Module 13

Certification in Construction

Circular Economy in Construction

24 partners

12 countries

Date of Event

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Certification in Construction | Summary

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The aim of this module is to provide the learner with the knowledge to understand the role of EPDs and product transparency in supporting the transition to a circular economy.

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CONSTRUCTION BLUEPRINT

Certification in Construction | Objectives

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1. Outline the role of certification in GPP and Circular Economy.
2. Outline how Environmental Product Declarations (EPDs) are produced
3. Outline the EU Product Environmental Footprint (PEF).
4. Outline the role of certification and identify examples of the types of eco labels and green certification labels used in construction.

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Certification in Construction | Content

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Topic 1 – Environmental Product Declaration (EPD)

Topic 2 – Eco Labels

Topic 3 – Product Environmental Footprint (PEF)

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1. Environmental Product Declaration (EPD)

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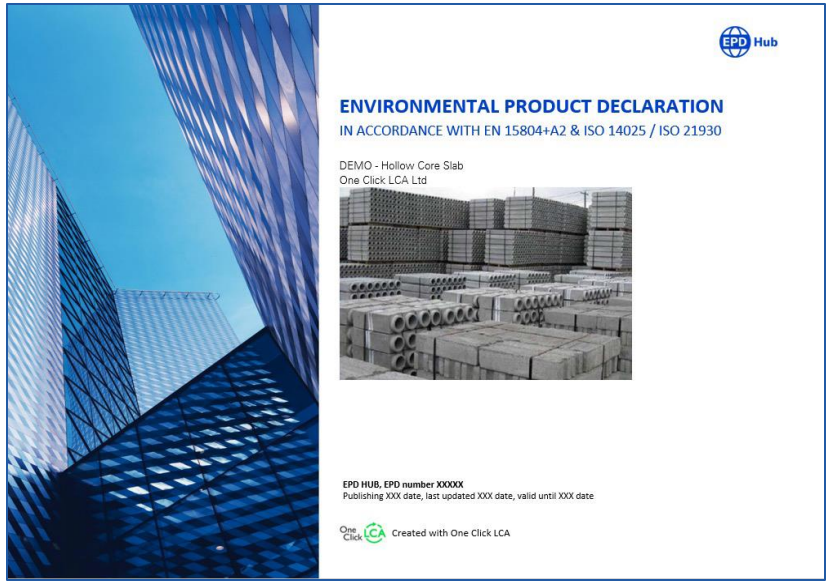
What is an EPD?

An EPD is an externally verified and standardised description of the environmental profile of any product or material over its lifetime.



EPD Hub

ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

DEMO - Hollow Core Slab
One Click LCA Ltd

EPD HUB, EPD number XXXXX
Publishing XXX date, last updated XXX date, valid until XXX date

Created with One Click LCA

EPD Hub

One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	One Click LCA Ltd
Address	Suvilahdenkatu 10 B, 00500 Helsinki, FINLAND
Contact details	support@oneclicklca.com
Website	www.oneclicklca.com

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804+A2:2019 and ISO 14025
PCR	EPD Hub Core PCR version 1.0, 1 Feb 2022 EN 16757 Product Category Rules for concrete and concrete elements
Sector	Construction product
Category of EPD	Third party verified EPD
Scope of the EPD	Cradle to gate with modules C1-C4 and D
EPD author	Thomas Mattinzioli
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
EPD verifier	Elma Avdyli, EPD Hub

The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are

PRODUCT

Product name	DEMO - Hollow Core Slab
Additional labels	
Product reference	
Place of production	United Kingdom
Period for data	
Averaging in EPD	No averaging
Variation in GWP-fossil for A1-A3	<10 (NOTE: if not applicable, mention Not Relevant) %

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 m^2 of hollow-core slab
Declared unit mass	500 kg
GWP-fossil, A1-A3 (kgCO2e)	1,69E2
GWP-total, A1-A3 (kgCO2e)	1,66E2
Secondary material, inputs (%)	1,87E0
Secondary material, outputs (%)	0E0
Total energy use, A1-A3 (kWh)	3,39E2
Total water use, A1-A3 (m3e)	2,85E0

DEMO - Hollow Core Slab

EPD Hub

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ENVIRONMENTAL IMPACT DATA

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total	kg CO_2e	1,6E2	2,96E0	3,11E0	1,66E2	9,06E0	1,16E1	MND	MND	MND	MND	MND	MND	MND	1,65E0	4,55E0	5,83E0	5,24E-1	-7,62E0
GWP – fossil	kg CO_2e	1,58E2	2,96E0	7,96E0	1,69E2	9,14E0	1,16E1	MND	MND	MND	MND	MND	MND	MND	1,65E0	4,55E0	5,83E0	5,23E-1	-1,2E1
GWP – biogenic	kg CO_2e	1,56E0	2,15E-3	-4,85E0	-3,29E0	6,64E-3	4,03E-2	MND	MND	MND	MND	MND	MND	MND	4,58E-4	3,3E-3	-1,75E-3	1,04E-3	4,39E0
GWP – LULUC	kg CO_2e	6,99E-2	8,91E-4	5,08E-3	7,59E-2	2,75E-3	7,11E-4	MND	MND	MND	MND	MND	MND	MND	1,39E-4	1,37E-3	1,74E-3	1,55E-4	-7,51E-3
Ozone depletion pot.	kg CFC_{11}e	6,1E-6	6,96E-7	7,52E-7	7,55E-6	2,15E-6	9,9E-7	MND	MND	MND	MND	MND	MND	MND	3,56E-7	1,07E-6	1,62E-6	2,15E-7	-7,34E-7
Acidification potential	mol H^+e	4,72E-1	1,24E-2	2,01E-2	5,05E-1	3,84E-2	5,7E-2	MND	MND	MND	MND	MND	MND	MND	1,72E-2	1,91E-2	5,28E-2	4,96E-3	-7,5E-2
EP-freshwater[3]	kg Pe	1,41E-3	2,41E-5	1,32E-4	1,56E-3	7,44E-5	1,26E-4	MND	MND	MND	MND	MND	MND	MND	6,66E-6	3,7E-5	6,26E-5	6,31E-6	-7,2E-4
EP-marine	kg Ne	1,28E-1	3,75E-3	5,56E-3	1,38E-1	1,16E-2	2,38E-2	MND	MND	MND	MND	MND	MND	MND	7,61E-3	5,76E-3	2,04E-2	1,71E-3	-1,31E-2
EP-terrestrial	mol Ne	1,48E0	4,14E-2	6,1E-2	1,58E0	1,28E-1	2,46E-1	MND	MND	MND	MND	MND	MND	MND	8,35E-2	6,36E-2	2,24E-1	1,88E-2	-1,59E-1
POCP ("smog")	kg $NMVOC_{eq}$	3,95E-1	1,33E-2	1,98E-2	4,29E-1	4,11E-2	6,92E-2	MND	MND	MND	MND	MND	MND	MND	2,3E-2	2,04E-2	6,3E-2	5,46E-3	-5,63E-2
ADP-minerals & metals	kg Sbe	1,44E-2	5,05E-5	1,71E-4	1,46E-2	1,56E-4	2,35E-5	MND	MND	MND	MND	MND	MND	MND	2,52E-6	7,76E-5	5,87E-5	4,78E-6	-4,69E-4
ADP-fossil resources	MJ	8,29E2	4,61E1	1,43E2	1,02E3	1,42E2	1,02E2	MND	MND	MND	MND	MND	MND	MND	2,27E1	7,07E1	1,1E2	1,46E1	-1,54E2
Water use[2]	m^3e depr.	2,55E1	1,71E-1	1,88E0	2,75E1	5,29E-1	1,71E0	MND	MND	MND	MND	MND	MND	MND	4,23E-2	2,63E-1	2,91E0	6,76E-1	-8,97E0

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	4,54E-6	2,68E-7	2,01E-7	5E-6	8,27E-7	1,42E-6	MND	MND	MND	MND	MND	MND	MND	4,57E-7	4,11E-7	2,71E-6	9,64E-8	-9,06E-7
Ionizing radiation[1]	kBq_{U235e}	2,78E0	2,01E-1	4,32E-1	3,42E0	6,22E-1	2,82E-1	MND	MND	MND	MND	MND	MND	MND	9,72E-2	3,09E-1	4,6E-1	5,99E-2	-8,11E-1
Ecotoxicity (freshwater)	CTUe	2,12E3	3,52E1	7,23E1	2,23E3	1,09E2	1,2E2	MND	MND	MND	MND	MND	MND	MND	1,33E1	5,41E1	8,05E1	9,22E0	-4,76E2
Human toxicity, cancer	CTUh	1,16E-7	9,01E-10	4,77E-9	1,22E-7	2,78E-9	1,97E-9	MND	MND	MND	MND	MND	MND	MND	4,77E-10	1,38E-9	2,5E-9	2,18E-10	-3,7E-8
Human tox. non-cancer	CTUh	1,89E-6	4,17E-8	8,22E-8	2,01E-6	1,29E-7	7,2E-8	MND	MND	MND	MND	MND	MND	MND	1,17E-8	6,41E-8	7,19E-8	6,74E-9	6,48E-7
SQP	-	1,26E3	6,96E1	1,1E1	1,34E3	2,15E2	2,47E0	MND	MND	MND	MND	MND	MND	MND	5,82E-1	1,07E2	1,2E2	2,48E1	-4,95E1

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D

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DEMO - Hollow Core Slab

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What is an EPD?

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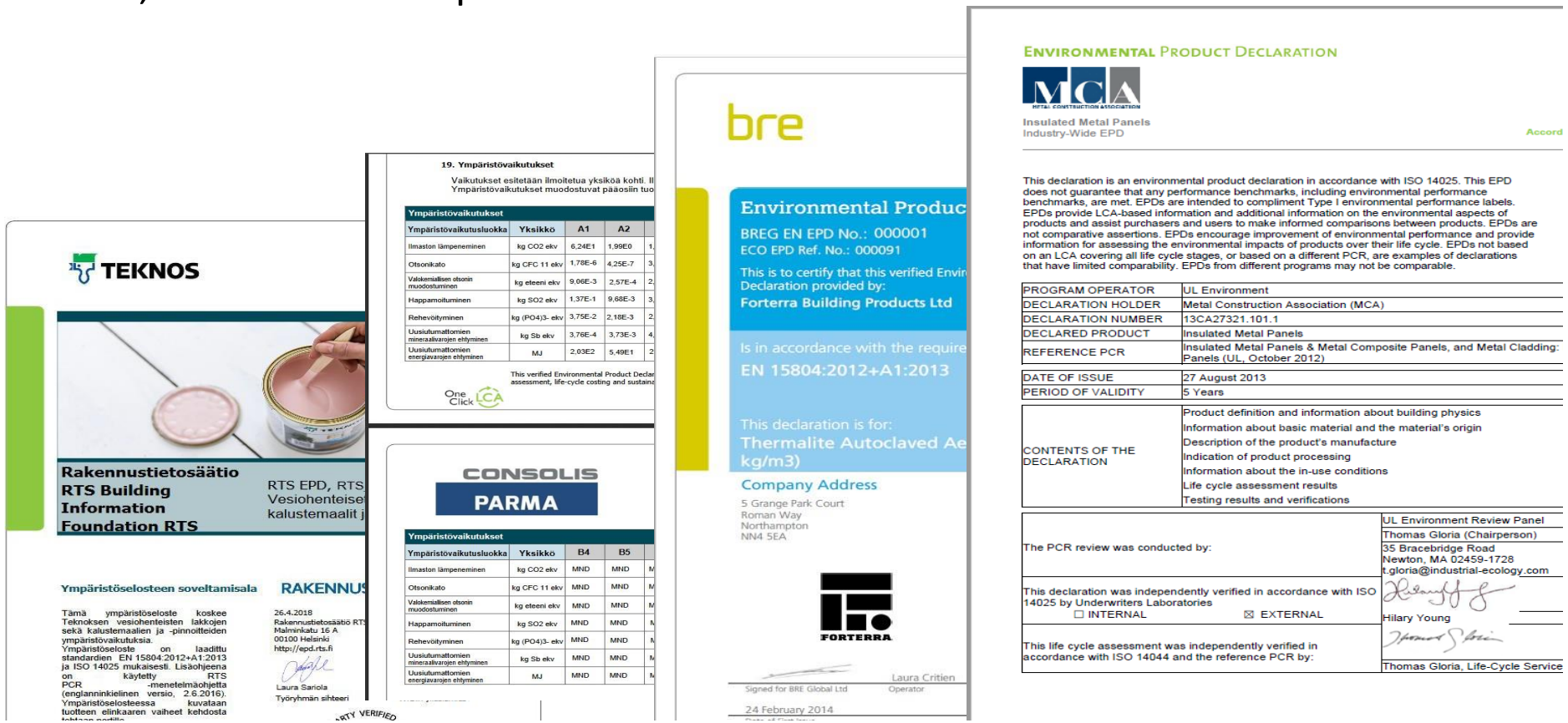
The Environmental Product Declaration (EPD) is an **LCA for a product** with additional rules for calculation, verification and publication



Source: OneClick LCA

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What is an EPD?

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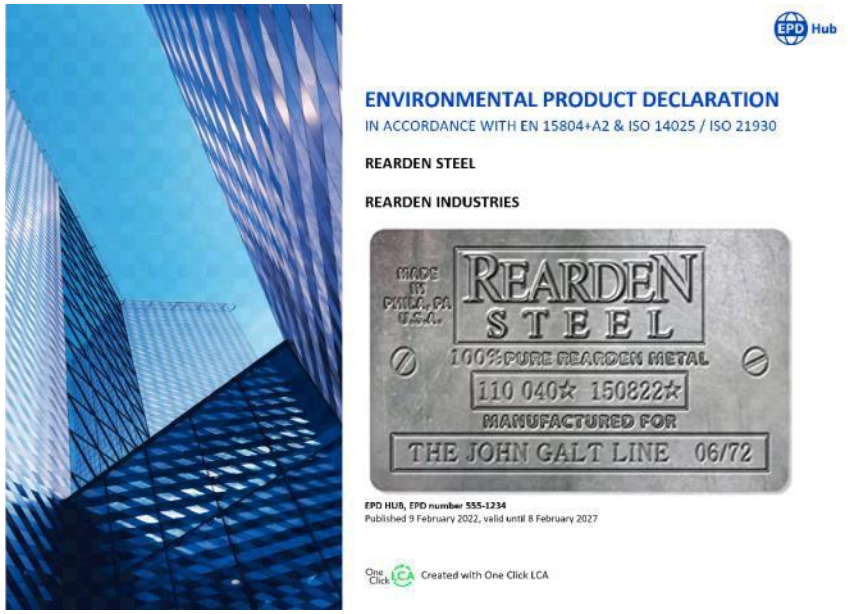

Every EPD provides the product's carbon footprint – called the Global Warming Potential (GWP).
In addition to carbon, the EPD contains environmental impacts to air, soil and water bodies.

Source: OneClick LCA

Why EPDs?

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EPDs are broadly accepted, because they are standards-based and third-party verified

ENVIRONMENTAL PRODUCT DECLARATION

ISO 14025/40/44 & EN 15804 or ISO 21930

- **Objective**: Based on internationally-accepted and valid methods for life cycle assessment (LCA)
- **Credible and Neutral**: Critically reviewed, approved, and maintained by an independent verifier and absent of claims of environmental preference
- **Open:** It has the widest range of applicability to all products and services, and easily accessible to all interested parties
- **Environmental impact oriented**: Through the possibility to include assessment of potential environmental impacts
- **Instructive:** Explains terms, definitions, and concepts, as well as general information on relevant environmental issues to help in the interpretation of the information

Source: OneClick LCA

Example EPD

ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

Louna, Carbon Neutral Wooden Design Door with Glass Opening
Kaskipuu Oy

EPD HUB, HUB-0041
Publishing date 23 May 2022, last updated date 23 May 2022, valid until 23 May 2027

One Click LCA Created with One Click LCA

EPD Hub

KASKI

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Kaskipuu Oy
Address	Ovitie 1, 91300 Ylikiiminki
Contact details	myynti@kaski.fi
Website	https://kaski.fi/

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804+A2:2019 and ISO 14025
PCR	EPD Hub Core PCR version 1.0, 1 Feb 2022 EN 17213 Windows and doors
Sector	Manufactured product
Category of EPD	Third party verified EPD
Scope of	
EPD auth	
EPD verif	
EPD verif	

The manufa
EPDs within
comparable
comply with

PRODUCT

Product name	Louna, Carbon Neutral Wooden Design Door with Glass Opening
Place of production	Ylikiiminki, Oulu
Period for data	2020
Averaging in EPD	No averaging

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 m2
Declared unit mass	40.28 kg
GWP-fossil, A1-A3 (kgCO2e)	38,1
GWP-total, A1-A3 (kgCO2e)	-30,1
Secondary material, inputs (%)	5,13

EPD Hub

KASKI

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries
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	MND	MND	x	x	x	x	x
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR.

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

The environmental impacts of raw material supply (A1) include emissions generated when raw materials are taken from nature, transported to industrial units for processing and processed, along with waste handling from the various production processes. All major upstream processes are taken into consideration, including infrastructure. Loss of raw material and energy transmission losses are also taken into account. This stage includes all the aforementioned for the raw materials which end up in the final product (i.e. wood, steel, aluminium, adhesives, surface treatment and packaging) as well as the electricity and heat production which are consumed during the manufacturing at the plant.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions. The transportation distance is defined according to standard EN 15804:2019 + A2. Manufacturing plant is taking place near Oulu region of Finland. The transportation distance from manufacturing site to construction site in Helsinki is assumed as 626 km and the transportation method is assumed to be lorry. Empty returns are not taken into account as it is assumed that return trip is used by the transportation company to serve the needs of other clients. Transportation does not cause losses as product are packaged properly.

PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not cover the use phase. Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

Demolition is assumed to have negligible effects due to easy dismantling as door elements. It is assumed that 100% of the elements are collected (C1). Distance for transportation to treatment is assumed as 50 km and the transportation method is assumed to be lorry (C2). 100 % of door element is assumed to be recycled (C3). Due to the recycling process the end-of-life product is converted into an energy and metals (D).

Source: OneClick LCA

Which Life Cycle Stages are included in EPDs?

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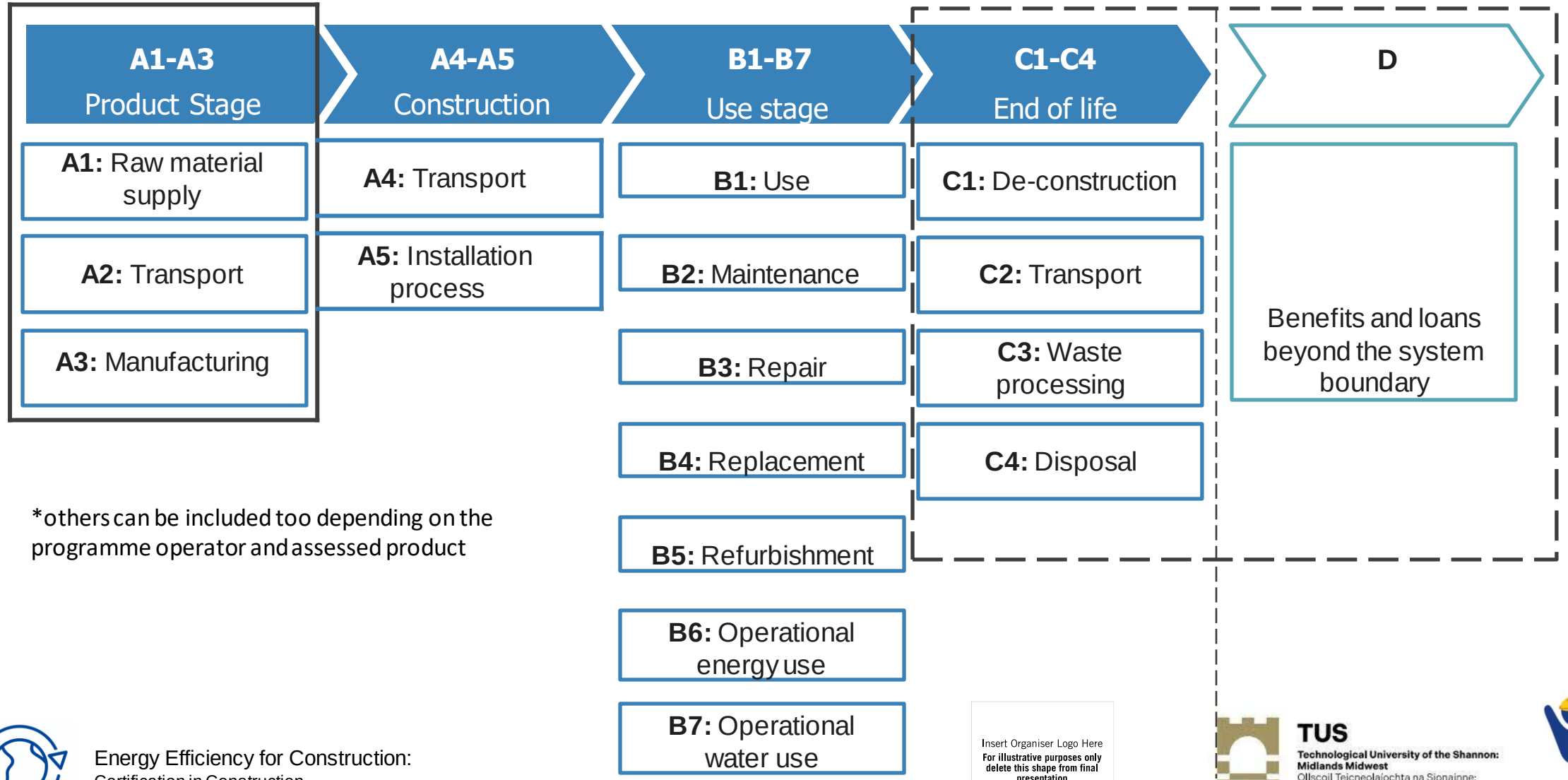

*others can be included too depending on the programme operator and assessed product

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Types of EPD- Scope

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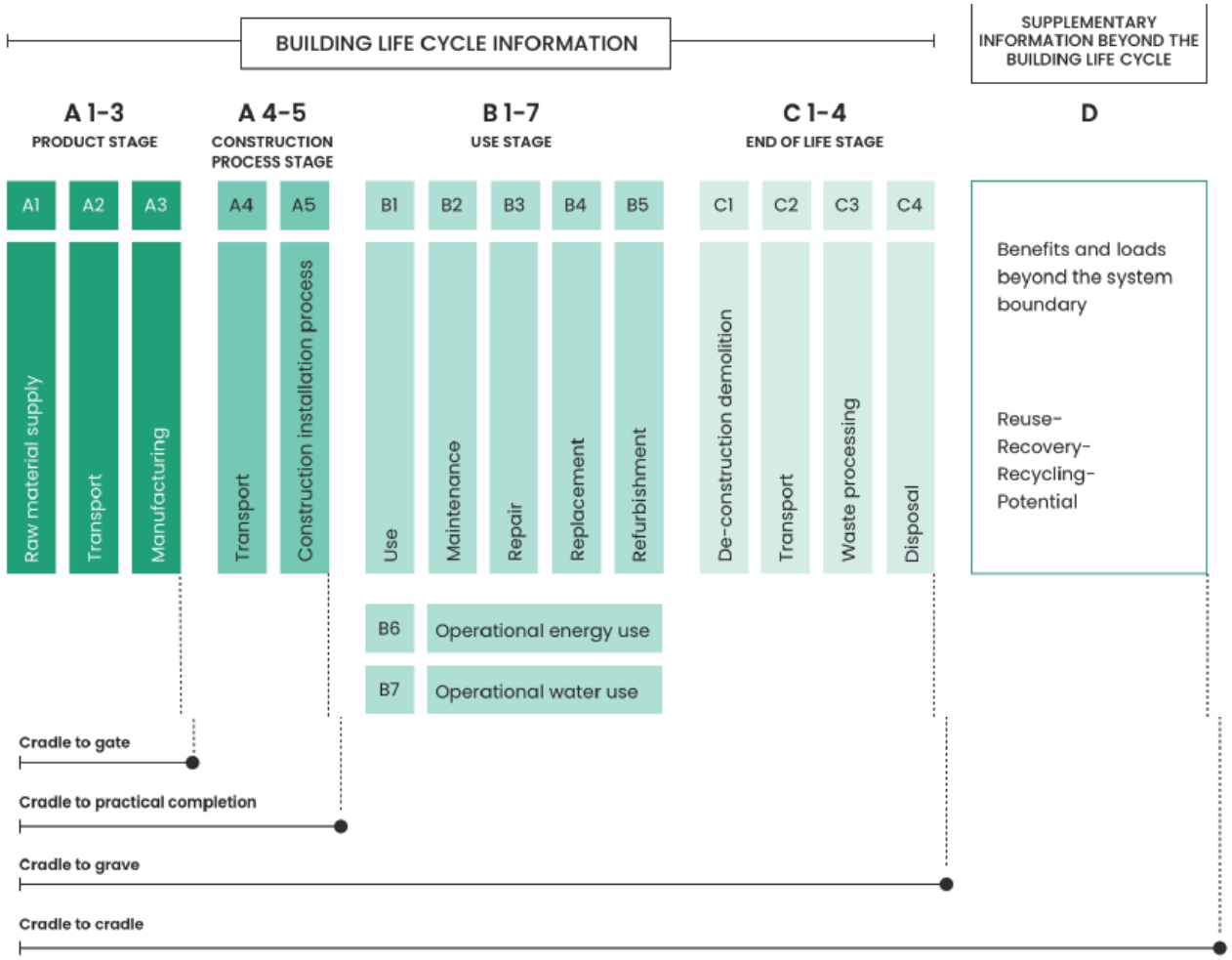
- **Cradle-to-gate**:
  This is the minimum scope
- **Cradle-to-gate with options:**
  For EN 15804+A2, this is the mandatory scope (with some exemptions)
- **Cradle-to-grave:**
  This includes the whole life cycle



Source: OneClick LCA

Where do I find EPDs?

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- LCA data can be obtained from EPD programme publishers or a **building LCA database** (such as One Click LCA).

- It is essential to have an accurate and robust database to get accurate results and identify the best material alternatives. For example, during the design phase, it helps to compare the environmental performance of building materials before finalising the design or choosing products.

Source: OneClick LCA

EPD standards

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- EPDs are based on Life-cycle assessment calculations according to **ISO 14040 and ISO 14044.**
- An EPD is created and verified in accordance with the International Standard **ISO 14025.**
- In Europe, the European Committee for Standardization has published common Product Category Rules (PCR) for EPD development in the construction sector, **EN 15804.**

To view
some EPDs..

SCAN ME

https://www.epdhub.com

Source: OneClick LCA

EPD verification and publishing

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EPD Verifiers must be:

- independent third parties
- approved by the Programme Operator (PO)

- A **programme operator (PO)** is the publishing platform on which an EPD is made available.
- POs are responsible for developing their system rules, Product Category Rules/PCR (rules for how a product LCA should be carried out), accrediting verifiers, and maintaining a public library of all registered EPDs.

Source: OneClick LCA

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How are EPDs created?

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1. Strategy is defined
From Type of EPD, to whether to invest in-house or hire a consultant, some important decisions need to be made before the process begins.

2. Data collection
The next step is to collect product life-cycle data, usually covering material extraction, manufacture, transport and end-of-life

3. Life Cycle Assessment
LCA is the basis of all EPDs. Life cycle data is translated into a series of environmental impacts, for example: Ozone depletion.

4. Background report
Providing further details about the LCA methodology, assumptions and approach employed to support 3rd part verification.

5. Third party verification
An EPD needs to be verified by an independent third-party before it can be published. To ensure accuracy, reliability and consistency.

6. Publication
Once verified, the EPD will be ready to be made public. It will be registered and published by the relevant program operator.

Source: OneClick LCA

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Why are EPDs created?

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- Certification schemes
- Compliance/procurement requirements
- Building LCA
- Marketing tool
- Product comparison & specifica
- Future product development

Source: OneClick LCA

EPD Data

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- Individual products of any building material type have significant variations in environmental performance, which is reflected in their EPDs.
- Generic data represents average environmental performance for all products within that category.
- During the concept design phase, it is best to use generic data, rather than a specific single product EPD, to avoid making design decisions based on the performance of a single product that may not be representative.
- EPD data can be used when you are ready to buy the material from a specific supplier. For example, the level of detail required for the construction material steel increases as the project progresses.

EPD Data

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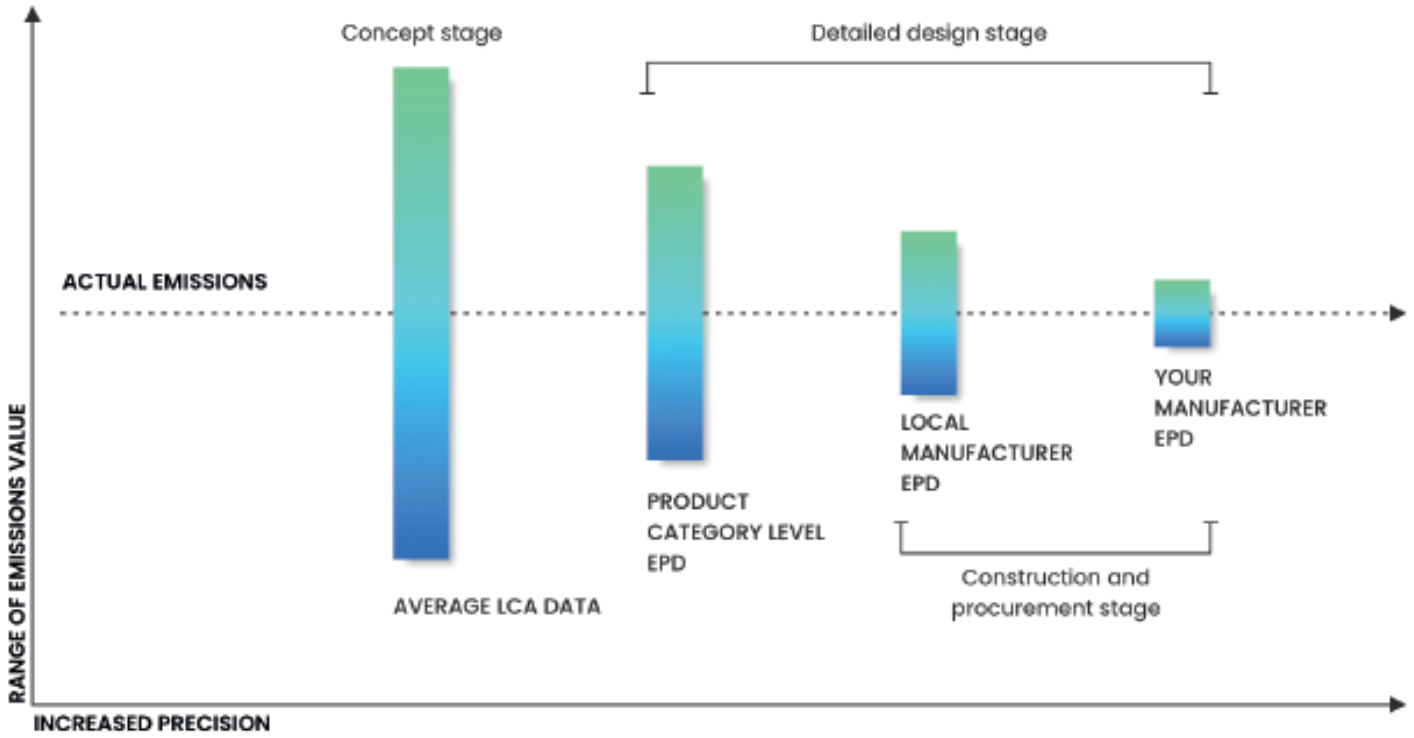
There are a number of types of EPD. Single product EPDs are the most common type, but Group and Industry average EPDs are available.

1. **Single Product and manufacturer EPD:** One product and manufacturer.
2. **Product Group EPD:** Average of very similar products, one manufacturer.
3. **Industry Average EPD:** One product and several manufacturers.



The level of detail required for the construction material increases as the project progresses

Source: OneClick LCA

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EPD Summary

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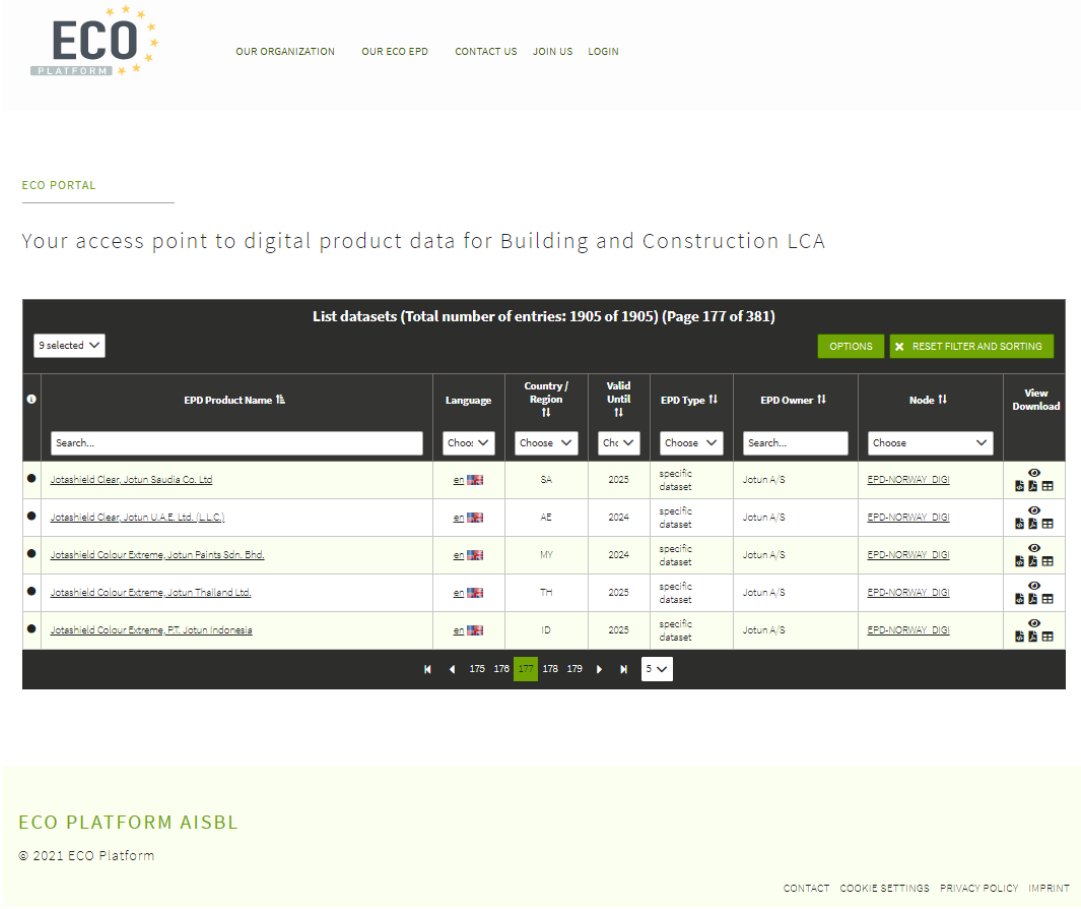
- EPDs use life cycle assessment (LCA) to quantify and then communicate the impact of a product on the environment during its life cycle.
  - They are verified by third parties and are based on international standards,
  - provide an objective, credible and neutral assessment.
- By creating the EPD, the manufacturer does not make claims of low impact, but demonstrate a commitment to measuring and transparently reporting environmental impacts.
- In addition to manufacturers, EPDs of construction products are published on various platforms.
  - https://www.eco-platform.org/epd-data.html



Source: BusGoCircular Project

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2. Eco labels

Introduction to Verification

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- An increasing number of companies make environmental claims about their products and services, and there is **a growing list of standards, certification schemes and labels which aim to give credibility to such claims.**

- You need to be able to **distinguish promotional or unfounded claims from genuine evidence**.
- In order to **avoid 'greenwash'**, Green Public Procurement, GPP requires you to identify those products and services which genuinely meet criteria targeting environmental characteristics

Source: EPA GPP Guidance for the public sector

EU Ecolabel

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- Established in 1992, the EU Ecolabel is a third party certified Type I (ISO 14024) environmental labelling scheme aimed to promote products and services which have a reduced environmental impact thus **helping European consumers distinguish more environmentally friendly products.**

- Recognised across Europe, the **EU Ecolabel** is a label of environmental excellence that is awarded to products and services meeting high environmental standards throughout their life-cycle: from raw material extraction, to production, distribution and disposal.

EU Ecolabel

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- The criteria are agreed at European level, following wide consultation with experts, and **the label itself is only awarded after verification that the product meets these high environmental and performance standards.**

- The EU Ecolabel is a rapidly growing brand. Many producers selling their products across Europe have realised the benefits of the European Ecolabel.

Click here to view all ecolabels in Europe on building products

https://www.ecolabelindex.com/ecolabels/?st=region=europe;category=building_products

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3. Product Environmental Footprint

What is Product Environmental Footprint (PEF)?

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- A company wishing to market its product as environmentally friendly in several Member State markets faces a confusing range of choices of methods and initiatives. Sometimes they have to use different ones for different markets. This results in costs for companies and confusion for consumers.

- The European Commission proposed the **Product Environmental Footprint** and Organisation Environmental Footprint methods as **a common way of measuring environmental performance.**

- The approach was tested between 2013-2018 together with more than 280 volunteering companies and organisations

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- The 2020 Circular Economy Action Plan foresees that “The Commission will propose that companies substantiate their environmental claims using Product and Organisation Environmental Footprint methods.”

- It aims to establish a strong and coherent product policy framework that **will make sustainable products, services and business models the norm, and not the exception, and to transform consumption patterns so that no waste is produced in the first place.**

What can Product Environmental Footprint bring?

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https://youtu.be/mTK59eseDBQ

Assessment

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CONSTRUCTION BLUEPRINT

Thank You

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