Green Construction Products: Recent Developments on an Europen Level

Ready for nZEB?
ingREes International Conference on
nearly Zero Energy Buildings

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What is a „green (construction) product“?

- within the mainstream („green economy“)
- manufacturers expect a market advantage
- European policy is the main driver:
  - Communication of the EC „Building a single Market for Green Products“

EUROPEAN COMMISSION

Brussels, 9.4.2013
COM(2013) 196 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL

Building the Single Market for Green Products

Facilitating better information on the environmental performance of products and organisations

(Text with EEA relevance)

{SWD(2013) 111 final}
{SWD(2013) 112 final}

Some European Directives, Strategies etc.

- Waste Framework Directive (2008)
- Energy Performance of Buildings Directive (2010)
- Construction Products Regulation (2011 ... 2013)
  with Basic Work Requirement No. 7
- Flagship Initiative „Resource Saving Europe“ (2011)
- Roadmap for a „Resource Saving Europe“ (2011)
- Lead Market Initiative „Sustainable Construction“ (2007)
- Action Plan „Sustainable Construction“
- Mandate M 350 (recently amended): CEN/TC 350 Sustainability of Construction Works (2004, new: 2018)
- **Communication “A Single Market for Green Products” (2013)**

Defining „Green Product“

(acc. to EC Communcation)

Green products .....

use resources more efficiently
and cause less environmental damage
along their life cycle, ...,
compared to other similar products of the same category.

Expected Advatages of Green Products

- less resource consumption
- less waste amount
- less emissions over the entire life cycle

but also

- lower costs (production, use, disposal)

But the Essential Questions are:

- how can such products be regognised?
- how can we measure the environmental performance of green products?
- which environmental impacts are caused be green products?

EC´s Answer: PEF

Product **E**nvironmental **F**ootprint (PEF Guide from 2012)

The PEF is a multi-criteria measure of the environmental performance of a good or service throughout its life cycle (for all industry sectors!).

PEF information is produced for the overarching purpose of seeking to reduce the environmental impacts of goods and services taking into account supply chain activities (extraction of raw materials → Production and use → waste management).

Primarily a tool to support policies!

On the Other Hand: CEN/TC 350 Standards

(based on the mandate M/350 from 2004)

- EN 15643 T. 1 – 4: Sustainability of Construction Works – Sustainability Assessment of Buildings
  - EN 15643-1 General Framework
  - EN 15643-2 Environmental Performance
  - EN 15643-3 Social Performance
  - EN 15643-4 Economic Performance
- **EN 15804: Environmental product declarations - Core rules for the product category of construction products**
- **EN 15978 Assessment of environmental performance of buildings - Calculation method**
- CEN/TR 15941: Environmental product declarations - Methodology for selection and use of generic data
- **EN 15942: Environmental product declarations - Communication format business-to-business**

Environmental Indicators covered by an EPD (1)

Indicators to describe the environmental impact

- Global warming potential
- Ozone depletion dotential
- Acidification potential
- Eutrophication potential
- Photochemical ozone creation potential
- Depletion of abiotic resources (elements)
- Depletion of abiotic resources (fossil fuels)

Environmental Indicators covered by an EPD (2)

Indicators to describe the use of resources

- Renewable primary energy resources, without energy resources, used as raw material
- Renewable primary energy resources, used as raw material
- Non renewable primary energy resources, without energy resources, used as raw material
- Non renewable primary energy resources, used as raw material
- secondary material
- Renewable energy (secondary fuels)
- Non renewable energy (secondary fuels)
- Use of fresh water

Environmental Indicators covered by an EPD (3)

Categories of waste

- Disposal of hazardous waste
- Disposal of non-hazardous waste
- Disposal of radioactive waste

Waste streams which are leaving the system

- Components for reuse
- Materials for recycling
- Waste flows for energy recovery
- Exported energy

New Indicators coming from PEF

- Toxicity
  - aquatic fresh water
  - human toxicity/cancer effects
  - human toxicity/non-cancer effects
- Particulate matter/Respiratory Inorganics
- Ionising Radation– human health effects
- Eutrophication: separation in
  - terrestrial
  - aquatic
- Resource Depletion
  - water
  - mineral, fossil

Life Cycle Stages covered by EN 15804 and Modules for the Building Assessment

BUILDING ASSESSMENT INFORMATION														
BUILDING LIFE CYCLE INFORMATION													SUPPLEMENTARY INFORMATION BEYOND THE BUILDING LIFE CYCLE	
A 1 - 3			A 4 - 5		B 1 - 7					C 1- 4				D
PRODUCT Stage			CONSTRUCTION PROCESS Stage		USE STAGE					END OF LIFE Stage				Benefits and loads beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport	Construction installation process	Use	Maintenance	Repair	Replacement	Refurbishment	De-construction demolition	Transport	Waste processing	Disposal	Reuse-recovery-recycling-potential
			Scenarios		B6 Operational energy use					Szenarien				
					B 7Operational water use									

Types of EPDs with respect to life stages covered

- „cradle to gate“
- „cradle to gate with options“
- „cradle to grave“

EN 15804 „Environmental Product Declarations“

- EN 15804
  - contains the necessary steps for a type III environmental declaration acc. to ISO 14025
  - delivers the basis for product category rules
  - contains 22/24 environmental indicators: parameters describing the environmental performance of a construction product
- an EPD acc. to EN 15804
  - represents a declaration of the environmental performance of a construction product
  - has the purpose to deliver necessary data for building certifications
  - contains scenarios, e.g. „after use scenarios“
  - informations about dangerous substances and reference service life

Limitations of EPDs

- an EPD is a **declaration**, not an assessment tool
- you cannot assess and even compare the environmental impacts of different products on product level
- basis for any assessment is the **functional equivalent**
- this is only possible on the **building level** (with restraints on the component level with the same functionality)

Construction Products Regulation

New Basic Requirement No. 7:
„Sustainable Use of Natural Resources“:

The construction works must be designed, built and demolished in such a way that the use of natural resources is sustainable and ensures the following:

a) ***recyclability*** *of the construction works, their materials and parts after demolition*

b) ***durability*** *of the construction works*

c) use of ***environmentally compatible raw and secondary material*** *in the construction*

→ all product standards have to be revised!

Open Questions:

What does it mean:

- recyclability?
- durability?
- environmentally compatible raw material?

No interpretation or documents or guidance papers by the EC to be expected!

Consequence: national unilateralism!

EPDs metioned in the CPR:

(56) For the assessment of the sustainable use of resources and of the impact of construction works on the environment Environmental Product Declarations should be used when available.

To distiguish:

- Voluntary:
  Framework of CEN/TC 350
  PEF

- Obligatory:
  Construction Products Directive, since 2013:
  Construction Products Regulation

The new situation

- EN 15804 (from 2014) has to be amended (due to the new mandate M/350 from EC to CEN)
- PEF concept and PEF indicators have to be integrated
- all European product standards have to be modified (due to the requirements of the „old“ EN 15804 and even more when the new one will be published
- the connex to BWR 7 of the CPR (sustainable use of natiral resources) is still open

JRC-Proposal (Dec. 2015): „Macro-objectives for the life cycle environmental performance and resource efficiency of EU-buildings

A) Life cycle environmental performance“ Macro-objectives for buildings:
   1. Greenhouse gas emissions from building life cycle energy use
   2. Resource efficient material life cycles
   3. Efficient use of water resources

B) „Quality, performance and value“ macro-objectives for buildings
   1. Healthy and comfortable spaces
   2. Resilience to climate change
   3. Optimised life cycle cost and value

Conclusions

- many uncertainties (at the moment) for architects and consulting engineers in selecting green products
- 24 indicators + additional ones from PEF cannot be handled (even using BIM-Buiding Information Modelling)
- the only real constraint comes from the CPR – BWR 7
- but it´s totally unclear and therefore largely irgnored
- we would urgently need the return to the well-known 80/20 principle
- that means defining a small number of **core indicators** and (obligatory?) benchmarks on a national level
- „macro-objectives“ could be a reasonable approach