BIMEPD

Co-funded by the Erasmus+ Programme of the European Union

ADAPTED SENIOR TRAINING PROGRAM ON BIM METHODOLOGIES FOR THE INTEGRATION OF EPD IN SUSTAINABLE CONSTRUCTION STRATEGIES

2020-1-ES01-KA204-083128

Module 03

Search and interpretation of EPD databases.

COAMU Colegio Oficial de Arquitectos Región de Murcia

iED institute of Entrepreneurship Development

Centro Tecnológico del mármol, piedra y materiales

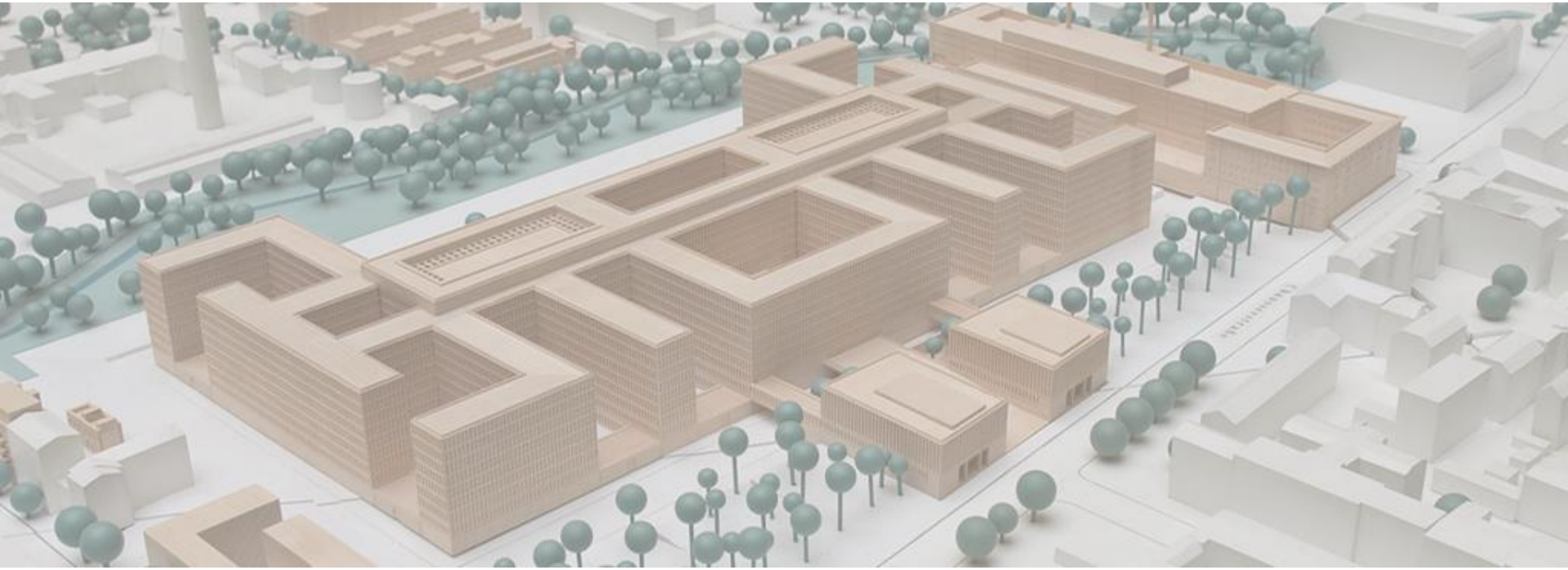
Warsaw University of Technology

Bulgarian Green Building Council

cype

Erasmus+

Co-funded by the
Erasmus+ Programme
of the European Union



3.1 Ecolabels

2.2 Environmental producto declarations

Co-funded by the
Erasmus+ Programme
of the European Union

3.1. Ecolabels

DEFINITION OF ECOLABEL

PRC

TYPE I

TYPE II

TYPE III. EPD

Co-funded by the
Erasmus+ Programme
of the European Union

DEFINITION OF ECOLABEL

According to ISO 14020, environmental labelling is a set of voluntary tools that aim to stimulate the demand for products and services with lower environmental burdens by providing relevant information on their life cycle, in order to satisfy buyers' demand for environmental information.

The implementation of ecolabels makes it possible to provide information on the environmental characteristics of a product or service.

Their use aims to:

- Respond to a customer's concern.
- Reinforce the brand image.
- Standardise communication with buyers.
- Respond to a demand from legislation or an attack from competitors.

Co-funded by the
Erasmus+ Programme
of the European Union

DEFINITION OF ECOLABEL

According to ISO standards, three eco-labelling schemes are defined, which characterise the nature of the information and the level of responsibility of the declarant and are classified as follows:

- Type I ecolabel (ISO 14024 standard). Ecolabels.
- Ecolabel Type II (ISO 14021 standard). Environmental self-declarations.
- Ecolabel Type III (standard ISO 14025). Environmental product declarations.

The above-mentioned ISO standards, together with the "Ecolabels and environmental claims. General Principles" (ISO 14020), define the general principles, objectives and procedures that should govern the different types of eco-labels and environmental declarations.

Co-funded by the
Erasmus+ Programme
of the European Union

PCR

PRODUCT CATEGORY RULES:

These are the rules under which the Life Cycle Assessment (LCA) study is to be carried out and detail the information to be shown in the EPD, normally being more detailed than required in ISO 14040 (LCA) and 14025 (EPD).

Co-funded by the
Erasmus+ Programme
of the European Union

TYPE I

TYPE I ECO-LABEL (ISO 14024 STANDARD).

Also known as certified ecolabels, these are voluntary environmental qualification systems that officially identify and certify that certain products or services have a lower impact on the environment.

- Environmental certifications that **consider the life cycle** of the product/service.
- These are **voluntary, multi-criteria certifications developed by third parties**. They are awarded by **an impartial third party**, which acts as a **certifying body.**
- Indicates that a **product** is **preferable** according to a series of considerations based on its **life cycle.**
- Regulated by the **ISO 14024 standard.**

Co-funded by the
Erasmus+ Programme
of the European Union

TYPE I

TYPE I ECO-LABEL (ISO 14024 STANDARD).

Some of the most widely used Type I ecolabel schemes in Spain are the following:

- AENOR Environment (Spain)
- Distintiu de Garantia de Qualitat Ambiental (Catalonia)
- Ecolabel (EU)
- Der Blaue Engel (Germany)

Certification bodies:

UE (Ecolabel)

España

Cataluña (El Distintiu)

Francia

Alemania

Nordic Swan (Países Nórdicos)

Co-funded by the
Erasmus+ Programme
of the European Union

TYPE I

ADVANTAGES

- **Credible,** as it is governed by a **reputable institution,** such as a government, and all stakeholders are involved in its definition. In addition, the use of these ecolabels is **certified by accredited external third parties.**
- Reliable and differentiating, because certification also **ensures** that the **product's functionality** is at least as good as other products with more environmental impact.
- **Visible**, due to their use on product packaging, which simplifies the choice for the **end consumer.** In addition, eco-labelling bodies organise **promotional campaigns** for ecolabelled products.

Co-funded by the
Erasmus+ Programme
of the European Union

TYPE I

DISADVANTAGES

- **A fee must be paid** to the ecolabelling body for its use.
- **Lack of uniform standardisation** of ecolabelling in different countries.
- **Complexity of the process.** Demonstrating compliance with each and every environmental requirement can be costly and time-consuming on many occasions.
- **It is not a universal system.** There are only criteria for certain product categories per labelling model and, furthermore, the criteria are not the same for all models.
- **Low recognition by citizens.** As a result of all of the above (different eco-label models, badges, brands, etc.), consumers are not able to recognise the eco-label symbol or know the eco-labelling system it represents.

Co-funded by the
Erasmus+ Programme
of the European Union

TYPE II

TYPE II ECO-LABEL (ISO 14021 STANDARD). ENVIRONMENTAL SELF-DECLARATIONS.

These are informative **self-declarations** of environmental aspects of products that allow them to be considered as environmentally friendly.

- Provides information on a single **environmental aspect** of **a single stage of the product life cycle.**
- Issued by the **manufacturer itself** without independent external verification.
- They are made by the manufacturer in the form of statements, symbols or graphics on a product, component or packaging, and are present on labels, technical manuals or advertisements.

Co-funded by the
Erasmus+ Programme
of the European Union

TYPE II

TYPE II ECO-LABEL (ISO 14021 STANDARD). ENVIRONMENTAL SELF-DECLARATIONS.

Examples are statements such as:

- "CFC-free".
- "biodegradable'.
- "100 % recyclable".
- etc.

Co-funded by the
Erasmus+ Programme
of the European Union

TYPE II

TYPE II ECO-LABEL (ISO 14021 STANDARD). ENVIRONMENTAL SELF-DECLARATIONS.

ADVANTAGES

- **Simplicity,** as it allows the environmental benefits to be communicated without the need for a Life Cycle Assessment (LCA).
- The verification mechanism is direct between the client requesting information and the company, **without independent third parties.**
- **Agile and adaptable** recognition mechanism.
- **Low economic cost,** as no certification or validation is required.
- **Visible and easily identifiable** by consumers in many cases (e.g. Möbius loop, recycling symbol, figure).

Co-funded by the
Erasmus+ Programme
of the European Union

TYPE II

TYPE II ECO-LABEL (ISO 14021 STANDARD). ENVIRONMENTAL SELF-DECLARATIONS.

DISADVANTAGES

- **Confusing** due to their similarity to Type I labels.
- Potential **lack of thoroughness** in the environmental information provided.
- (Internal) standard **not comparable** with other competing products, except for the company's own products.
- **Reduced credibility** compared to other types of ecolabels (Type I and III) due to lack of certification and validation.

Co-funded by the
Erasmus+ Programme
of the European Union

TYPE III. EPD

TYPE III ECO-LABEL (ISO 14025 STANDARD). ENVIRONMENTAL PRODUCT DECLARATIONS (EPD).

They show standardised quantitative information based on Life Cycle Assessment (LCA) of a product or service of environmental indicators and their interpretation.

They are verified by an independent third party, although they are not necessarily certified.

- An EPD does **not assess the environmental performance** of a product/service (as for example the type I ecolabel, European flower) but only **reports on it.**
- It is an unbeatable tool for **objective and transparent decision-making** based on the environmental impact of goods and services.
- It allows to **act** on **those processes with a higher environmental impact** and to improve the environmental performance of products and services.
- The **credibility** of an EPD is **reinforced** by the fact that it is **verified by an** independent **third party, and includes the Carbon and Water Footprint.**

Co-funded by the
Erasmus+ Programme
of the European Union

TYPE III. EPD

TYPE III ECO-LABEL (ISO 14025 STANDARD). ENVIRONMENTAL PRODUCT DECLARATIONS (EPD).

Examples of Type III Ecolabel Programme Administrators: Environmental Product Declarations:

- Global EPD.
- DAP construcción.
- EDP System.

Co-funded by the
Erasmus+ Programme
of the European Union

TYPE III. EPD

TYPE III ECO-LABEL (ISO 14025 STANDARD). ENVIRONMENTAL PRODUCT DECLARATIONS (EPD).

ADVANTAGES

- **Comparable,** because the data are collected and calculated on the basis of common calculation methods set out in the PCRs of products of the same class, i.e. intended to perform similar functions.
- **Credible**, due to inspection, review and monitoring by an independent and neutral verifier, as it does not include value judgements.
- **Facilitates the process of product development** and continuous improvement in the work of the Environmental Management System.
- It provides a **great deal of information** on the impact of the product or service on the environment.
- **It is not mandatory** and any manufacturer can opt for it, regardless of whether they market a hazardous material or not.

Co-funded by the
Erasmus+ Programme
of the European Union

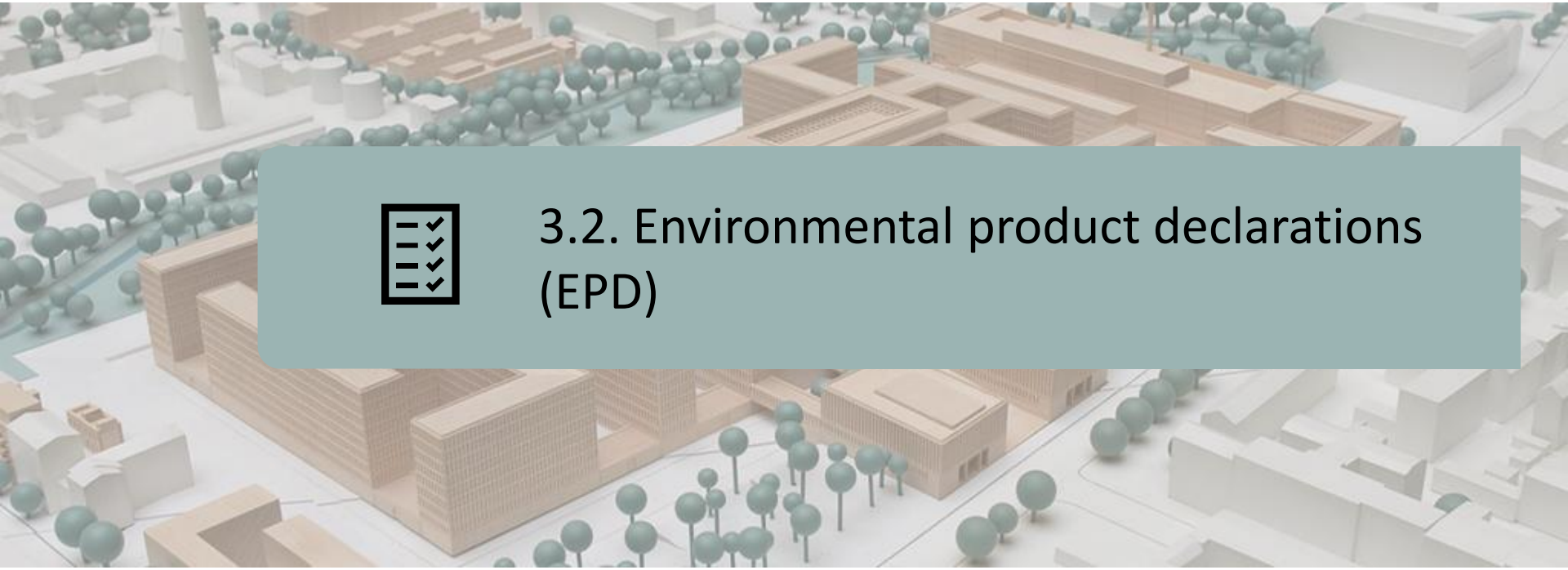
TYPE III. EPD

TYPE III ECO-LABEL (ISO 14025 STANDARD). ENVIRONMENTAL PRODUCT DECLARATIONS (EPD).

DISADVANTAGES

- **Information that is too complex or too detailed** for a standard end consumer.

Co-funded by the
Erasmus+ Programme
of the European Union



3.2. Environmental product declarations (EPD)

KEY TO EPDs

PROPERTIES OF EPDs

CHARACTERISTICS OF THE EPDs

GUIDING PRINCIPLES

USE OF EPDs: STATISTICAL DATA

APPLICATIONS

PRODUCT FOOTPRINT

EPDs INDICATORS

Co-funded by the
Erasmus+ Programme
of the European Union

KEY TO EPDs

Factors: Exponential increase in the publication and use of **EPDs** both **internationally and nationally.**

- Consumer **demand** for **credible** quantified **environmental information.**
- **Standardisation of LCA and EPD** standards at **international** level.
- **Reduced** implementation **costs.**
- Their **introduction** into **European environmental regulations and** environmental **building certifications (e.g. LEED).**
- Need to **reduce energy and material consumption** (and thus operating costs) by private and public organisations.

Co-funded by the
Erasmus+ Programme
of the European Union

KEY TO EPDs

Major milestones achieved during the 25 years of the EPDs' existence at **international and national level:**

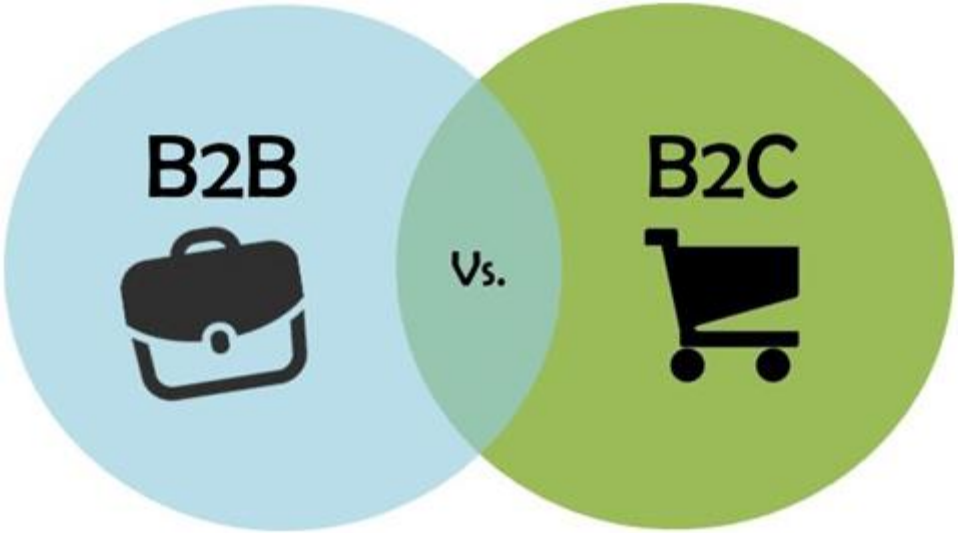
- **1997**: initiation of EPDs by Swedish industry.
- **1998**: first EPD published in the world (hydro-generated electricity).
- **1999**: progressive development of different EPD programmes.
- **2006**: development of ISO 14025.
- **2007**: Publication of the first Climate Declaration (Carbon Footprint included in the EPD).
- **2013**: Exponential increase in the number of published EPDs.

As an example, in **The International EPD System** programme, **more than 180 organisations from 18 countries** have developed **more than 400 EPDs** representing more than a thousand products.

Co-funded by the
Erasmus+ Programme
of the European Union

KEY TO EPDs

B2C and B2B: ideal tool to communicate and improve the environmental performance of services, products and companies, since **EPDs** allow products, services and companies to comply with the **environmental requirements** of **today** and in the immediate **future.**



Co-funded by the
Erasmus+ Programme
of the European Union

KEY TO EPDs

B2C and B2B.

- **B2C** stands for **Business-to-Consumer.**
- **B2B** stands for **Business-to-Business.**

Both refer to two different ways of doing business relationships and transactions.

*For example, in order to obtain the life cycle **impact** of a **building's materials** it is necessary to **add up the environmental impact** of its **different enclosures,** which will result from the **sum** of the life cycle **impact** of the **different materials** that make up each enclosure.*

Co-funded by the
Erasmus+ Programme
of the European Union

KEY TO EPDs

B2C and B

- **B2C** st
- **B2B** st

Both re
transact

For exan
is neces
which w
materia

EXPLANATORY NOTE

B2C: Business-to-Consumer

- B2C refers to the mass consumer market, i.e. companies that offer products or services to people.
- B2C marketing is oriented towards highlighting the personal benefits that the product brings to consumers, through emotion.

Efforts are focused on reinforcing the brand through repetitive advertising.

B2C: Business-to-Business

B2B refers to the corporate market, those companies that market their products or services to other companies.

In B2B marketing, the aim is to establish professional relationships, with which the prestige and value of the company can be reinforced and conveyed.

The strategy focuses on conveying how the product helps customers save time, resources and money.

B2B marketing is mainly linked to industry, institutions and government.

Co-funded by the
Erasmus+ Programme
of the European Union

PROPERTIES OF EPDs

Type III Environmental Declarations present quantified environmental information on the life cycle of products (and services) to allow comparison between products fulfilling the same function.

- They provide quantified environmental information on the life cycle of products/services.
- They allow comparison between products fulfilling the same function.

Co-funded by the
Erasmus+ Programme
of the European Union

PROPERTIES OF EPDs

- **Provided** by one or more **organisations.**
- **Based on** an **independent verification** of LCA data from the **Life Cycle Inventory** (LCI) analysis, in accordance with ISO 14040 and 14025.
- **Subject** to the management of a **programme manager**, *such as: companies, industry sector, trade association, public bodies, scientific bodies...*
- **Reports** on the **environmental performance of a product**, it does not evaluate it.
- **Multicriteria** provide **information** on **different impact indicators** *(climate change, eutrophication, etc.)* and **life cycle inventory** *(water consumption, consumption of non-renewable material and energy resources, etc.).*

Co-funded by the
Erasmus+ Programme
of the European Union

PROPERTIES OF EPDs

Assist and support organisations in communicating the environmental performance of products and services in a **scientific, credible and understandable** way.

Serve as an **ideal tool** for **objective and transparent decision**-making based on the life cycle environmental impact of goods and services.

EPDs PERSECUTE:

Certify any type of **product**/service, whether it is an "organic product" or not.

Consider the **CARBON FOOTPRINT**, either as an impact indicator to be calculated or as a separate document.

Co-funded by the
Erasmus+ Programme
of the European Union

CHARACTERISTICS OF EPDs

- 1. Objective
- 2. Credible
- 3. Neutral
- 4. Comparable
- 5. Open
- 6. Impact-oriented
- 7. Pedagogical

Co-funded by the
Erasmus+ Programme
of the European Union

CHARACTERISTICS OF EPDs

- **1. Objective**

An EPD is based on the use of internationally validated and accepted **LCA methods** (UNE-EN ISO 140404, UNE-EN 140445, ISO 14.025 and UNE-EN 15.804 in construction products).

This makes it possible to **identify and focus** on the most significant **environmental aspects** from a holistic perspective that leads us towards continuous improvement.

Co-funded by the
Erasmus+ Programme
of the European Union

CHARACTERISTICS OF EPDs

- **2. Credible**

A key point is the **critical review, approved** and followed up by an independent verifier.

- **3. Neutral**

There are **no environmental preference** claims, assessments or pre-determined **levels** of environmental performance to **be met.**

Co-funded by the
Erasmus+ Programme
of the European Union

CHARACTERISTICS OF EPDs

- **4. Comparable**

It makes **comparisons** possible through the establishment of so-called **Product Category Rules (PCR)** for selected groups of products and services.

The **PCRs** describe the **details per product** according to **LCA** standards for data collection, methodology, calculations and presentation of results.

- **5. Open**

To all **products and services.**

To all **stakeholders:** during the process of creating a **CPR,** involvement of different stakeholders. Publicly available **DAPs** via the Internet.

Co-funded by the
Erasmus+ Programme
of the European Union

CHARACTERISTICS OF EPDs

- **6. Impact-oriented**

It includes the **assessment** of **potential environmental impacts**, as well as **inventory indicators** such as consumption of renewable, non-renewable resources and water.

- **7. Pedagogical**

Through them it is possible to educate and learn about environmental impacts throughout the life cycle.

Co-funded by the
Erasmus+ Programme
of the European Union

GUIDING PRINCIPLES

- **Voluntary**

As it is not mandatory.

- **Transparency**

At all stages of the development of the EPD.

- **Accessibility**

To all interested parties: *the development of the EPD should be open to all potential candidates who meet the relevant regulatory requirements.*

- **Dialogue**

Open stakeholder dialogue and consultation on PCRs: *formal consultation open to receive feedback and comments on suggested documents and new CPRs proposed by stakeholders.*

Co-funded by the
Erasmus+ Programme
of the European Union

GUIDING PRINCIPLES

- **Functionality**

Product functionality: *it has to be ensured that the product's functionality, use and associated performance levels are taken into account.*

- **Scientifically based**

EPD should be developed on a methodology based on internationally accepted scientific approaches, which reflects and communicates significant environmental aspects.

- **Confidentiality**

Full confidentiality of specific information that has been identified as such by an organisation must be guaranteed.

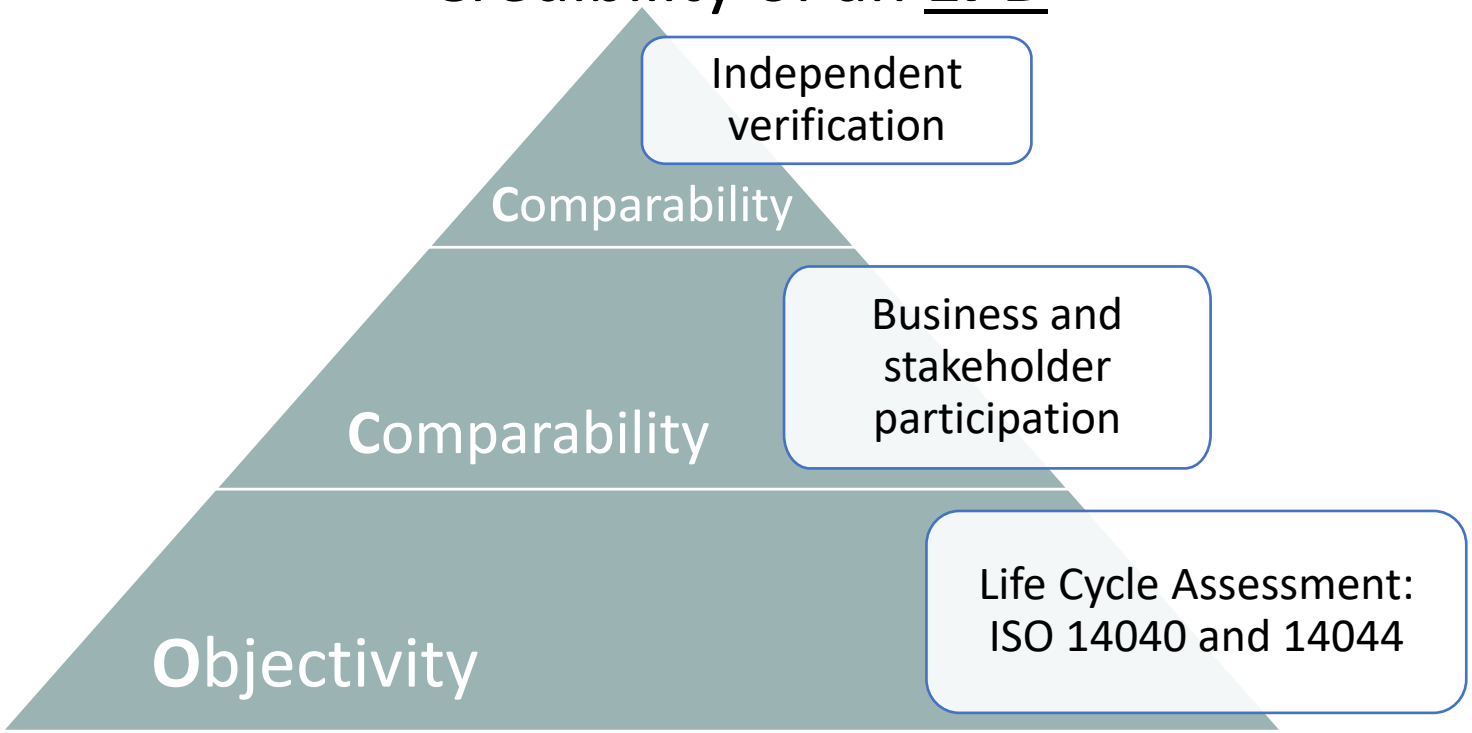
- **Cost-effectiveness**

EPD development is based on open, market-oriented, internationally recognised systems: *verification and registration.*

Co-funded by the
Erasmus+ Programme
of the European Union

GUIDING PRINCIPLES

Elements ensuring the Objectivity, Comparability and Credibility of an EPD



Co-funded by the
Erasmus+ Programme
of the European Union

GUIDING PRINCIPLES

Elements ensuring the Objectivity, Comparability and Credibility of an **EPD**

Independent verification

EXPLANATORY NOTE

Objectivity is ensured by conducting the life cycle assessment on the basis of ISO 14040 and 14044, comparability is made possible by the establishment of so-called Product Category Rules (PCR) involving companies and stakeholders and credibility is achieved by independent verification.

Co-funded by the
Erasmus+ Programme
of the European Union

USE OF EPDs: STATISTICAL DATA

INCREASE IN THE NUMBER OF EPDs UNDER CONSTRUCTION:

Recent years have seen an exponential increase in the number of DAPs published at international and national level.

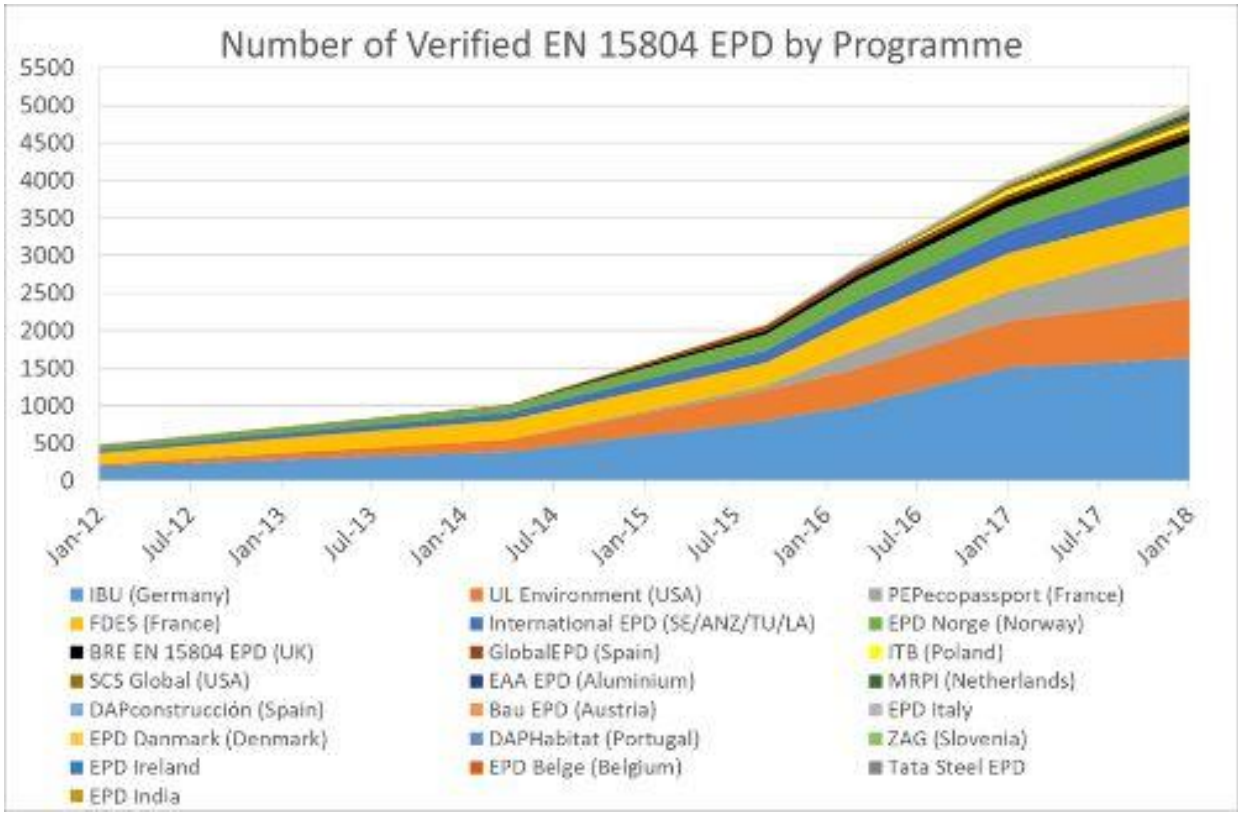
It is not yet common practice in all countries.

Co-funded by the
Erasmus+ Programme
of the European Union

USE OF EPDs: STATISTICAL DATA

INCREASE IN THE NUMBER OF EPDs UNDER CONSTRUCTION:

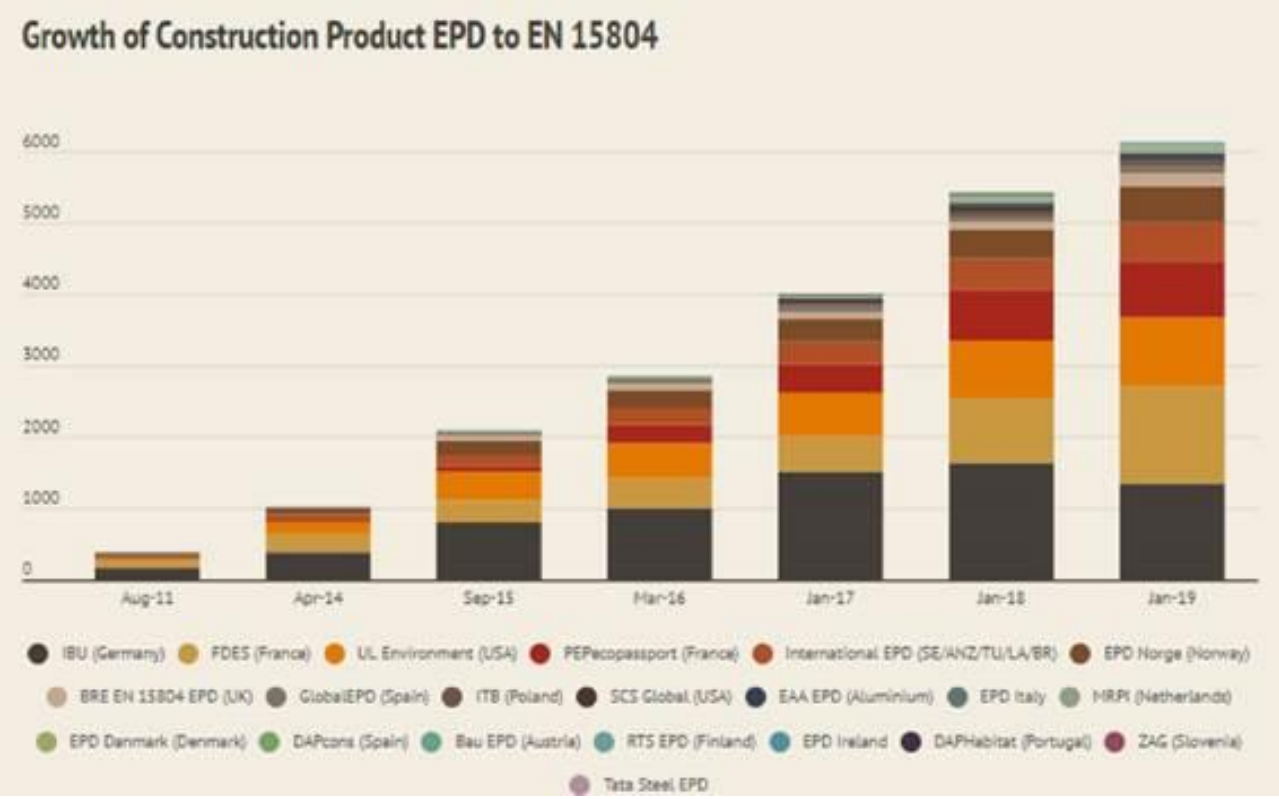
Globally, there are currently just over **5,000 EPDs verified and registered** with the different programme managers.



Co-funded by the
Erasmus+ Programme
of the European Union

USE OF EPDs: STATISTICAL DATA

INCREASE IN THE NUMBER OF EPDs UNDER CONSTRUCTION:



Co-funded by the
Erasmus+ Programme
of the European Union

USE OF EPDs: STATISTICAL DATA

FURTHER PROGRESS AT NATIONAL LEVEL IN REDUCING THE COSTS OF THE DAP PUBLICATION PROCESS:

- Implementation of **LCA methodology** in **private consultancy**.
- **Maturity** of **LCA software**, databases and impact models.
- Possibility to **introduce several products** in a **single EPD and EPD of construction products** based on **UNE-EN 15804.**
- Wide **variety** of **Product Category Rules** available.
- **Verification: free competition** between verifiers leading to moderate prices.
- **Moderate time and cost of publishing multiple** EPD if done in a **modular way** *(possibility to apply EPD to companies with multiple references of the same product).*

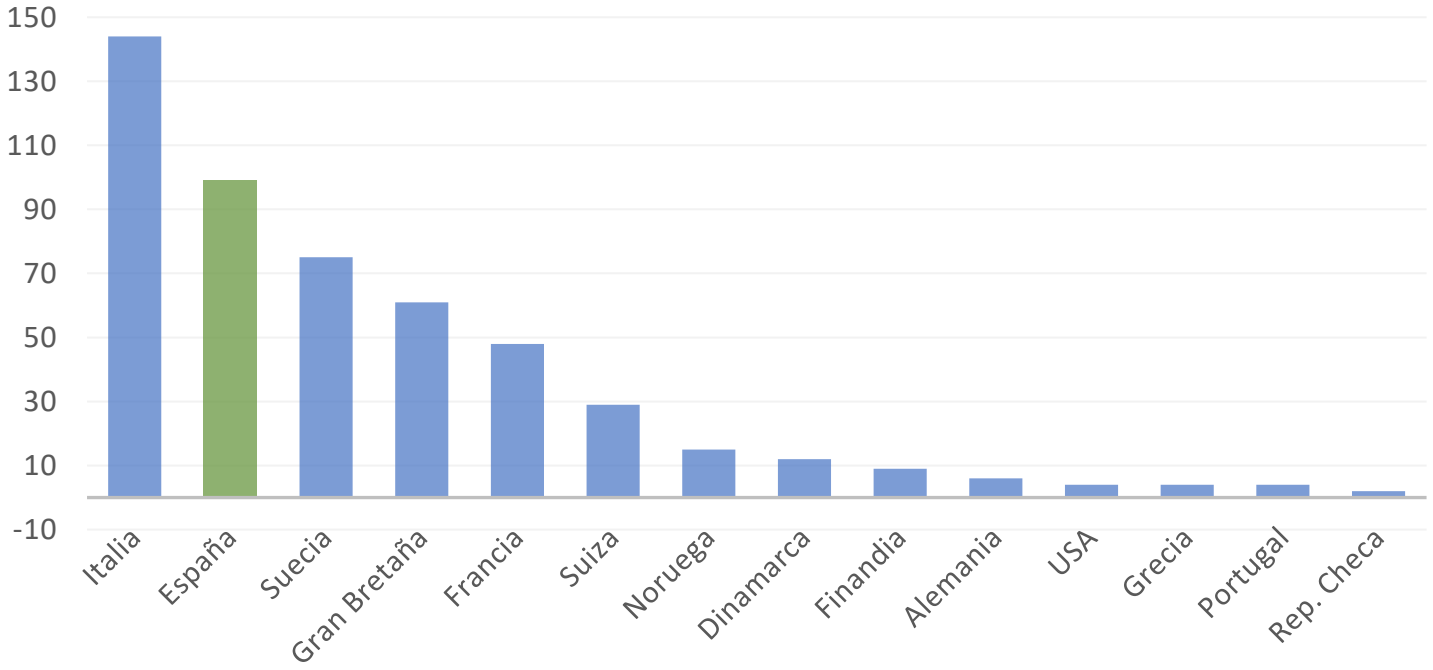
Co-funded by the
Erasmus+ Programme
of the European Union

USE OF EPDs: STATISTICAL DATA

EUROPE AND EPDs UNDER CONSTRUCTION:

Europe is the world **region with the highest implementation of LCA and EPD.**

Italy, Spain, Sweden and Great Britain are the European countries with the highest number of **EPD of construction products.**

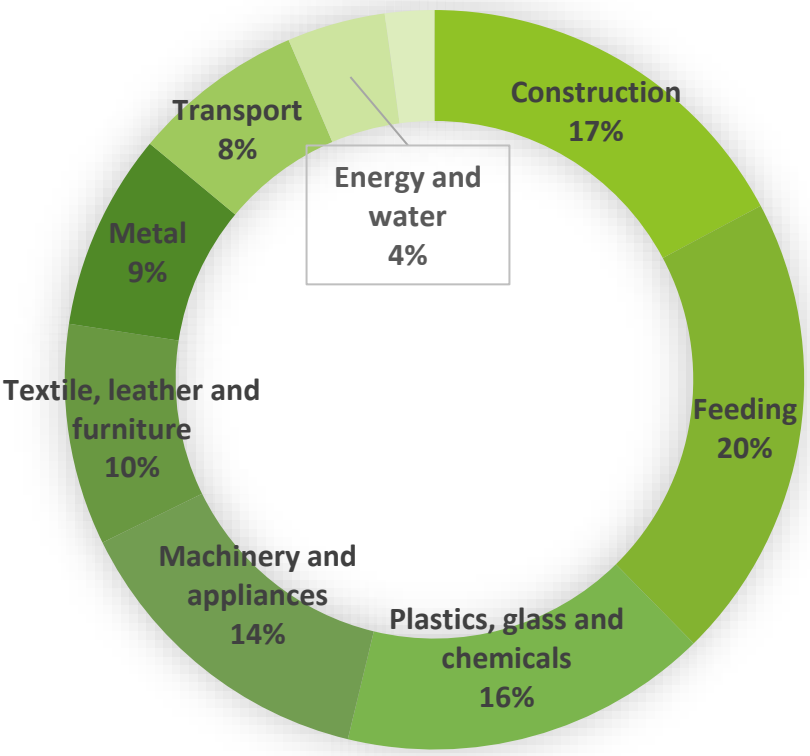


Co-funded by the Erasmus+ Programme of the European Union

USE OF EPDs: STATISTICAL DATA

EPD SERVICES/PRODUCTS PUBLISHED

There are a **large number** of product typologies with published DAP and thus **available PCRs**, with no clearly dominant product typology.



It should be noted that **construction products and services** are reinforced worldwide by the presence of numerous **DAP programmes specific** to the **construction sector**, for example:

- DAPconstrucción in Spain
- IBU in Germany

Co-funded by the
Erasmus+ Programme
of the European Union

APPLICATIONS

EPD SERVICES/PRODUCTS PUBLISHED

- **Environmental marketing.**
- **Environmental communication** to suppliers **(B2B)** and end consumers **(B2C)** to be attached to the technical documentation of the product.
- **Source of quantified, robust and verified information on environmental management systems and Corporate Social Responsibility reports.**
- **Obtaining** points in **environmental certifications of LEED, BEEAM, and VERDE buildings.**

Co-funded by the
Erasmus+ Programme
of the European Union

APPLICATIONS

EPD SERVICES/PRODUCTS PUBLISHED

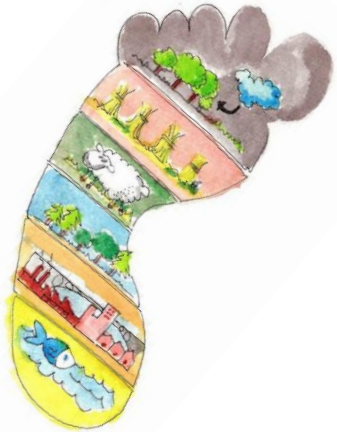
- **Compliance with regulations.**
- It opens the door to **improving the environmental performance of the product:** the implementation of an EPD makes it possible to **identify the processes** (material and energy) **with the greatest impact, an essential** first step for **analysing proposals for improvement** at those points in the life cycle with the greatest potential.
- **Export aid:** especially to developed countries.

Co-funded by the
Erasmus+ Programme
of the European Union

PRODUCT FOOTPRINT

The **Environmental Footprint** assesses, calculates and sometimes weights the main potential environmental impacts of a product (EIP), organisation (EIO) or service, based on a Life Cycle Assessment (LCA) according to international ISO standards.

Ecological Footprint (EF)



Carbon Footprint (CF)

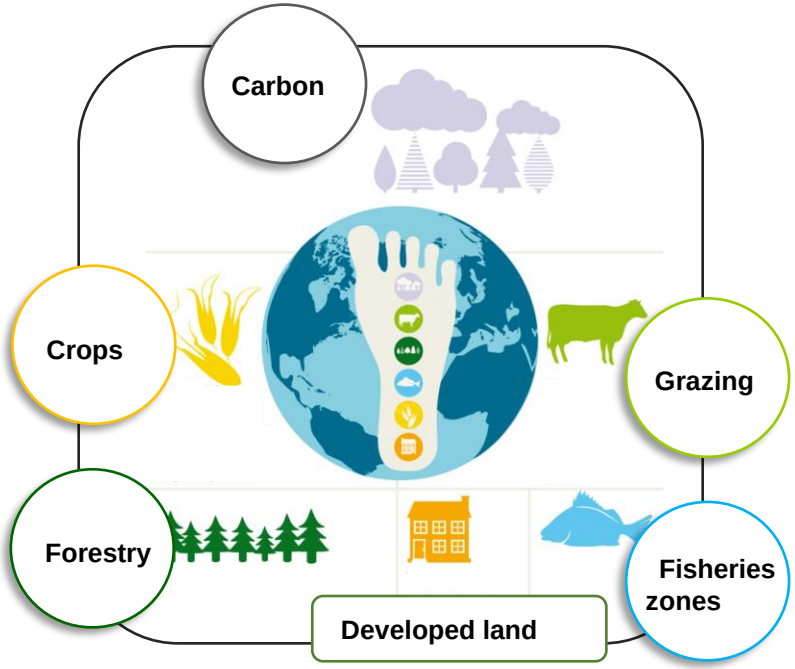
Water Footprint (WF)

Co-funded by the
Erasmus+ Programme
of the European Union

PRODUCT FOOTPRINT

ECOLOGICAL FOOTPRINT - EF

The **EF methodology** quantifies the **consumption of resources, materials or energy** and in the **absorption of waste**, it **translates** into **productive territories** necessary for the production or elimination of waste.



Co-funded by the
Erasmus+ Programme
of the European Union

PRODUCT FOOTPRINT

ECOLOGICAL FOOTPRINT - EF

Six different productive areas:

- **CO2 absorption territory** (Carbon): forest area needed to absorb CO2 from energy consumption.
- **Agricultural land** (crops): area needed for cultivation. Ecologically more productive land.
- **Forest land:** area of forest products such as wood and paper.
- **Pasture land:** livestock grazing.
- **Productive sea**: fish and seafood production.
- **Developed land**: areas used for development or infrastructure.

Co-funded by the
Erasmus+ Programme
of the European Union

PRODUCT FOOTPRINT

ECOLOGICAL FOOTPRINT - EF

Six different productive areas:

- **CO2 absorption territory** (Carbon): forest area needed to absorb CO2 from energy consumption.
- **Agricultural land** (crops): area needed for cultivation. Ecologically more r
- **Fores**
- **Pastu**
- **Produ**
- **Devel**

EXPLANATORY NOTE

We can conclude that the HE methodology translates all the consumptions of human activities into biologically productive land (or biocapacity), as well as the area of forest required to absorb the additional carbon dioxide emissions that the oceans cannot absorb, the sum of these areas being the HE produced.

The EF indicator, originally created to establish the impact produced by society at the level of countries, neighbourhoods and cities, has qualities to be adapted to specific productive sectors and industries.

Co-funded by the
Erasmus+ Programme
of the European Union

PRODUCT FOOTPRINT

ECOLOGICAL FOOTPRINT

Implementation project

Budgets and measurements: resources (materials, labour and machinery).
General data: consumption of water, electricity and surface area.

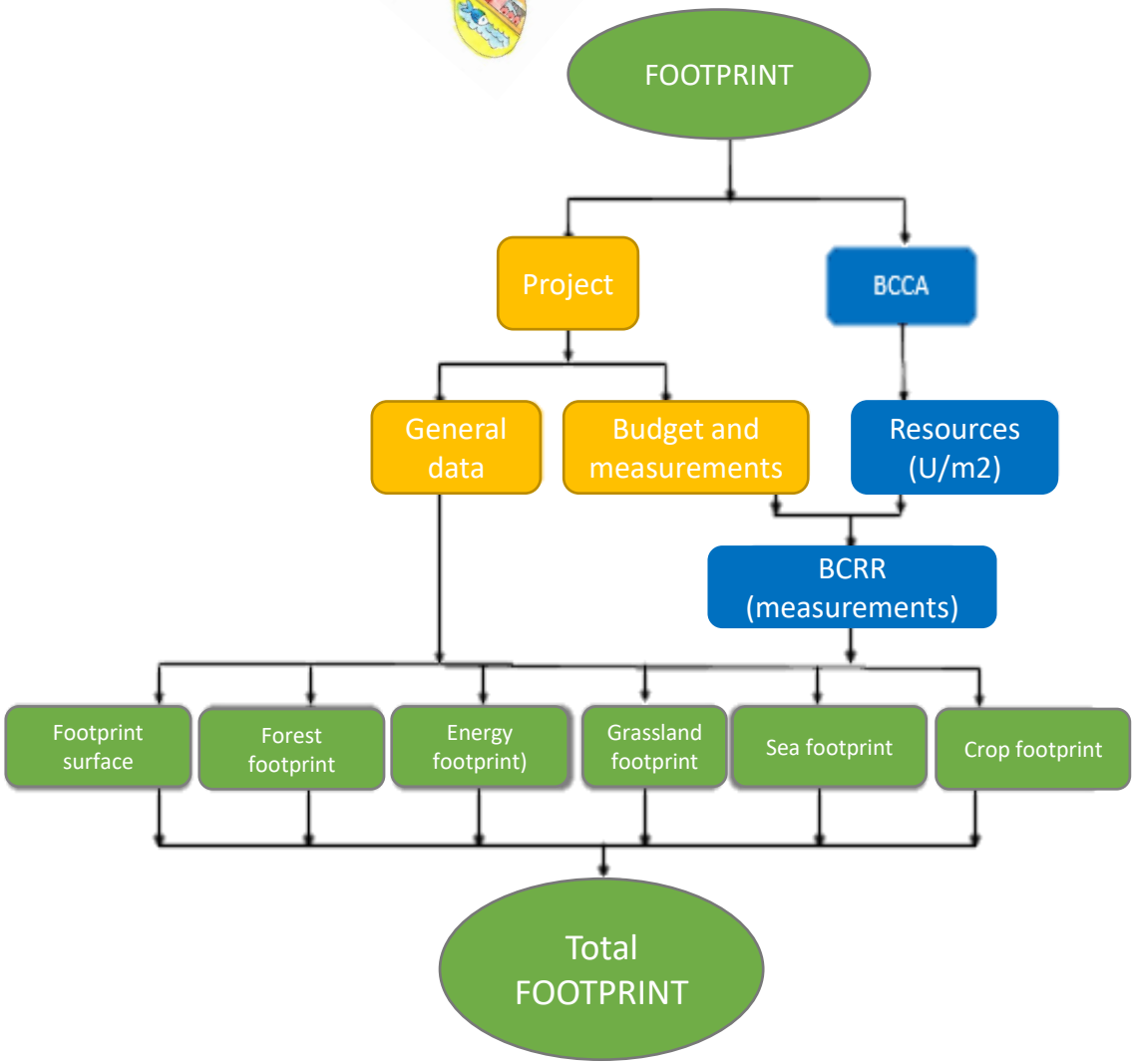
Construction cost base (BCCA)

Resource quantities: Qi (u/m2)
Systematic classification chapters

Resource Quantification Basis (BCCR)

Project-specific quantities: machinery, materials, labour.

Total footprint calculation



Co-funded by the Erasmus+ Programme of the European Union

PRODUCT FOOTPRINT

CARBON FOOTPRINT – CF

It quantifies the **emissions** of **all greenhouse gases**, expressed in **tonnes of CO2 equivalent**, that are **released into the atmosphere** over the entire life cycle of the product.

- **Knowing the environmental load** of a product in terms of its contribution to climate change.
- Establishing **target values** and **assessing** greenhouse gas emission **reductions.**
- **Financial** compensation to **absorption projects or forest sinks.**
- Communicate the **carbon footprint** to all elements of the value chain or to final consumers.

Co-funded by the Erasmus+ Programme f the European Union

PRODUCT FOOTPRINT

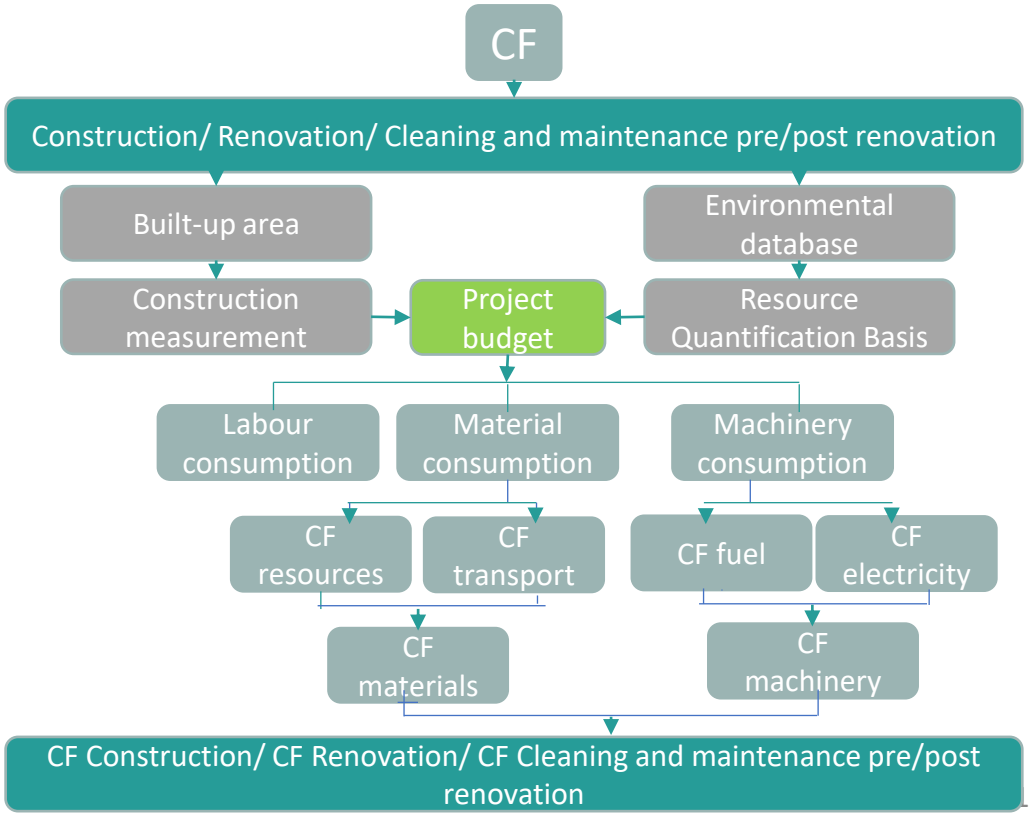
CARBON FOOTPRINT CALCULATION IN CONSTRUCTION

UNE-CEN ISO/TS 14067:2015. Greenhouse gases. Carbon footprint of products. Requirements and guidelines for quantification and communication.

Area 1 - Direct
- Machinery
- Company vehicle

Area 2 - Indirect
- Electricity consumed

Area 3 - Indirect
- Materials
- Waste

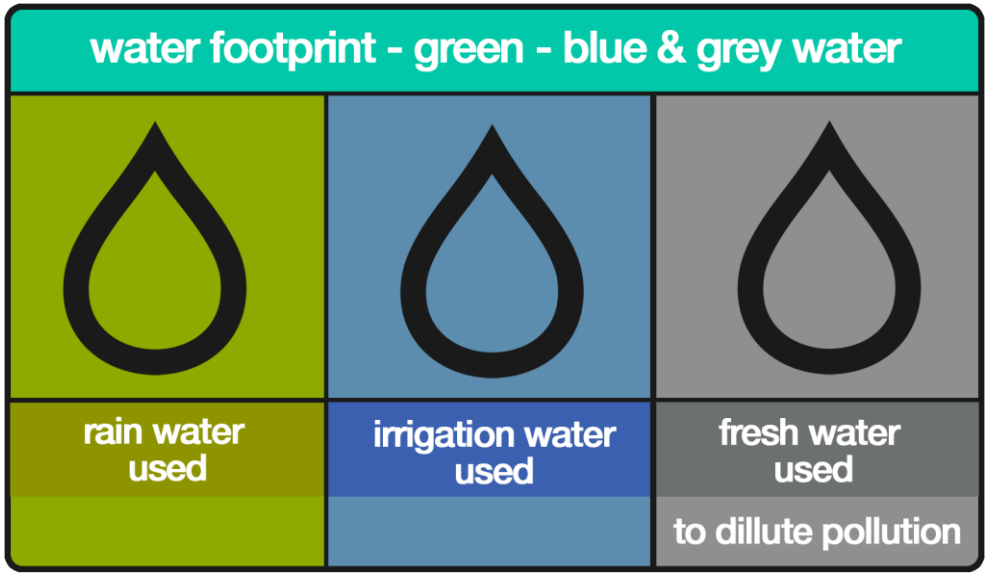


Co-funded by the
Erasmus+ Programme
of the European Union

PRODUCT FOOTPRINT

WATER FOOTPRINT – WF

It assesses water consumption from different water supply sources as well as pollution levels in production processes.



Co-funded by the
Erasmus+ Programme
of the European Union

EXPLANATORY NOTE

The water footprint is an environmental indicator that defines the total volume of freshwater used to produce the goods and services we typically consume. It is a necessary variable that tells us how much water it costs us to manufacture a product.
The indicator called 'water footprint' (WF) seeks to assess the level of appropriation and impact on water resources required for the production of a good or the provision of a service throughout its production chain, including, in the calculation, raw materials. It is calculated on a modular basis, i.e. by adding up the water use and consumption needs of each stage of production from the source to the final consumer.

The water footprint is measured in units of volume (litres or cubic metres) per unit of product manufactured or service consumed, and consists of three summands that have been named according to the colours usually assigned to water: the green water footprint contains the fraction of the footprint that comes directly from rain or snow water and is stored in the soil in surface layers within the reach of plants; the blue footprint refers to water that comes from or is captured from natural or artificial sources through human-operated infrastructures or facilities; and finally, the grey footprint refers to the volume of water contaminated in processes and which subsequently needs to be diluted to comply with the parameters required by the sectoral regulations of the watercourse or receiving body of the final process discharges.

Co-funded by the
Erasmus+ Programme
of the European Union

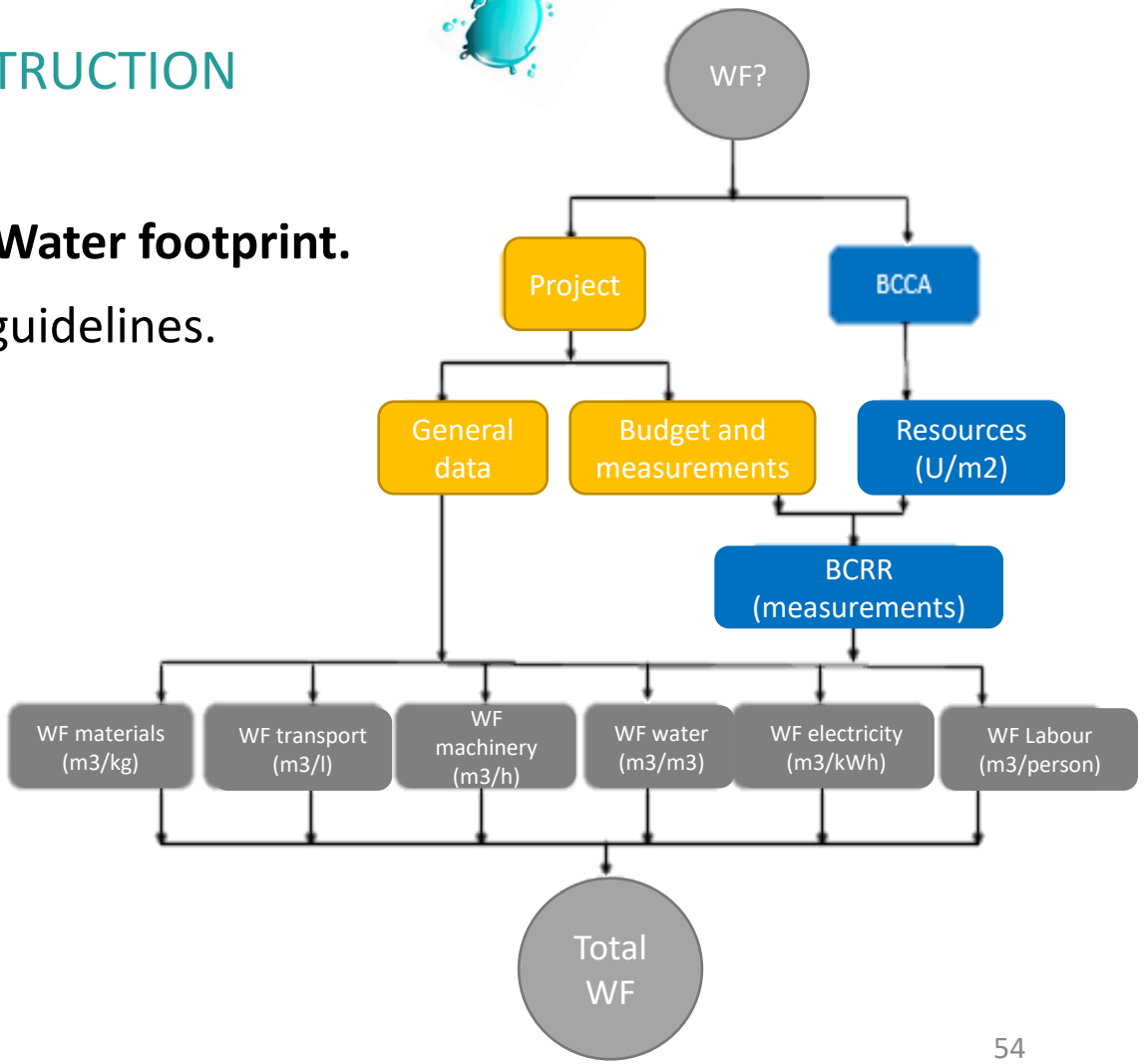
PRODUCT FOOTPRINT

WF CALCULATION IN CONSTRUCTION

UNE-ISO 14046:2015.

Environmental management. **Water footprint.**

Principles, requirements and guidelines.



Co-funded by the Erasmus+ Programme of the European Union

EPDs INDICATORS

ENVIRONMENTAL IMPACT ASSESSMENT INDICATORS PROVIDED IN THE EPDs:

- **Environmental impacts:**

Global Warming Potential (GWP), kgCO2eq

Ozone Depletion Potential (ODP), kgCFC-11eq

Acidification Potential of Soil and Water Resources (AP), kgSO2eq

Eutrophication Potential (EP), kgPO4 eq

Tropospheric Ozone Formation Potential (TOPP), kg C2H4 eq

Abiotic Resource Depletion Potential for Non-Fossil Resources (ADP-elements), kg Sb eq

Abiotic Resource Depletion Potential for Fossil Resources (ADP-fossil fuels), MJ

Co-funded by the Erasmus+ Programme of the European Union

EPDs INDICATORS

ENVIRONMENTAL IMPACT ASSESSMENT INDICATORS PROVIDED IN THE EPDs:

- **Resource use:**

Renewable primary energy use, MJ

Non-renewable primary energy use, MJ

Secondary material use, kg

Renewable secondary fuel use, MJ

Non-renewable secondary fuel use, MJ

Net use of tap water resources, m3

Co-funded by the
Erasmus+ Programme
of the European Union

EPDs INDICATORS

ENVIRONMENTAL IMPACT ASSESSMENT INDICATORS PROVIDED IN THE EPDs:

- **Waste category:**

Hazardous waste landfilled, kg/UF

Non-hazardous waste landfilled, kg/UF

Radioactive waste landfilled, kg/UF

- **Other output streams:**

Components for reuse, kg/UF

Materials for recycling, kg/UF

Materials for energy recovery (energy recovery), kg/UF

Exported energy (electrical, thermal, etc.), kg/UF

Co-funded by the Erasmus+ Programme of the European Union

EPDs INDICATORS

Indicators of life cycle

Indicator	Direction	Unit	Production A1-A3	Transport A4	Installation A5	De-construction C1	Transport C2	Waste processing C3	Disposal C4	Recycling Potential D	Recycling Potential D S1
Renewable primary energy as energy carrier (PERE)	Input	MJ	243	3.1	0.0559	0.271	0.725	2.28	1.7	-5.45	-3.78
Renewable primary energy resources as material utilization (PERM)	Input	MJ	0	0	0	0	0	0	0	0	0
Total use of renewable primary energy resources (PERT)	Input	MJ	243	3.1	0.0559	0.271	0.725	2.28	1.7	-5.45	-3.78
Non renewable primary energy as energy carrier (PENRE)	Input	MJ	1.59E+3	53.3	0.0559	4.66	12.5	27.1	12.9	-19.1	-15.1
Non renewable primary energy as material utilization (PENRM)	Input	MJ	1.23	0	0	0	0	0	0	0	0
Total use of non renewable primary energy resources (PENRT)	Input	MJ	1.59E+3	53.3	0.0559	4.66	12.5	27.1	12.9	-19.1	-15.1
Use of secondary material (SM)	Input	kg	142	0	0	0	0	567	0	0	0

Co-funded by the Erasmus+ Programme of the European Union

EPDs INDICATORS

Use of renewable secondary fuels (RSF)	Input	MJ	0	0	0	0	0	0	0	0	0
Use of non renewable secondary fuels (NRSF)	Input	MJ	0	0	0	0	0	0	0	0	0
Use of net fresh water (FW)	Input	m^3	0.205	0.00278	0.00405	0.000243	0.00065	0.00709	0.00326	0.00354	-0.00206
Hazardous waste disposed (HWD)	Output	kg	0.00168	0.00000205	2.28E-10	1.74E-7	4.66E-7	5.7E-7	1.08E-7	-3.6E-7	-7.95E-9
Non hazardous waste disposed (NHWD)	Output	kg	7.84	0.00962	0.00761	0.000818	0.00219	0.00815	35.7	-11.2	-0.00712
Radioactive waste disposed (RWD)	Output	kg	0.0288	0.0000577	0.0000081	0.00000491	0.0000131	0.000217	0.0000796	-0.000712	-0.000548
Components for re-use (CRU)	Output	kg	0	0	0	0	0	0	0	0	0
Materials for recycling (MFR)	Output	kg	0	0	0	0	0	567	0	0	0
Materials for energy recovery (MER)	Output	kg	0	0	0	0	0	0	0	0	0
Exported electrical energy (EEE)	Output	MJ	0	0	3.42	0	0.05	0	0	0	0

3.2 Environmental product declarations (EPDs)

Co-funded by the Erasmus+ Programme of the European Union

Exported thermal energy (EET)	Output	MJ	0	0	7.88	0	0.11	0	0	0	0

Core environmental impact indicators

Indicator	Unit	Production A1-A3	Transport A4	Installation A5	De-construction C1	Transport C2	Waste processing C3	Disposal C4	Recycling Potential D	Recycling Potential D S1
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC11-Äq.	2.91E-11	1.01E-15	-1.59E-14	8.61E-17	2.3E-16	6.11E-15	2.03E-15	-2.07E-14	-1.61E-14
Eutrophication potential aquatic freshwater (EP-freshwater)	kg PO_(4)-Äq.	0.00014	0.00000899	-0.00000217	7.64E-7	0.00000204	0.00000343	9.32E-7	-0.00000441	-0.0000022
Acidification potential of land and water (AP)	mol H^(+)-Äq.	0.279	0.00383	-0.000866	0.00173	0.000871	0.0135	0.00388	-0.00461	-0.00116
Formation potential of tropospheric ozone photochemical oxidants (POCP)	kg NMVOC-Äq.	0.135	0.00315	-0.000881	0.00228	0.000717	0.0193	0.00302	-0.00414	-0.00101
Global Warming Potential biogenic (GWP-biogenic)	kg CO_(2)-Äq.	0.291	0.00166	-0.0039	-0.0156	0.000377	-11.5	-0.0429	-0.00909	-0.00439
Eutrophication potential aquatic marine (EP-marine)	kg N-Äq.	0.0473	0.00119	-0.000329	0.000816	0.000271	0.00664	0.000999	-0.00175	-0.000375

Co-funded by the
Erasmus+ Programme
of the European Union

EPDs INDICATORS

Water use (WDP)	m^(3) Welt-Äq. entzogen	4.89	0.0178	0.161	0.00151	0.00404	0.242	0.0565	-0.0355	-0.012
Eutrophication potential terrestrial (EP-terrestrial)	mol N-Äq.	1	0.0145	-0.00265	0.00904	0.00329	0.073	0.011	-0.0192	-0.004
Global Warming Potential total (GWP-total)	kg CO (2)-Äq.	146	4.15	0.824	0.352	0.942	-10.1	0.5	-1.46	-1.06
Global Warming Potential fossil fuels (GWP-fossil)	kg CO (2)-Äq.	145.6	4.13	0.83	0.366	0.938	1.44	0.541	-1.45	-1.05
Abiotic depletion potential for fossil resources (ADPF)	MJ	1.58E+3	54.8	-14.9	4.66	12.5	27.1	6.9	-19.1	-15.1
Abiotic depletion potential for non fossil resources (ADPE)	kg Sb-Äq.	0.0000162	3.43E-7	-2.25E-7	2.92E-8	7.79E-8	0.00000158	4.88E-8	-3.14E-7	-2.28E-7
Global Warming Potential luluc (GWP-luluc)	kg CO (2)-Äq.	0.0795	0.0173	-0.00132	0.00147	0.00392	0.00529	0.00156	-0.00484	-0.00135

Co-funded by the Erasmus+ Programme of the European Union

EPDs INDICATORS

Additional environmental impact indicators

Indicator	Unit	Production A1-A3	Transport A4	Installation A5	De-construction C1	Transport C2	Waste processing C3	Disposal C4	Recycling Potential D	Recycling Potential D S1
Incidence of disease due to PM emissions (PM)[2]	Krankheitsfälle	ND	ND	ND	ND	ND	ND	ND	ND	ND
Human exposure efficiency relative to U235 (IR)[1]	kBq U235-Äq.	ND	ND	ND	ND	ND	ND	ND	ND	ND
Comparative toxic unit for ecosystems (ETP-fw)[2]	CTUe	ND	ND	ND	ND	ND	ND	ND	ND	ND
Comparative toxic unit for humans (noncarcinogenic) (HTP-nc)[2]	CTUh	ND	ND	ND	ND	ND	ND	ND	ND	ND
Soil quality index (SQP)[2]	SQP	ND	ND	ND	ND	ND	ND	ND	ND	ND
Comparative toxic unit for humans (carcinogenic) (HTP-c)[2]	CTUh	ND	ND	ND	ND	ND	ND	ND	ND	ND

[1]This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

[2]The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experiences with the indicator.

Co-funded by the
Erasmus+ Programme
of the European Union

EPDs publishing platforms

- **DAPcons**
- **Global EPD**
- **Environdec**
- **ECO Platform**
- **INIES (Francia)**
- **IBU (Alemania)**

DAPcons

- The DAPconstrucción Programme brings together manufacturers of construction products and materials that are committed to sustainability and the environment, and wish to make progress in analysing the environmental impact of their products.
- The aim of this programme is for manufacturing companies to improve their production processes in order to provide the construction sector with the necessary environmental transparency so that technicians and professionals can make the right decisions when choosing the products to use in their projects.
- On this page you can find a free comparator of construction products registered in the DAPconstrucción Programme: http://www.csostenible.net/dapcons/llistat_productes?locale=es

Co-funded by the
Erasmus+ Programme
of the European Union

Global EPD

- AENOR is the Administrator of the GlobalEPD Programme with the aim of making it easier for organisations to communicate the environmental performance of their products in a verified manner.
- The GlobalEPD Declarations may include relevant information from other certifications.
- GlobalEPD Declarations for some construction products are the only EPDs included in the General Register of Environmental Certifications of the product life cycle analysis and other environmental assessments of buildings of the Technical Building Code of the Spanish Ministry of Public Works and Transport (Código Técnico de la Edificación del Ministerio de Fomento).
- Example: https://www.aenor.com/Producto_DAP_pdf/GlobalEPD_007_001_01_ESP.pdf

GlobalEPD
A VERIFIED ENVIRONMENTAL DECLARATION

Co-funded by the
Erasmus+ Programme
of the European Union

Environdec

- The International EPD System is a programme for developing and registering EPDs for any type of goods and services. This system is international and verified by a third party.
- In total 824 construction products are currently registered in Environdec.
- To date, 16 infrastructures are registered in Environdec.
- Example: https://gryphon4.environdec.com/system/data/files/6/18653/S-P-01933%20EPD.pdf

EPD®
THE INTERNATIONAL EPD® SYSTEM

Co-funded by the
Erasmus+ Programme
of the European Union

ECO Platform

- The objective of the ECO Platform is the development of verified environmental information (EPD) for construction products.
- The added value of EPDs in the framework of ECO Platform is the possibility to use these declarations in all European but also in international markets.
- ECO Platform is a group of programme operators, LCA practitioners, industry associations and other stakeholders working to ensure a coherent framework for EPD.
- Example: LIST OF ALL ECO PLATFORM EPD.

https://www.eco-platform.org/list-of-all-eco-epd.html

Co-funded by the
Erasmus+ Programme
of the European Union

ECO Platform

- The INIES database provides Environmental and Health Declarations for construction products, Environmental Product Profiles for equipment, data on services (water, energy, etc.) and life cycle inventories of materials.
- All information is provided voluntarily by manufacturers and professional associations on the basis of an LCA that complies with French regulatory requirements, based on French and European standards, which are benchmarks adapted to construction products and equipment.
- A significant part of this data is audited by an independent third party.
- Example: https://www.base-inies.fr/iniesV4/dist/infos-produit

IBU

- IBU is one of the leading operators of EPD programmes in the construction industry and is also the leading organisation in Europe for EPD of construction products complying with the European standard EN 15804.
- IBU has set an industry standard that has already established itself in all areas of the construction industry, from products for building construction and subsoil engineering to building services components.
- The members of this association are volunteers and are all players in the construction industry.
- With more than 200 companies and associations, the IBU is the largest association of building materials manufacturers dedicated to sustainable construction.
- In total, to date it has 1760 registered EPDs of construction products.
- Example: https://ibu-epd.com/ibu-data-start/

Co-funded by the
Erasmus+ Programme
of the European Union

SOURCES

DAPcons. http://www.csostenible.net/dapcons?locale=es

http://www.csostenible.net/dapcons/llistat_productes?locale=es

Global EPD. https://www.aenor.com/certificacion/certificacion-de-producto/declaraciones-ambientales-de-producto

https://www.aenor.com/certificacion/certificacion-de-producto/declaraciones-ambientales-de-producto/declaraciones-globalepd-en-vigor

https://www.aenor.com/Producto_DAP_pdf/GlobalEPD_007_001_01_ESP.pdf

Environdec. https://www.environdec.com/

https://gryphon4.environdec.com/system/data/files/6/18653/S-P-01933%20EPD.pdf

Plataforma ECO. https://www.eco-platform.org/home.html

https://www.environdec.com/Epd-Search/?search_type=simple&Category=7764

https://www.environdec.com/Epd-Search/?search_type=simple&Category=9493

https://www.eco-platform.org/list-of-all-eco-epd.html

INIES. http://www.base-inies.fr/iniesV4/dist/consultation.html

https://www.base-inies.fr/iniesV4/dist/infos-produit

IBU. https://ibu-epd.com/

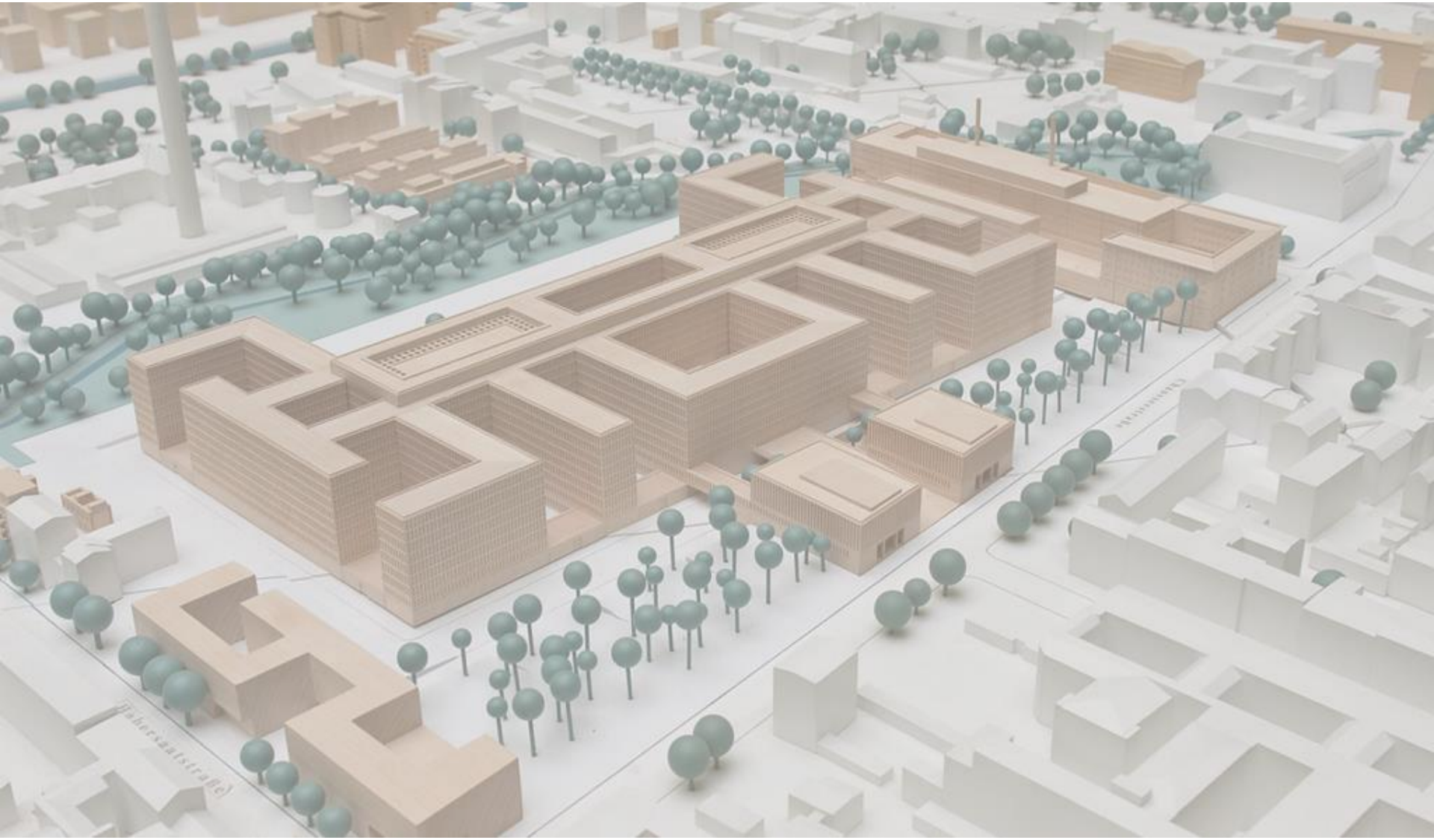
https://ibu-epd.com/ibu-data-start/

Normas UNE. https://www.une.org/encuentra-tu-norma/

Normas ISO. https://www.iso.org/home.html

BIMEPD

Co-funded by the Erasmus+ Programme of the European Union



COAMU COLEGIO OFICIAL DE ARQUITECTOS REGIÓN DE MURCIA

iED institute of Entrepreneurship Development

CTm Centro Tecnológico del mármol, piedra y materiales

Warsaw University of Technology

BULGARIAN GREEN BUILDING COUNCIL

cype

Erasmus+