



# Development of European Ecolabel Criteria for Buildings

Technical norms - Existing initiatives - LCA of buildings

Laura Cutaia – APAT



## Summary

- Technical norms – work in progress
  - [CEN 350](#)
  - [ISO TC 59](#)
- Existing initiatives
  - Initiatives in the EU
  - International initiatives
  - Further initiatives
- [LCA of buildings](#)



## CEN TC 350 - Sustainability of construction works

- Objective of TC 350: development of voluntary horizontal standardised methods for the assessment of the sustainability aspects of new and existing construction works and for standards for the environmental product declaration of construction products.
- Generally applicable (horizontal) and relevant for the assessment of integrated performance of buildings over its life cycle.
- Harmonized methodology for assessment of
  - environmental performance of buildings
  - life cycle cost performance of buildings
  - quantifiable performance aspects of health and comfort of buildings.



## CEN 350

CEN 350 - Sub-structure

SC/WG	Title
CEN/TC 350/WG 1	Environmental performance of buildings
CEN/TC 350/WG 2	Building Life Cycle Description
CEN/TC 350/WG 3	Products Level



## CEN/TC 350

### Standards under development

Project reference	Title	Current status	DAV
prEN 15643-1	Integrated assessment of building performance - Part 1: General framework	Under Approval	
CEN/TC 350 /WG1 N015rev1	Assessment of environmental performance of buildings - Calculation methods	Under Development	2008-11
prEN 15804	Environmental product declarations - Product category rules	Under Approval	2010-02
	Environmental product declarations - Communication formats	Under Development	2010-04
	Environmental product declarations - Methodology and data for generic data	Under Development	2009-01
	Description of the building life cycle	Under Development	2009-10
prEN 15643-2	Integrated assessment of building performance - Part 2: Framework for the assessment of environmental performance	Under Development	2013-01



## ISO TC 59 – Building construction

- Standardization in the building field and civil engineering:
- general terminology for building and civil engineering;
  - organization of information in the design processes, manufacture and construction;
  - general geometric requirements for building, building elements and components including modular coordination and its basic principles, general rules for joints, tolerances and fits;
  - general rules for other performance requirements for buildings and building elements including the coordination of these with performance requirements of building components to be used in building and civil engineering;
  - geometric and performance requirements for components that are not in the scope of separate ISO technical committees.

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## ISO TC 59

### Subcommittees

Subcommittee	Subcommittee Title
<a href="#">TC 59/SC 2</a>	Terminology and harmonization of languages
<a href="#">TC 59/SC 3</a>	Functional/user requirements and performance in building construction
<a href="#">TC 59/SC 4</a>	Dimensional tolerances and measurement
<a href="#">TC 59/SC 8</a>	Joining products
<a href="#">TC 59/SC 13</a>	Organization of information about construction works
<a href="#">TC 59/SC 14</a>	Design life
<a href="#">TC 59/SC 15</a>	Performance criteria for single family attached and detached dwellings
<a href="#">TC 59/SC 16</a>	Accessibility and usability of the built environment
<a href="#">TC 59/SC 17</a>	Sustainability in building construction

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## ISO TC 59

### ISO TC 59/SC 17 - Subcommittees/Working Groups

Subcommittee/Working Group	Title
TC 59/SC 17/WG 1	General principles and terminology
TC 59/SC 17/WG 2	Sustainability indicators
TC 59/SC 17/WG 3	Environmental declaration of products
TC 59/SC 17/WG 4	Environmental performance of buildings
TC 59/SC 17/WG 5	Civil engineering works

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 <h1>ISO TC 59</h1> <p>Standards and projects of TC 59/SC 17</p>	
UD	<a href="#">ISO/FDIS 15392</a> General principles
P	<a href="#">ISO/TS 21929-1:2006</a> Sustainability indicators -- Part 1: Framework for development of indicators for buildings
P	<a href="#">ISO 21930:2007</a> Environmental declaration of building products
UD	<a href="#">ISO/CD 21931-1</a> Framework for methods of assessment for environmental performance of construction works -- Part 1: Buildings
P	<a href="#">ISO/TS 21931-1:2006</a> Framework for methods of assessment for environmental performance of construction works -- Part 1: Buildings
UD	<a href="#">ISO/AWI TR 21932</a> Buildings and constructed assets -- Sustainability in building construction - Terminology




## Existing initiatives

- In Europe
  - [UK – BREEAM](#)
  - [France – HQE](#)
  - [Swan Eco-labelling](#)
  - [Swiss – Minergie](#)
  - [Italy – Itaca](#)
  - [Spain](#)
  - [Germany – Guideline for Sustainable Building](#)
- Worldwide
  - [USA – LEED Rating Systems](#)
  - [Japan - CASBEE](#)
- Other initiatives
  - UNEP – SBCI (Sustainable Buildings and Construction Initiative)
  - iSBE (International Initiative for a Sustainable Built Environment) – Green Building Challenge
  - GB Tool
  - Annex 31
  - The LEnSE project

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## UK – BREEAM (BRE Environmental Assessment Method)

- The BREEAM assessment process was created in 1990 with the first two versions covering offices and homes. Versions are updated regularly in line with UK Building Regulations and different building versions have been created since its launch to assess various building types.
- These versions essentially look at the same broad range of environmental impacts:
  - Management
  - Health and Wellbeing
  - Energy
  - Transport
  - Water
  - Material and Waste
  - Land-use and Ecology
  - Pollution
- Credits are awarded in each of the above areas according to performance. A set of environmental weightings then enables the credits to be added together to produce a single overall score. The building is then rated on a scale of:
  - PASS, GOOD, VERY GOOD or EXCELLENT
  - and a certificate awarded to the development.

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## UK – BREEAM

- [BREEAM Bespoke](#) can assess buildings that fall outside the standard BREEAM categories, including leisure complexes, laboratories, higher & further education buildings and hotels at the design stage and post construction.
- [BREEAM Courts](#) can assess both new build and the major refurbishment of court buildings.
- The code for sustainable homes. In April 2007 the Code for Sustainable Homes replaced Ecohomes for the assessment of new housing in England. [BREEAM Ecohomes](#) can assess new homes, apartments/flats, and houses, apartments and flats undergoing major refurbishment at the design stage and post construction.
- [BREEAM ECOHOMES XB](#). A tool for housing associations and housing stock managers as a stock management aid for existing buildings.
- [BREEAM Industrial](#) can assess storage and distribution, light industrial units, factories and workshops at the design stage and post construction. BREEAM Industrial assessments can be carried out for:
  - New buildings
  - Design stage and post construction stages
  - Buildings undergoing major refurbishment

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## UK – BREEAM

- BREEAM International can assess a single development or BRE can also assist in creating a BREEAM version for a country or region outside of the UK.
- BREEAM Multi-Residential can assess student halls of residence, sheltered housing for the elderly, supported housing and hostel type accommodation at the design stage and post construction.
- BREEAM Prisons can assess high and standard security prisons, young offenders institutions, local prisons and women's prisons at the design stage and post construction.
- BREEAM Offices can assess new build or major refurbishment and existing offices, at the design stage, post construction and in use.
- BREEAM Retail can assess new build or major refurbishment, post construction, tenant fit-out, existing (occupied), management and operation.
- BREEAM Schools can assess new schools, major refurbishment projects and extensions at the design stage and post construction.



## France – HQE (Haute Qualité Environnementale)

- The Haute Qualité Environnementale or HQE® (High Quality Environmental standard) is a standard for green building in France, controlled by the Paris based Association pour la Haute Qualité Environnementale (ASSOHQE).
- The HQE standard was tested since 1994 on projects of residential buildings and not, and it was officially adopted in 1997 from HQE association. The HQE standard is based on the voluntary environmental certification systems according to the ISO 14000 norms.



## France – HQE (Haute Qualité Environnementale)

The HQE standard has two main topic of application:

- The environmental management system of the building project
- The environmental performances of buildings analysed through 14 “cibles” sub-divided into 4 groups:
  - Operations on the exterior environment (G1: Eco-Building; G2: Eco-Management);
  - Operations on the indoor environment (G3: comfort; G4: Health).



## Swan eco-labelling (Small houses)

- Ecolabel criteria for Small houses adopted in Denmark, Norway, Sweden, Finland and Iceland (v. 1.5, valid until the 31<sup>st</sup> of march 2010).
- Requirements regarding the building process, materials and energy consumption.
- The criteria for Small houses comprise a combination of obligatory requirements and point score requirements.
- To be awarded a Swan licence:
  - All obligatory requirements (O) must be fulfilled.
  - A minimum of 40% of the total point score (P) must be achieved which means 16 out of 40 possible point;
  - All requirements regarding environment and quality management (M) must be fulfilled.



## Swiss Minergie ®

- MINERGIE® is a registered **quality label** for new and refurbished buildings.
- Within the framework of the MINERGIE® registered trade mark, several products are offered:
  - MINERGIE®-Standard for buildings requires that general energy consumption must not be higher than 75 % of that of average buildings and that fossil-fuel consumption must not be higher than 50 % of the consumption of such buildings.
  - MINERGIE-P®-Standard defines buildings with a very low energy consumption, it is especially demanding in regard to heating energy demand. This standard corresponds to the internationally-known passive house standard.
  - MINERGIE-ECO®-Standard adds ecological requirements such as recyclability, indoor air quality, noise protection etc. to the regular MINERGIE®-Requirements.
  - MINERGIE®-Modules are building components and building equipment elements which are certified as being exceptionally well-performing with regard to energy efficiency.



## Italy - ITACA

- The ITACA Protocol has been developed by ITACA (Istituto per l'innovazione e trasparenza degli appalti e la compatibilità ambientale, in the framework of the Federal association of Regions and Autonomous Provinces of Italy).
- ITACA standard enables to estimate the **buildings environmental quality levels during the project phase**, through the measure of their performances in respect with 12 criteria and 8 sub-criteria that are sub-divided in 2 main evaluation areas according to:
  - Resources consumption (energy, materials, water, drinking water)
  - Environmental loads (greenhouse gas emissions, solid waste, liquid waste, territory)



## Italy - ITACA

- In particular, the requirements are related with the following topics:
  - Exterior environmental quality (external environmental Comfort, local pollution, inclusion in the surrounding areas);
  - Resources consumption (energetic consumption, land use, drinking water, material consumption);
  - Environmental loads (greenhouse gas emissions, liquid waste, C&D waste, waste, relation with the neighbouring);
  - Environmental internal quality (Visual, acoustic and thermal comfort, air quality);
  - Service quality (Maintenance and service plants, consumption monitoring, common areas).



## Italy - ITACA

- In details, the evaluation scale is determined as indicated below:
  - -1 represents a low performance compared to the present standards and practices;
  - 0 represents the minimum standard as defined by laws or present regulations or, if any regulation is in force, as executed by current practices;
  - 1 represents a moderate performances improvement with respect to the present regulations and practices;
  - 2 represents a performances improvement with respect to the present regulations and practices;
  - 3 represents a significant performances improvement with respect to the present regulations and practices; this has to be considered as the best current practice.
  - 4 represents a moderate improvement of the best current practice;
  - 5 represents a very significant improvement of the best current practice, experimental.



## Spain

- The Emblem of Guarantee of Environmental Qualification, the Catalan Eco-label, has defined two service groups concerning buildings:
  - Buildings intended for use as offices
  - Office networks with customer services
- Criteria are sub-divided into:
  - Basic
  - Optional
  - Assessment of compliance



## Spain

- 1 Environmental criteria for the service category
  - 1.1 Energy efficiency and saving
  - 1.2 Saving water
  - 1.3 Waste management
  - 1.4 Construction materials
  - 1.5 Purchasing
  - 1.6 Integration with the landscape
  - 1.7 Design of outdoor spaces
  - 1.8 Noise and vibrations
  - 1.9 General management
  - 1.10 User information
- 2 Compliance assessment system and documentation
  - 2.1 Documentation
  - 2.2 Selection of the collaborating body
  - 2.3 Control system



## Germany – Guideline for sustainable buildings

The Guidelines explain criteria for sustainable buildings through the following topics:

- Planning principles
  - General
  - The design
  - Specific requirements
- Ecological assessment - construction, operation, use and demolition
- Economic efficiency
- Health, comfort and socio-cultural aspects
- Project tender and construction
- Operation / use / building maintenance
- Quality assurance



## Germany – Guideline for sustainable buildings

- **Appendix 1:** Checklist
- **Appendix 2:** Planning Principles for the Design of Buildings and Landholdings
- **Appendix 3:** Requirements for Health Protection and Comfort
- **Appendix 4:** Energy and Building Service
- **Appendix 5:** Design Principles for Outdoor Facilities
- **Appendix 6:** Assessment of the Sustainability of Buildings and Landholdings
- **Appendix 7:** Building Certification
- At present, it does not exist a proper national rating system for buildings, but it is rapidly growing an interest coming from private and public investors.

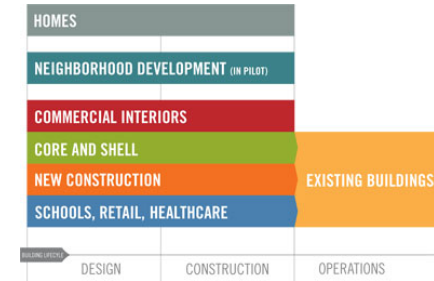


## USA – LEED Rating Systems™

- LEED standards (Leadership in Energy and Environmental Design), developed in the US and now adopted in 40 countries around the world, have been elaborated by US Green Building Council (GBC) with the cooperation of universities of United States and Canada.
- LEED is a flexible scheme which**, despite a basilar common structure, **provides different criteria for many kind of buildings**: new constructions and major renovations – **NC**; existing buildings – **EB**; schools – LEED for **Schools**; small houses – LEED **Homes**.
- The LEED Rating System is based on **awarding of credits for every requirement**. The **level** of Rating obtained derives from the addition of credits.



## USA – LEED Rating Systems™



Structure of the LEED rating system

n.	LEED categories	n. of prerequisites	n. of credits	Max points
1	Sustainable sites	1	8	14
2	Water efficiency		3	5
3	Energy and atmosphere	3	6	17
4	Material and resources	1	7	13
5	Indoor environmental quality	2	8	15
6	Innovation and design process		2	5
	<b>TOTAL</b>	<b>7</b>	<b>34</b>	<b>69</b>

LEED certification levels

Certification level	Points
Certified	26-32
Silver	33-38
Gold	39-51
Platinum	52 - 69



## Japan - CASBEE

- CASBEE** (Japan Sustainable Building Consortium – Building Environmental Efficiency) was developed according to the following policies:
  - The system should be structured to award high assessments to superior buildings, thereby enhancing incentives to designers and others.
  - The assessment system should be as simple as possible.
  - The system should be applicable to buildings in a wide range of applications.
  - The system should take into consideration issues and problems peculiar to Japan and Asia.





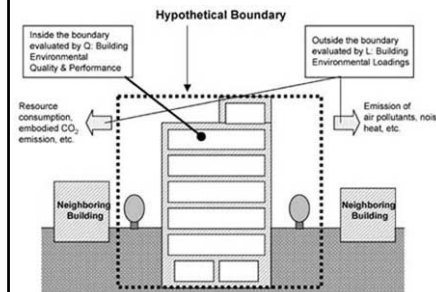
## Japan - CASBEE

- CASBEE is composed of four assessment tools corresponding to the building lifecycle (*CASBEE Family*):
  - CASBEE for Pre-design,
  - CASBEE for New Construction,
  - CASBEE for Existing Building and
  - CASBEE for Renovation
- CASBEE is composed of four assessment tools corresponding to the building lifecycle (*CASBEE Family*):
- Each tool is intended for a separate purpose and target user, and is designed to accommodate a wide range of uses (offices, schools, apartments, etc.) in the evaluated buildings



## Japan - CASBEE

### The assessment method employed by CASBEE



### Q (Quality): Building Environmental Quality & Performance:

Evaluates "improvement in living amenity for the building users, within the hypothetical enclosed space (the private property)".

### L (Loadings): Building Environmental Loadings:

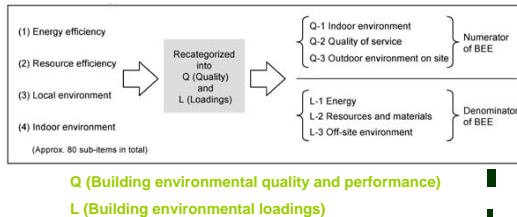
Evaluates "negative aspects of environmental impact which go beyond the hypothetical enclosed space to the outside (the public property)".



## Japan - CASBEE

- CASBEE covers the following four assessment fields:

- (1) Energy efficiency
- (2) Resource efficiency
- (3) Local environment
- (4) Indoor environment

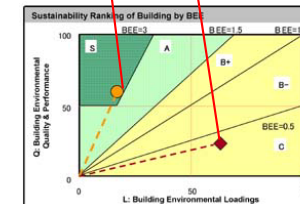


## Japan - CASBEE

$$\text{Building Environmental Efficiency (BEE)} = \frac{\text{Q (Building environmental quality and performance)}}{\text{L (Building environmental loadings)}}$$

sustainable

ordinary



- The BEE value assessment result is expressed as the gradient of the straight line passing through the origin (0,0).

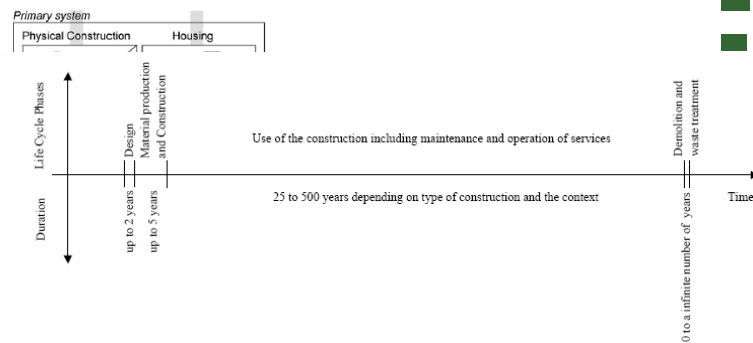
- Graphically presentation of results of building environmental assessments using areas bounded by these gradients (Eco-labelling):

- class C (poor),
- class B-,
- class B+,
- class A, and
- class S (excellent)





## LCA of buildings



Thank you for your kind attention!

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