



## **DELIVERABLE D4.1**

# **REPORT ON SUITABLE STANDARDS AND GUIDELINES FOR CERTIFICATION AND SUSTAINABILITY ANALYSIS**



## Project Information

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## Summary

This document presents the Report on suitable standards and guidelines for certification and sustainability analysis. Identified suitable standards, technical rules and guidelines in this deliverable are described for innovative building components developed in scope of INBUILT. This document is guidance for the INBUILT partners which develop the innovative products on their way for certification and LCA respectively EPD for their products.

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## List of symbols and acronyms

AbZ	De. Allgemeine bauaufsichtliche Zulassung (German National technical assessment)
ATEX	Fr. Avis Technique d'Expérimentation (Technical assessment of experimentation)
BSI	British Standards Institution
BWR	Basic Works Requirements
CE	European Conformity
CEN	Fr. Comité Européen de Normalisation (European Committee for Standardization)
CENELEC	Fr. Comité Européen de Normalisation Electrotechnique (European Committee for Electrotechnical Standardization)
CO <sub>2</sub>	Carbon dioxide
CPR	Construction Products Regulation
CSTB	Fr. Centre Scientifique et Technique du Bâtiment (Scientific and Technical Center for Building, France)
DAU	Document of Assessment for fitness of Use (Spanish National technical assessment)
DIN	De. Deutsches Institut für Normung (German standard)
DIT	Spanish National Technical Approval
DoP	Declaration of Performance
EAD	European Assessment Document
EN	European Standard
EN IEC	European implementation of international standard
EOTA	European Organisation for Technical Assessment
EPD	Environmental Product Declaration
ETA	European Technical Assessment
EU	European Union
GHG	Greenhouse gases

GRI	Global Reporting Initiative
hEN	harmonized European Standard
ICB	Insulation Cork Boards
IEC	International Electrotechnical Commission
IP	Innovative product
ISO	International Organization for Standardization (international standard)
LEITAT	Short name for project participant Acondicionamiento tarrasense asociacion
LCA	Life Cycle Assessment
MultiVaLCA	Multi Value Life Cycle Assessment
NZS	New Zealand Standard
PCR	Product Category Rules
PUR	Polyurethane
PV	Photovoltaics
SETAC	Society of Environmental Toxicology and Chemistry
SIP	Structural insulated panels
SLCA	Social Life Cycle Assessment
SOREN	eco-organism SOREN
TAB	Technical Assessment Body
UBAH	University of Bath
UNE	Sp. Unión Nacional Española (Spanish standard)
UNEP	United Nations Environment Programme
USTUTT	University of Stuttgart
WEEE	Waste from Electrical and Electronic Equipment
WF	Wood fiber
WP	Work package
ZiE	De. Zustimmung im Einzelfall (German National technical assessment)
Z	De. Zulassung (German National technical approval)

# 1. Introduction

This deliverable is guidance for the INBUILT partners which develop the innovative products on their way for certification and LCA respectively EPD for their products. In this document following topics are defined:

- **Certification:** Identification of suitable standards, technical rules and guidelines (EADs on European level) for the developed products and designs
- **LCA:** Confirmation of suitable standards under which Life Cycle Assessment will be conducted during the project
- **SLCA:** Confirmation of methodology for Social Life Cycle Assessment during the project.

## 2. Certification

This part of report describes possible ways for future certification of the newly developed materials and systems concerning technical performance of products. Therefore, suitable standards, technical rules and guidelines (EADs on European level) have been identified for the developed products and designs. Main goal is to show path to certification at European level in order to gain a CE-marking. Project Consortium is aware that Construction Products Regulation (CPR) is under revision. This report shows Certification for CE-marking valid at time of preparation of this Deliverable, 01<sup>st</sup> December 2023 to 31<sup>st</sup> May 2024.

### 2.1. CE-marking and the Construction Products Regulation

Since 01<sup>st</sup> July 2013, it has been a legal requirement for construction products covered by harmonized European Standards (hEN) to carry CE (European Conformity) marking if they are to be placed on the market, for sale, in Europe. Additionally, products not covered by a hEN (including innovative products) but which have successfully achieved a European Technical Assessment (ETA) must also carry the CE mark.

The Construction Products Regulation (CPR) requires all construction products covered by a hEN to have a declaration of performance (DoP) produced and to be CE marked. This is a legal requirement and applies to manufacturers, importers, or distributors of affected construction products placed on the market in Europe. Construction products covered by the regulation cannot be legally sold in Europe if they do not comply, even if the product is an established one.

The CPR harmonizes the methods of assessment and test, the means of declaration of product performance and the system of conformity assessment of construction products. The CPR has the following main elements:

- A system of harmonized technical specifications.
- An agreed system of conformity assessment for each product family.
- A framework of notified bodies.
- CE marking of products.

The CPR, which defines a number of standard classification of products (as set out in Table 1 below) is not intended to harmonize member state's building regulations. It harmonizes the methods of:

- Test.
- Declaration of product performances.
- Assessment and verification of constancy of performances.

Table 1: Extract from Annex IV of CPR Regulation (EU No. 305/2011)

AREA CODE	PRODUCT AREA
1	PRECAST NORMAL/LIGHTWEIGHT/AUTOCLAVED AERATED CONCRETE PRODUCTS.
2	DOORS, WINDOWS, SHUTTERS, GATES AND RELATED BUILDING HARDWARE.
3	MEMBRANES, INCLUDING LIQUID APPLIED AND KITS (FOR WATER AND/OR WATER VAPOUR CONTROL).
4	THERMAL INSULATION PRODUCTS. COMPOSITE INSULATING KITS/SYSTEMS.
5	STRUCTURAL BEARINGS. PINS FOR STRUCTURAL JOINTS.
6	CHIMNEYS, FLUES AND SPECIFIC PRODUCTS.
7	GYPSUM PRODUCTS.
8	GEOTEXTILES, GEOMEMBRANES, AND RELATED PRODUCTS.
9	CURTAIN WALLING/CLADDING/STRUCTURAL SEALANT GLAZING.
10	FIXED FIRE FIGHTING EQUIPMENT (FIRE ALARM/DETECTION, FIXED FIREFIGHTING, FIRE AND SMOKE CONTROL AND EXPLOSION SUPPRESSION PRODUCT).
11	SANITARY APPLIANCES.
12	CIRCULATION FIXTURES: ROAD EQUIPMENT.
13	STRUCTURAL TIMBER PRODUCTS/ELEMENTS AND ANCILLARIES.
14	WOOD BASED PANELS AND ELEMENTS.
15	CEMENT, BUILDING LIMES AND OTHER HYDRAULIC BINDERS.
16	REINFORCING AND PRESTRESSING STEEL FOR CONCRETE (AND ANCILLARIES). POST TENSIONING KITS.
17	MASONRY AND RELATED PRODUCTS. MASONRY UNITS, MORTARS, AND ANCILLARIES.
18	WASTE WATER ENGINEERING PRODUCTS.
19	FLOORINGS.
20	STRUCTURAL METALLIC PRODUCTS AND ANCILLARIES.
21	INTERNAL & EXTERNAL WALL AND CEILING FINISHES. INTERNAL PARTITION KITS.
22	ROOF COVERINGS, ROOF LIGHTS, ROOF WINDOWS, AND ANCILLARY PRODUCTS. ROOF KITS.
23	ROAD CONSTRUCTION PRODUCTS.
24	AGGREGATES.
25	CONSTRUCTION ADHESIVES.

AREA CODE	PRODUCT AREA
26	PRODUCTS RELATED TO CONCRETE, MORTAR AND GROUT.
27	SPACE HEATING APPLIANCES.
28	PIPES-TANKS AND ANCILLARIES NOT IN CONTACT WITH WATER INTENDED FOR HUMAN CONSUMPTION.
29	CONSTRUCTION PRODUCTS IN CONTACT WITH WATER INTENDED FOR HUMAN CONSUMPTION.
30	FLAT GLASS, PROFILED GLASS AND GLASS BLOCK PRODUCTS.
31	POWER, CONTROL AND COMMUNICATION CABLES.
32	SEALANTS FOR JOINTS.
33	FIXINGS.
34	BUILDING KITS, UNITS, AND PREFABRICATED ELEMENTS.
35	FIRE STOPPING, FIRE SEALING AND FIRE PROTECTIVE PRODUCTS. FIRE RETARDANT PRODUCTS.

Under the CPR, harmonized technical specifications are:

- harmonized European product standards (hENs) established by CEN/CENELEC , or
- European Assessment Documents (EADs) produced (by EOTA or TABs) as the basis for issuing European Technical Assessments (ETAs) for products not covered by hENs.

The harmonized technical specification for a product defines EEA-wide methods of assessing and declaring all the performance characteristics required by regulations in any Member State which affect the ability of construction products to meet seven Basic Works Requirements (BWR) for construction works as outlined in Table 2.

*Table 2: The seven Basic Works Requirements of the CPR*

BWR	Description
1	Mechanical resistance and stability
2	Safety in case of fire
3	Hygiene, health and environment
4	Safety and accessibility in use
5	Protection against noise
6	Energy economy and heat retention
7	Sustainable use of natural resources

The main route to a harmonized technical specification under the CPR is for hENs to be drawn up and published by CEN/CENELEC.

However, if hENs cannot be produced or foreseen within a reasonable period of time, or if a product deviates from the scope of a hEN, an ETA may be issued on the basis of an EAD.

The list of Harmonized European Standard (hEN) can be viewed here: [https://single-market-economy.ec.europa.eu/single-market/european-standards/harmonised-standards/construction-products-cpdcp\\_en](https://single-market-economy.ec.europa.eu/single-market/european-standards/harmonised-standards/construction-products-cpdcp_en)

The CPR generally envisages three groups of products:

1. Products covered by a hEN
2. Products not fully covered by a hEN, i.e. where a hEN exists, but for at least one essential product characteristic either:
  - the method of assessment is inappropriate, or
  - there is no assessment method.
3. Products which do not fall within the scope of a hEN

For ‘group 1’ products, a Declaration of Performance (as set out in the relevant hEN) and CE marking is mandatory.

For ‘group 2’ and ‘group 3’ products, there are choices in the way to declare and support claims of product performance, as following:

- A Technical Assessment Body (TAB) can develop an EAD, and performance can be declared via an ETA conducted by the TAB. Performance declared by this route should bear the CE mark.
- Declare performance and have this supported by a National Approval Body. Those bodies who are part of EOTA generally seek to use a methodology and a technical language in line with that used by CEN and EOTA, thus allowing progression to route 1 later.
- Declare performance with or without the support of other information (e.g. a test report) using assessment methods of their choice. However, it is worth noting that as the technical language used in regulations and procurement progressively moves towards a common EU-wide system the relevance of such data in the long-term should be considered.

## 2.2. Studies on possible certification routes for INBUILT products

By definition a “construction product” is any product or kit which is produced and placed on the market for incorporation in a permanent manner in construction works, or parts thereof, and the performance of which has an effect on the performance of the construction works with respect to the basic requirements for construction works.

The INBUILT products, except PV modules, therefore fall under the Construction Products Regulation.

This section provides a summary of suitable standards, technical rules and guidelines that relate to each of the separate INBUILT products.

Main goal was to identify the harmonized European product standards (hENs) and European Assessment Documents (EADs) of each product under CPR. Additional guidance is also presented to summarize the potential routes available for the assessment and certification. Thereby, national certification routes as well as certification routes of comparable products were studied. It may help manufacturers to develop their own EAD / ETA in conjunction with a Technical Approval Body (TAB). For example, manufacturers may also choose to do this to obtain a Market Advantage against other comparable products.

Relevant product requirements of INBUILT products must be chosen based on these studies in connection with given application field.

Table 3

Product:	IP#1
Product standards (EU):	None
Product standards (Spain):	UNE 41410. Compressed earth blocs for walls and partitions. Definitions, specifications and test methods.
Product standards (New Zealand):	NZS 4298. Materials and construction for earth buildings (The product conforms to what the standard calls "pressed bricks")
Product standards (Germany):	DIN 18945. Earth blocks - Requirements, test and labelling
<b>Comparable products:</b>	Masonry units
Standards (comparable products) (EU):	All masonry-related regulations (EN 771, EN 772)
	EN 1996. Eurocode 6: Design of masonry structures
Product standards / Certification (France):	In France, comparable products must be accompanied by an Avis Technique. For non-standard techniques such as ours, an ATEx (Avis Technique d'Expérimentation) is required. In France, earth construction is a so-called "non-routine" method, requiring validation by the French government through a public technical center (CSTB) to be insurable. As part of this validation process, CSTB offers the ATEx ("Appréciation Technique d'Expérimentation" -Technical assessment of experimentation), a fast-track procedure formulated by a group of experts. The ATEx are valid for three years and may concern a construction project (ATEx de cas b) or a range of materials (ATEx de cas a).

<b>Product:</b>	<b>IP#1</b>
Product standards / Certification (Germany):	National technical assessment - Zulassung
Product standards / Certification (Spain):	National technical assessment (DAU, DIT)

Table 4

<b>Product:</b>	<b>IP#2a</b>	
Product standards (EU):	EN 771-1. Specification for masonry units - Part 1: Clay masonry units	EN 772 all parts Testing of masonry units
	EAD 170005-00-0305. Re-cycled clay masonry units (non-loadbearing structures)	EN 1052 all parts Testing for masonry
	EN 1996. Eurocode 6: Design of masonry structures	
Product standards / Certification (Germany):	DIN 20000-401. Application of building products in structures - Part 401: Rules for the application of clay masonry units according to DIN EN 771-1	
	National technical assessment - Zulassung (Planstein)	

Table 5

<b>Product:</b>	<b>IP#2b</b>	
Product standards (EU):	EN 771-1. Specification for masonry units - Part 1: Clay masonry units	EN 772 all parts Testing of masonry units
	EAD 170005-00-0305. Re-cycled clay masonry units (non-loadbearing structures)	EN 1052 all parts Testing for masonry
	EN 1996. Eurocode 6: Design of masonry structures	
	EN ISO 12354 parts 1-4 Acoustic performance of buildings	

<b>Product:</b>	<b>IP#2b</b>
Product standards / Certification (Germany):	DIN 20000-401. Application of building products in structures - Part 401: Rules for the application of clay masonry units according to DIN EN 771-1 Z-23.22-1787 Sound-insulation bricks

Table 6

<b>Product:</b>	<b>IP#3</b>
Product standards (EU):	None
Product standards (Germany):	DIN 18948. Earthen boards - Requirements, test and labelling
<b>Comparable products:</b>	
Standards (comparable products) (EU):	EN 12467. Fiber-cement flat sheets - Product specification and test methods
	EN 520. Gypsum plasterboards – Definitions, requirements and test methods
	EN 14190. Gypsum board products from reprocessing – Definitions, requirements and test methods
Product standards (comparable product for single straw board):	EAD 040005-00-1201. Factory-made thermal and/or acoustic insulation products made of vegetable or animal fibres
	EN 13171. Thermal insulation products for buildings - Factory made wood fibre (WF) products - Specification
	EAD 040138-01-1201. In-situ formed loose fill thermal and/or acoustic insulation products made of vegetable fibres

Table 7

<b>Product:</b>	<b>IP#4</b>	
Product standards (EU):	EN 206. Concrete - Specification, performance, production and conformity	EN 13369. Common rules for precast concrete products

Product:	IP#4	
	EN 12620. Aggregates for concrete	EN 1992. Eurocode 2: Design of concrete structures
	----	EN 14992. Precast concrete products - Wall elements
	----	EN 15258. Precast concrete products - Retaining wall elements
	----	EN 771-3. Aggregate concrete masonry units
Product standards (Germany):	DIN 1045-2. Concrete, reinforced and prestressed concrete structures - Part 2: Concrete	DIN 1045-4. Concrete Structures - Part 4: Precast concrete products - Common Rules
	DAfStb Beton, rezyklierte Gesteinskörnung:2010-09 (Recycled aggregates for concrete)	----
	DAfStb Alkali-Richtlinie:2013-10 (Alkali-aggregate reactivity)	----
Certification (Germany):	National technical assessments - Zulassung AbZ or ZiE	
Product standards (Spain):	UNE 127771-3. Requirements and delivery and reception conditions of aggregate concrete masonry units (dense and light-weight aggregates) (complement to EN 771-3)	

Table 8

Product:	IP#5	
Product standards (EU):	EN 14081-1 - Timber structures - Strength graded structural timber for loadbearing purposes with rectangular cross-section (Remark: As in the description says, the product is used in non-load bearing walls, so This distinction must be considered when analyzing EN 14081-1)	EAD 210005-00-0505. Internal partition kits for use as non-loadbearing walls

Product:	IP#5	
	----	EAD 090120-00-0404. Kits for non-load bearing mineral board external wall systems
Product standards (Germany):	DIN 4074. Strength grading of wood - Part 1: Coniferous sawn timber (Sorting of wood according to load-bearing capacity, visual sorting)	DIN 4103-4. Internal non-loadbearing partitions; partitions with timber framing

Table 9

Product:	IP#6	
Product standards (EU):	EN 14351-1. Windows and doors - Product standard, performance characteristics - Part 1: Windows and external pedestrian doorsets	
Product standards/ Certification (Germany):	DIN 18055. Criteria for the use of windows and external doors in accordance with DIN EN 14351-1	

Table 10

Product:	IP#7	
Product standards (EU):	EN 13830. Curtain walling - Product standard	

Table 11

Product:	IP#8	
Product standards (EU):	EAD 040005-00-1201. Factory-made thermal and/or acoustic insulation products made of vegetable or animal fibers	
	EAD 040685-00-1201. Factory-made insulation mats made of glass fibers and amorphous silica	
Certification / Standard (country):	None	
Comparable products:	Wood-fiber insulation mats	

Product:	IP#8
Standards (comparable products) (EU):	EN 13171. Thermal insulation products for buildings - Factory made wood fibre (WF) products - Specification

Table 12

Product:	IP#9
Product standards (EU):	None
Certification/Standard (country):	None
Comparable products:	DurraPanel
Standards (comparable products) (EU):	EN 13171. Thermal insulation products for buildings - Factory made wood fibre (WF) products – Specification EN 13170. Thermal insulation products for buildings - Factory made products of expanded cork (ICB) - Specification

Table 13

Product:	IP#10
Product standards (EU):	None for EU (There is an international Group IEC working of the second life PV in order to prepare the future certification. )
Standard/Certification (France):	French national label from 2024 provided by the ecoorganism SOREN (WEEE photovoltaics). The label will be given to company that respects the tests protocols to validate the quality of a module for a second life. 4 tests are mandatory.
Product standards (reference product is new PV module):	EN IEC 61215 all parts Quality of product EN IEC 61730 all parts Safety of product

## 3. Suitable standards for Life Cycle Assessment

The call for proposals that led to this INBUILT project (European Commission, 2022a) asked for projects to develop building demonstrations with performance measurements based on appropriate Level(s) indicators.

Level(s) has a variety of “macro objectives”, one of which is to minimise whole life carbon as reflected by Life Cycle Global Warming Potential measured in  $\text{CO}_{2\text{eq.}}/\text{m}^2/\text{yr}$  (European Commission, 2022b). Further guidance documentation from the Commission states that Indicator 1.2 follows the most relevant global and EU standards for sustainable construction, such as ISO 14040/44, EN 15804 and EN 15978 (European Commission and Directorate-General for Environment, 2021).

### 3.1. LCA standards in the construction sector

EN 15804 is the European standard for conducting LCA and producing Environmental Product Declarations for all types of construction products. The most recent version of this standard (at the time of writing) incorporates corrigendum August 2021 (e.g. BSI, 2021).

EN 15804 provides “Core Product Category Rules”, which are built upon and made more prescriptive by “Product Category Rules” and even more specific “complementary Product Category Rules” by EPD Programmes. The aim is to ensure consistency and comparability of LCAs for specific types of construction products – e.g. to be able to compare the global warming potential of one insulation product with another insulation product.

ECO Platform is a cross-Europe initiative that brings together a wide range of EPD Programmes (ECO Platform, 2024). Each programme has been audited by ECO Platform to ensure they are following EN 15804 and using ECO Platform Verification Guidelines, “to ensure a high level of robustness and quality”. ECO EPD are recognized across Europe, giving a manufacturer’s EPD much wider recognition than through a single EPD Programme (*ibid.*).

### 3.2. LCA in this project

Thus, in Work Package 4 and particularly Task 4.3, we will conduct life cycle assessment of INBUILT’s Innovative Products in accordance with EN 15804, by selecting and using an appropriate ECO PCR (such as EPD International AB, 2023), or c-PCR if available, for each type of product within INBUILT.

As INBUILT’s Innovative Products are at various stages of product development, they may not all be able to fully meet the requirements for publishing an EPD, and EPD production also has costs beyond those covered by INBUILT. As per the original proposal, we therefore will not publish EPDs within the project (unless manufacturers wish to do so themselves), but to follow all the

appropriate LCA rules so that the results are in the form of EPD results. Alongside this, we will make clear if and how an LCA deviates from the relevant PCR, so that manufacturers know what else will be required in order to produce an Environmental Product Declaration when their products are ready for the mass market.

Table 14 summarizes the partners involved in the LCAs of INBUILT’s Innovative Products. Most of the LCAs will be conducted by UBAH, USTUTT and LEITAT in collaboration with, and based on data from, the product manufacturers. In two instances (Filiater and CEA), the manufacturers are already involved in producing LCAs. In these cases, Task 4.3 will review the work to ensure consistency of methods and results for use in this project.

Table 14: Summary of partners and roles for LCA of INBUILT Innovative Products

Technology	Partner roles	
	Provide data for LCA	Conduct LCA
#IP1	Filiater	Filiater
#IP2	LB	USTUTT
#IP3	LB	USTUTT
#IP4	FEES	USTUTT
#IP5	KIT / ZRS	UBAH
#IP6	INDRE/LEITAT	LEITAT
#IP7	INDRESMAT/LFE	LEITAT
#IP8	Balticfloc	UBAH
#IP9	Mykor	UBAH
#IP10	CEA	CEA

When conducting each LCA the general process will be:

- (1) *Define goal, scope and declared unit for each LCA. We will follow the requirements of appropriate standards and Product Category Rules as far as data allows. We will also discuss how suitable those mainstream standards are for representing the environmental performance of novel, circular construction techniques, to inform future iterations of those standards.*
- (2) *Develop life cycle inventory. We will:*
  - a. *Draw a process map that visually describes each step (unit process) in the life cycle.*
  - b. *Collect inventory data (inputs and outputs) for each step. We will collate primary data from each IP manufacturer, and secondary data for upstream/downstream from PCR-compliant databases such as ecoinvent. Section 6.4.1 of EN 15804 covers data collection and refers on to ISO 14044:2006 section 4.3.2 (BSI, 2021). Thus, all partners will follow the guidance and requirements of section 4.3.2 of ISO 14044:2006+A2:2020 for data collection. We will collaboratively develop data collection sheets based on Annex A of ISO 14044, such that all partners use a*

*consistent approach. As suggested in Annex A, the example sheets will be modified to consider additional factors that are relevant to this project, such as the “quality of the data (uncertainty, measured/calculated/estimated)”. Data quality is particularly relevant in this project because the innovative products are at various stages in their development and therefore may, for example, involve some estimated data. It is important to capture this information to enable effective interpretation of results. Data requirements for EN 15804 and example collection sheets from ISO 14044 are given in Appendix 1.*

- c. Build model in LCA software. We will ensure consistency in various aspect of the LCA particularly related to modelling biogenic carbon and handling background data. Partners will be using different software and there may be different approaches to modelling products. However, we will ensure modelling is in accordance with EN15804 following the appropriate PCR, by providing feedback. In this way it will be possible to identify and address any discrepancies or inconsistencies.*
- (3) Produce results (life cycle impact assessment). We will produce impact category results in accordance with EN 15804 and appropriate Product Category Rules. These will be shared for use in the building-level Digital Tool of WP5.*
- (4) Interpretation. Standards (such as EN 15804) and PCRs are under continual development, and there is ongoing debate about key aspects of LCA modelling, such as the representation of biogenic carbon and recycling. (This is why the University of Bath is leading an ongoing project for the UN Environment Programme about biogenic carbon in LCA: Biogenic Carbon - Life Cycle Initiative, 2023). Therefore, in addition to a core requirement of producing results to EN 15804 / PCRs, we will also explore alternative approaches if appropriate. For example, USTUTT have developed software MultiVaLCA (<https://github.com/JoachimSchwarte/MultiVaLCA>), while the University of Bath have ongoing research to improve the representation of uncertainty in EPDs (<https://researchportal.bath.ac.uk/en/projects/towards-net-zero-carbon-buildings-tackling-uncertainty-when-predi>).*

Task 4.3 will be complemented by dissemination activities such as scientific publications and a draft Environmental Product Declaration to illustrate how results could be published as ecolabels by manufacturers when products are ready for the market.

## 4. Social Life Cycle Assessment (S-LCA)

Social Life Cycle Assessment (S-LCA) is a methodology that evaluates the social and sociological aspects of products throughout their life cycle, from resource extraction to final disposal.

Key Components of SLCA are:

1. **Stakeholder Categories:** SLCA will identify impacts on the following stakeholder groups workers, building occupants, local communities, societies, consumers. This comprehensive approach helps in understanding how a product affects different segments of society.
2. **Impact Categories:** These are the social and socio-economic aspects considered in the assessment, such as labor rights and working conditions, health and safety, gender equality, community rights, socioeconomic repercussions, and any other aspects relevant to human well-being...
3. **Inventory Analysis:** This step involves collecting data on the relevant social indicators across the product's life cycle stages. The data can be qualitative and quantitative.
4. **Impact Assessment:** This phase interprets the data collected during the inventory analysis to evaluate the social impacts associated with the product. The aim is to identify, assess, and potentially quantify the positive and negative social impacts.  
The assessment should demonstrate: high quality recycling at the end of life; reduction of GHG emissions (in  $t_{CO_2}$ ); significant reduction of embodied energy.
5. **Interpretation/sensitivity analysis:** The final phase involves summarizing and discussing the results, reaching conclusions, and making recommendations (influence of critical parameters on the results-user behaviour, electricity mix...). The goal is to provide insights into improving social performance and contributing positively to sustainable development.

### Methodological Framework to be used:

- The Guidelines for Social Life Cycle Assessment of Products: Introduced by the UNEP/SETAC Life Cycle Initiative, these guidelines offer a detailed framework for carrying out SLCA, aiming to standardize the methodology and ensure its comprehensive application.

### Green accreditations Aligned to SLCA

- Green accreditations are certifications that recognize the environmental responsibility and sustainable practices of organizations. They are typically awarded by independent bodies after a thorough assessment against certain environmental standards.
- The Green accreditation we will promote in the project is the GRI. The Global Reporting Initiative (GRI) provides standards for sustainability reporting, which include a wide range of economic, environmental, and social topics. Organizations around the world use GRI standards to report their sustainability performance and impacts.

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# Appendix 1 - Data collection and example templates

Data collection templates are provided below from ISO 14044, which were sent to all project partners during the proposal stage.

## A1.1 EN 15804

Summary of types of allowable data according to EN 15804 :

**Table 1 — Application of generic and specific data**

Modules	Module A1-A3		A4 and A5	B1-B7	C1-C4
	Production of commodities, raw materials	Product manufacture	Installation processes	Use processes	End-of-life processes
Process type	Upstream processes	Processes the manufacturer has influence over	Downstream processes		
Data type	Generic data	Manufacturer’s average or specific data	Generic data		

## A1.2 ISO 14044, Annex A

Examples of data collection templates from ISO 14044 are shown below.

Upstream transportation:

Name of intermediate product	Road transport			
	Distance km	Truck capacity tonnes	Actual load tonnes	Empty return (Yes/No)

The consumption of fuel and the related air emissions are calculated using a transportation model.

Internal transportation:

Air emissions are calculated using a fuel consumption model.

	Total amount of input transported	Total consumption of fuel
Diesel oil		
Gasoline		
LPG <sup>a</sup>		
<sup>a</sup> Liquefied Petroleum Gas.		

Unit process:

**A.4 Example of data sheet for unit process**

Completed by:		Date of completion:		
Unit process identification:		Reporting location:		
Time period: Year		Starting month:	Ending month:	
Description of unit process: (attach additional sheet if required)				
Material inputs	Units	Quantity	Description of sampling procedures	Origin
Water consumption <sup>a</sup>	Units	Quantity		
Energy inputs <sup>b</sup>	Units	Quantity	Description of sampling procedures	Origin
Material outputs (including products)	Units	Quantity	Description of sampling procedures	Destination
NOTE The data in this data collection sheet refer to all unallocated inputs and outputs during the specified time period.				
<sup>a</sup> For example, surface water, drinking water.				
<sup>b</sup> For example, heavy fuel oil, medium fuel oil, light fuel oil, kerosene, gasoline, natural gas, propane, coal, biomass, grid electricity.				

Life cycle inventory analysis data collection sheet:

**A.5 Example of life cycle inventory analysis data collection sheet**

Unit process identification:			Reporting location:
<b>Emissions to air<sup>a</sup></b>	<b>Units</b>	<b>Quantity</b>	<b>Description of sampling procedures (attach sheets if necessary)</b>
<b>Emissions to water<sup>b</sup></b>	<b>Units</b>	<b>Quantity</b>	<b>Description of sampling procedures (attach sheets if necessary)</b>
<b>Emissions to land<sup>c</sup></b>	<b>Units</b>	<b>Quantity</b>	<b>Description of sampling procedures (attach sheets if necessary)</b>
<b>Other releases<sup>d</sup></b>	<b>Units</b>	<b>Quantity</b>	<b>Description of sampling procedures (attach sheets if necessary)</b>
Describe any unique calculations, data collection, sampling, or variation from description of unit process functions (attach additional sheets if necessary).			
<p>a For example inorganics: Cl<sub>2</sub>, CO, CO<sub>2</sub>, dust/particulates, F<sub>2</sub>, H<sub>2</sub>S, H<sub>2</sub>SO<sub>4</sub>, HCl, HF, N<sub>2</sub>O, NH<sub>3</sub>, NO<sub>x</sub>, SO<sub>x</sub>; and organics: hydrocarbons, PCB, dioxins, phenols; metals: Hg, Pb, Cr, Fe, Zn, Ni.</p> <p>b For example: BOD, COD, acids, Cl<sub>2</sub>, CN<sub>2</sub><sup>-</sup>, detergents/oils, dissolved organics, F<sup>-</sup>, Fe ions, Hg ions, hydrocarbons, Na<sup>+</sup>, NH<sub>4</sub><sup>+</sup>, NO<sub>3</sub><sup>-</sup>, organochlorides, other metals, other nitrogen compounds, phenols, phosphates, SO<sub>4</sub><sup>2-</sup>, suspended solids.</p> <p>c For example: mineral waste, mixed industrial waste, municipal solid waste, toxic wastes (please list compounds included in this data category).</p> <p>d For example: noise, radiation, vibration, odour, waste heat.</p>			

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