

Training materials

Module A – The environmental sustainability of products

Sub-module A.2 – How to certify and communicate the sustainability of products

Contents of the presentation

- Introduction to the measurement of sustainability of construction products
- Environmental labels: classification and specificities
- Comparison of the main type of labels
- Ecolabels for construction products and building materials
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- Products and materials in the building assessment and certification systems

The measurement of sustainability of construction products

Several types of tools exist for the **measurement and certification** of the sustainability of **construction products**, different in their methodology, sector and phases of the life cycle considered. Each of them presents pros and cons, and different features that must be known.

1. Life Cycle Assessment (LCA, ISO 14040)
2. Carbon footprinting of products (CFP, ISO 14067)
3. Environmental labels
 1. Type I (ISO 14024)
 2. Type II (ISO 14021)
 3. Type III (ISO 14025, EN 15804)
4. Life Cycle Costing (LCC)
5. Social Life Cycle Assessment (Social LCA)

Gli impatti ambientali nell'LCA

In every LCA analysis, the **environmental impacts** of the **processes/activities** are described through a set of categories defined at international level, which include all possible effects on the environment of the energy and material flows in the life cycle of the product (**environmental aspects**)

Categoria di impatto	Indicatore	Unità di misura
Acidificazione	AP	Kg SO ₂ -EQ
Cambiamento climatico	GWP	Kg CO ₂ -EQ
Eutrofizzazione	EP	Kg PO ₄ -EQ
Tossicità per l'uomo	HTP	Kg 1,4-DCB-EQ
Ossidazione fotochimica	POCP	Kg Ethylene - EQ
Riduzione dello strato di ozono	ODP	Kg CFC-11-EQ

Introduction to environmental labelling

Environmental labels are the prove that a product is certified according to specific requisites and verification methods. They can be distinguished in TYPE I, TYPE II or TYPE III eco-labels, basically according to three different aspects:

- Request of a life cycle approach
- Necessity of a third party verification
- Performance requirements

In general, we can distinguish the labels in:

- Business to Consumer (BtoC) / Business to Business (BtoB)
- Sector specific labels / Multiproduct labels
- Single impact labels / Multi impact labels

Type I environmental labels

Main features of **TYPE 1** environmental labelling:

- They should consider **all the life cycle stages** of the product (LCA is not required)
- **Threshold values** have to be respected for each of the criteria and requisites included in the label
- They are **third party** controlled and certified
- Technical standard for their implementation: **ISO 14024**

Examples of type I labels: EU Eco label, Nordic Swan, Blauer Engel, Holz Von Hier, Energy Star



Type II environmental labels

Main features of **TYPE 2** environmental labelling:

- They are normally referred to only one or few issues of the product
- They are **self-declared** environmental claims
- They must be **verifiable** (though third party certification is not a requisite), through methods documented by the claimant
- Technical standard for their implementation: **ISO 14021**

Examples of type II labels: Recyclable, % Recycled, Compostable, Sustainable Forestry Management (PEFC/FSC)



Type III environmental labels

Main features of **TYPE 3** environmental labelling (Environmental Product Declarations, EPD):

- They are based on the development of a Life Cycle Analysis (LCA) of the product
- The LCA is developed on the basis of specific product criteria (Product Category Rules, PCR), so that they can be compared for the same type of products
- They are third party verified and validated
- Technical standard for their implementation: **ISO 14025**

Examples of type III labels: EPD and other national/regional protocols





EPDs for construction products



The life cycle of construction products (according to ISO 15804:2012)

In the construction sector, the life cycle phases are identified through the ISO 15804:2012 standard, that defines the criteria for EPD (Environmental Product Declarations) based on life cycle analysis, according with the life cycle of the building

Building Assessment Information														
Building Life Cycle Information												Supplementary information beyond the Building Life Cycle		
A1-A3			A4-A5		B1-B7					C1-C4				D
PRODUCT stage			CONSTRUCTION PROCESS stage		USE stage					END OF LIFE stage				Benefits and loads beyond the system boundary
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	
Raw material supply	Transport	Manufacturing	Transport	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Deconstruction Demolition	Transport	Waste Processing	Disposal	
scenario			scenario	scenario	scenario	scenario	scenario	scenario	scenario	scenario	scenario	scenario	scenario	Reuse-Recovery-Recycling-Potential
					B6 Operational energy use									scenario
					scenario									
					B7 Operational water use									
					scenario									

Comparison between ecolabelling types in construction sector

Pros and cons of the different type of labels for products, in relation to the reduction of the carbon footprint and transport related impacts of products

Type of ecolabel	Pro	Cons
TYPE 1	Robust, they guarantee performance level above the market average	Sometimes expensive and complex
TYPE 2	Some are widespread, easy to be implemented in most of cases	Normally self-declared
TYPE 3 (EPDs)	Based on LCA, according to technical standards for external verification. They allow a direct comparison of products	Uncertainty of information regarding the upstream processes Traiding processes and real transport distances are underestimated (use of standard data sets, unknowledge of the implementation site) They only refer to «standard» conditions and average products and do not consider possible changes in the supply chain, which can reduce carbon emissions with no additional cost

Focus: EPD limitations for benchmarking

From an analysis of 80 building product EPD (type III) from the German database ÖkobaDat, the **influence of transport, and the associated impact on climate, is underestimated or neglected:**

- in 24 EPD (out of 80) transports are “not specified”.
- in 30 it is referred to standard data sets of GaBi Software
- in 26 for raw materials illogical data about distances are presumed or not logically comprehensible



Ecolabels for building materials (type I and third party checked type II)

Environm. label	A1	A2	A3	A4	B	C
Blue Angel climate					Dark Green	
Blue Angel Resources	Light Green					
Blue Angel health					Dark Green	
Cradle to cradle						Light Green
EU Ecolabel	Light Green					
FSC	Dark Green					
Holz von Hier	Dark Green	Dark Green	Dark Green	Dark Green		
NaturePlus	Light Green		Dark Green		Dark Green	
Nordic Swan	Light Green					
Austrian Environm. label	Light Green					
PEFC	Dark Green					

Overview of the main EU labels valid for building materials, on the basis of the life cycle stages covered

Dark green fields: directly addressed by criteria

Light green fields: partly, limited or indirectly covered

Datas and sources: see CaSCo report „ Environmental product label - a comparison “

Ecolabels for building materials (type I and third party checked type II)

Environm. label	respons. sourcing	resource saving	climate protection	no harmful emissions	environm. friendly prod.	saving biodiversity
Blue Angel climate			Dark blue			
Blue Angel Resources	Light blue	Dark blue				
Blue Angel health				Dark blue		
Cradle to cradle		Dark blue		Dark blue	Light blue	
EU Ecolabel	Light blue			Dark blue	Light blue	
FSC	Dark blue					Light blue
Holz von Hier	Dark blue	Light blue	Dark blue		Dark blue	Light blue
NaturePlus	Light blue			Dark blue		
Nordic Swan	Light blue			Dark blue	Light blue	
Austrian Environm. label	Light blue			Dark blue		
PEFC	Dark blue					Light blue

Overview of the main EU labels valid for building materials, on the basis of the environmental factors covered

Dark blue fields: directly addressed by criteria

Light blue fields: partly, limited or indirectly covered

Datas and sources: see CaSCo report „ Environmental product label - a comparison “

Applicability to the wood product groups

Label/Product Group (number of certified wood products)	Construction materials boards, ...)	Insulation	Floors	Furniture	Windows and doors	Wood for outdoor use	Pallettes	Pulp and paper
Blue Angel	X (8)	X (1)	X (9)	X (82)	X (6)	-	-	X (509)
C2C	X (2)	X (4)	X (12)	X (21)	X (2)	X (1)	-	X (6)
EU Ecolabel	-	-	-	-	-	-	-	X (63)
FSC/PEFC	X	n.a.	n.a.	X	X	X	n.a.	X
HvH	X	-	X	X	X	X	X	-
Nature Plus	X (8)	X (82)	X (10)	-	X (9)	-	-	-
Nordic Swan	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Austrian UZ	X (4)	X (2)	X (2)	X (20)	-	X (1)	-	X (15)

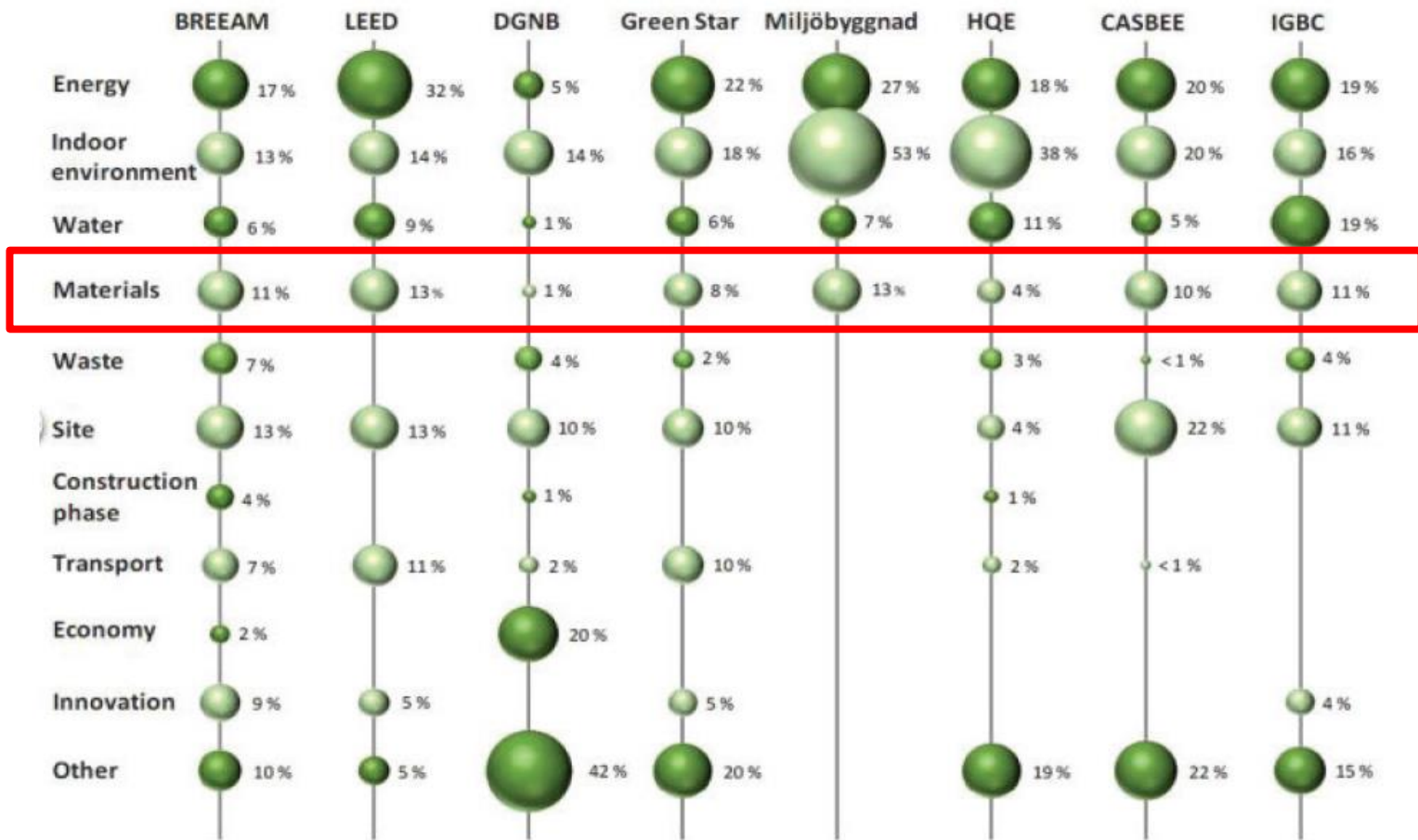
Datas and sources: see CaSCo report „ Environmental product label - a comparison “



The contribution of products to the sustainability of the building

The sustainability of products and materials is a **main component** of the overall sustainability of the building. Not all the evaluation protocols for building consider in the same way the materials (and in particular **their production and transport**). Only some of them consider the origin of raw materials and the processing and supply chain as an evaluation criteria.

Sustainable building certification schemes



Datas and sources: see CaSCo report „ Environmental product label - a comparison “

Sustainable building certification schemes

System	Aspect	weight of ecological aspects	consideration of prechains	meaning of the material	regionality of materials	costs	importance in Europe
BCA		++	-	+	-	?	-
BDM		++	+	+	+	€	+
BREAM		+++	+	+	-	€€€	+++
casaclima nature		+++	++	++	-	€	+
CASBEE		+	+	+	-	free/€€	-
DGNB		+	+	-	+	€€€	+++
Effinergie		+	-	-	-	?	+
European Greenbuilding Progr.		+	-	-	-	free ?	+++
German Passive House Standard		+	-	-	-	?	+
Green Star		+	-	-	-	?	-
GRIHA		+	-	-	-	?	-
HQE		++	+	+	-	€€	++
IGBC		+	-	++	-	?	-
Klima:aktiv		+	-	+	-	free ?	+
LEED		+++	-	++	+	€€€	+++
Miljöbyggnad system		++	+	++	-	?	-
Minergie (-ECO)		+	-	-	-	€€	+
protocollo Itaca Regione Piemonte		++	-	+	-	free	+
TQB		+	+	+	+	€€	+
US ENERGY STAR		+	-	-	-	?	-

Datas and sources: see CaSCo report „ Environmental product label - a comparison “

Web resources

If you want to know more, the following resources are available:

- Environmental product label – a comparison (CaSCo project)
- Sustainable building certification schemes – a comparison (CasCo project)
- The meaning and importance of transports (ppt by HvH)

Links to CaSCo documents

- «Environmental product label – a comparison» (CaSCo project)
- «Sustainable building certification schemes – a comparison» (CaSCo project)
- The meaning and importance of transports (ppt by HvH)
- “Construction or renovation contracts incorporating Low Carbon Timber - Recommendations and key stages” (CaSCo project)