

White Paper | April 2016

Streamlining Material Sourcing: An Analysis of Environmental Product Declaration Use in Construction

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Introduction

Environmental labelling schemes are becoming increasingly prevalent in the construction industry due to the green building movement. As the energy demand and usage in buildings decreases with technological advancements and stricter legislation, the embodied energy within the building's materials becomes increasingly important. Environmental labelling schemes are one form of documentation which can help quantify the embodied energy and environmental impact of materials and assist practitioners with making informed choices.

What are Environmental Product Declarations? (EPDs)

There are three basic types of environmental product labels, often referred to as Types: Type I – category labels, Type II – self-declared environmental claims, and Type III – Environmental Product Declarations. Environmental product declarations (EPDs) are internationally standardized (ISO 14025 – Environmental labels and declarations – Type III environmental declarations) third-party verified documents which quantify environmental impacts over a material or product's life-cycle: from the acquisition of raw materials to its final disposition.

The quantitative information in EPDs is determined through a process of life cycle analysis (LCA), a methodology which determines the environmental impacts of processes and materials in the product's lifecycle. Each EPD reports this data by adhering to product category rules (PCR), a document published by program operators (such as UL Environment or the Canadian Standards Association) which defines the criteria for specific product category, and provides guidance on the structuring of the LCA and the format of the EPD.

Where does the information in EPDs come from?

How do I know if I can compare EPDs?

In order for EPDs to be compared, they must adhere to the same PCRs. In an ideal world, EPDs can be used to compare two very similar products adhering to the same PCR, and summarize third-party verified LCA results.

Potential issues with EPDs include: a lack of harmonization in PCRs, leading to incomparability in EPDs [1]; the use of generic data (from a database or the literature) over specific data (measured/calculated directly from the manufacturer) [2]; a lack of EPDs from small- to medium-sized manufacturers due to financial and personnel constraints [3]; and an under-representation of PCRs of North American origin [4].

What issues do I need to know about?

Case Study Illustrating EPD Use

With the introduction of EPDs and other material disclosure documentation in the newest version of LEED, Version 4, the concentration on material sourcing for new LEED projects will increase. The Canada Green Building Council's (CaGBC) National Office in Vancouver is the first LEED v4 project in Canada to target the Materials and Resources credit focused on the use of EPDs in a construction project. This white paper will provide experiences on the project related to the use of EPDs in the design and construction process from three stakeholders: the Client/Owner (CaGBC), the Designer (DIALOG), and the Contractor (Ledcor), and will identify the advantages a streamlined material sourcing platform can have by aiding practitioners with aligning their product choices to sustainable rating systems and energy codes.

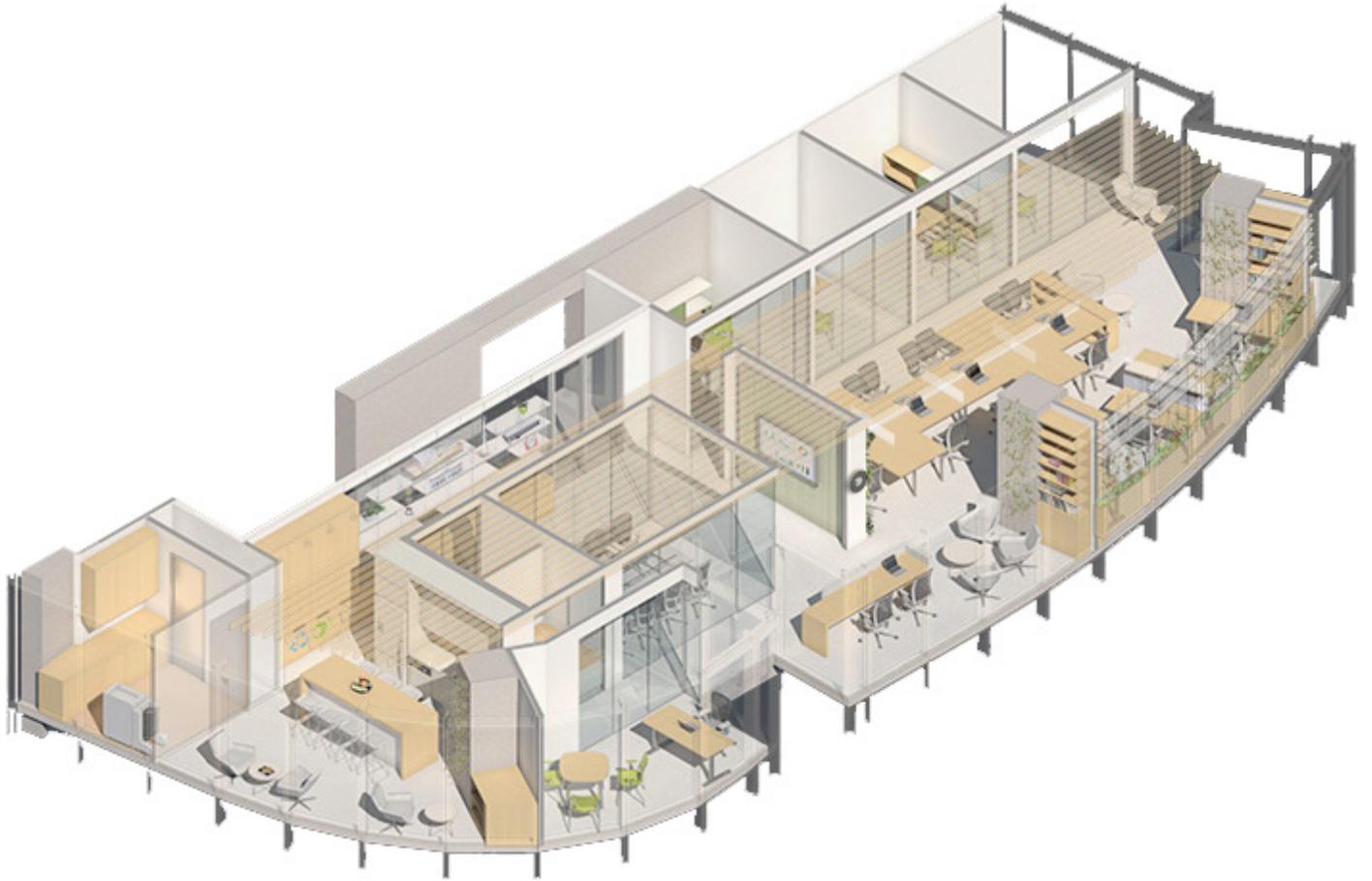


Figure 1: Axonometric of the CaGBC National Office, Vancouver

Case Study Lessons Learned

Both DIALOG and Ledcor believed using EPDs on a construction project was beneficial to the overall design goals and outcome. By definition, EPDs are verified, transparent documentation about environmental impacts. This is also aided by the use of an internationally standardized protocol, an improvement over other labelling schemes for construction projects. Interviewees found that products that carried EPDs generally met or exceeded expectations for overall quality and sustainability.

Designer's Point of View

Using EPDs helped the project team make informed decisions about which products they were to select, and added depth to discussions through the design process by providing the required information regarding environmental performance. The Designer added that EPDs gave them the opportunity to speak to the sustainability of the product, and provided verified data to reinforce their claims where no documentation, policy, or advocacy already existed to do so.

Another impact of using EPDs on a construction project was having to conduct much more material research than DIALOG would have on a comparable project that did not use EPDs, in both time and breadth. This also included a necessary increase in interaction with manufacturers, as they required documentation for not only the LEED EPD credit but for all the Building Product Disclosure and Optimization credits the team was targeting. DIALOG found that the products they used which carried EPDs came from manufacturers who have an environmental story to tell, and have been thinking about creating EPDs for quite a while. However, the Designer mentioned that as EPDs increase in popularity and other manufacturers catch up, these early adopter characteristics may not hold and practitioners will need to be more cautious in regards to deciding who to work with.

Another facet of the required material research and sourcing was evident through the Integrative Design Process, a holistic approach to the design and construction of a building, by learning about EPDs and the nuances of the credit at the beginning of the project timeline. The team found that credits often had to “play double- or triple-duty”, as it was not enough for the product to only achieve the EPD credit. In order to have usefulness on the project, the product had to achieve or help achieve multiple LEED credits, with third-party documentation such as manufacturer inventories, health product declarations (HPDs), Cradle to Cradle certifications (C2C), or Corporate Sustainability Reports (CSRs).

One concern regarded the transparency within EPDs, and how they are analyzed on the project. DIALOG acknowledged EPDs are great for the construction industry and are a good source of information, but stressed the importance of reading the information within them with some level of knowledge. One example given by DIALOG was a hypothetical product that scored exceptionally well in the environmental impact categories, but either used a material in the manufacturing process that was harmful to the environment (like lead or other heavy metals) or had a component in the supply/manufacturing chain which might have been environmentally friendly but was socially unethical. It would be hard for a practitioner with no experience working with EPDs to ascertain these and other aspects which could possibly be hidden within EPDs.

Contractor's Point of View

Ledcor described some difficulties with products they were potentially interested in using, but ultimately could not for varying reasons. One of these reasons was the fact that documentation submitted by sub-trades for some products were LEED 2009 – but not v4 – compliant, which either excluded the product from contention, or lengthened the sourcing timeline by having to find the compliant documentation. Secondly, products which had EPDs were required to be used with specific adhesives, sealants, or other associated products for warranty reasons. In some cases, these associated products either (a) did not carry a second EPD with them, which would count for two products under the current structure of the LEED credit; or (b) did not meet testing requirements and was ultimately not LEED-compliant, which excluded the product from contention on the project. The Contractor proposed that products which had EPDs and required the use of associated products provided an EPD for that associated product, and ensured it was LEED-compliant.

Impacts of EPDs on Construction Projects

EPDs are helpful for both designers and contractors as the third-party, independently verified information is useful for making material selections based on environmental performance. As the embodied energy of materials within buildings increases in importance, EPDs lend themselves to be the best identifier of a product's energy use and environmental impact during its manufacturing stage, and the positive effects it can have if the products has the potential to be recovered, recycled, or reused. As such, the LEED v4 credit on EPDs provides incentives for manufacturers to create EPDs and for architecture, design and construction professionals to use products with EPDs on construction projects.

However, using EPDs on a construction project requires extra effort from the Designer and Contractor. Thinking about how they will fit into the project and affect material choices and specification language needs to be determined at the very beginning of the project timeline, especially when using them as part of the LEED Materials and Resources credits. For example, the lack of compatibility between products and their required adhesive, sealants, or other associated products lengthens the product timeline and can exclude products from contention. By planning ahead, teams can start to see potential roadblocks and plan ahead before they become major obstacles. Using EPDs on a construction project requires extensive material research, alignment with other documentation requirements, and communication with all manufacturers whose products may be used on the project.

Using EcoSpex™ as a Source of EPD Information

As the sustainable building movement gains increasing momentum, designers, specifiers, construction and procurement professionals are demanding greater transparency in product certifications. Third-party verification provides the assurance these professionals are seeking.

EcoSpex is a North America premier online support tool for sourcing and verifying building products. The EcoSpex tool services the design, construction and utility sectors who utilize our product database as a trusted source for selecting and specifying healthy, green building products, clean technologies, and renewable energy systems.

The tool allows for greater connection between manufacturers and suppliers and the professionals reducing time spent on material research and sourcing by 90% allowing project teams to be far more efficient in achieving sustainability goals.

Additionally, project teams can access the online tool for free and utilize the advance search options, access energy efficient products linked to incentive programs, find products linked to LEEDv4 requirements, or other standards, as well as compare products for sustainable, technical and health properties in a simple format. Professionals can then download all supporting documentation without going through the manufacturer, reducing communication time. The online tool provides these benefits through:

- **Transparent third-party verification** of technical, healthy and sustainable attributes of products,
- **Ease of evaluation** through a centralized and standardized product information search system,
- **Embedded alignment** with numerous sustainable rating systems, legislation, and energy codes,
- **Cloud-based knowledge sharing tools** for project teams,
- **Product advanced searches** by MasterFormat, key word, project type, incentives, sustainable criteria and;
- **Alignment to LEED v4 and ASHRAE 90.1** requirements.

Manufacturers are pre-qualified first, and give options to pay for a basic, standard or full verified listing. EcoSpex verified all data from the manufacture in seven key areas for the verified listing: **Company Sustainability, Product Information, LEEDv4 alignment, Specifications, Manufactures Experience, Product Library, and alignment to Incentives.** There is also a product inquiry to track manufactures direct leads.

All documents verified are downloaded and published by EcoSpex staff.

Manufacturers and suppliers gain a competitive edge by having products reviewed and having Verified Listings in the EcoSpex database by:

- **Enhancing brand reputation** through EcoSpex's credible and trusted third-party verification system,
- **Accelerating market reach** through aligning existing product documentation to meet international sustainable rating systems and energy codes,
- **Increased visibility** through the product database, providing direct access to a large, international community of construction and design professionals.
- **Powerful filtering search options**, and;
- **Documents are all** in one place for users.

References

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- [4] M.D.C Gelowitz, J. J McArthur, Investigating the Effect of Environmental Product Declaration Adoption in LEED® on the Construction Industry: A Case Study, Manuscript submitted for publication.