

# Understanding Environmental Product Declarations

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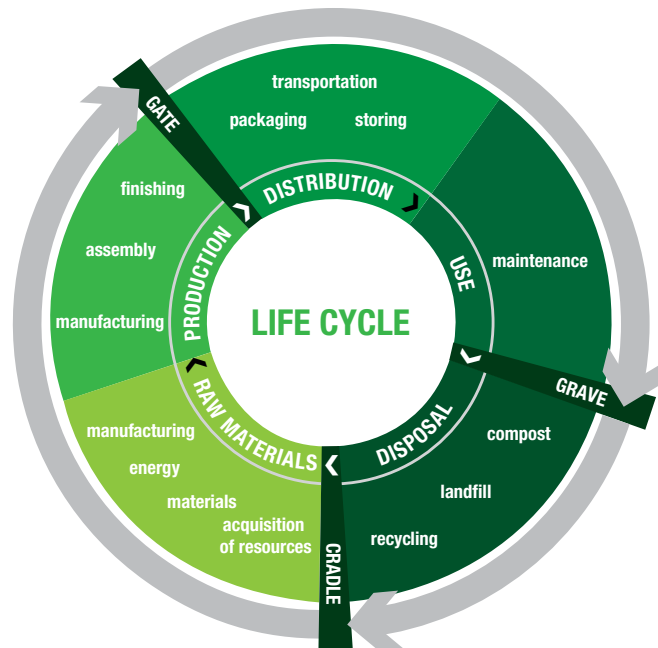
When evaluating the various attributes of a product, there are several standardized tools that have proven to be invaluable. Life Cycle Cost Analysis (LCCA) assesses the economic impacts of a product, and Life Cycle Assessment (LCA) determines the environmental impact of a product over its entire lifespan. The results of the LCA are reported in a comprehensive document called an Environmental Product Declaration (EPD).

An EPD is a transparent, internationally recognized report for communicating the environmental impacts of a product or material

EPDs are developed based on a robust, objective set of ISO-14025 established requirements and guidelines called Product Category Rules (PCRs), which define the data to be used in an LCA and how the data is collected and reported.

PCRs essentially level the playing field when comparing the environmental impacts of products within a specific category group. They allow the user to make direct, apples to apples comparisons between multiple products that can fulfill equivalent functions.

Figure 1: Impacts Included in a Life Cycle Assessment



through its entire life cycle. This comprehensive disclosure report provides the results of a product's LCA and is verified by a third party, ensuring the results are valid. When dealing with a manufacturer who provides EPDs, you can be confident they are credible and environmentally responsible, as they use these documents as a roadmap to improve their products and reduce their carbon footprints.

The EPD considers all stages in the life cycle of a product, including raw material extraction and refining, energy use and efficiency during manufacture, packaging, transportation methods, use phase and end-of-life disposal or recycling and has been equated to a nutrition label for construction products. Figure 1 shows the impacts included in a life cycle assessment.

## Why EPDs are Used

EPDs are designed to help architects, interior designers, building owners and other specifiers better understand the environmental impacts of a product or material and make comparisons between similar products more easily.

It is important to understand that EPDs are not product ratings, but rather tools to help purchasers better understand a product's sustainable qualities and its effects on the environment.

By utilizing EPDs, design and procurement teams are able to reduce the environmental impact of their structures by comparing the data of similar products and applying the results to make environmentally sound decisions. Additionally, project teams who specify products from manufacturers that provide EPDs can qualify for Leadership in Energy and Environmental Design (LEED®) credit under LEED v.4.

The use of EPDs is also driven by other rating systems such as Green Globes, as well as a desire to meet green building and sustainability goals.

Manufacturers can use EPDs as a tool to identify areas for improvement in the sustainable attributes of their products as well as the manufacturing process as it relates to sustainable operating practices. This provides them an opportunity to focus on impact reduction efforts. In a study conducted by Zakrisson et al. (2008), 80% of the manufacturers reported the main benefit of conducting an EPD was the opportunity to learn about the environmental performance of their products and how they could be improved<sup>1</sup>.

A product specific EPD tells the Architecture and Design community that the manufacturer understands the environmental impacts of their products. Once the EPD is complete, the manufacturer has a guide for where and how to reduce the environmental impacts associated with their products.

## EPDs and Green Building Rating Systems

When the United States Green Building Council launched LEED v4, a new credit – Building Product Disclosure and Optimization: Environmental Product Declarations – was included. This credit pushed the rating system beyond single attributes credits and encouraged project teams to select products from manufacturers who develop and understand products using LCA. LEED v4 rewards project teams with one credit if they select 20 products with EPDs and an additional point if they select products with impact reduction below industry average. LEED was not the first rating system to include a credit for selecting products with EPDs. The Collaborative for High Performance School included an EPD credit in 2008, and recently other rating systems such as Green Globes have added credits for selecting product with EPDs.

## How to Use an EPD

Environmental Product Declarations (EPDs) have been gaining fast recognition as the “gold standard” of product disclosures<sup>3</sup> and can be used in different ways (Figure 2) depending upon an individual's role. Some of the ways EPDs are used and the individuals who use them include<sup>2</sup>:

**Product Designers:** To help understand the environmental impacts of their product, what causes them, and where they occur in the life cycle. This provides opportunities to reduce a product's carbon footprint.

**Marketing:** To substantiate marketing claims, to transparently communicate the environmental performance of a product, and to show how the impact of a product has been reduced over time.

**Supply Chain:** To collect and provide specific data for input materials, energy and waste processing associated with the manufacture of a product and to more accurately represent a product's environmental impact.

**Procurement:** To provide buyers with the confidence of knowing the environmental performance of a specific product has been reviewed and validated by an independent party with expertise in LCA.

**Specifiers:** To ensure the products they choose meet required environmental performance and contribute to sustainability credits.

**End Users:** To make comparable comparisons between similar products and informed selections using a standardized, comprehensive and verified set of information.

Figure 2: Use of EPDs by Manufacturers and Architects

	Manufacturers	Architects
Product transparency	✓	✓
LEED® credit		✓
Green Globes credit		✓
To compare similar products		✓
To identify product improvement opportunities	✓	
To aid in understanding LCAs		✓
To validate marketing claims	✓	
To verify product information	✓	
To show carbon footprint reduction	✓	

## Tips for Understanding EPDs

**TIP**

**Functional Units**

A comparison of environmental impacts is only possible if both products have the same functional units. For example, comparing 1m<sup>2</sup> of product for 1 year to 1m<sup>2</sup> of product.

Make sure you are comparing the same impact category units. Why? Depending on who (e.g., CML, TRACI, RECIPE) developed the impact factors, the units may not be the same. For example, TRACI reports acidification potential in SO<sub>2</sub> equivalents, but CML reports in mol H<sup>+</sup> equivalents.

**TIP**

**Category Unit**

**Table 1. Cradle to Gate LCA results for 1m<sup>2</sup> of product for 1 year.**

IMPACT Category CML 2010	UNIT	SOURCING / EXTRACTION	PRODUCTION	CRADLE- GATE TOTAL
Primary Energy	MJ	77.9	33.1	111.0
Global Warming Potential	kgCO <sub>2</sub> -eq.	3.26	2.02	5.28
Acidification Potential	kgSO <sub>2</sub> -eq.	0.0150	0.0048	0.0198
Eutrophication Potential	kgPO <sub>43</sub> --eq.	0.0012	0.0003	0.0015
Ozone Depletion Potential	kgR11-eq.	7.83E-09	5.04E-10	8.34E-09
Photochem Ozone Creation Potential	kgEthene-eq.	0.0016	0.0003	0.0019

**TIP**

**Impact Category**

Know who developed the impact factors in the EPD. Why? LCA models provide results from several impact categories and the units may vary.

Know the boundary conditions of the EPD. Why? LCA assessment can cover different life cycle stages or boundaries. The impacts of the stages are cumulative, so it is important to know what is included in a number.

**TIP**

**Boundary**

## Know the Lingo

### CRADLE TO GATE

Cradle to Gate refers to an LCA that included impact from the raw material production to the gate of the production or manufacturing facility. See Figure 1.

### POTENTIAL

The concept of potential allows inventory results to be compressed into one number. For example, a global warming potential (GWP) is given in GWP equivalents and can represent the impact of many greenhouse gas chemicals.

### EQUIVALENT

A number that allows for common comparison. For example, you can add the global warming impact of 1 gram of carbon dioxide with the impact of 1 gram of methane by knowing that methane equals the impact of 21 grams of carbon dioxide. Similar to how you calculate currency exchanges. Euros can be added to US dollars, because Euros have a known US dollar value.

## Limitations of EPDs

While there are strong benefits to Environmental Product Declarations, they are not without their limitations. Some of the ways EPDs are lacking include:

- EPDs do not take into account economic or social impacts.
- EPDs provide environmental data without judgment; they do not indicate that any environmental performance benchmarks are met.
- EPDs are not comparative assertions and are not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts<sup>3</sup>.
- EPDs may not encompass all impacts. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity.
- EPDs regularly rely on estimations of average impacts, and the level of accuracy in estimation of effect may differ by product line and reported impact.
- EPDs are complex documents that can be difficult to understand.

## Environmental Product Declarations and Building Information Modeling (BIM)

Although products are only components of buildings, the data in building product EPDs can be utilized and managed through Building Information Modeling (BIM) to deliver a more sustainable structure. Through BIM, sustainability data (such as embodied energy or global warming potential) can be integrated into design files (such as REVIT<sup>®</sup> Files) and analyzed to better understand the impacts of a building and calculate the whole building LCA. This enables construction teams to make more educated product selection decisions.

## Product Transparency

In a world where more demand is being placed on environmental sustainability, EPDs have enabled manufacturers to become more transparent with their product data, providing buyers with more confidence about the products they select. Survey research presented by UL Environment in 2011 found that over “90 percent of architects and building designers surveyed had researched, specified or purchased so-called green products during the past year, and were continuing to seek products with accompanying environmental impact assessments.”<sup>4</sup>

The transparency of EPDs makes it easier for buyers to efficiently conduct product comparisons and ultimately make more objective and better informed purchasing decisions.

Manufacturers are paying closer attention to the environmental impact of their products from the design and manufacturing stages through actual use to end-of-life. By documenting their findings through EPDs, they not only identify opportunities for improvement along the supply chain, but they help to accomplish the goal of promoting transparency in the green building and design industry.

## In Summary

Environmental Product Declarations are a valuable tool in your transparency toolbox, providing clear understanding and insight into the environmental impact and performance attributes of a product for both the manufacturer and the buyer. For the manufacturer, this means newfound opportunity for product improvement and impact reduction. For the buyer, EPDs enable objectivity, easier comparison of similar products and more informed decision-making. In either situation, EPDs aid in the common goal of environmental impact awareness and improved sustainability.

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## References

1. Zackrisson, M., Rocha, C., Christiansen, K., & Jarnehammar, A. (2008). “Stepwise Environmental Product Declarations: Ten SME Case Studies.” *Journal of Cleaner Production*, 16(17), 1872-1886.
2. “Environmental Product Declarations (EPDs): Specifying Sustainable Materials to Save the Planet.” GBCI: 0920004245. <http://www.usgbc.org/education/sessions/environmental-product-declarations-epds-specifying-sustainable-materials-save-pla> (Last access on Aug. 26, 2015).
3. Thinkstep. (2015) “What are Environmental Product Declarations?” <http://www.pe-international.com/america/topics/what-are-environmental-product-declarations/> (Last access on Aug. 26, 2015).
4. Underwriters Laboratories Inc. (2011) “Transparency and the Role of Environmental Product Declarations.”