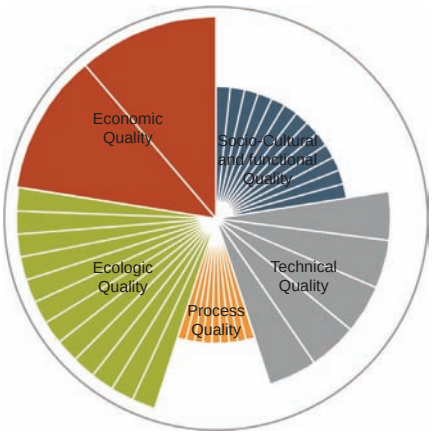
Assessment System for Sustainable Building | 2nd Pilot Phase

Nachhaltiges Bauen

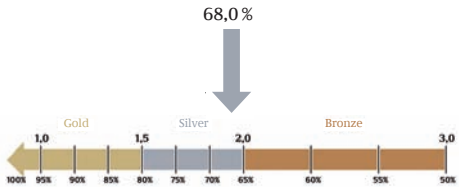
Object Grade 1,90 (Silver)

Main Customs Office Rosenheim

Client	Federal Republic of Germany
Architect	Staatliches Bauamt Rosenheim
Auditor	Dipl.-Ing. Nicolas Kerz, Federal Institute for Research on Building, Urban Affairs and Spatial Development
Completion	2007
Gross Floor Area	5.181 m²
Cost	
Building Cost Total	7,8 Mio. €
Life Cycle Cost	
Production Cost	1.084 €/m² GFA
Cash Value of Occupancy Cost	918 €/m² GFA
Energy / Ecology	
Primary Energy Demand / DIN V 18599	69,7 kWh/(m² a)
Energetic Quality of the Building Closure HT	0,71 W/(m² K)
Life Cycle Analysis	
Total Primary Energy Demand PEges	236,3 kWh/(m² NFA a)
Primary Energy Demand not Renewable PEne	115,4 kWh/(m² NFA a)
Amount of Renewable Energy Demand PEe	51,2 %
Global Warming Potential	21,3 kgCO_2-Äqu/(m² NFA a)



Assessment of Main Criteria Groups



Degree of Performance

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Federal Ministry
of Transport, Building
and Urban Development

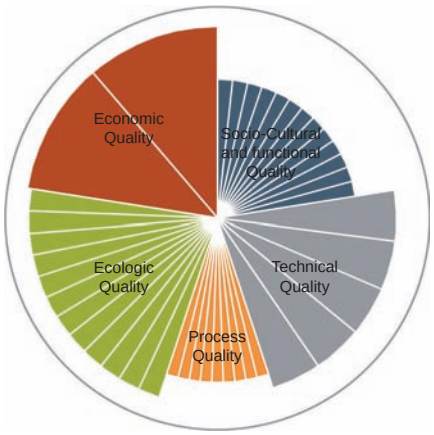
Assessment System for Sustainable Building | 2nd Pilot Phase

Nachhaltiges Bauen

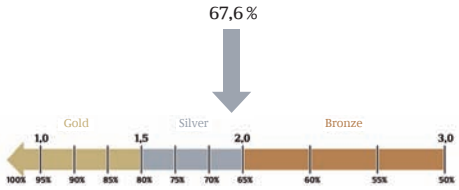
Object Grade 1,91 (Silver)

Federal Office for Radiation Protection Berlin

Client	Federal Republic of Germany
Architect	Cosa Nova Architekten, BDA, Berlin
Auditor	Prof. Ing. Alexander Rudolphi, GFÖB Berlin mbH
Completion	2009
Gross Floor Area	1.715 m²
Cost	
Building Cost Total	7,2 Mio. €
Life Cycle Cost	
Production Cost	1.378 €/m² $_{GFA}$
Cash Value of Occupancy Cost	1.242 €/m² $_{GFA}$
Energy / Ecology	
Primary Energy Demand / DIN V 18599	101,7 kWh/(m² a)
Energetic Quality of the Building Closure HT	0,42 W/(m² K)
Life Cycle Analysis	
Total Primary Energy Demand PEges	218 kWH/(m² $_{NFA}$a)
Primary Energy Demand not Renewable PEne	200 kWH/(m² $_{NFA}$a)
Amount of Renewable Energy Demand PEe	8 %
Global Warming Potential	47,2 kgCO_2-Äqu/(m² $_{NFA}$a)



Assessment of Main Criteria Groups



Degree of Performance

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Federal Ministry
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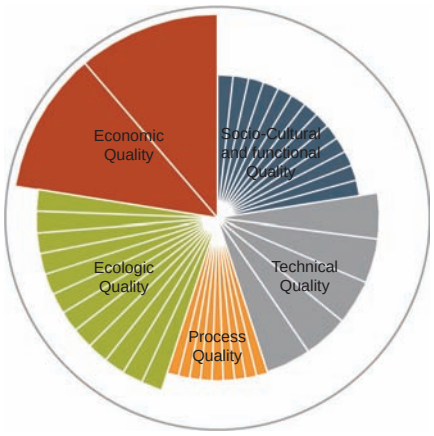
Assessment System for Sustainable Building | 2nd Pilot Phase

Nachhaltiges Bauen

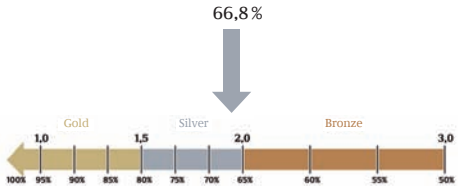
Object Grade 1,94 (Silver)

Federal Ministry of Health Bonn

Client	Federal Republic of Germany
Architect	Petzinka Pink Architekten, Düsseldorf
Auditor	Dipl.-Ing. Natalie Eßig, Technische Universität München
Completion	2007
Gross Floor Area	17.202 m²
Cost	
Building Cost Total	28 Mio. €
Life Cycle Cost	
Production Cost	1.093 €/m² $_{GFA}$
Cash Value of Occupancy Cost	1.109 €/m² $_{GFA}$
Energy / Ecology	
Primary Energy Demand / DIN V 18599	195,5 kWh/(m² a)
Energetic Quality of the Building Closure HT	0,78 W/(m² K)
Life Cycle Analysis	
Total Primary Energy Demand PEges	316,7 kWH/(m² $_{NFA}$a)
Primary Energy Demand not Renewable PEne	304,3 kWH/(m² $_{NFA}$a)
Amount of Renewable Energy Demand PEe	3,9 %
Global Warming Potential	73,9 kgCO_2-Äqu/(m² $_{NFA}$a)



Assessment of Main Criteria Groups



Degree of Performance

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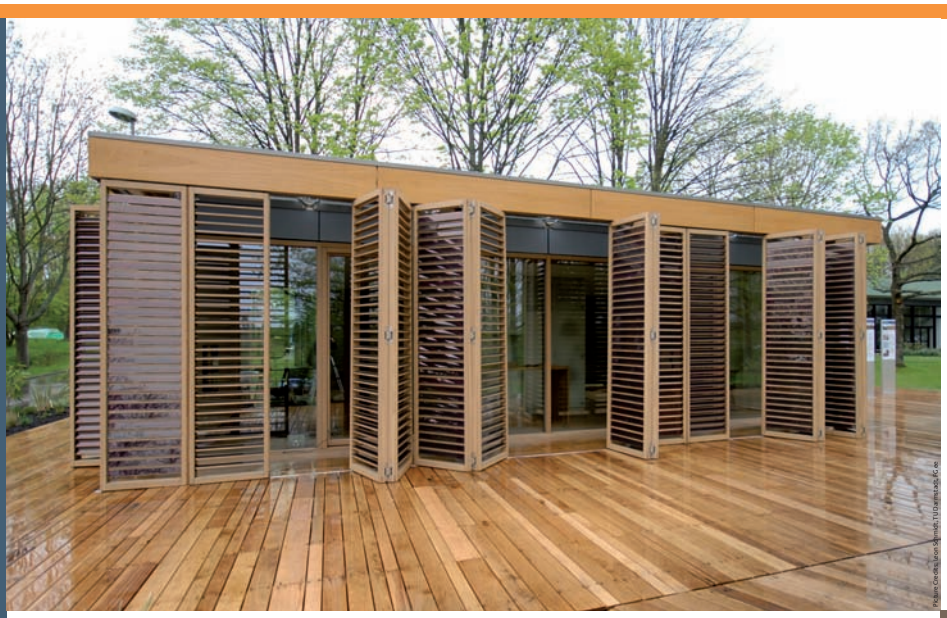

Solar Decathlon 2007

1st Prize

Universität Darmstadt

EnOB
Forschung für
Energieoptimiertes Bauen

Project Management and Organisation
Fachgebiet Entwerfen und Energieeffizientes Bauen
Prof. Manfred Hegger

Support
Fachgebiet Regenerative Energien
Prof. Thomas Hartkopf,

Fachgebiet Statik der Hochbaukonstruktionen
Prof. Johann-Dietrich Wörner,

TU München,
Fachgebiet Thermodynamik
Prof. Thomas Sattelmayer

1st prize in the international „Solar Decathlon 2007“ competition to find the most attractive and energy-efficient solar home in 2007 went to Germany. The competition rules require a fully energy-independent building with a floor area limited to 75 m² . The design is based on three basic ideas. Firstly, the principle of layering: The ground plan is sub-divided into various zones which are set like layers of an onion around an inner core. The differently temperature-controlled layers of the building envelope allow a differentiated display of the ground plan depending on the time of year (summer and winter house). Secondly, there is the platform concept for furniture and technology, similar to automotive construction: A false floor houses the building service components which can be added to the overall system according to the plug-in procedure. An equipment room for the building is no longer necessary. The false floor also serves as storage space for furniture which is crucial for the third topic of design: A quiet room should be created which can be perceived in its pure, actual form. The room can be used flexibly and is, in that sense, also sustainable. Afterwards this high-tech building was erected as a project office on the „Lichtwiese“ campus at TU Darmstadt, serving as an EnBau model project for detailed testing and optimisation in everyday use.

Key aspects: Heat insulation, facade systems, glazing + windows, daylight planning, ventilation + heat recovery, active cooling, regenerative + passive cooling, thermo-active building element systems, heat pump, heat / cold storage, control technology, operational management, building automation, solar thermal energy, photovoltaic, biomass utilisation, ecology of building materials.

Innovations: Vacuum insulation panels (VIP), thermo-active building systems using phase change materials (PCM), solar power generation (PV) integrated into the facade and roof and many other features ensure energy autonomy.

The German Federal Ministry of Transport, Building and Urban Development (BMVBS) promoted project-related work and studies. The performance of this high-tech building will now be measured and optimised in detail during normal building usage over several years within the scope of the research programme “EnOB – Research for Energy-Optimised Construction” sponsored by the German Federal Ministry of Economics and Technology (BMWi).

Further Details at www.enob.info

Solar Decathlon 2007 | 1st Prize

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ptj
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Forschungszentrum Jülich

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Federal Ministry
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European Solar Decathlon 2010

2nd Prize

EnOB
Forschung für
Energieoptimiertes Bauen

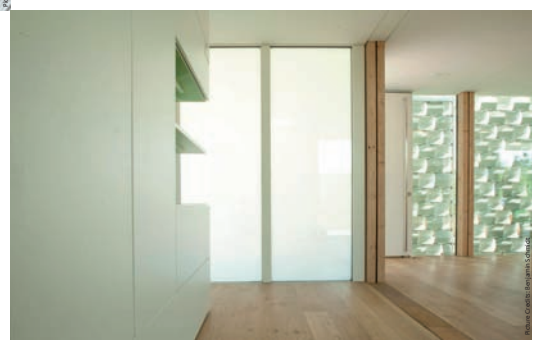
Hochschule Rosenheim

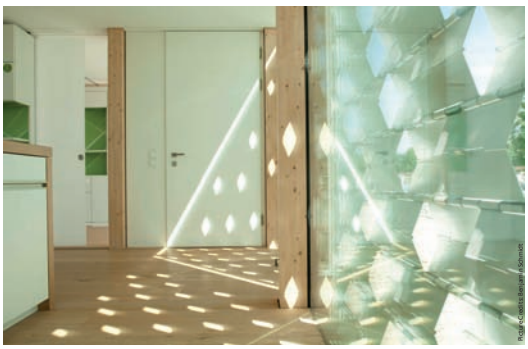
Fakultät für Innenarchitektur
Prof. Mathias Wambsganss

Fakultät für Angewandte Natur- und Geisteswissenschaften,
Studiengang Energie und Gebäudetechnologie
Prof. Dr. Harald Krause, Prof. Dr. Michael Krödel

Informatik, Prof. Dr. Gerd Beneken

Fakultät für Holztechnik und Bau,
Studiengang Innenausbau
Prof. Andreas Betz
Fakultät für Innenarchitektur
Prof. Ulrike Förschler, Prof. Franz Robold





The building's design concept developed by the Rosenheim university team is based on a modular structure. This produces a flexible and open floor plan. The building, which is designed as a home for two people, also provides enough space for two overnight guests and enables up to eight people to eat in the dining area. With its "serrated" facade, an entirely new facade and solar shading concept, the building's architecture is given an individual and expressive character. In addition, the solar shading can be adapted to meet the requirements and needs of the building and occupants during the course of the day and year. This creates a play of light and shade, and the facade continually shows a different face.The energy concept relies on excellent thermal insulation, a maximum of air tightness and efficient solar shading. At midday when the solar loads are greatest, the solar shading – which retracts into the ground – can be extended upwards from the ground as far as the eaves. The building is predominantly cooled using passive measures, whereby a film of water is directed across the sloping solar modules on the roof during the cool hours of the night. By means of thermal radiation and evaporative cooling, the water is cooled by up to 10 kelvin, is collected in a storage tank, and is then used during the day to provide ceiling cooling. In order to provide a buffer for peak loads, a newly developed channel is used with latent heat storage material (PCM). In air recirculation mode, a cooling output of 2 kW is achieved with a temperature difference of around 10 kelvin. And there is one more special feature: with this building, hot water is not provided from solar thermal collectors but using the process heat from a water-to-water heat pump.

Innovations: Modular wooden frame construction system with rigid and specially developed wood-to-steel adhesive bonds, Variable, retractable "serrated facade", Radiation and evaporative cooling across the roof surfaces in combination with a cooling ceiling, PCM latent heat storage system operated in recirculation mode, Flexible LED lamps (Plugit) that can be slotted into a ceiling grid, Multifunctional interior furnishings (kitchenette, room divider)

The Federal Ministry of Economics and Technology (BMWi) is the patron of the German entrants to the Solar Decathlon Europe competition, and has supported these university projects under the auspices of government energy research (the EnOB research initiative).

Further Details at www.enob.info

European Solar Decathlon 2010 | 2nd Prize

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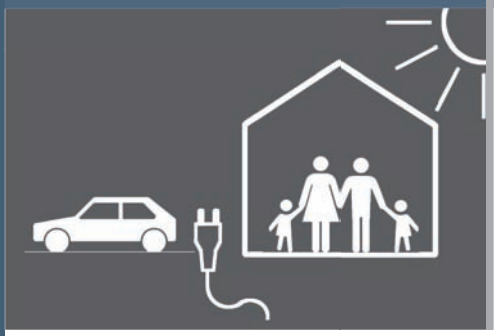
FORSCHUNGSINITIATIVE Zukunft BAU

Living and Mobility | Competition

Plus Energy House with E-mobility

Pilot project under the auspices of the Zukunft Bau [„Future in Construction“] research initiative



Open, interdisciplinary competition

for institutes of higher education in collaboration with planning offices

Central requirements:

- Energy supply for a 4-person household solely from environmental energies
- Energy networking of buildings and vehicles (approximately 29,000 km/year)
- Electrical storage capacity in connection with an intelligent network control
- Complete recyclability of the house

The design project submitted by the first prize winner has been under construction in Berlin since Spring 2011 and will undergo a two-year monitoring period under real-life conditions.

2nd PRIZE: The form of the building is compact and optimised for solar energy absorption. The PV modules are utilised for the design of the plus energy house in order to achieve a succinct autonomy. The well-dimensioned energy yield of the PV systems, in combination with a 30 kWh buffer storage unit, enables a self-use share of electricity generation of 53%. The integration of the user by means of touch screens, adaptive regulation options, etc. establishes a good coupling of building engineering with electric mobility.*

Technische Universität Dresden
Institute für Energietechnik, Gebäudelehre und Entwerfen, Bauklimatik, Elektrische Energieversorgung und Hochspannungstechnik, angewandte Informatik, Baubetriebswesen, Professur für Betriebliche Umweltökonomie
Prof. Dr.-Ing. Clemens Felsmann, Prof. Carsten Lorenzen, Dr.-Ing Rudolf Plagge, Prof.Dr.-Ing. Peter Schegner, Prof. Dr.-Ing. habil. Klaus Kabitzsch, Prof. Dr.-Ing. Rainer Schach, Prof. Dr. Edeltraut Günther
with HMX, Dresden

3rd PRIZE: The architectural and construction conception as city block is a convincing approach for the development of buildings and connections between buildings at the level of urban quarters. At this site, however, it leads to an almost completely closed south facade. The street facade shares a space-saving but nonetheless visible E-mobility concept with the cantilevered upper storey. The use of wood as construction material lends the building an air of being connected with nature. The overall energy management concept is good but, because of low storage capacities, only a 34% self-use share of the electricity generated is achieved.*

Universität der Künste Berlin
Institut für Architektur und Städtebau, Fachgebiet Konstruktives Entwerfen und Tragwerkslehre, Prof. Dr.-Ing. Christoph Gengnagel

Fachgebiet Versorgungsplanung und Versorgungstechnik, Prof. Dr.-Ing. Christoph Nytsch-Geuxen

with
Institut für urbanen Hochbau, Dipl. Ing Architekt Daniel Rozynski

Happold Ingenieurbüro GmbH, Berlin

SHORT-LISTED: The architectural concept relies on the integration of the „classical form“ of the house and new technologies. The southern roof and facade surfaces of the house with monocrystalline PV modules convey the energy mandate of the building. The supply air for the heat recovery system is pre-warmed by underflow of the PV modules. These are cooled thereby at the same time, thus enhancing their efficiency. The inclusion of the subsoil enables component cooling in the summer. The capacity of the buffer storage unit should be designed to be greater; a positive feature is the approach of an inductive loading station.*

Technische Universität Darmstadt
Fachbereich Architektur, Fachgebiet Entwerfen und Energieeffizientes Bauen, Prof. Manfred Hegger

TU Braunschweig, Institut für Gebäude- und Solartechnik, Univ. Prof. Dr.-Ing. M. Norbert Fisch

TU Darmstadt, Fachgebiet Tragwerksentwicklung Prof. Dr.äing.Karsten Tichelmann

with
HHS Planer + Architekten AG, Kassel

energydesign braunschweig GmbH, Braunschweig

*Excerpt from the assessment of the prize jury

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FORSCHUNGSINITIATIVE
Zukunft BAU

1st Prize

Universität Stuttgart

Institut für Leichtbau und Entwerfen,
Prof.Dr.-Ing. Dr.-Ing. E.h. Werner Sobek

Institut für Gebäudeenergetik,
Dipl.-Ing. Jörg Arnold

Lehrstuhl für Bauphysik,
Dipl.-Ing. Jan Paul Lindner

Institut für Arbeitswissenschaft und
Technologiemanagement,
Dipl.Physiker Florian Klausmann

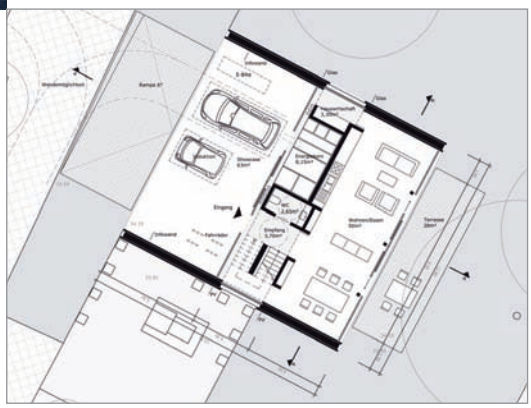
with
Werner Sobek Stuttgart GmbH, Stuttgart
Werner Sobek Green Technologies GmbH, Stuttgart

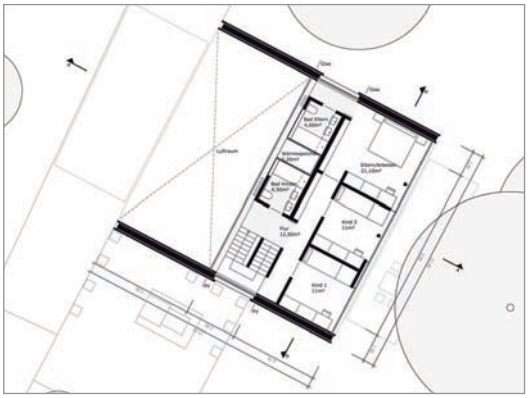
The Efficient House Plus represents a convincing combination of energy-efficient living and electric mobility.

The house has around 130 m² of living area, a terrace and a garden. A large combination living room and kitchen is to be found on the ground floor, while the upper floor has three bedrooms, a bathroom and a storage room. The floor plan structure with east-west orientation and a supply and interrelative link in the middle is convincing. The project combines in the sense of sustainable construction high quality of design and modern user comfort with energy-efficient construction technologies and renewable energy yield systems.

The form of the building is compact, the thermal insulation and the solar protection highly effective. The building has an efficient heating and cooling system in conjunction with a cistern. Energy is provided by means of photovoltaics, solar heat and a reversible heat pump, which optionally uses the air or the cistern as its energy source. With a buffer storage unit of 40 kWh, a good self-use of the electronic energy generated is possible (50%). The rapid-charging and storage concepts are coherently integrated. The interaction between user, house and vehicles is intelligently planned by means of smart-phone concepts, thus opening up the opportunity for trendsetting applications.

The project is being built as a model house for the Federal Ministry of Transport, Building and Urban Development with the scientific support of the Fraunhofer Society and the Berlin Institute for Social Research (BIS). Following a test phase, a four-member family is scheduled to live in the building for one year, beginning in 2012. The results are intended to be available for the broad-impact economic construction of this kind of building and for the further development of technical systems.





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Significant savings potential in refurbishment of existing buildings: dena's "Efficient Homes" pilot project

Existing buildings currently require an average of three times more energy for heating than new buildings. However, despite rising energy prices, the enormous potential for energy savings during refurbishment projects is often not sufficiently exploited.

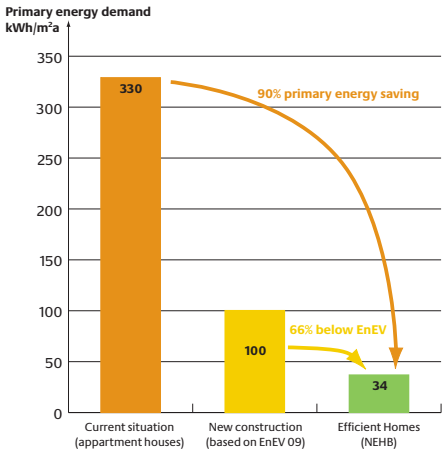
The dena "Efficient Homes" pilot project shows that high-efficiency refurbishments for sustainable buildings are not only technically feasible, but also economically worthwhile.

The goals

- To test and establish high-efficiency refurbishment standards, significantly lower than legal requirements
- To initiate lighthouse projects, which prepare the market and stimulate emulation
- To support the launch of innovative technologies onto the market
- To accelerate know-how transfer

The Concept

- Since 2003, high-efficiency refurbishments of more than 450 residential and non-residential buildings (to date)
- Scientific evaluation research
- Nationwide press and public relations



The energy saving in dena's „Effizient Homes"
pilot project 2008 amounted to up to 90 percent on average

Results

- Energy requirements of non-refurbished existing buildings can be reduced by up to 85 percent
- Energy-efficient refurbishments are not only technically feasible but also economically worthwhile. Apartment buildings in need of refurbishment up to the standard of "Effizienzhaus 70" ("Efficient Home 70") can be refurbished without any impact on the heating-inclusive rent.

dena's „Efficient Homes"

dena
German Energy Agen

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The new dena pilot project 2011:
"On the way to "EffizienzhausPlus" ("Efficient Homes Plus")"

The EU Buildings Directive requires that new buildings from 2019 to 2021 are constructed as low energy houses. In addition, according to the Federal Government's Energy Concept, the building stock in Germany should be almost climate-neutral by 2050.

Goals:

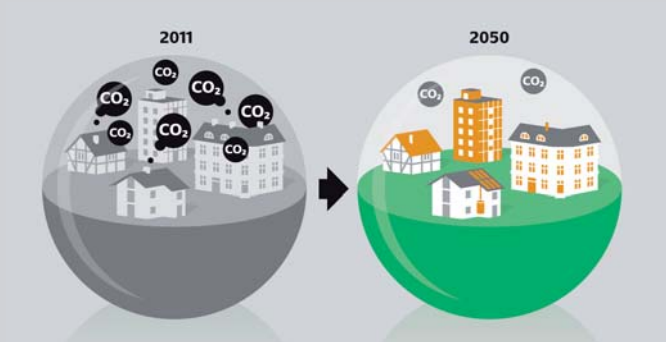
To lay the foundations for future climate-neutral standards for new construction and refurbishment, in order to determine how an almost climate-neutral standard in residential buildings can be achieved. The goal for refurbishment or new construction is: climate-neutral.

The Efficiency Standards:

- In new construction: better than a KfW Efficient House 40
- In refurbishment: better than a KfW Efficient House 55

The Efficiency Standards

- In new construction: better than a KfW Efficient House 40
- In refurbishment: better than a KfW Efficient House 55



By 2005, buildings in Germany should emit hardly any harmful greenhouse gases

Examples of Current Construction Projects:

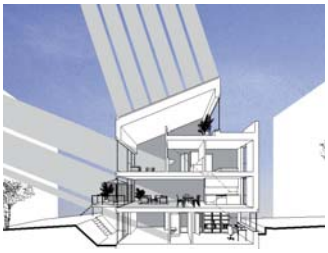
The Hamburg Kaffeemühle ("Coffee Mill")

- Increase of living space through an extension
- Refurbishment according to passive house criteria
- Use of renewable energies (wood pellet stove, solar thermal energy, PV)
- Sustainable building materials
- Preservation of architectural quality

ZEROPlus Buildings

Goal: energy and CO_2-neutral residential household

- Energy lifecycle assessment considers mobility, embedded energy of products, users' CO_2-emissions etc.
- Building envelope: passive house standard
- Heat pump, photovoltaic plant with digital power management



„Efficient Homes Plus"

dena
German Energy Agen

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