

Development and Use of Environmental Product Declarations (EPD)-

Knowledge based choice of building materials for
sustainable design

SASBE 09, Delft

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Calculating environmental qualities in buildings today – what's the problem?

Lack of databases with satisfactory environmental input data on materials, building products and elements

- A lot of data is needed in order to assess environmental qualities in alternative design solutions
- Existing data are unavailable” (only available for manufacturer itself, format not available for import in assessment tools)
- Time consuming to collect information in each separate case.
- Not integrated with existing processes, existing tools
- With poor/insufficient data quality - the result of a LCA significant reduced



Sustainable design to a great extent based on undocumented common (non)sense.

Environmental assessment –What does it mean?



ISO 14020 series

- ISO 14020:2000
Environmental labels and declarations - General principles
- ISO 14021:1999
Environmental labels and declarations - Self-declared environmental claims (**Type II** environmental labelling)
- ISO 14024:1999
Environmental labels and declarations - **Type I** environmental labelling - Principles and procedures
- ISO 14025:2006
Environmental labels and declarations – **Type III** environmental declarations
- ISO 21930:2007
Sustainability in building construction – Environmental declaration of building products



EPD – gives information about

- Use of resources (raw materials and energy)
- Emissions (to air, water and soil)
- Hazardous substances
- Waste treatment.

Strongly dependant on information provided by the producer.

ENVIRONMENTAL DECLARATION ISO 14025 and ISO 21920 epd-norge.no

NORGIPS Norgips Plasterboard 12.5 mm, Type A

NPD no.: 113
Approved: 2009-05-26
Valid until: 2015-05-26

Independent verification of conformity
We confirm that this environmental declaration has been carried out according to ISO 14025, ISO 14050 and ISO 21920, and that the sampling takes (PCDs) for 'Building boards'. The documentation has been carried out with the manufacturer.

The declaration has been prepared by:
SINTEF Building

Used: 2009-05-26
Prepared by: *Ken Engvall*
Independent verifier

Manufacturer
Norgips Norway AS
Torshovveien 200, 2008 Stouen (Norway)
Organisation no.: NO 860349771AYA
VAT no.: NO120103030
NBS-EN-ISO 15024 Serial no.: 8010011025
Place of production: Sweden
Manufacturer: Norgips/Tvedestrand

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Product information
Scope: Cradle to grave
Year of study: 2008
Expected service life of building: 60 years
Service life of product: 60 years
Thickness: 12.5 mm
Standard and CEN: EN 12618 plasterboard with recessed service life of 60 years.

Product description
System specifications are composed of a plaster core enclosed in, and firmly bonded to, paper liners to form rectangular boards. The first and last paper liners are overlapping and joined together at the board's edge. The product is compatible suitable for the sealing of interior walls, ceilings and partitions in all types of buildings. Type A plasterboard is used, designed for use in construction designed for fire resistance and not also perform requirements construction designed for sound insulation. The recessed plasterboard Type A has tapered long edges to allow seamless joining.

Product specification

Parameter	Unit	Value
Thickness	mm	12.5
Boardwidth	mm	1200
Boardlength	mm	2400

Material flow diagram

Raw materials: 100% Recycled materials: 0%
The product does not contain recycled wood.
Recycled materials: 0%

Consumption of chemicals in the Norgips observation list

Chemical	Quantity	Unit
Calcium hydroxide	0	kg
Calcium chloride	0	kg
Calcium nitrate	0	kg
Calcium sulfate	0	kg
Calcium hydroxide	0	kg
Calcium chloride	0	kg
Calcium nitrate	0	kg
Calcium sulfate	0	kg
Total	0	kg

Environmental impacts

Impact	Unit	Value
CO2 emissions	kg CO2 eq./m2	3.1
Energy use	MJ/m2	49.0
Recycled materials	%	99
Indoor air classification	M2	M2

Waste treatment

Waste will be recycled the rest will be:

- Recycled building
- Recycled plaster
- Recycled waste

Environmental Indicators

Global warming

Energy use

Recycled materials

Indoor air classification (Classification according to EN 15251:2007)
































3,1 kg CO2 equiv.

49,0 MJ

99 %

M2

Norwegian EPD-Register

EPD-register byggematerialer					
Produkt	Modell	Produsent	EPD	Språk	
Hulldekelement i forspent betong	HD265	Contiga	6		
Hulldekelement i forsp. betong	Miljødekke HD265	Contiga	11		
Betongbjelke, armert		Spenncon	12		
DT-element i armert betong		Spenncon	13		
Hulldekelement i forsp. betong	HD32	Spenncon	14		
Søyle i armert betong		Spenncon	15		
Veggelement, isolert, betong		Spenncon	16		
Veggelement, betong		Spenncon	17		
Bærende innervegg av 15 cm Lecablokk		maxit-Leca	18		
Portland Standardsement FA	CEM I	Norcem-Brevik	23		
Standard FA Sement og Anlegg FA	CEM II	Norcem-Brevik	24		
Takbelegg	SE (1,2 mm)	Protan AS	32		
Bjelke i armert betong		Contiga as	35		
Veggelement, isolert, betong		Contiga as	36		
Søyle i armert betong		Contiga as	37		
Veggelement, uisolert, betong		Contiga as	38		
Skyvedør	IS 2,5mX2,1m	Gjøvik Trevare	49		
Skyvedør	US 2,5m X 2,1m	Gjøvik Trevare	50		
H-vindu	Top swing 1,2m X 1,2m	Gjøvik Trevare	51		
Balkongdør	1,0m X 2,1m	Gjøvik Trevare	52		
H-vindusramme	1,2m X 1,2m	Gjøvik Trevare	53		
Stålkonstr av IHULT m bredflat profiler	flere dimensjoner	Norsk Stålforbund	54		
Varmvalsede stålplater	flere dimensjoner	Norsk Stålforbund	64		

Managed by the foundation EPD-Norge www.epd-norge.no

The MIKADO project

- Environmental assessment and documentation of wood and wood based building products.
- Environmental Product Declarations (EPD)
- Identify improvement potential of process and product.
- 20 industrial partners providing data for wood products
 - Benchmarking and quality assurance of data

- Budget: € 900 000
- Project owner: The Norwegian Sawmill Industry Association
- Funding:
 - 50% from The Norwegian Research Council and Innovation Norway
 - 50% from the Norwegian forest, wood and timber industry



Products assessed in MIKADO



Sub category	MIKADO-product
Sawn softwood (not planed)	Sawn softwood (rough)
Solid softwood cladding	Untreated softwood cladding
	Primed/painted softwood cladding
	Fire resistant softwood cladding
Paneling (indoor)	Particleboard panel
	Solid softwood panel
Beams and pillars	Softwood gluelam beams and pillars
Solid softwood construction	Solid softwood graded construction lumber
	Solid softwood finger joint construction lumber
Construction elements	Glued massive softwood construction element
Strips	Untreated solid softwood strips
	Painted solid softwood strips
Flooring	Solid pine floor coated with lacquer or oil.
Preservative treated lumber	Copper preservative treated pine lumber
	Metal free preservative treated pine lumber



Some challenges dealing with wood products

- Allocation of environmental impacts
 - A wide range of products and by products
- Service life and maintenance intervals
 - Strongly dependant on use and climate.
- Small companies – data quality
- Additives, such as glue or preservatives, bear a relatively large share of the total environmental load



Product Category Rules (PCR)

- Gives a structure and premises to ensure that EPDs within the same product category are calculated, controlled and presented in a harmonized way.
- (C)EN 350004 Product Category Rules for construction products (PCR) - Describes PCR for all construction products
- Experience: Product Category rules are often not specific enough to ensure easy comparison of EPDs for alternative building products.

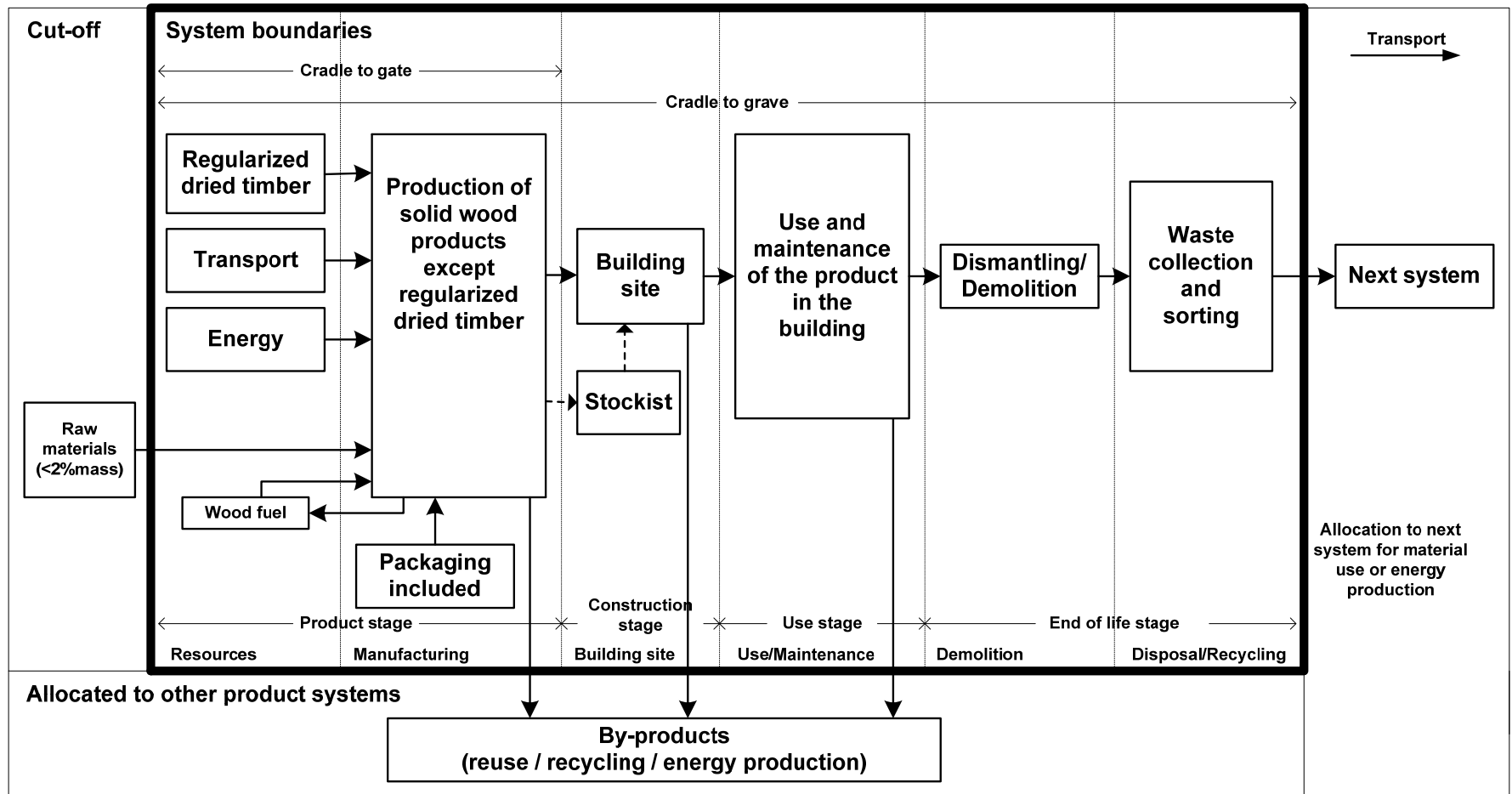
PCR for solid wood products

Under development in the MIKADO project through close cooperation and discussions with the industry partners.

Allocation

- For production at saw mills, the allocation to regularized dried timber, pulp chips, sawdust and bark shall be carried out according to volume.
 - Exception: Energy use from sawing and drying and internal transportation should be allocated to regularized dried timber exclusively.
- For production of solid wood products, the allocation shall be carried out according to volume and process steps.
 - E.g. the energy use of each production chain should be allocated to its respective product

System boundaries for solid wood products



Use of EPDs – experience from two building projects

- **Norwegian Wood** – Innovative and environmentally friendly timber architecture
- **Nye AHUS-** New district general hospital



Nye AHUS



Eigenes Park, Architects: HLM Architecture and Plan/Onix,



Preikestolen mountain cabin, Architects: Helen & Hard

- Strong emphasis on selecting environmentally friendly materials
- Design criteria checklists
- Documentation requirements included in the construction contracts
- Evaluation and approval of building materials.
- Many products rejected due to unsatisfactory environmental profiles or lack of documentation

Use of EPDs – experience from two building projects



- Shortage of environmental documentation.
- Existing documentation is of varying quality, only rarely based on standardized methods and thus not easily comparable.
- LCA-based documentation (EPD) the preferable choice
- Time consuming process of gathering information about the products
 - Not always time to do well-informed choices of materials.



Nye AHUS



Eigenes Park,
Architects: HLM / Onix,



Preikestolen mountain cabin, Architects: Helen
& Hard

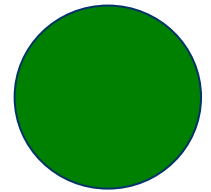
OK, we have EPDs – Now what?

?



ECOProduct

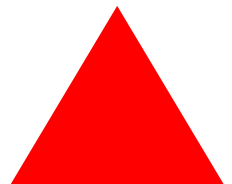
- Environmental assessment method developed at SINTEF Byggforsk
- Based on information available in EPDs for building products
- Assessment results in four main categories:
 - Indoor air
 - Content of hazardous substances
 - Use of resources
 - Global warming potential
- Comparison of alternatives
- Tool available at www.byggjeneste.no



Good



Acceptable



Not acceptable

Concluding remarks

- Making the sustainable choices depend on the **availability** of proper information and documentation
- **Standardized** documentation, such as EPD, is a matter of necessity for a fair comparison of different alternatives.
- Complexity of the results require **educated costumers**.
- Need for integration of LCA-based environmental information in **guidelines, design tools** and software.
- Larger projects assessing many similar products, as done for wood products in the MIKADO project, make possible a better **quality assurance of incoming data through benchmarking**.

Thank you for your attention

www.sintef.no
www.mikado.no