RTS EPD’s – Different Methods of Producing Reliable Environmental Information of Building Products in Finland

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Abstract. The Building Information Foundation RTS sr launched a national EPD program in the year 2016 and after that there have been produced several RTS EPD’s published by the RTS. The Information gathered from the Environmental Product Declaration (EPD) is verified by a third party and therefore neutral and reliable. Environmental performance of construction products is compiled according to the standard EN 15804+A1 and A2 and with a guidance’s and methodology processed in the committee PT18 RT EPD’s. The name of the principal publication is “Methodology (PCR) for compiling environmental declarations for building products: EPD’s published by The Building Information Foundation RTS (2019)” and in addition there are guidance for the application process and verification processes.

The Building Information Foundation got a full membership status of EcoPlatform in September 2018 and therefore the guidance has been revised. PT18 noticed the future demand of easy way of producing EPD’s and therefore it compiled a guidance of verification process of customized and product specific EPD-tools used in connection to production processes. PT18 considered also amendment of the EN15804 standard (A2) in advance as far as possible and updated the RTS methodology accordingly. The EPD’s are created in Finland by the Principal Committee PT18 of The Building Information Foundation RTS. A work group of the Committee PT18 will audit and approve/reject the applications. All RTS EPDs have been verified, there is no difference if the EPDs have been compiled with the EPD tool or without it.

The eco-profiles and other environmental aspects provide input data for the assessment of environmental impacts of the buildings. The purpose of the declarations is to provide environmental information of construction products in a standardized and transparent way. The EN-standardized method developed by CEN/TC350 is utilized in other European countries as well by different EPD-programs. The purpose of different EPD-tools is to provide easy way to produce EPD information of similar products and to use gathered information in multiple product information services and data modelling tools.

1. Introduction
RTS EPDs help building contractors, constructors and planners to better understand environmental issues related to construction products and materials. The environmental impacts of a product during its life cycle and making better use of natural resources have become relevant information in order to assess the environmental performance of a building or other construction works. EPDs according to the European standard EN 15804:2012+A1:2013 are voluntary, transparent and well-established way to present fundamental and verified environmental information based on life cycle assessment about the environmental impacts of a product or product group.
An EPD for construction materials can be drawn up for many different applications. The manufacturer of a construction product can make a declaration:

- For the company's own use, in order to provide information about the environmental impacts of products.
- An EPD can also be made for other companies, in which case the declaration provides the company with essential information from the point of view of the information needs of other companies.
- for EPD tools and basic information (concerning calculation data) in it.

RTS EPDs are made primarily for “business-to-business” use. The declarations are Type III EPDs, i.e. they provide quantified environmental information about the life cycle of a product in order to enable comparison at the building level between products that fulfil the same functional and technical requirements. The life cycle assessment is carried out in accordance with EN ISO 14044 and the construction sector-specific amendments contained in EN 15804:2012 + A1:2013 (e.g., system boundaries, modularity, etc.). An EPD can also be made for consumers. In this case, the most technical information can be left out to focus exclusively on what is essential for the consumer (e.g., carbon footprint and energy consumption).

2. Content and process of the RTS EPD

EPDs shall contain all the information that, in accordance with EN 15804:2012 + A1:2013, must be presented in EPDs in the context of “business-to-business” communications. They can be produced by one or more organisations for one product or a product group containing similar products. Product information and environmental impact calculations shall be presented in EPDs as defined in EN 15804:2012 + A1:2013. All RTS EPDs shall be verified by a third party. The information contained in them has been checked and proved to be a reliable source of environmental information.

The indicators referred to in the standard EN 15804:2012+A1:2013 are used to describe the environmental impacts caused during the product life cycle, including:

- climate change impact, which takes account of the so-called carbon footprint
- ozone-depleting substances, which make the ozone layer thinner
- acidifying emissions to soil and water bodies, which damage ecosystems and the built environment
- depletion of non-renewable energy resources and mineral flows resulting from the exploitation of these resources.
There shall be presented all the modules shown in a table and marked with x.

| Product stage | Construction process stage | Use stage | End of life stage | Supplementary information beyond the life cycle |
|---------------|-----------------------------|-----------|-------------------|-----------------------------------------------|
| A1 A2 A3 A4 A5 B1 B2 B3 B4 B5 B6 B7 C1 C2 C3 C4 D D D |

| Raw material supply | Transport | Manufacturing | Transport | Construction-installation process | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Reuse | Recovery | Recycling |
|---------------------|-----------|---------------|-----------|-----------------------------------|-----|-------------|--------|-------------|--------------|------------------------|----------------------|--------------------------|-----------|-----------|---------|--------|----------|----------|

Figure 2 Building process stages according to CEN/TC 350 standards

Approval shall be carried out by a workgroup approved by the PT18 RTS EPD Committee. The workgroup will need application form fulfilled and with a signature, RTS EPD declaration document compiled according to EN 15804, product information, verification checklist filled up, dialog filled up. The verification data and the EPD drawn up by the company shall be checked during the approval process. The approved EPDs are published on the website of the Building Information Foundation RTS sr at http://epd.rts.fi.

**Approval process flow**

- Initial data
  - Standard (EN 15804) and RTS EPD-protocol (RTS PCR
  - Presentation of initial data: RTS EPD declaration
  - EPD-information must contain information specified in the declaration template and partly in the standard
  - The company can use its own EPD layout

- Verification
  - The verification is carried out in accordance with the principles of ISO 14025
  - Verification report fulfilled
  - A list of approved verifiers is available at epd.rts.fi

- Approval
  - Workgroup of the PT18 RT EPD
  - The RTS notifies the applicant company of the approval
  - The company has the right to use the RTS EPD logo in conjunction with its declaration

Figure 3: RTS EPD approval process
After few years publishing process of RTS EPD’s the PT18 work group has accepted 25 compiled RTS EPDs covering approximately hundred products. It is obvious that without great amount of published EPDs, e.g. carbon footprint calculations cannot be provided appropriately. There are a lot of other EPD organizers in the Europe and according to latest calculations, amount of published EPDs have increased to 6000 pieces.

3. The EPD-tool and verification process

Environmental impacts of a product during its life cycle have become relevant information to assess environmental performance of a building or other construction works. Therefore, access to the data should be as simple as possible. EPD-tools will provide manufacturers to demonstrate environmental impacts and flows and to create environmentally better products to meet increasing requirements placed for the products.

The RTS EPDs comprised with an EPD-tool are verified. The PT18 RT EPD will accept EPD-tools and with this option the Building Information Foundation RTS sr will establish process to reduce the amount of work in collecting data, performing LCAs and creating RTS EPDs for similar product types. When creating a new EPD-tool, the purpose and target product groups of the tool shall be determined in detail.

The verification of EPD-tools differs from the verification of independent EPD’s. The LCA-report/PRE-EPD shall contain all relevant product and production information in suitable form (e.g. data sheet programme, machine readable) to be easily added to the EPD-database and later use e.g in building information modelling.

The EPD-tool cannot be created for wide product groups, the products shall be classified in the same group with similar ingredients. If the tool is suitable for different product groups, the details concerning specific products shall be separated. The EPD-tool shall be created in such a way that product information in different product groups cannot be mixed together.

The EPD-tool can be developed by a single company or by several companies like industry organizations. EPD-tools that will be used by several companies will lead to comparable EPDs that reduce the possible systematic error in EPD-tools used only by one company. It is important for both the company comprising RTS EPDs and for the Building Information Foundation RTS to emphasize that RTS EPDs created using EPD-tools shall have the same quality as EPDs created without EPD-tools.

The quality of the EPD-tools and process will be checked continuously by appointed data collector and verified every three years by approved verifier. SAMPLE-EPDs verification will be carried out every three year in connection with verification of the EPD-tool. The quality of the EPDs will be ensured by verifying every EPD compiled in the EPD-tool. The verification process of single EPDs has been simplified and does not cover all parameters verified at the first time. The EPD-tool can use background information e.g. ready-made and approved LCA databanks mentioned in the RTS PCR like GaBi (http://www.gabi-software.com/databases/gabi-databases/) and ecoinvent database (www.ecoinvent.ch). The background LCA-tool shall be verified with the foreground LCA-tool and the combination (Background LCA and foreground LCA databanks) is valid for three years. Reverification is after three years. When verifying the EPD-tool for the first time, both the tool and SAMPLE-EPDs’ (three different kind, extremities included) will be verified.
PRE-EPD verification process, in other words, simplified verification process can start after verifying the tool and SAMPLE-EPDs for the first time. The verifier shall use the checklist for the verification process of PRE-EPDs. The checklist differs from the SAMPLE-EPD and tool verification checklist and concentrate on the modified details. The verifier should check basic information and modified information using the log book as a map of all changes.

4. Connections to other systems

The building sector is digitalizing the information needed for the building process and for other processes during the building life cycle with accelerating speed in Finland.
The need for specific information in certain phase of the designing process can be achieved because of digitalized designing tools and databases linked to them. The tools help designers, contractors, building owners, real estate management and other participants to decide in an early phase e.g. with the following parameters: used materials, used amounts, targets for carbon footprint, targets for energy efficiency in construction and in use phases, targets for resource efficiency. The outcome will be more precise target values and more precise price for the project. Altogether the major power in decision making process is in public and private procurements, in the second place are environmental classifications like RTS Environmental Classification.

4.1. The Finnish RTS Environmental Classification

The purpose of the RTS Environmental Classification is to manage, monitor and lead the construction project efficiency and achieve more sustainable buildings and to avoid problems in the future. The expected outcome of the tool is an enhanced environmental performance of the final “as-built” building. The Finnish legislation has been considered in the tool, i.e. every target is above the minimum regulatory requirements. In addition, there are few key classifications and certifications utilized to create the criteria for the Green Leadership Tool. These key factors are the Building Performance Indicators of GBC Finland, the Emission Classification of Building Materials and Cleanliness classification of HVAC devices (M1-label), Classification of Indoor Environment, Energy Audit (E-Value), Green Factor Tool (GF) and Drychain10. The real outcome and constructed premise will be certified. The certification after construction phase is mandatory if the owner of the project like to use certification label.

RTS EPD’s are presented in the part Y1.2 Resource efficiency, where are considered material efficiency related to used materials in the construction project. There is possible to gain points also of used EPD’s in the projects to encourage material producers to conduct information related to environmental product declarations.

4.2. The Building Performance Indicators

The Building Performance Indicators were developed to react to the demand of key indicators that assesses environmental efficiency of properties and to ensure principles of sustainable development. The project was implemented with support of SITRA and published by the Green Building Council Finland in the year 2013. The eight indicators are mainly based on the European CEN/TC 350 standards including Life-Cycle Carbon Footprint, Life-Cycle Cost, energy performance indicator (E-value), Indoor Air Class, Measured Energy Consumption, Operational Carbon Footprint, Baseload Demand, User Satisfaction. RTS EPD information is basic data provided by the manufacturers.

4.3. Carbon footprint calculations and calculators

In Finland there are different LCA-calculation tools to assess carbon footprint of buildings. In principle carbon footprint calculations can be modelled in the calculation programs, but the simplest way to calculate is a special program where the basic data information is converged to the tool and checked all the time.

4.4. Eco-Platform system

The Building Information Foundation RTS sr has been approved into the ECO Platform system, which contains hundreds of approved EPDs. The holder of an RTS EPD declaration has the possibility to access the list of approved declarations published in the ECO Platform system and add the ECO Platform logo to the declaration. It guarantees the approvability of the declaration within the EPD programmes operating in all European countries as these programmes are ECO Platform members. ECO Platform membership is also mentioned on the Building Information Foundation's website as well as on the list of approved declarations.
5. Conclusions

The members of the principal committee PT18 represent the highest expertise as well as all parties concerned by the system in Finland. A declaration is granted for five years depending on the time for verification document. If the composition and method of manufacturing the product have not changed, the declaration can be renewed by application without new LCA calculations. Both new and continuation applications will always be examined in accordance with the current methodology and guidance. RTS EPD’s created using EPD-tool are granted for five years, the EPD-tool and SAMPLE-EPDs’ are granted for three years.

The RTS EPD is a voluntary and public document providing comparable and impartial information on the environmental impacts of construction products. It is a source of information for users, designers and constructors. In the future demand for environmentally, socially and economically sustainable buildings will increase and for that purpose shall be created lot of transparent, comparable and third party verified environmental declarations to be used in digitalized designing processes.

6. Acknowledgement

The methodology for compiling RTS EPD is a document and guidance tool created by the enthusiastic and indefatigable committee PT18 RT EPD appointed by the Director General of The Building Information Foundation RTS sr.

7. References

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