



ENVIRONMENTAL PRODUCT DECLARATIONS

May 2023

■ An environmental product declaration (EPD) is a third-party verified declaration of the environmental impacts of a product or service.

■ An EPD contains calculated environmental impacts based on life cycle assessment (LCA) and other environmental information.

■ EPDs provide robust data that contributes to evaluating the environmental impacts of whole buildings.

1 INTRODUCTION

1.0.1 Manufacturers, importers and trade associations may choose to make an environmental claim about a construction product or products. These are the options:

- Type I environmental labels – typically operated by third-party programmes that authorise the use of a label that recognises better environmental performance in comparison with similar products. Assessment of products is based on multiple criteria and consideration of the life cycle. Environmental Choice is a New Zealand-based example.
- Type II self-declared claims – may be a statement, symbol or graphic about an environmental aspect of a product. Verification is not required for the claim but is normally desirable for reliability. Claims of recyclability, reusability or recycled content are examples of this type of claim.
- Type III environmental declarations or environmental product declarations (EPDs) – based on quantified life cycle assessment (LCA) and other environmental information and usually registered with an EPD programme operator. Potential environmental impacts are calculated for all or part of the life cycle. EPD Australasia provides a platform for this in New Zealand.

1.0.2 This bulletin focuses on Type III environmental declarations [or EPDs] in the construction industry.

2 WHO CAN USE EPDs?

2.0.1 EPDs can be useful to anybody who wants to find out about the environmental impacts of a product or service – architects, structural engineers, designers, quantity surveyors, specifiers and others involved in design.

2.0.2 They may also be used by facilities managers wanting to evaluate alternative products for installation in a building they manage. Decision makers using EPDs to make comparisons must take care. Sections 5.0 and 6.0 of this bulletin provide details to help ensure that EPDs are comparable.

2.0.3 The environmental data in EPDs can be used in building LCAs that calculate and evaluate the environmental performance of whole buildings. The assessment can consider the potential environmental implications of a design as a result of multiple variables such as the building's location, orientation, function, form, window to wall ratios, type of structure, insulation levels and source[s] of energy and water. By making changes and rerunning the building LCA, the design team can hone in on an optimum design solution. The building LCA results can also be compared with results for similar buildings to benchmark the environmental performance of building solutions devised by different design teams.

3 WHO DEVELOPS EPDs AND WHY?

3.0.1 EPDs provide an internationally recognised format for the declaration of product or service environmental impacts. They are voluntary and covered by the international standard ISO 14025:2006 *Environmental labels and declarations – Type III environmental declarations – Principles and procedures*.

3.0.2 EPDs of construction products are also covered by the international standard ISO 21930:2017 *Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services* and the European standard EN 15804+A2 *Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products*.

3.0.3 The goal of EPDs, as set out in ISO 21930, is “... to encourage the demand for, and supply of, building products that cause less stress on the environment through communication of verifiable and accurate information on environmental aspects of those building products that is not misleading, thereby stimulating the potential for market-driven, continuous environmental improvement.”

3.0.4 A manufacturer or importer may develop an EPD that declares environmental impacts for a product manufactured at a specific plant or, if the product is made at several plants, average environmental impacts across all plants.

3.0.5 A trade association or sector body may manage the development of an EPD that declares average environmental impacts for similar products manufactured by participating members [together with an indication of the variance or range of impacts].

3.0.6 The potential benefits of EPDs include:

- Helping design teams and their clients gain recognition in building environmental rating tools – for example, the the New Zealand Green Building Council awards up to 7 points for using LCA to evaluate the environmental performance of building, which can be informed with data from EPDs.
- Understanding processes better and identifying cost savings and efficiency gains. Undertaking an LCA needed for an EPD requires collecting data for many parts of the business, allowing identification of ‘hot spots’ where environmental improvements can be made. The result is a far more comprehensive environmental understanding of the business. Performance across plants can be benchmarked and compared to identify resource and energy efficiency opportunities.
- Communication with customers. Developing an EPD provides a means for a manufacturer, importer or trade association to communicate with customers and other stakeholders. Declaration of potential environmental impacts helps to meet the increasing desire from design professionals for transparency about construction products.
- Cutting greenwash (misleading or unsubstantiated claims about environmental benefits). Registration of an independently verified EPD with an established EPD programme operator, which complies with international standards, product category rules (PCR) and general programme instructions (GPI), provides a robust platform for declaring environmental impacts.
- Trade associations and sector bodies can reduce the cost of LCA model development for participating members. Development of an LCA model is typically the largest cost element of an EPD. Where a trade association or sector body commissions the development of a single LCA model that participating members can access, time and

cost can be reduced as the individual members do not need to commission their own.

- Increased future linkage to building information modelling (BIM) objects. Manufacturers are increasingly making BIM objects available for their products for use by design teams in BIM software. In the future, the data in an EPD can be added to these BIM objects as metadata, facilitating the calculation of building environmental impacts in a BIM environment during design.

4 EPD CONTENT

4.0.1 A construction product EPD compliant with EN 15804 typically contains the following information:

- EPD owner and logo (Figure 1).
- Name of the EPD (Figure 1).
- EPD programme operator name and logo (Figure 1). Section 7 of this bulletin covers EPD programme operators.
- EPD registration number (Figure 1).
- Date of issue and validity (Figure 1).
- A verification statement (Figure 2).
- A description of the product covered by the EPD, its properties and relevant standards.
- A process flow diagram, which depicts the processes and life cycle stages covered by the EPD (Figure 3).
- A declaration of the stages of the life cycle covered by the EPD (Table 1).
- The functional or declared unit, which provides the basis for reporting of environmental indicators.

- Calculated potential environmental and other indicators expressed per the functional or declared unit.
- Organisations involved in developing the EPD.

4.0.2 In addition, an EPD should contain:

- reference to the PCR on which it is based (see section 8.0)
- details of the basis for scenarios that are used to calculate environmental impacts of life cycle stages beyond manufacture
- other qualitative or quantitative environmental information – for example, details of a product stewardship scheme.

4.0.3 Construction product EPDs compliant with EN 15804 must report the indicators summarised in Table 2, all of which can be calculated using LCA.

5 COMPARING EPDs

5.0.1 EPDs may be used to make comparisons between products, but this requires care. To reduce the risk of making a wrong comparison, check that:

- the EPDs have been developed to the same standard – for example, an EPD developed to comply with ISO 21930 is not necessarily comparable to an EPD developed to comply with EN 15804
- the EPDs have been developed using the same PCR and version and are registered by the same EPD

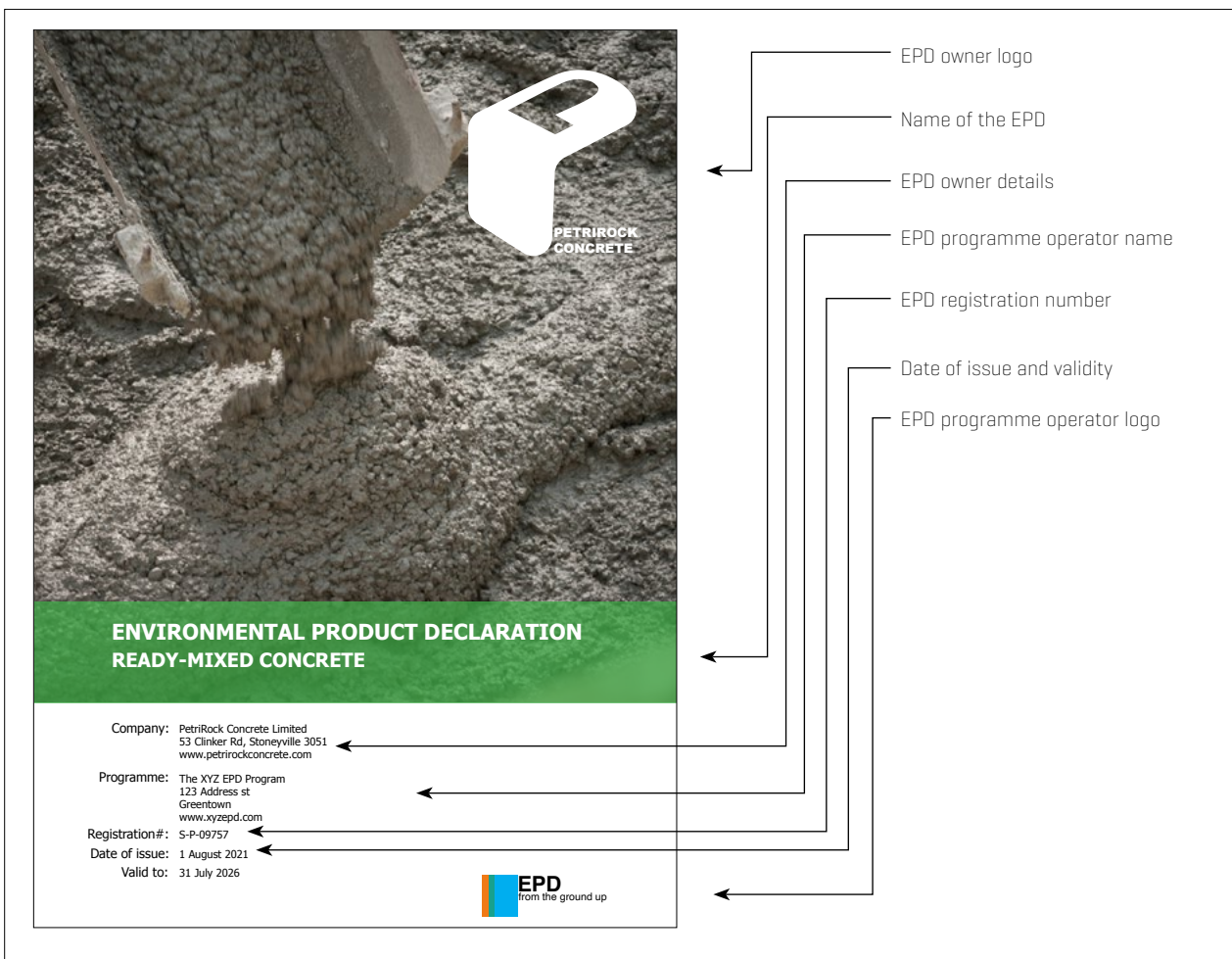


Figure 1. Example of a cover page for an EPD [all details are fictitious].

Product category rules [PCR] review was conducted by:
The Technical Committee of the XYZ EPD Programme

Independent verification of the declaration and data, according to ISO 14025:2006
 EPD process certification EPD verification

Third-party verifier:
 Xxxxxxx, as individual verifier, qualified by the Technical Committee of the XYZ EPD Programme – Organisation: xxxxx www.xxxxx.com

Figure 2. Example of a verification statement contained in an EPD.

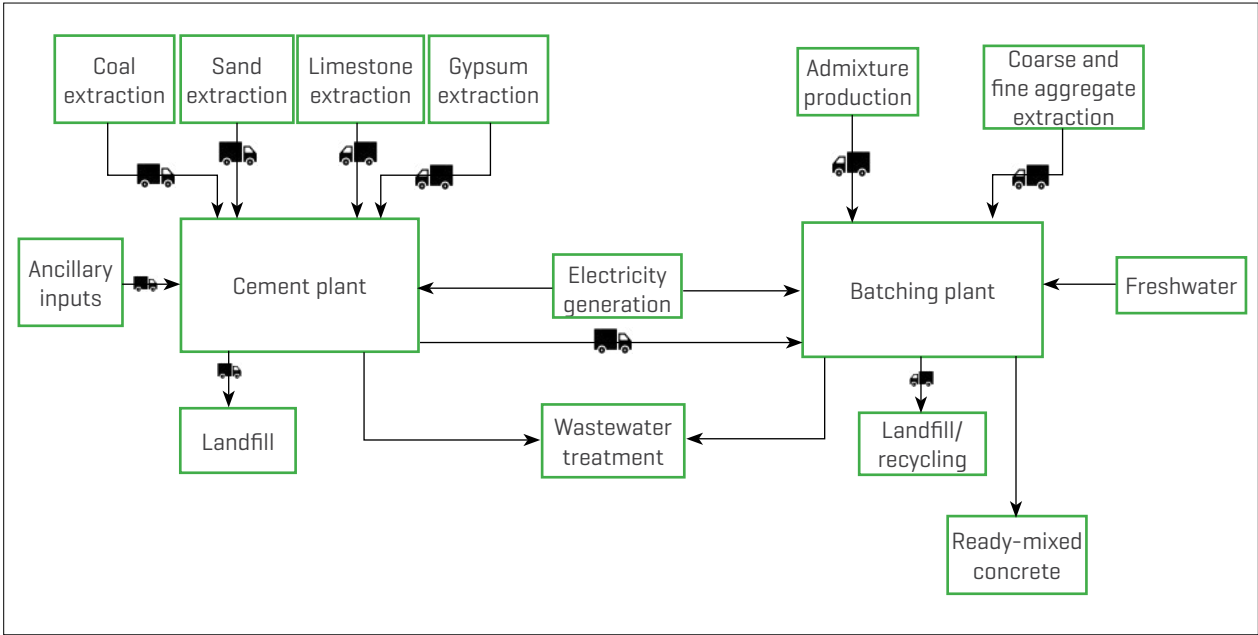


Figure 3. Example of a process flow diagram, which depicts the processes covered by the EPD.

Table 1. Example of a declaration of the stages of the life cycle covered by the EPD.

| Product stage | | | Construction process stage | | Use stage | | | | | | | End-of-life stage | | Benefits and loads beyond the system boundary | | |
|---------------------|----------------------------|---------------|----------------------------|--------------|--------------------|-------------|--------|-------------|---------------|------------------------|-----------------------|---------------------------|-------------------------------|---|----------|------------------------------------|
| Raw material supply | Transport of raw materials | Manufacturing | Transport to customer | Installation | Material emissions | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | Deconstruction/demolition | Transport to waste processing | Waste processing | Disposal | Reuse-recovery-recycling potential |
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| X | X | X | MNA | MNA | MNA | MNA | MNA | MNA | MNA | MNA | MNA | MNA | MNA | MNA | MNA | MNA |

MNA = module not accounted

programme operator – this ensures a consistent underlying basis for the EPDs, including compliance with the GPI

- the EPDs cover the same parts of the life cycle – EN 15804-compliant EPDs require a declaration of the stages of the life cycle covered by the EPD [Table 1]
- the declared or functional unit, system boundaries and any scenarios used to model life cycle stages beyond manufacture [for example, at building end of life] are on the same basis.

5.0.2 Even under these conditions, EPDs from different manufacturers are likely to contain some differences caused by use of different LCA databases and assumptions. Look for reasonable differences to be comfortable that option 1 is better than option 2. For example, a difference in global warming impact between options of 1% could not be considered material, while a difference of 20% could be.

5.0.3 EPDs of products made by the same manufacturer are more likely to have more consistent supporting LCA databases and assumptions. In this case, smaller differences between options may be considered material.

5.0.4 Provided conditions for comparability are met, examples of comparisons that can be made are:

- a product-specific EPD is compared with a sector average EPD for the same or similar products, demonstrating environmental performance of a specific product relative to other products in its sector
- an updated product-specific EPD [or sector average EPD] is compared with an older version

of the EPD from the same manufacturer or sector body, demonstrating continuous improvement at a manufacturer or sector level

- a product-specific EPD from a manufacturer is compared to another manufacturer with a competing product in the same sector, demonstrating better environmental performance of one product over another.

5.0.5 Without knowing how much of a product is required in a building, it is impossible to compare the total impact of two different options. An EPD for 1 tonne of structural steel is not comparable to an EPD for 1 tonne of ready-mixed concrete, for example, because the reported environmental indicators in each EPD do not consider the application of the product in a building. This type of assessment is better carried out at the whole-building level [a building LCA].

5.0.6 Construction products are frequently used in combination with other products to form building elements. For example, a wall element may consist of cladding, framing, underlay, insulation and lining. The combination of these products and the quality of their assembly dictates the functional performance of the wall in terms of thermal resistance, the need for maintenance and typical service life. The environmental consequences of use of a particular external wall element in a building is a function of its location and orientation in the building, the source[s] of energy required for heating and cooling in the building, how the building is operated and when heating and cooling is required, in addition to other variables.

Table 2. Summary of indicators required for an EPD that is compliant with EN 15804.

| Indicator group | Indicators |
|---|--|
| Parameters describing environmental impacts | Global warming Ozone depletion Acidification of soil and water Eutrophication Photochemical oxidant formation Depletion of abiotic resources – elements Depletion of abiotic resources – fossil fuels |
| Parameters describing resource use | Use of renewable primary energy excluding renewable primary energy resources used as raw materials Use of renewable primary energy resources used as raw materials Total use of renewable primary energy resources Use of non-renewable primary energy resources excluding non-renewable primary energy resources used as raw materials Use of non-renewable primary energy resources used as raw materials Total use of non-renewable primary energy resources Use of secondary material Use of renewable secondary fuels Use of non-renewable secondary fuels Net use of freshwater |
| Other environmental information describing waste categories | Hazardous waste disposed Non-hazardous waste disposed Radioactive waste disposed |
| Other environmental information describing output flows | Components for reuse Materials for recycling Materials for energy recovery Exported energy [per energy carrier] |

5.0.7 Building LCAs provide a holistic form of assessment that can cater for consideration of these and other issues. Incorporating robust environmental data from building product EPDs can improve the accuracy of a building LCA and facilitate comparison of potential environmental impacts at the building level.

6 LIMITATIONS

6.0.1 An EPD does not directly show that a product is environmentally better than alternatives – it is simply a declaration.

6.0.2 EPDs do not cover all environmental impacts. For example, toxicity, land use, biodiversity impacts and social impacts are not usually reported. Other sources of information may be required to make balanced decisions.

6.0.3 Special care must be taken when using different EPDs to make comparisons. EPDs produced using different standards or PCR or developed under different EPD programmes may not be comparable. Stages of the life cycle reported in the EPDs should be the same, as should the functional or declared unit.

7 EPD PROGRAMME OPERATORS

7.0.1 An EPD programme operator typically develops and provides a GPI that sets out the requirements of the EPD scheme. This includes information about governance, requirements and procedures for development of PCR and requirements of verifiers. EPDs registered with an EPD programme are required to comply with the GPI in addition to the PCR. An example of a GPI [for The EPD Australasia Programme] can be found at epd-australasia.com/creating-epds/pcr.

7.0.2 EPD programmes began developing in other countries in the 1990s. Today, they are found around the world, typically covering specific geographical regions. Programme operators are increasingly developing mutual agreements to ensure wider recognition of EPDs and better consistency between different EPD programmes.

7.0.3 In 2014, the Life Cycle Association of New Zealand [LCANZ] and Australian Life Cycle Assessment Society [ALCAS] launched the EPD Australasia Programme for developing and registering EPDs in Australia and New Zealand [Figure 4]. Examples of other EPD schemes globally:

- The International EPD® System, located in Sweden, provides the basis for the EPD Australasia Programme.
- IBU, based in Germany, focuses on construction products.
- Ecoleaf, operated by JEMAI, is based in Japan. The scheme has been operating for over 10 years.
- UL Environment, based in the United States.
- EPD programmes also operate in China, Korea and Taiwan.

8 PRODUCT CATEGORY RULES (PCR)

8.0.1 PCR set out detailed requirements and guidance for undertaking an LCA in support of an EPD and the format and minimum content of the EPD itself. They also provide requirements and guidance for undertaking environmental footprints such as carbon footprints.

8.0.2 PCR may be developed for different products meeting a particular function [for example, insulation achieving a specified thermal resistance] or for a product used in different applications [for example, ready-mixed concrete used in floor slabs, walls, columns and beams].

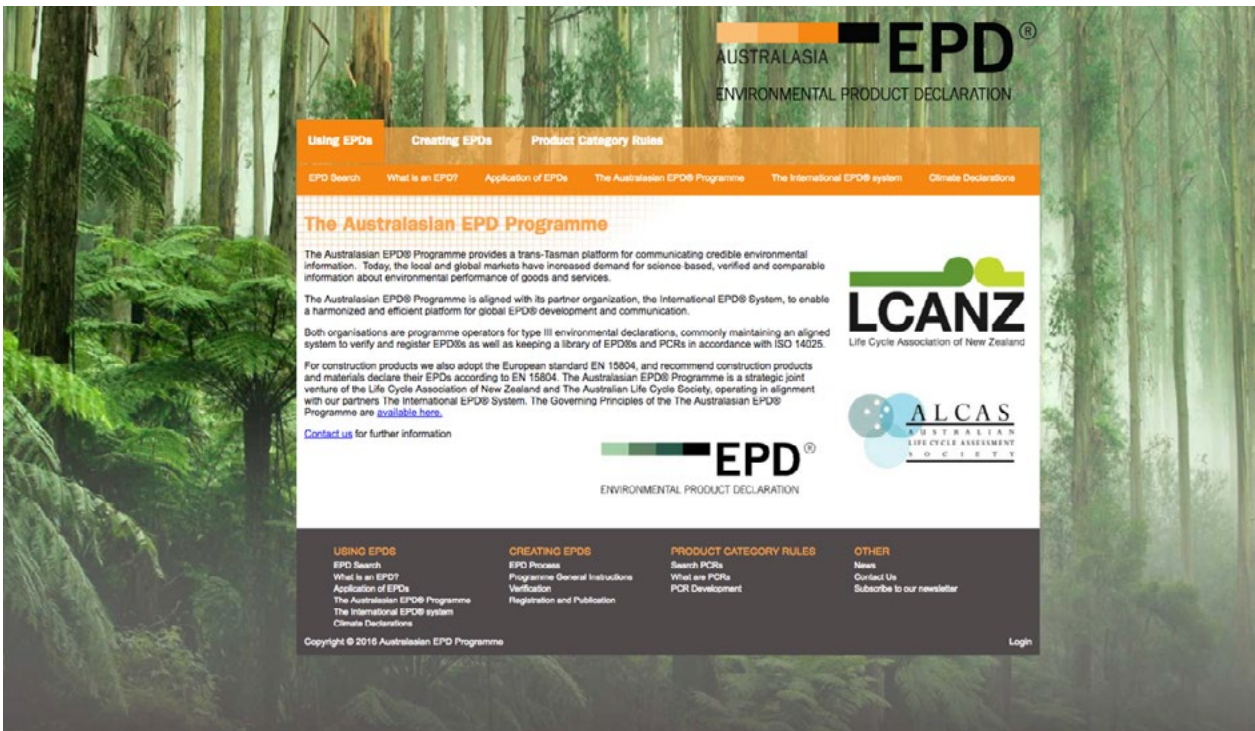


Figure 4. The Australasian EPD® Programme

8.0.3 PCR may also be available that cover a sector or group of products – for example, construction products. In this case, the rules provide more detailed requirements than are set out in standards (such as ISO 21930 and EN 15804) but that are generally applicable across different products in the sector or group. Below this may be further subcategories of PCR that provide more detailed rules for specific products within the group (as illustrated in Figure 5).

8.0.4 PCR should be freely available from EPD programme operators. The product or product group that the PCR apply to should be clearly stated. Classification systems exist to facilitate this, such as the United Nations Central Product Classification (UN CPC) and, locally, the Australian and New Zealand Standard Industrial Classification (ANZSIC).

8.0.5 PCR may be developed outside of an EPD programme operator and then subsequently registered with a programme operator (subject to the PCR being reviewed and accepted by the programme operator) or developed under the guidance of a programme operator. The advantage of developing PCR under an EPD programme operator’s guidance is access to their experience, access to established mechanisms to facilitate PCR development and ensuring better consistency with other PCR registered with them.

8.0.6 The typical process for developing PCR is as follows:

- Establish a PCR committee. This should be balanced so that no single view dominates and should include people with knowledge of the product and expertise in LCA.
- Notify intent to develop PCR to interested parties.
- Review expired or existing PCR, or PCR for similar products that could provide a basis for the rules. It is preferable to adapt existing PCR than develop new ones. To search for PCR, use a search engine and/or check individual EPD programme websites – some examples are provided at the end of this bulletin. Currently, there is no comprehensive global PCR registry. A PCR library worth checking is www.environdec.com/pcr-library.
- Adapt text from existing PCR and develop new text. If developing new PCR, one or more LCAs relevant to the product should be available to inform the PCR development to understand what environmental

impacts occur where in the life cycle and their magnitude. The geographical scope of the PCR and underlying standards on which they are based should be clearly stated. If they are based on other PCR, this should also be stated.

- Consult with interested parties, showing them the draft PCR.
- Consider comments received and develop a final version.
- Review of the PCR draft by the EPD programme operator. EPD programme operators typically have access to a scientific committee or technical advisory group for this purpose. If the PCR are accepted, they are registered on the EPD programme and should be downloadable from the programme operator’s website.

8.0.7 ISO/TS 14027:2017 provides guidance for developing PCR. Check if PCSR have been developed or updated in accordance with the technical specifications.

8.0.8 Once registered, PCR have a lifetime that is usually set by the EPD programme operator in its GPI. This is typically 3–5 years, after which the PCR may be updated or expire.

9 DEVELOPMENT AND MAINTENANCE OF EPDs

9.0.1 A manufacturer, importer, exporter or sector body wanting to develop an EPD typically seeks to register the EPD with a programme operator in the location(s) where the product is sold.

9.0.2 Key to this choice will be the availability of suitable PCR registered with the EPD programme operator. It is therefore worth checking EPD programme operator websites for suitable PCR (section 12.0). If suitable PCR exist, the process of EPD development can commence. If suitable PCR do not exist, they must be developed (section 8.0).

9.0.3 Typical steps in developing an EPD:

- Decide on the scope of the EPD, in particular, which parts of the life cycle will be included.
 - If the EPD covers manufacture only, then it is a ‘cradle to gate’ EPD and is based on a declared unit,

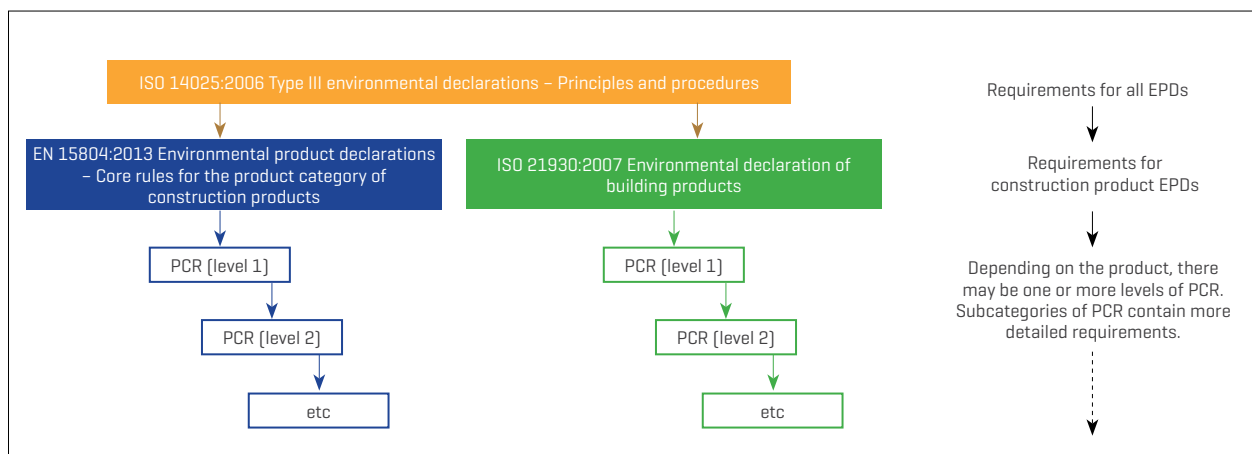


Figure 5. Hierarchy of requirements for EPD development.

which is a physical quantity such as a kilogram, cubic metre or square metre [depending on what is relevant to the product].

- If the EPD includes manufacture and some other parts of the life cycle, then it is a 'cradle to gate with options' EPD. In this case, the other parts of the life cycle must be declared and the scenarios used for their calculation clearly defined.
- If the EPD covers the full life cycle of a product, it must be based on a functional unit, which reflects a level of functionality achieved through use of the product against which declared environmental indicators are provided in the EPD. Requirements for the declared or functional unit are set out in the PCR.
- Undertake an LCA that meets requirements in the PCR and GPI of the EPD programme operator and relevant international standards. This includes requirements concerning the system boundary, data quality, allocation, cut-off criteria and what indicators should be calculated and reported.
- Develop a project report that sets out how the LCA study has been developed and how it complies with the PCR, GPI and relevant standards. This document is needed for EPD verification.
- Draft the EPD. Requirements for this vary between programme operators and are set out in the PCRs and GPI.
- Engage an independent verifier early in the process to address issues that may arise during the LCA development. If a verifier is only engaged at the end, there is an increased risk that they may not agree with an approach taken in the LCA study, leading to potential delays and rework. EPD programme operators usually have a list of accredited verifiers for their programmes.
- Submit the draft EPD, project report and accompanying documentation to the verifier. Accompanying documentation usually includes underlying data and information that informed the LCA model. Examples may include energy and water utility bills, goods-in receipts for delivery of raw materials, flue gas and wastewater outfall monitoring results. The verifier reviews all the documents and may request further information. The review may include a meeting between the verifier and the provider of the draft EPD.
 - Once the verifier is satisfied, they provide a recommendation to the EPD programme operator.
 - The result of the verification is considered by the EPD programme operator [usually by its scientific committee or technical advisory group]. On acceptance, the programme operator registers the EPD in its programme and provides a unique registration number.
 - The final EPD is available on the EPD programme operator's website.

9.0.4 Once registered, EPDs have a lifetime of 3–5 years. Construction product EPDs compliant with EN 15804 have a lifetime of 5 years.

9.0.5 During the life of an EPD, the environmental indicators and information reported in the EPD must remain valid. The EPD must be periodically reviewed and updated if necessary.

10 EPD DEVELOPMENT COSTS

10.0.1 Typical costs of developing an EPD include:

- engaging an LCA specialist to develop the LCA and produce a project report for verification [if the expertise is not available in house]
- engaging an accredited verifier to the EPD programme in which the EPD will be registered
- registering with the EPD programme operator once the EPD is accepted – this may include a cost for a company membership and a cost for EPD registration
- there is usually an annual EPD registration cost for the period during which the EPD is registered
- there may also be further costs during the life of the EPD arising from periodic review, which may mean some time from an LCA specialist to update the underlying LCA model if necessary and further time for the verifier.

10.0.2 For companies that wish to produce EPDs for several products, some EPD programme operators allow process verification in addition to individual EPD verification in which the systems and processes for EPD development within a company are independently verified. This option can mean that the unit cost per EPD is lower.

10.0.3 The registration and EPD publication cost structure of the Australasian EPD® Programme can be accessed at www.epd-australasia.com/creating-epds/registration-and-publication.

11 GLOSSARY

EPD programme operator – “Body or bodies that conduct an EPD programme. A programme operator can be a company, a group of companies, industrial sector or trade association, public authorities or agencies, or an independent scientific body or other organisation” [ISO 14025].

LCA (life cycle assessment) – “Compilation and evaluation of the inputs, outputs and potential environmental impacts of a product system throughout its life cycle” [ISO 14040]. An LCA model is required to generate potential environmental impact results that can be reported in an EPD and is therefore a necessary prerequisite for an EPD.

PCR (product category rules) – “Set of specific rules, requirements and guidelines for developing Type III environmental declarations for one or more product categories” [ISO 14025].

12 FURTHER INFORMATION

BRANZ

- [Bulletin 596 An introduction to life cycle assessment](#)
- [Study Report SR293 New Zealand whole-building whole-of-life framework: Life cycle assessment-based indicators](#)
- [Study Report SR349 New Zealand whole-building whole-of-life framework: An overview](#)

For information about building LCA and the New Zealand whole-building whole-of-life framework, go to www.branz.co.nz/buildingLCA.



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