

# The EPD 2.0 concept

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## Abstract

Building products manufacturers increasingly use LCA based information for their environmental communication. ISO 14025 consistent Environmental Product Declarations (EPD) provide an ideal format and verification structure, to deliver unbiased information transparently. The EPDs themselves are on the one hand side used in marketing and communication and demonstrate a company's responsibility for sustainability impacts. On the other hand side, the information provided in EPDs is directly used in quantified ways in building assessment schemes. The European DGNB assessment scheme for example is performance-oriented and uses total building LCA calculation and benchmarking in its certification process. This procedure is in line with the upcoming standardization in the field of sustainable construction. EPDs are the basis for the environmental assessment according to the DGNB scheme.

But is the intention of companies to generate EPDs only because of the sheer communicational aspects? Having experienced over one hundred successful EPD projects it shows that in most of the projects there is much more intention in such projects. The paper provides insights into companies' EPD projects, summarizing how these companies make use of EPDs today, in their internal and external communication, and in their eco-design activities.

With the "EPD 2.0 concept", a new way of integrating life cycle management is introduced: Starting point for process and product optimization, product related environmental management and sustainability communication.

## 1 Introduction

Building products manufacturers increasingly use LCA based information for their environmental communication. ISO 14025 consistent Environmental Product Declarations (EPD) provide an ideal format and verification structure, to deliver

unbiased information transparently. The EPDs themselves are on the one hand side used in marketing and communication and demonstrate a company's responsibility for sustainability impacts. On the other hand side, the information provided in EPDs is directly used in quantified ways in building assessment schemes. The European DGNB assessment scheme for example is performance-oriented and uses total building LCA calculation and benchmarking in its certification process. This procedure is in line with the upcoming standardization in the field of sustainable construction. EPDs are the basis for the environmental assessment according to the DGNB scheme.

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With the "EPD 2.0 concept", a new way of integrating life cycle management is introduced: Starting point for process and product optimization, product related environmental management and sustainability communication.

## **2 Communicating LCA results**

### ***2.1 Communicating LCA results for producers in the building and construction sector***

Product LCA results can be used in different ways: Internally and externally, qualitatively and quantitatively.

Internal use of LCA results: If a company decides not to be publish LCA results, third party verification or an external review is not needed. The results can be used for decision making processes, environmental product development, internal environmental management, site selections, etc.

External use of LCA results: If a company decides to communicate LCA results externally in a quantitative way, an external review is crucial for gaining reliability. EPD schemes such as the IBU, the French FDES or the Swedish EPD system provide external verification. If the company decides to communicate that

LCA is used e.g. in product development without publishing the environmental profile results, it is not needed to go through an external review.

If EPDs e.g. according to IBU are chosen by the producer, the LCA results can go into LCA databases. Examples are the German Oekobau.dat or the UK Green Guide to Specification.

## ***2.2 Content of EPDs***

Environmental Product Declarations EPD are a communication tool. According to ISO 14025 "type III environmental declarations present quantified environmental information on the life cycle of a product to enable comparisons between products fulfilling the same function". According to the standard, EPDs are primarily used for B2B communication. The experiences of using EPDs in the building and construction sector show, that it is more and more true, that architects and planners use EPDs in their decision making processes to support their customers, the final consumers.

It would be wrong to say that already today, EPDs are widespread the favored information source for environmental conscious building planners. But due to the introduction of sustainable building certification schemes such as DGNB, EPDs gain growing recognition in this field. Secondly, "first movers" being very active in the communication of providing EPDs for their products motivate other companies to follow and also provide such quantified environmental information.

The LCA indicators being communicated by EPDs e.g. according to the German IBU scheme embrace (amongst others) the following:

- Global warming potential (GWP) in kg CO<sub>2</sub> equivalents
- Depletion potential of the stratospheric ozone layer (ODP) in kg CFC 11 equivalents
- Acidification potential of land and water sources (AP) in kg SO<sub>2</sub> equivalents
- Eutrophication potential (EP) in kg (PO<sub>4</sub>)<sub>3</sub>- equivalents
- Formation potential of tropospheric ozone photochemical oxidants (POCP) in kg Ethene equivalents
- Input of non-renewable primary energy in MJ, net calorific value
- Input of renewable primary energy in MJ, net calorific value

This set of indicators is complemented by additional indicators such as abiotic depletion potential for non fossil and fossil resources ADP, waste indicators, total water consumption, etc.

### **3 Current use of EPDs**

#### ***3.1 Communication to the market***

Currently, EPDs are used to communicate environmental product profiles to the market, be it via the EPDs as published or be it via databases and tools. In Germany, the DGNB Navigator for example also publishes EPD results of building products beside the program holder IBU or the companies themselves. B2B usage of EPDs becomes recently more prominent especially for system products such as external thermal insulation composite systems (ETICS). The German ETICS association has published a so-called Environmental System Declaration (ESD), consisting of separate specific EPDs for the respective system elements.

Performing LCA is defined in ISO 14040 and ISO 14044. This framework is valid for all product types or studies. For EPDs of building products, EN 15804 is the valid standard (starting mid 2011), defining exactly calculation methods, scenario developments, indicator choices etc. This allows building up consistent data management structures. For building LCAs EN 15978 is the future respective standard.

#### ***3.2 Identification of environmental highlights***

Part of an EPD project is the provision of an LCA report to the verifier. This report usually contains environmental contribution and sensitivity analyses, which are a helpful source for the identification on improvement potentials. These analyses show the verifier whether the calculation was performed correctly, side-effect is the identification of environmental hot-spots for the producers. These analyses in EPD LCA reports can be a very valuable source for eco-design strategies.

### ***3.3 Use of building-LCA for producers***

The assessment of a product's environmental profile e.g. during an EPD project allows producers to understand own impacts and when integrated into an exemplarily building LCA, to gain orientation how relevant a product performs in a building's life cycle context. Sustainability certification scheme frameworks such as the DGNB scheme also allows to identify and assess additional performance criteria and to better understand and strategize product development.

## **4 Eco-design with EPDs**

That product LCA is best qualified to serve as environmental analysis tool and to support the identification of environmental optimization potential is no new message. Eco-design with LCA provides a big picture view on the product life cycle and its alternatives. The environmental optimization of an insulation material can include the assessment of bio-based alternative materials, the switch to renewable on-site energy generation, an assessment of the suppliers' performance or evaluating alternative end-of-life pathways.

Interpretation and result presentations usually provide information on:

- Share of environmental impacts of materials, substances, processes or life cycle stages
- Comparison of alternatives
- Environmental indicators to control and measure eco-design

### ***4.1 Interpreting the current situation***

EPDs, providing the relevant LCA indicator results of products, can be used to identify the current environmental situation. It can be used as a starting point within an environmental product related management system, for eco-design, or benchmark setting. It allows setting priorities in improvement processes. The reliability of results for the producer is high through the external verification step.

#### ***4.2 Calculating alternatives based on the current situation***

If alternatives based on the current situations are to be assessed, the life cycle models used to calculate the EPD indicators serve as perfect starting point. Different material choices, energy generation options, suppliers can be assessed in the same defined context as for the EPD. The effort to adapt such models and receive results for alternatives is usually quite low, especially compared to "new LCA studies".

Software tools such as the GaBi i-report allow producers to vary their LCA models without any LCA expert knowledge, only by changing e.g. recipes, physical amounts or the like.

#### ***4.3 Assessing new approaches***

The assessment of total new approaches usually requires an extended life cycle model including all options that are of interest for the producer. LCA modeling know-how is needed. Therefore it is useful to work with predefined models e.g. based on an initial EPD project that can be extended and then used for assessment of total new approaches. Training and initial support by LCA experts is usually indispensable.

Becoming an LCA expert based on an initial EPD project is a manageable and feasible task and should not be regarded any more as work for scientist only.

#### ***4.4 Implementing life cycle thinking in organizations using EPDs***

The implementation of life cycle thinking into organizations can best be supported by easy to use tools that are as close to day to day work of e.g. product designers as possible. Web-based LCA solutions are available nowadays, and training also does not require traveling or long absence times. If LCA becomes integral part of a designer's work, undesirable developments from an environmental point of view can be avoided. And again, using the EPD framework supports a consistent environmental conscious product development.

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