# Environmental Product Declarations

## What they are and how to use them

ASSA ABLOY

ASSA ABLOY Entrance Systems

The global leader in door opening solutions

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## For a more sustainable future

The construction sector has traditionally had a huge impact on the environment. Various reports show a significant contribution to global natural resource consumption and energy usage as well as to air and drinking water pollution, climate change and landfill waste.

However, current macro trends, especially the sharp focus on sustainability, is changing how buildings are constructed. Contractors, building owners and architects are increasingly aware of areas such as energy efficiency and sustainability of materials.

But it is not only about being environment-friendly. The indoor climate is increasingly linked to health issues, for example the growing prevalence of illnesses such as asthma and allergies.

## Fair product comparisons

To keep pace with the trends, building owners are increasingly relying on green building certification systems when communicating with stakeholders such as investors and potential tenants. However, there are hundreds of product labeling systems globally. Navigating this jungle is a time-consuming challenge. On top of this, the various systems don't allow for direct product comparisons, which makes it very hard to get a clear understanding of the environmental impact.

For example, while one product may shine when it comes to CO2 emissions, it might not perform at all well regarding water consumption.

This is where the Environmental Product Declaration, EPD, comes in. This objective, third-party and international verified program can report the environmental impact of a product or service throughout the life cycle.

## Flexible tools

EPDs are not another labeling system, but flexible tools that can be created for just about any product or service. One of the major benefits is that they allow for direct comparisons and the possibility to see "the whole picture". So, they give you the opportunity to make a balanced decision, based on the most relevant environmental aspects in your specific case.

Focusing mainly on the construction sector, this white paper explains what an EPD is, what the benefits are, and how you can use it to build trust with environmental information that is transparent and relevant throughout the value chain.

## Do you need more information?


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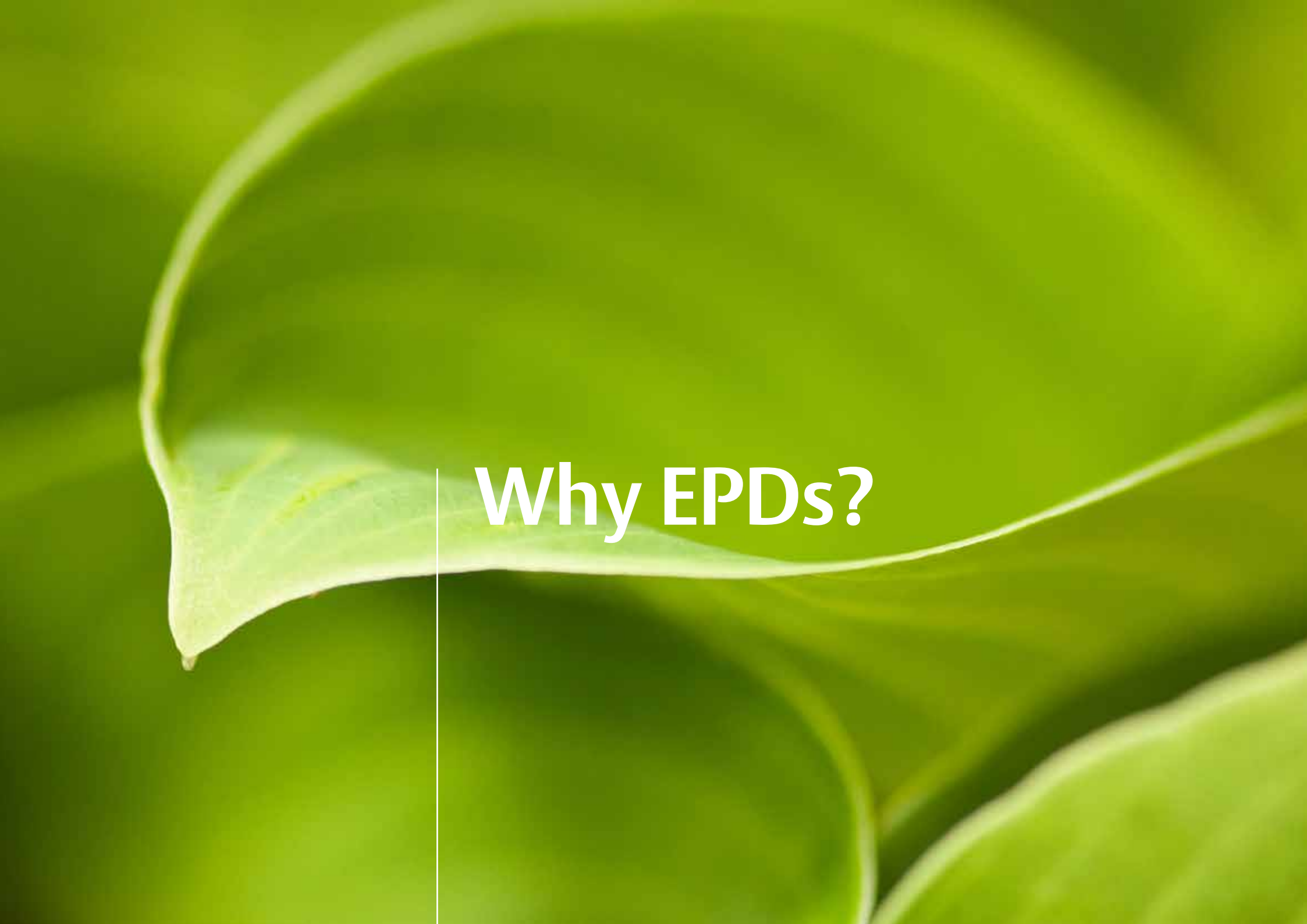


# Why EPDs?

## Severe consequences

Most products impact the environment in some way or other and at some point during their life cycle, for example through depletion of natural resources or through pollution. Ultimately, this may lead to negative impacts on human and animal health and to irreversible effects on the entire natural environment.

Covering a very wide range of consequences, from ozone layer depletion to eye irritation from smog, the environmental impacts can be classified as one or more of the following:

- Global
- Regional
- Local

The impacts are described more in detail on the following pages.

## Health effects

While the EPD covers and measures environmental impact, generally during the entire life cycle, it omits the more specific effects on health, well-being and productivity, which are caused by the design of the building. For example, if a product that is part of a building's construction emits VOCs (volatile organic compounds), which could be a health concern, this will have to be covered in a separate Health Product Declaration, HPD.

# Global impacts

The global environmental impacts generally have far-reaching and very serious consequences relating to climate change. In the worst case, they will affect the Earth and future generations irreversibly.

- Global warming potential (GWP): global warming (climate change) is caused by greenhouse gases, such as CO2, methane and nitrous oxide that keep heat from radiating out in space, instead making it heat the earth. Some effects are polar melt, soil moisture loss, longer seasons, forest loss/change, and changes in wind and ocean patterns, for example leading to extreme weather, rising sea levels and species extinction.
- Ozone depletion potential (ODP): halogen atoms, for example from foam-blowing agents and solvents, lead to an increase in unfiltered UV radiation from the sun, with potentially severe effects on human health and on terrestrial and marine biological systems.
- Abiotic depletion potential for non-fossil resources (ADPE): depletion of finite non-fossil resources such as metals and water. (Abiotic = the material is physical rather than biological and not derived from now living organisms.)
- Abiotic depletion potential for fossil resources (ADPF): depletion of finite fossil resources, such as coal and gas.

## Regional impacts

The regional and local impacts may not have the overarching climate change potential of the global impacts. Still, they may pose very serious threats to humans, animals, the terrestrial and aquatic environment as well as to buildings and structures.

- Formation potential of tropospheric photochemical oxidants (POCP): better known as “smog”, air pollution may lead to serious human health issues and significant damage to ecosystems.
- Acidification potential of land and water (AP): acidification has far-reaching negative effects through the lowering of pH values and oxygen levels. Especially marine ecosystems are affected negatively. When, for example, shellfish and plankton die, it significantly impacts the whole food chain.

## Local impacts

- Eutrophication Potential (EP): phosphorous and nitrogen nutrients are essential for plant growth. But when superfluous amounts from detergents, fertilizers and other sources enter the biosphere and water bodies, the effects are significant on marine and aquatic systems. Excessive plant growth and oxygen-starvation, for example, lead to toxic oceans and dead sea beds.

# What is an EPD?

## Quantified data

Environmental Product Declarations (EPDs) present quantified environmental data for a product or a system, from sourcing raw material to manufacturing, throughout its use and beyond, covering recycling and final disposal. They are developed based on the requirements of ISO 14025 (Environmental labels and declarations – Type III environmental declarations) or EN 15804 for construction products.

## Simplifies selection

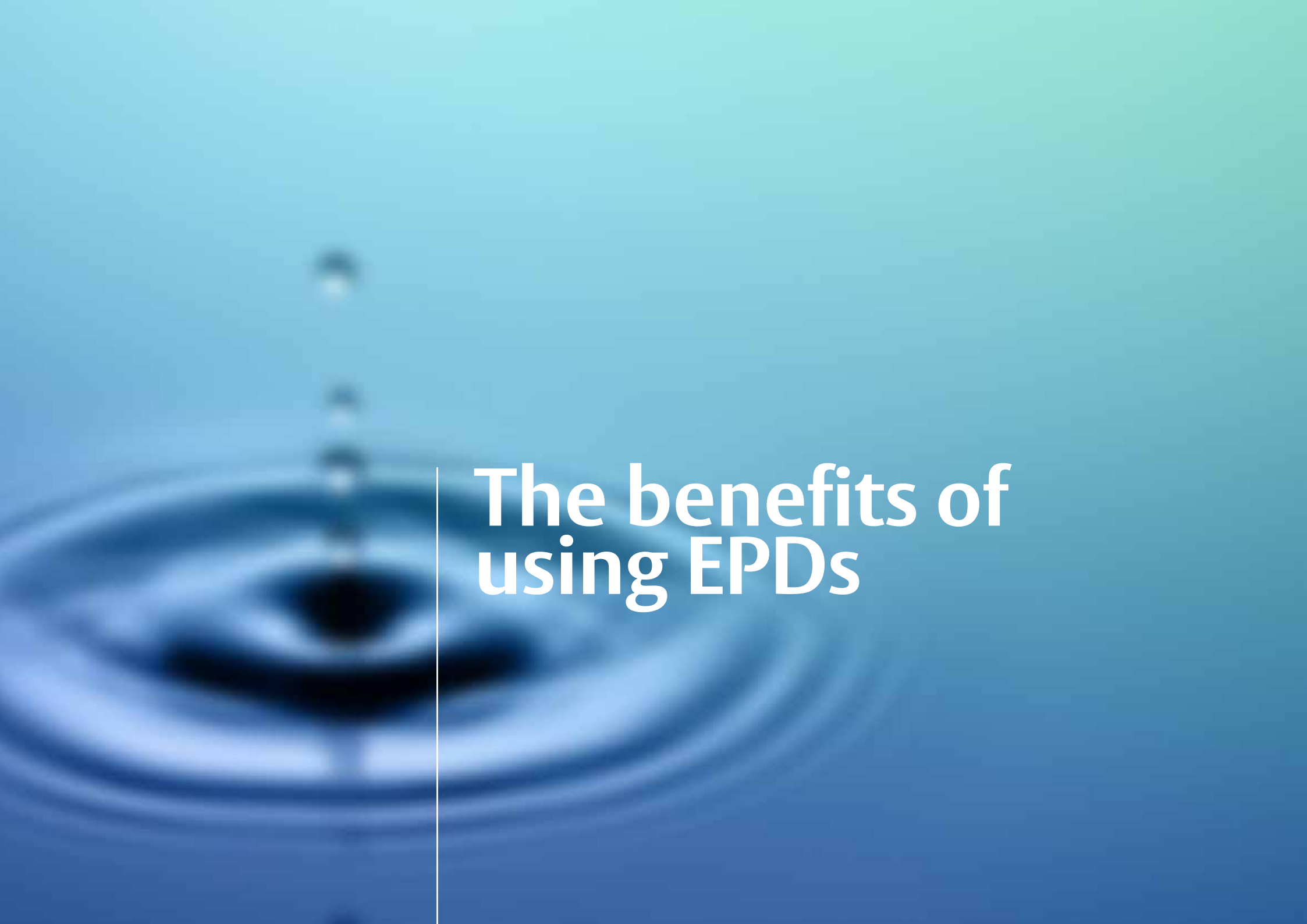
EPDs provide a bigger picture when comparing products as they cover all essential features and parameters regarding the product's impact on the environment. This makes it easier to choose the products with the least environmental impact.

## Standardized methodology

Every EPD is based on a Life Cycle Assessment (LCA), which is described in ISO 14040 and ISO 14044. The LCA is a standardized methodology for identifying the environmental impact of a product, process or activity over its entire lifespan as mentioned above. It typically does not address economic or social aspects.

### Environmental Product Declaration (EPD)

- Based on ISO standard for Type III environmental declaration, ISO 14025 and EN 15804 (Construction products)
- Based on LCA according to ISO 14040 and ISO 14044



# The benefits of using EPDs

## Valuable tools

There are many benefits of using EPDs. Depending on your role, those may vary, but an increasing number of businesses are using EPDs as tools to compare verified data regarding environmental issues.

### EPD benefits:

- Provides transparent environmental information that gives a balanced overview of most important current environmental concerns
- Increases credibility through third-party verification
- Helps to choose products with minimal environmental impact over their entire life cycle
- Reflects continuous environmental product improvements
- Can contribute to earning points in LEED and BREEAM green building certification systems.

# Creating an EPD

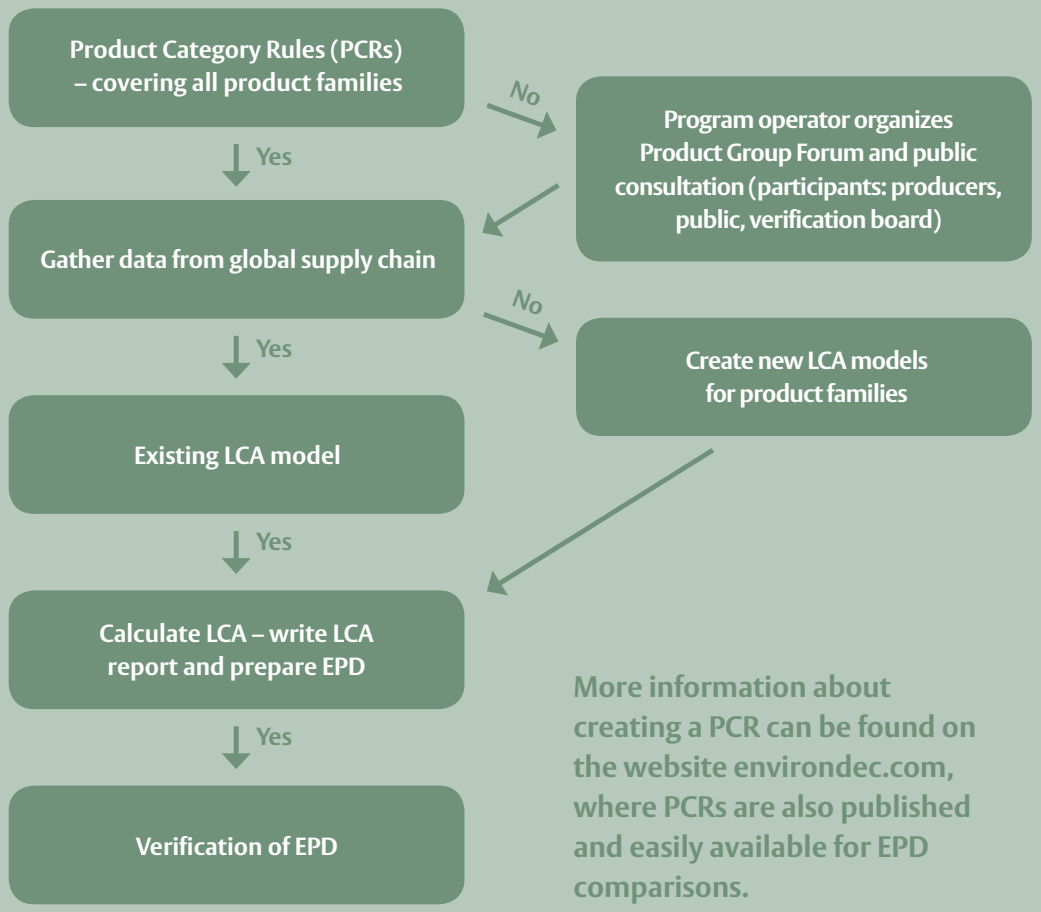
## A solid foundation

Environmental Product Declarations can be produced for all types of products and services and may be initiated by any stakeholder. The starting point is always a Product Category Rule (PCR), which lays the foundation for the LCA, which in turn is required to prepare the final EPD.

## What the PCR does:

- Defines the product category so that products from different manufacturers are using the same rules when creating the LCA, making it possible to compare them
- Offers specific rules for this product category
- Describes which impacts the manufacturer must share
- Details how to measure each of these impacts

## The steps when creating an EPD




More information about creating a PCR can be found on the website environdec.com, where PCRs are also published and easily available for EPD comparisons.

## Creating an LCA

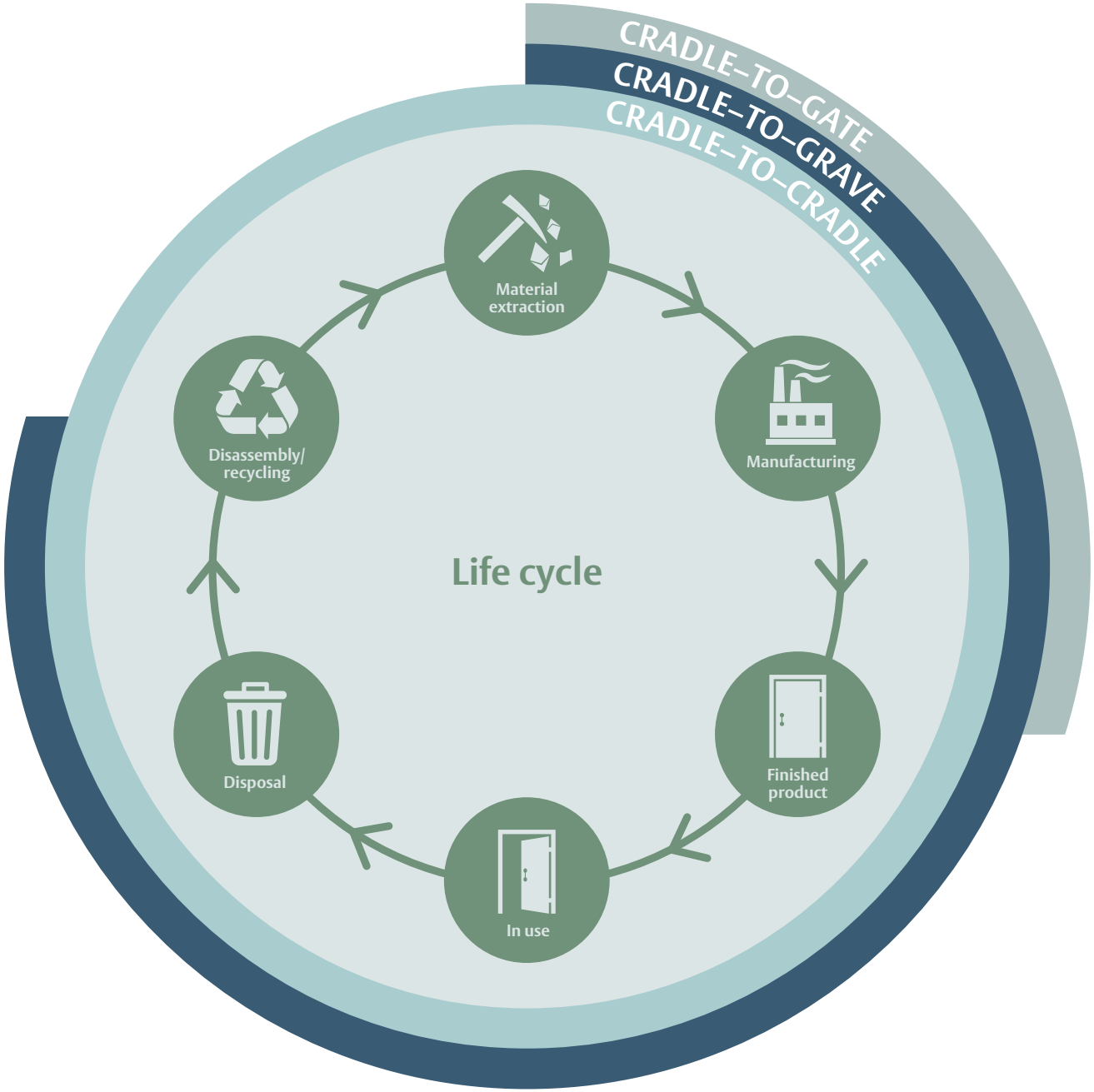
ISO 14040 describes how the creation of an LCA goes through four phases:

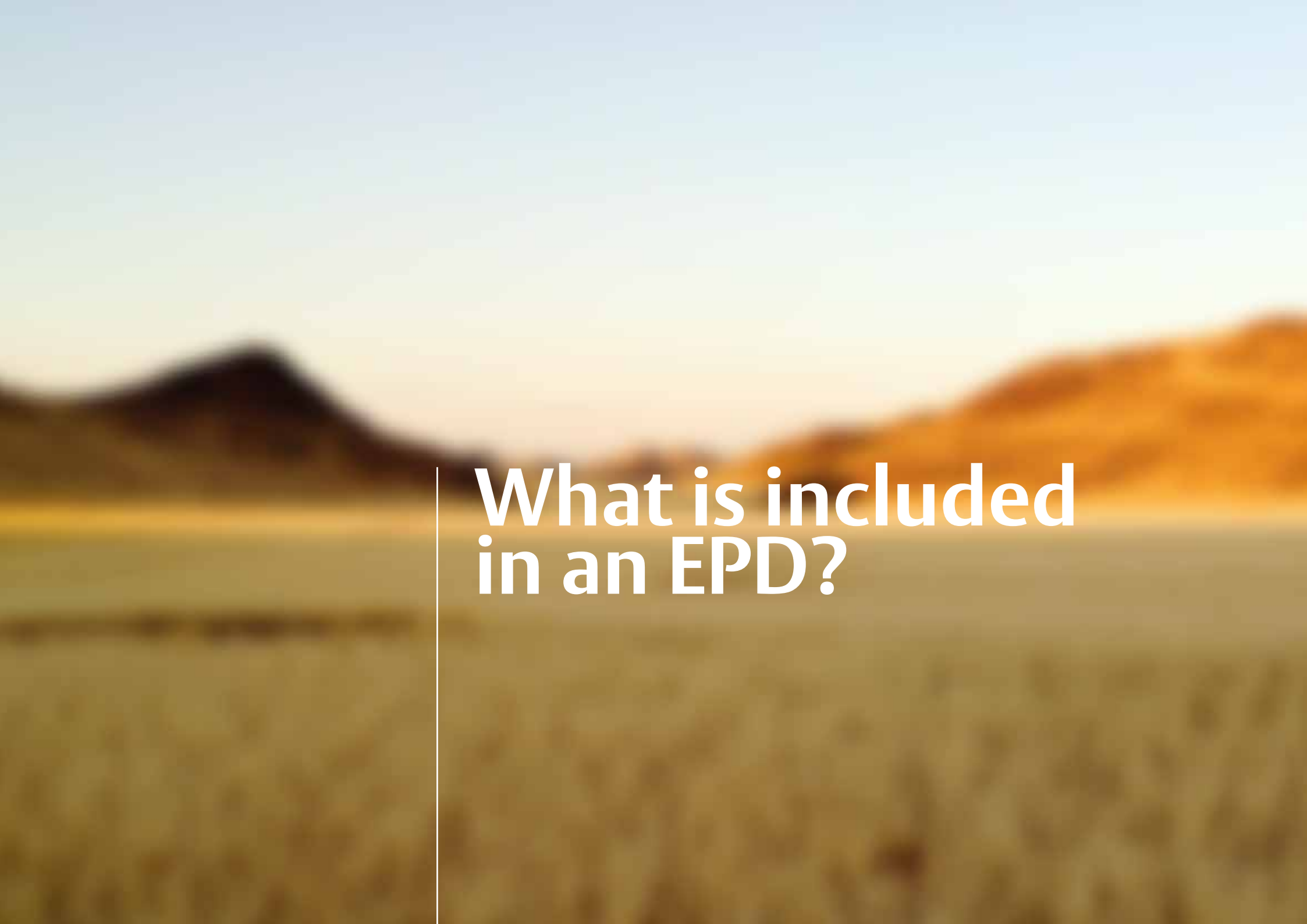
- The first phase sets the scope of the LCA, including the boundary and level of detail. The depth and breadth can vary greatly from one LCA to another, depending on their respective goals.
- The life cycle inventory phase (LCI phase) is an inventory analysis phase, where the necessary data is collected.
- The life cycle impact assessment phase (LCIA) provides additional information to get a better understanding of the environmental impact. It provides a systematic procedure for classifying and characterizing how so-called stressors may impact the environment.
- The life cycle interpretation phase summarizes the results of the LCI and/or LCIA, laying a foundation for conclusions, recommendations and decisions.

## LCA scope

Not every EPD declares all the modules included in an LCA (see page 17). There are different ways of explaining the scope of an LCA and what is included. The term "Cradle-to-X" is often used to illustrate the scope, where X may stand for "gate", "grave" or "cradle":

- Cradle-to-gate – the LCA covers the product stage, including manufacturing until transport to the consumer
- Cradle-to-grave – the LCA covers the above plus the use and disposal phase
- Cradle-to-cradle – covers the entire LCA, that is, the above plus reuse, recovery or rrecycling. This is also called closed loop production.



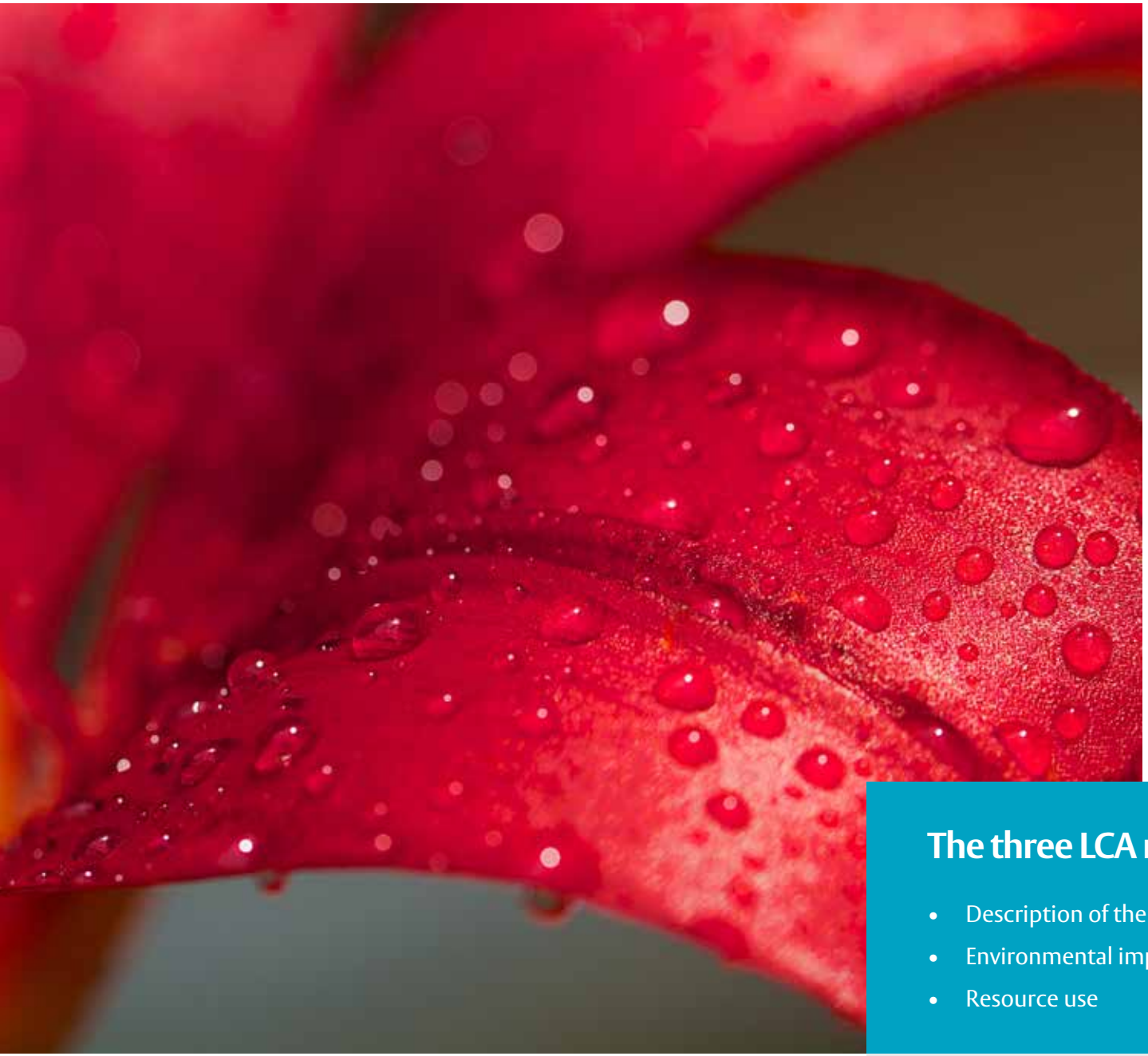


# What is included in an EPD?

## Comprehensive information

An EPD will contain information about how it was produced, about the product in question as well as the product's environmental impact. The information is divided into several sections.

1. General information
   Including which PCR it was based on and validity
2. Product information
   Including product description, base materials and manufacture
3. LCA: Calculation rules
   Including system boundary, data quality and allocation.
4. LCA: Scenarios and additional technical information
   Including installation, operational energy use and recycling potential
5. LCA: Results
   Including environmental impact, resource use and output flows and waste categories (see Appendix for example of EPD LCA results)
6. LCA: Interpretation
7. Requisite evidence
8. References



## Explaining the LCA results

The LCA is the backbone of each EPD. Section 5 of the EPD is where the results of the LCA are presented, going more into detail in three tables.

## System boundaries

The system boundaries set the framework for the LCA. Depending on the LCA scope (see page 14), they may cover up to 17 modules included in the life cycle, from raw material supply to reuse, recovery and recycling potential. If an EPD uses a cradle-to-gate or cradle-to-grave scope, not all 17 modules will be declared. The modules are divided into five major phases:

- Product stage
- Construction process stage
- Use stage
- End of life stage
- Benefits and loads beyond the system boundaries

### The three LCA results tables:

- Description of the system boundaries
- Environmental impact
- Resource use

## Environmental impact

The LCA results for environmental impact comprise seven parameters, for example global warming potential and acidification, and cover impacts from raw material supply to recycling. The results are closely linked to and make more sense when seen in terms of the global, regional and local impacts as described more in detail on pages 4–6.

## Resource use

The third table of the LCA Results is made up of 10 parameters that cover the resource use of the declared LCA modules. They cover renewable and non-renewable primary energy resources, secondary materials, renewable and non-renewable secondary fuels as well as fresh water consumption.

# APPENDIX

EPD: LCA results tables

## 5. LCA: Results

Results shown below were calculated using CML 2001 – Apr. 2013 Methodology.

**DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)**

| PRODUCT STAGE | | | CONSTRUCTION PROCESS STAGE | | USE STAGE | | | | | | | END OF LIFE STAGE | | | | BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARYS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Raw material supply | Transport | Manufacturing | Transport from the gate to the site | Assembly | Use | Maintenance | Repair | Replacement[1)] | Refurbishment[1)] | Operational energy use | Operational water use | De-construction demolition | Transport | 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 | X | X | MND | MND | MND | MND | MND | X | MND | MND | X | X | X | X |

**RESULTS OF THE LCA - ENVIRONMENTAL IMPACT:**
**One piece of Besam SL500 Frame with Besam TightSeal (frame height 2.2 m, frame width 1.8 m and laminated glass)**

| Parameter | Parameter | Unit | A1 - A3 | A4 | A5 | B6 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|
| GWP | Global warming potential | [kg $CO_2$-Eq.] | 1.24E+03 | 7.26E+00 | 9.72E+00 | 1.93E+03 | 6.97E-01 | 6.81E-01 | 3.25E+01 | -4.66E+02 |
| ODP | Depletion potential of the stratospheric ozone layer | [kg CFC11-Eq.] | 4.05E-07 | 3.48E-11 | 4.45E-11 | 1.32E-06 | 3.34E-12 | 4.66E-10 | 1.39E-10 | 2.01E-07 |
| AP | Acidification potential of land and water | [kg $SO_2$-Eq.] | 7.75E+00 | 3.32E-02 | 2.22E-03 | 9.11E+00 | 3.19E-03 | 3.21E-03 | 1.86E-02 | -2.65E+00 |
| EP | Eutrophication potential | [kg $(PO_4)^{3-}$-Eq.] | 4.58E-01 | 7.59E-03 | 3.87E-04 | 5.13E-01 | 7.28E-04 | 1.81E-04 | 1.89E-03 | -1.26E-01 |
| POCP | Formation potential of tropospheric ozone photochemical oxidants | [kg Ethen Eq.] | 4.89E-01 | -1.07E-02 | 1.57E-04 | 5.41E-01 | -1.03E-03 | 1.91E-04 | 1.44E-03 | -1.48E-01 |
| ADPE | Abiotic depletion potential for non fossil resources | [kg Sb Eq.] | 2.06E-02 | 2.74E-07 | 1.75E-07 | 2.67E-04 | 2.63E-08 | 9.42E-08 | 3.07E-06 | -1.35E-02 |
| ADPF | Abiotic depletion potential for fossil resources | [MJ] | 1.36E+04 | 1.00E+02 | 2.72E+00 | 2.19E+04 | 9.61E+00 | 7.73E+00 | 4.91E+01 | -4.53E+03 |

**RESULTS OF THE LCA - RESOURCE USE:**
**One piece of Besam SL500 Frame with Besam TightSeal (frame height 2.2 m, frame width 1.8 m and laminated glass)**

| Parameter | Parameter | Unit | A1 - A3 | A4 | A5 | B6 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|
| PERE | Renewable primary energy as energy carrier | [MJ] | 2.85E+03 | - | - | - | - | - | - | - |
| PERM | Renewable primary energy resources as material utilization | [MJ] | 0.00E+00 | - | - | - | - | - | - | - |
| PERT | Total use of renewable primary energy resources | [MJ] | 2.85E+03 | 3.95E+00 | 2.54E-01 | 6.28E+03 | 3.79E-01 | 2.21E+00 | 2.73E+00 | -1.88E+03 |
| PENRE | Non renewable primary energy as energy carrier | [MJ] | 1.72E+04 | - | - | - | - | - | - | - |
| PENRM | Non renewable primary energy as material utilization | [MJ] | 0.00E+00 | - | - | - | - | - | - | - |
| PENRT | Total use of non renewable primary energy resources | [MJ] | 1.72E+04 | 1.01E+02 | 3.19E+00 | 3.44E+04 | 9.65E+00 | 1.21E+01 | 5.18E+01 | -5.73E+03 |
| SM | Use of secondary material | [kg] | 2.20E+01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| RSF | Use of renewable secondary fuels | [MJ] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| NRSF | Use of non renewable secondary fuels | [MJ] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| FW | Use of net fresh water | [$m^3$] | 8.34E+00 | 2.79E-03 | 2.83E-02 | 1.55E+01 | 2.67E-04 | 5.47E-03 | -3.98E-02 | -5.05E+00 |

## ASSA ABLOY Entrance Systems

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