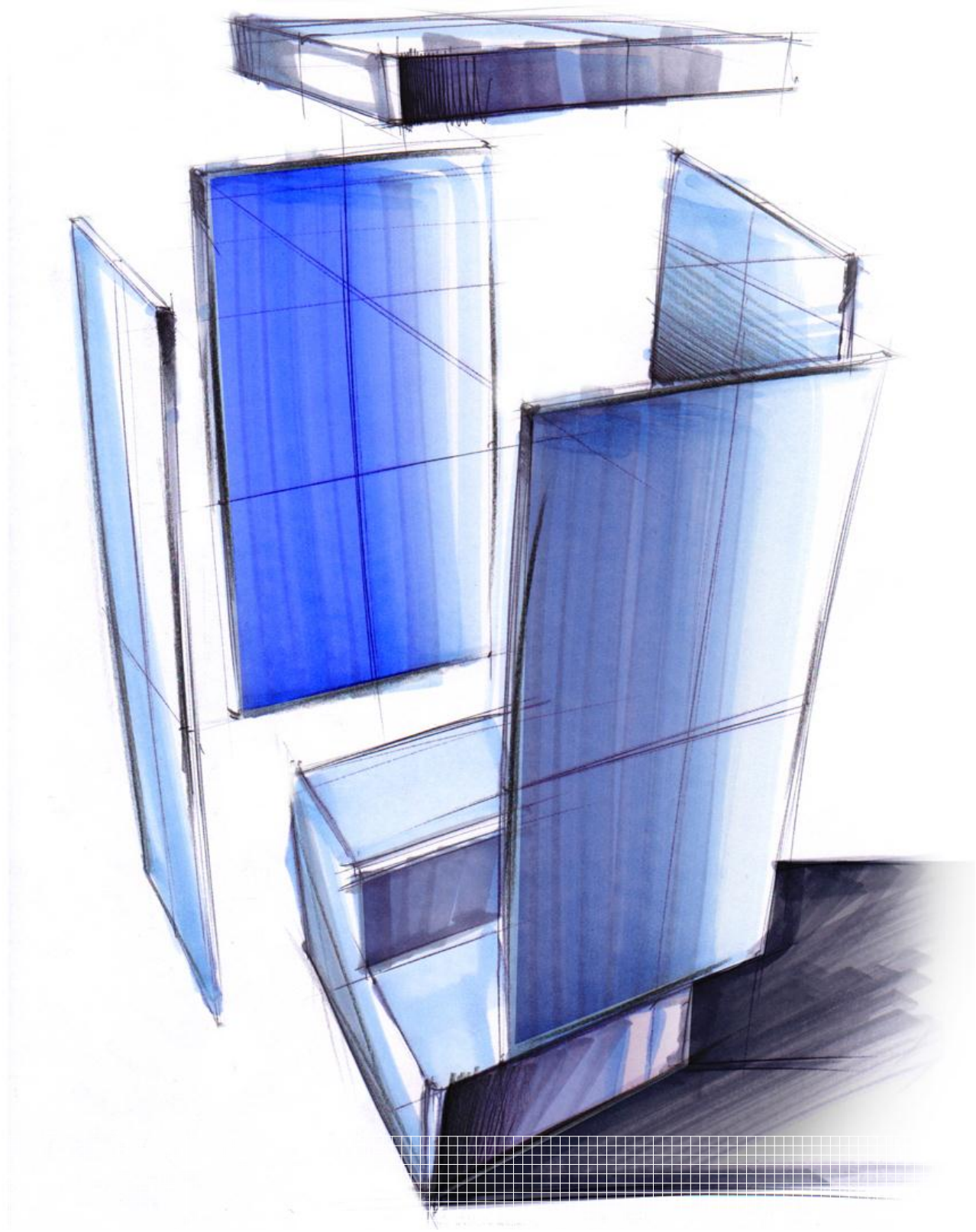
PRODUCT CATEGORY RULES
DATE 2013-01-24

UN CPC 387
PREFABRICATED BUILDINGS

2013:01
VERSION: 1.0



GENERAL INTRODUCTION

The International EPD® System is based on a hierarchic approach following the international standards:

- ISO 9001, Quality management systems
- ISO 14001, Environmental management systems
- ISO 14040, LCA - Principles and procedures
- ISO 14044, LCA - Requirements and guidelines
- ISO 14025, Type III environmental declarations
- ISO 21930, Environmental declaration of building products
- EN 15804, Environmental product declarations - Core rules for the product category of construction products

The General programme Instructions are based on these standards, as well as instructions for developing Product Category Rules (PCR).

The documentation to The International EPD® System includes three separate parts (www.environdec.com):

- Introduction, intended uses and key programme elements
- General Programme Instructions Supporting annexes
- Supporting annexes

This PCR document specifies further and adds additional minimum requirements on EPDs of the product group defined below complementary to the above mentioned general requirement documents. Principle programme elements concerning the Product Category Rules (PCR) included in The International EPD® System are presented below.

PURPOSE	ELEMENT IDENTIFICATION AND PRINCIPAL APPROACH
Complying with principles set in ISO 14025 on modularity and comparability	1. "Book-keeping LCA approach" 2. A Polluter-Pays (PP), allocation method
Simplifying work to develop Product Category Rules (PCR)	3. PCR Module Initiative (PMI) in order to structure PCR in modules according to international classification 4. PCR moderator for leadership and support of the PCR work
Secure international participation in PCR work	5. Global PCR Forum for open and transparent EPD stakeholder consultation
Facilitating, identification and collection of LCA-based information	6. Selective data quality approach for specific and generic data

Product Category Rules (PCR) are specified for specified information modules “gate-to-gate”, so called core modules. The structure and aggregation level of the core modules are defined by the United Nation Statistics Division - Classification Registry CPC codes (http://unstats.un.org). The PCR also provides rules for which methodology and data to use in the full LCA, i.e. life cycle parts up-streams and down-streams the core module.

The PCR also has requirements on the information given in the EPD, e.g. additional environmental information. A general requirement on the information in the EPD is that all information given in the EPD, mandatory and voluntary, shall be verifiable.

In the EPD, the environmental performance associated with each of the three life-cycle stages mentioned above are reported separately.

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1 GENERAL INFORMATION

Date:	2013-01-24
Registration no:	PCR 2013:01
This PCR was prepared by:	"Bagni Mobili Italia" working group*, Studio Fieschi (www.studiofieschi.it)
Appointed PCR moderator:	Maurizio Fieschi.
Open consultation period:	2012-09-24 until 2012-11-19
Valid within the following geographical representativeness:	Global
Valid until:	2018-01-24
More information on this PCR's website:	http://environdec.com/en/Product-Category-Rules/Detail/?Pcr=8589

* The "Bagni mobili Italia" working group is composed by companies producing, renting, and providing full service for mobile not-sewer-connected toilet cabins.

This document provides Product Category Rules (PCR) for the assessment of the environmental performance of UN CPC 387 – Prefabricated Buildings and the declaration of this performance by an EPD.

In order to comply with the "harmonization PCR documents" principle (GPI § 2.5 Developing a PCR document – Consider available PCRs) the following PCRs and standards have been considered:

- PCR Basic Module CPC Division 38: Furniture; other transportable goods n.e.c. (version 1.2 dated 2010-11-30, published by the International EPD® System)
- PCR and PCR Basic Module Construction products and CPC division 54: Construction services (version 1.0 dated 2012-01-09, published by the International EPD® System)
- ISO 21930:2007 - Sustainability in building construction -- Environmental declaration of building products
- EN 15804:2012 - Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
- EN 16194:2012 - Mobile non-sewer-connected toilet cabins. Requirements of services and products relating to the deployment of cabins and sanitary products

This PCR is based on the requirements and guidelines given in the General Programme Instructions.

Any comments to this PCR document may be given on the Global PCR Forum or directly to the PCR moderator during the period of validity.

The PCR document is a living document. If relevant changes in the LCA methodology or in the technology for the product category occur, the document will be revised and any changes will be published on the international EPD system website: www.environdec.com.

The EPD shall refer to a specific PCR version number. The production of new PCR versions does not affect the EPD certification period.

2 DEFINITION OF THE PRODUCT GROUP

The product category referred to in this PCR includes the following products:

- Group: 387 – Prefabricated Buildings
  - Class: 3870 – Prefabricated Buildings
    - Subclass: 38701 - Prefabricated Buildings, of wood
    - Subclass: 38702 - Prefabricated Buildings, of metal
    - Subclass: 38703 - Prefabricated Buildings, of plastics
    - Subclass: 38704 - Prefabricated Buildings, of concrete

In case of inclusion of several similar products, the international EPD®system offers the possibility for similar products to be included in the same EPD provided that the difference between their environmental impacts is less than 5 % for each impact category (or expressed as a ceiling value of 10 %). In these cases it is still possible to include all products in the same EPD e.g. in separate columns in a table. In case a single value is chosen for each impact category for all products, the value reported should be the worst performance within the range of variation. It is allowed to also show "average data" in an EPD as supplementary information if found relevant. It is also possible to create a so-called Sector EPDs which enables the possibility to present average data for a whole industrial branch in a well-defined geographical area.

As an example, products such as Mobile non-sewer-connected toilet cabins (as defined by EN 16194:2012) fall within the scope of this PCR.

2.1 SPECIFICATION OF MANUFACTURING COMPANY

The information on the manufacturing company, required in the EPD, are reported in the table 2.1.1, separated into mandatory and voluntary information.

Table 2.1.1 – Information on the manufacturing company

Mandatory information	**Example of voluntary information**
Name of the company	Specific aspects regarding the production
Production site(s)	Environmental policy
Issuer and Contacts	Environmental labels, as ISO type one environmental claims (ISO 14024)
Information on environmental management system	

2.2 SPECIFICATION OF THE PRODUCT

A description of the product's use and of the main product components shall be provided in the EPD. The product weight and dimensions shall be specified in the EPD. Other specifications are voluntary.

3 FUNCTIONAL UNIT

The EPD may follow a "cradle to gate" or a "cradle to grave" approach. The functional units that shall be used in the EPD are defined in the following table, based on the selected approach. The approach shall be declared in the EPD.

Approach	Life cycle stages (see §6)	Functional units
Cradle to gate	A1-A5	Prefabricated buildings necessary to cover a reference service life (RSL) of 10 years*
Cradle to grave	A1-A5, B1-B7, C1-C4	10 years of use of a prefabricated building
		One day of effective usage** of a prefabricated building

* e.g. if the RSL of a prefabricated building is 2 years, 5 prefabricated buildings shall be considered in the EPD.

** Effective usage is the number of days when the prefabricated building is accessible for use.

The functional unit(s) shall be declared in the EPD. The environmental impact shall be given per functional unit(s).

4 CONTENT OF MATERIALS AND CHEMICAL SUBSTANCES

The EPD shall include a content declaration of the product covering relevant materials and substances. The gross weight of material shall be declared in the EPD at a minimum of 99% (see General Programme Instructions, available at www.environdec.com).

The declaration of material content of the product shall list as a minimum substances contained in the product that are listed in the "Candidate List of Substances of Very High Concern (SVHC) for authorisation" when their content exceeds 0,1 weight-% of the product. SVHC are listed by European Chemicals Agency[1] and includes the Candidate List of SVHC.

An optional detailed list of the product's substances, including CAS[2] number, environmental class and health class, may be included in the product content declaration. It is also recommended to include substances' functions in the product (e.g., pigment, preservative, etc.). An optional detailed content declaration is illustrated in Table 1.

Table 1 An example of an illustrative detailed product content declaration, (example written in italic).

All materials/ components, A)	**Substances**	**Weight % B)**	**CAS number**	**Environ-mental class**	**Health class**
Structure	*Polyetylene*	*90%*			
Pigment	*Titanium dioxide* *Iron oxides fume*	*6 +/-3* *2*	*13463-67-7* *1309-37-1*	*no* *Data lacking*	*R 37* *Data lacking*
Preservative	*—C)*	*3*	*—*	*no*	*R 46*
Etc.					
…					
Other, non-allergenic, health-sensitive or environmentally-sensitive substances		*<1%*	*—*	*no*	*No*
Total		**100**			

[1] http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp

[2] The reporting could also be given with use of EINEC number.

a) Substance(s) do not need to be included if they may affect patent or company secrets.

b) Figures can alternative be given in e.g. g/kg.

c) The product content declaration shall report if the substance is confidential.

The declaration of contents shall also report all substances' inherent properties that are regarded as hazardous. These hazardous substances may be reported with the applicable risk classification, as per the regulations for those markets where the product will be used (see Table 1). The following natural substances' inherent properties (i.e. risk classification) do not need to be specified in the content declaration for:

- metals including alloys that are fixed in the building during its utilisation in the construction, and that the composition (i.e. the entire product) are not classified as dangerous.
- minerals, ores, or other naturally-occurring substances and raw materials, provided that they have not been chemically modified under production, and that they are not classified as dangerous under the EU directive 67/548/EEG.

The content declaration does not apply to proprietary materials and substances such as those covered by exclusive legal rights including patent and trade marks (see General Programme Instructions).

Only if the EPD follows a cradle to grave approach, the composition of the products needed for the use phase (e.g. cleaning agents) of the prefabricated building shall be declared.

An optional detailed list of the product's substances, including CAS number, environmental class and health class, may be included in the product content declaration. It is also recommended to include substances' functions in the product (e.g., pigment, preservative, etc.). An optional detailed content declaration is illustrated in Table 2.

Table 2 An example of an illustrative detailed product content declaration, (example written in italic).

All materials/ components, A)	**Substances**	**Weight % B)**	**CAS number**	**Environ-mental class**	**Health class**
Surfactant	*___(C)*	*5-10%*			
Etc.					
…					
Other, non-allergenic, health-sensitive or environmentally-sensitive substances		*<1%*	*—*	*No*	*No*
Total		**100**			

a) Substance(s) do not need to be included if they may affect patent or company secrets.

b) Figures can alternative be given in e.g. g/kg.

c) The product content declaration shall report if the substance is confidential.

5 UNITS AND QUANTITIES

SI units shall be used. For power and energy, the preferred units are kW or kWh. A maximum of three value numbers shall be used when reporting LCA results.

6 GENERAL SYSTEM BOUNDARIES

The PCR defines the general system boundary of a prefabricated building.

The EPD (cradle-to-gate) of the product shall cover all modules in the stage A (see Table 3 and Figure 1)

The EPD (cradle-to-grave) of the product shall cover all modules in the stages A to C (see Table 3 and Figure 1). In some cases certain modules may not be relevant to the environmental performance of the product. In such cases the irrelevant module shall be declared as “not relevant”. Such a declaration shall not be regarded as an indicator result of zero.

The Reference Service Life (RSL) of the prefabricated building shall be declared in the EPD.

Table 3: The life cycle of a prefabricated building divided in three process modules according to the General Program Instructions (GPI) and four information modules according to ISO 21930 and supplemented by an optional information module on potential loads and benefits beyond the building life cycle (EN ISO 15804).

GPI module	**Asset life cycle stages**	**Information module**	**Cradle to gate**	**Cradle to grave**
UPSTREAM	A1) RAW MATERIAL SUPPLY	A1-3) MANUFACTURING PHASE	Mandatory	Mandatory
Core	A2) Transport			
	A3) Manufacturing			
DOWN-STREAM	A4) TRANSPORT	A4-5) MANUFACTURING PHASE	Mandatory	Mandatory
	A5) Installation process			
	B1) Material emission from usage*	B) Usage stage	Excluded	Mandatory
	B2) Maintenance			
	B3) Repair			
	B4) Replacement			
	B5) Refurbishment			
	B6) Use of energy			
	B7) Use of water			
	C1) Deconstruction, demolition	C) End of life	Excluded	Mandatory
	C2) Transport			
	C3) Waste processing			
	C4) Disposal			
Other environmental information	D) Reuse, recycle or recovery	D) Recyclability potentials	Optional	Optional

* Named ‘Use’ in ISO 21930.

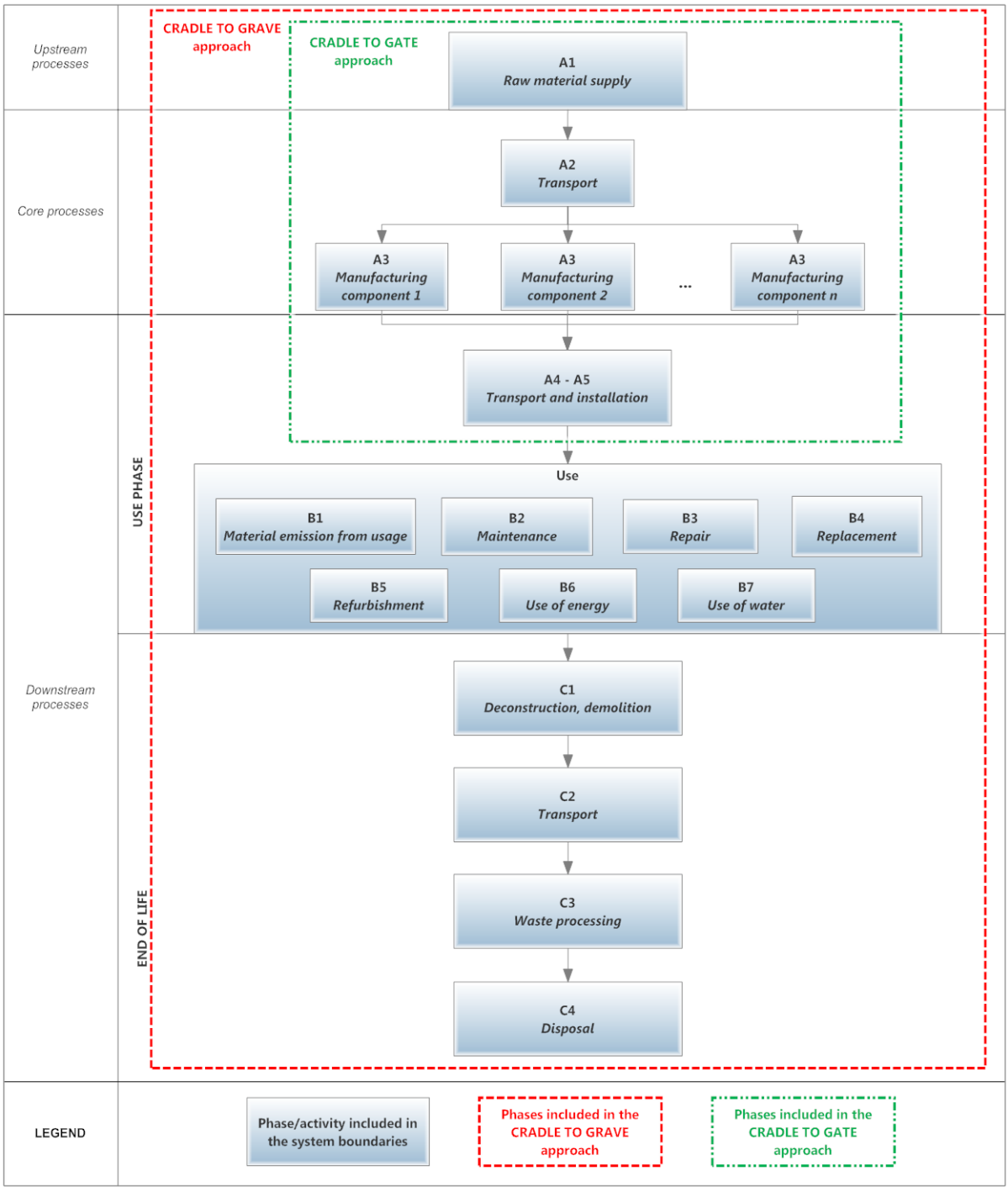

Figure 1:System boundaries

6.1 UPSTREAM PROCESSES

The following upstream processes/life cycle stages are included:

- **A1) Raw material supply**
  - Extraction and processing of raw materials (e.g. mining processes), biomass production and processing (e.g. agricultural or forestry operations)
  - Reuse of products or materials from a previous product system.
  - Processing of secondary materials used as input for manufacturing the product, but not including those processes that are part of the waste processing in the previous product system.
  - Generation of electricity, steam and heat from primary energy resources, also including their extraction, refining and transport.
  - Energy recovery and other recovery processes from secondary fuels, but not including those processes that are part of waste processing in the previous product system;

6.2 CORE PROCESSES

The core processes include:

- **A2) Transportation:**
  External transportation up to the factory gate and internal transport.
- **A3) Manufacturing:**
  - Production of ancillary materials or pre-products
  - Manufacturing of products and co-products
  - Manufacturing of packaging
  - Processing up to the end-of-waste state or disposal of final residues including any packaging not leaving the factory gate with the product
  - In case that the manufacturing incorporate (at the same site) recycling process of any purchased recycled material and the transport from the recycling process to where the material is used.

Please note that this is a general description and that not all processes are relevant for every type of product included in this PCR.

6.3 DOWNSTREAM PROCESSES

In the case that any downstream process is used and part of the underlying LCA it shall be reported in the EPD in brief what precise activities are included.

The downstream processes include the B) Usage stage and the C) End-of-life stage. On a general level the B) Usage stage and the C) End-of-life stage step includes all relevant goods and services that in a life cycle perspective include an inventory taken into account e.g.:

- the production and transportation related to any service, component and ancillary products used
- transportation of any waste from these products or services processes and their related transportation;
- end-of-life processes related to these products or services processes including transportation following the “polluter pays principle”:

The here generally applied “polluter pays principle” means that processes of waste processing shall be assigned to the product system that generates the waste until a new user pays for it as a raw material.

The downstream life cycle stages are divided into a number of life cycle module steps as defined below:

- **A4) Transport:**
  - Transportation from the production gate to the distribution site
  - Storage of products, including the provision of heating, cooling, humidity control etc.
  - Wastage of products (additional production processes to compensate for the loss of wastage of products)
  - Waste processing of the waste from product packaging and product wastage during the installation processes up to the end-of-waste state or disposal of final residues.
- **A5) Installation process:**
  - Installation of the product at the site, manufacturing and transportation of ancillary materials and any energy or water required for installation or operation of the site. It also includes on-site operations to the product.
  - Wastage of products (additional production processes to compensate for the loss of wastage of products)
  - Waste processing of the waste from product packaging and product wastage during the installation processes up to the end-of-waste state or disposal of final residues.
- **B1) Use:**
  The module covers environmental aspects and impacts arising from components of the building and construction works during their normal (i.e. anticipated) use, which are assigned to module B1. This module includes e.g. release of substances from the facade, roof, floor covering and other surfaces (interior or exterior) to indoor air, soil or water.
- **B2) Maintenance:**
  Maintenance covers the combination of all typically planned technical and associated administrative activities and actions during the service life to maintain the prefabricated building or its parts in a state in which it can perform its required funtional and technical performance, as well as preserve the aesthetic qualities of the product. This will include preventative and regular maintenance activity such as cleaning and the planned servicing, replacement or mending of woen, damaged or degraded parts. Water and energy usage required for cleaning, as part of maintenance, shall be included in this module and not in modules B6 and B7. This module includes, in addition:
  - The production and transportation of any component and ancillary products used for maintenance, including cleaning
  - Transportation of any waste from maintenance processes or from maintenance related transportation
  - The end-of-life processes of any waste from transportation and the maintenance process, including any part of the component and ancillary materials removed
  - Transport of the prefabricated building to the installation site and its transport back from the installation site to another site (storage or new installation site)
- **B3) Repair:**
  The module “repair” covers a combination of all technical and associated administrative actions during the service life associated with a typically not planned corrective, responsive or reactive treatment of a part of the building to return it to an acceptable condition in which it can perform its required functional and technical performance. It also covers the preservation of the aesthetic qualities of the product. Replacement of a broken component or part due to damage shol be assigned to “repair”, whereas replacement of a whole element due to damage should be assigned to the module “replacement”. The module includes:
  - Repair process of the reparied part of a component, including
    - Production of the reparied part of a component and of ancillary materials;
    - Use of related energy and water;

- The production and transport aspects and impacts of any wastage of materials during the repair process;

- The transportation of the repaired part of component and ancillary materials, including production aspects and impacts of any waste of materilas during the repair related transportation
- The end-of-life processes of any waste from transportation and the repair process, including any part of the component and ancillary materials removed

See replacement when repair is not possible.

- **B4) Replacement:**
  The module “replacement” covers the combination of all technical and associated administrative actions during the service life associated with the return of the prefabricated building to a condition in which it can perform its required functional or technical performance, by replacement of a whole construction element.

  Replacement of a broken component or part due to damage should be accounted for in the module “repair”. Replacement of a whole construction element as part of a concerted replacement programme for the building should be considered as “refurbishment”.

  The module includes:

  - The production of the components and of ancillary materials used for replacement;
  - Replacement process, including related water and energy use and the production aspects and impacts of any waste of materials used during the replacement process;
  - The transportation of the component and ancillary materials used for replacement, including production aspects and impacts of any losses of materials damaged during transportation;
  - The end-of-life processes of any waste from transportation and the replacement process, including any part of the component and ancillary materials removed

- **B5) Refurbishment:**
  The module “refurbishment” covers a concerted typically planed programme of maintenance that finally ends up with a restoration, that often includes across a significant part or whole section of the prefabricated building.
  The module includes:

  - The production of the components and of ancillary materials used for refurbishment;
  - Refurbishment process, including related water and energy use and the production aspects and impacts of any waste of materials used during the refurbishment process;
  - The transportation of the component and ancillary materials used for refurbishment, including production aspects and impacts of any losses of materials damaged during transportation;
  - The end-of-life processes of any waste from transportation and the refurbishment process, including any part of the component and ancillary materials removed

<u>B6-B7 use stage information modules related to the operation of the building:</u>

- **B6) Energy use to operate building integrated technical systems:**
  The boundary of this module shall include energy use during the operation of the product (the integrated building technical system), together with its associated environmental aspects and impacts including processing and transportation of any waste arising on site from the use of energy.

  Integrated building technical systems are installed technical equipment supporting operation of a building. This includes technical buildings systems for heating, cooling, ventilation, lighting, domestic hot water and other

systems for sanitation, security, fire safety, internal transport and building automation and control and IT communications.[3]

Aspects related to the production, transportation and installation of equipment required to supply energy to the building shall be assigned to modules A1-A5. Energy use during maintenance, repair, replacement or refurbishment activities for the equipment shall be assigned to modules B2-B5. Aspects related to the waste processing and final disposal of rquipment shall be assigned to modules C1-C4.

- **B7) Operational water use by building integrated technical systems:**
  The module covers the period from the handover of the building to when the building is deconstructed or demolished.
  The boundary of this module shall include water use during the operation of the product (the integrated building technical system), together with its associated environmental aspects and impacts considering the life cycle of water including production and transportation and waste water treatment.

  Integrated building technical systems are installed technical equipment supporting operation of a building. This includes technical buildings systems for heating, cooling, ventilation, humidification, domestic hot water and other systems for sanitation, security, fire safety, internal transport.

- **C1) Deconstruction, demolition:**
  Deconstruction includes dismantling or demolition of the product from the construction, including initial on-site sorting of the materials.

- **C2) Transport:**
  Transportation of the discarded product accounts for part of the waste processing, e.g. to a recycling site and transportation of waste e.g. to final sorting yard or disposal (see “polluter pays principle” in section 6.5.5).

- **C3) Waste processing:**
  Waste processing includes collection of waste fractions from the deconstruction and waste processing of material flows intended for reuse, recycling and energy recovery. Materials for recycling or energy recovery processing shall be modelled as the elementary technosphere flows in the inventory, see section 6.5.5 and reported in the EPD. Materials for energy recovery are identified based on the efficiency of energy recovery with a rate higher than 60 % without prejudice to existing legislation. Materials from which energy is recovered with an efficiency rate below 60% are not considered materials for energy recovery (but incineration).

- **C4) Disposal:**
  Waste disposal including physical pre-treatment and management of the disposal site. Emissions from waste disposal are considered part of the product system under study and therefore part of this module, according to the “polluter pays principle”.

6.4 OTHER ENVIRONMENTAL INFORMATION

As one option for other environmental information it is possible to report on recyclability potentials.

- **D) Recyclability potentials:**
  The information in module D may contain technical information as well as LCA result from post-consumer recycling, i.e. environmental benefits or loads resulting from reusable products, recyclable materials and/or useful energy carriers leaving a product system e.g. as secondary materials or fuels. Avoided impacts from co-products from module A to C shall not be included in Module D

  In module D the net impacts are calculated as follows:

[3] Guidance on the selection of standards to calculate operational energy use of technical building systems can be obtained from CEN/TR 15615, *Explanation of the general relationship between various European standards and the Energy Performance of Buildings Directive (EPBD) – Umbrella Document.*

- By adding all output flows of a secondary material or fuel and subtracting all input flows of this secondary material or fuel from each sub-module first (e.g. B1-B5, C1-C4, etc.), then from the modules (e.g. B, C), and finally from the total product system thus arriving at net output flows of secondary material or fuel from the product system;
- By adding the impacts connected to the recycling or recovery processes from beyond the system boundary (after the end-of-waste state) up to the point of functional equivalence where the secondary material or energy substitutes primary production and subtracting the impacts resulting from the substituted production of the product or substituted generation of energy from primary sources;
- By applying a justified value-correction factor to reflect the difference in functional equivalence where the output flow does not reach the functional equivalence of the substituting process.

In module D substitution effects are calculated only for the resulting net output flow.

The amount of secondary material output, which is for all practical purposes able to replace one to one the input of secondary material as closed loop, is allocated to the product system under study and not to module D.

6.5 GENERAL INVENTORY METHODOLOGY

6.5.1 GEOGRAPHICAL BOUNDARIES

The data for the core module shall be representative for the actual production processes and representative for the site/region where the respective process is taking place.

6.5.2 TIME BOUNDARIES

Data shall be based on data that represent the current situation. In case the actual prefabricated buildings fleet is composed by several products (e.g. different versions of the same product), data shall refer to the currently produced model.

6.5.3 BOUNDARIES TO NATURE

System boundaries to and from nature are jointly described by so-called elementary flows. The inclusion of resource flows from nature to the technosphere corresponds to resource use and explorative impact, and on the output side emissions and resource consumption. In an ideal LCA, all flows studied shall be traceable to a natural recipient. A flow that cannot be traced back to a natural recipient is regulated by data quality requirements see section 6.6.

Waste to landfills is modelled to achieve elementary flows in a foreseeable time perspective.

6.5.4 SYSTEM BOUNDARIES FOR MANUFACTURING OF EQUIPMENT AND FOR EMPLOYEES

The following system boundaries are applied on manufacturing equipment and employees:

- Environmental impact from infrastructure, construction, production equipment, and tools that are not directly consumed in the production process are not accounted for in the LCI.
- Personnel-related impacts, such as transportation to and from work, are also not accounted for in the LCI.

Note: The system boundaries on manufacturing of equipment and for employees are *not* regarded as limiting the scope of the inventory or as an incomplete inventory (i.e., a cut-off).

6.5.5 BOUNDARIES TO OTHER PRODUCT LIFE CYCLES

Allocation of recycled material, also known as open loop recycling, is reported in the inventory as an input or output technosphere flow when such materials leave or enter the specific product system. Therefore, a system boundary between the product's systems in a material recycling cascade has to be defined between individual sub-processes.

When a product is discarded and its original function is lost, it can be processed further in a waste management system. Those parts of the initial product system that are utilised in a new product will be accounted for as material recycling in the LCI (as a flow to technosphere). The secondary user of recycled material will account for the use of recycled material (as a flow from technosphere).

The exact boundary settings between the first and the next product systems are defined by the *willingness to pay* for the recycled material. This implies that from the moment the user of a secondary material pays for the material, this (secondary) product system will also be responsible for the environmental burden from that point on. This principle is referred to in the International EPD system as the *Polluter-Pay (PP) allocation method.*

Consequently, if there is an inflow of recycled material to the production system, the recycling process and the transportation from the recycling process to where the material is used shall be included. If there is an outflow of material to recycling, the transportation of the material to a sorting facility/recycling process shall be included. The material intended for recycling is then an outflow from the production system.

6.6 CUT OFF RULES

Life Cycle Inventory data for a minimum of 99% of total inflows to the upstream and core module shall be included, accounted as GWP, energy consumption or mass. Inflows not included in the LCA shall be documented in the EPD. Data gap in included stages in the downs stream module shall be reported in the EPD including an evaluation of its significance.

6.7 ALLOCATION RULES

In a process step where more than one type of product is generated, it is necessary to allocate the environmental stressors (inputs and outputs) from the process to the different products (functional outputs) in order to get product-based inventory data instead of process-based data. An allocation problem also occurs for multi-input processes.

In an allocation procedure, the sum of the allocated inputs and outputs to the products shall be equal to the unallocated inputs and outputs of the unit process.

The following stepwise allocation principles shall be applied for multi-input/output allocations:

- the initial allocation step includes dividing up the system sub-processes and collecting the input and output data related to these sub-processes.
- the first (preferably) allocation procedure step for each sub-process is to partition the inputs and outputs of the system in to their different products in a way that reflects the underlying physical relationships between them.
- the second (worst case) allocation procedure step is needed when physical relationship alone cannot be established or used as the basis for allocation. In this case, the remaining environmental inputs and outputs from a sub-process must be allocated between the products in a way that reflects other relationships between them, such as the economic value of the products.

These allocation principles are described below:

0) INITIAL ALLOCATION STEP

Before an allocation can be performed, the product system must first be subdivided into sub-processes. To simplify the initial allocation step, we introduce system boundaries indicating where a further allocation is needed. This routine defines the different sub-processes needed in the product-related inventory. A sub-process system's boundary appears

- each time a product is generated and leaves the specific analysed product system,
- each time a waste flow appears and leaves the specific analysed product system,

- when product flows are treated in various ways in a process, or
- when a material recycling loop occurs outside the own process step.

In the last case, when a material recycling loop occurs outside the own sub-process step, such systems can be regarded in a steady state and thereafter allocated4. The product system is now subdivided into sub-processes, creating the base for the next allocation step.

1) FIRST ALLOCATION PROCEDURE

The first allocation procedure should be performed so that it reflects the way in which the inputs and outputs are changed by quantitative changes in the products (or functions) delivered by the system. This means that the allocation shall be based on the way in which resource consumption and emissions change, following quantitative modifications.

Some common allocation cases and how these should be applied according to the general allocation procedure are described below. The following products or functional inputs/outputs from a sub-process have been identified: services, goods, and energy (subdivided into electricity and heat, where convenient). The following allocation procedures shall be performed for sub-process allocations on goods, energy and services.

1.1) MULTI-OUTPUT

1.1.1) Goods

A multi-output sub-process delivering goods that are treated equally in the specific sub-process shall be allocated based on the inherent physical property of the different products, such as mass. If these goods are treated differently in the sub-process, the specific sub-process-related physical causality should be taken into account. For example, different products are covered by different amounts of paint, or different raw material fractions are dried differently.

1.1.2) Energy, including co-production of heat and electricity

In a pure energy generation process where either heat or electricity is produced, allocation should be performed on the basis of the inherent energy contents of the produced energy-wares. In the case of combined heat and power production, a distribution based on the best efficiency for the (potential) separate generation of electricity or heat shall be accounted for[5]. For illustrative examples and generic allocation efficiency factors, see a copy in Annex A[6] or if check for a current update.

1.1.3) Co-produced goods and energy

In the case of co-production of goods and energy, an allocation can be 'virtually avoided' by performing a limited system expansion around the sub-process. In order to do this, the real sub-process is divided in to two (or more) virtual sub-processes, where the environmental stressors (resource use, resource consumption and emissions) are distributed according to realistic efficiency factors, provided that the energy output was produced alone with the actual process inputs. For illustrative examples see Figure 2, and for generic allocation efficiency factors, see Annex A[7] or if check for a current update.

[4] See guidance in Erlandsson (1996).

[5] This allocation rule follows the global PCR on "Electricity, Steam and Hot and Cold Water Generation and Distribution" (PCR CPC 17, 2007-10-31).

[6] These generic defaults are accepted as specific data. However, actual site-specific data may be used if they can be verified.

[7] These generic defaults are accepted as specific data. However, actual site-specific data may be used if they can be verified.

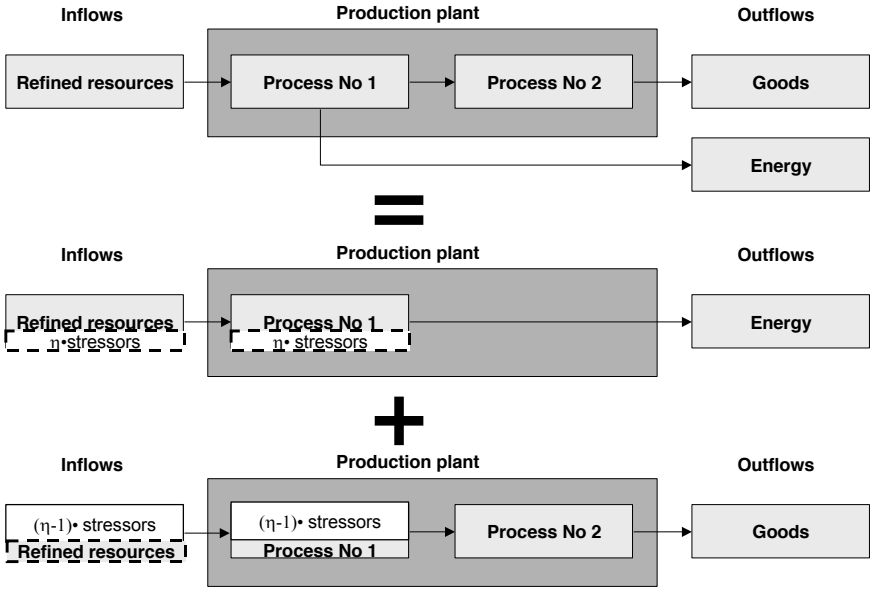

Figure 2:'Virtually avoided' co-production of goods and energy by performing a limited system expansion around the sub-process.

1.1.4) Co-produced goods, heat and electricity
The multi-output allocation of environmental stressors from a sub-process that delivers heat, electricity and goods at the same time can be handled via a stepwise allocation procedure based on the above-mentioned allocation procedures (see Figure 3).

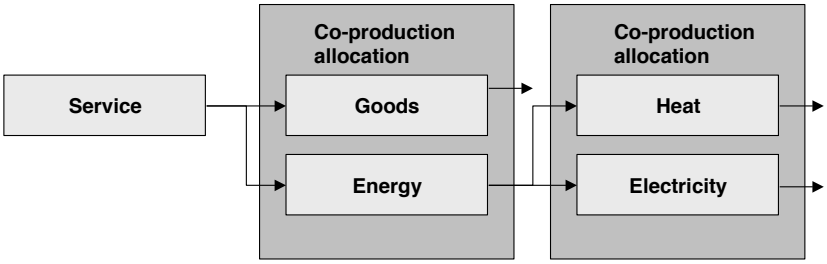

Figure 3: Elements of a stepwise allocation procedure for a service.

This stepwise procedure starts by partitioning the delivered goods and energy and then further partitioning between heat and electricity. It is then possible to allocate the environmental stressors to the individual functional outputs from the sub-process, i.e., goods, heat and electricity respectively.

1.1.5) Multi-output services
Services (e.g., transport) can in general be handled as a sub-process that requires both goods and energy resources. This implies that a multi-output service can be handled with the allocation procedures given above, once the physical relationships between the inputs are identified.

1.2) MULTI-INPUT SERVICES
A service with a multi-input sub-process generates no physical products. Instead, an allocation must be performed for the upstream product systems that facilitate the service sub-process. For such multi-input services, the allocation shall be based on the physical relationships of the inputs (such as waste incineration or landfill) typically described by the stoichiometry of the reaction. If allocation based on the physical composition and stoichiometry of the inputs is not possible, another allocation principle based on physical and chemical properties should be applied.

1.3) MULTI-INPUT/OUTPUT SERVICES
The multi-input/output allocation of a sub-process service constitutes, by definition, a system boundary between two or more product systems, including open loop recycling. To follow the generic allocation rule by partition the inputs and outputs of the system in to their different products in a way that reflects the underlying physical relationships between them, in the case of material recycling, it means that the burden of the resource consumption will always be carried by the outputs. This means that the *resource consumption and emissions from for instance a waste incineration* are allocated to the *downstream* product systems (see Figure 4), since these products' characteristics are determined by the waste incineration sub-process step in which the product is generated from. All *other processes* will be allocated to the *upstream* product system (see Figure 4). The allocation specification here is applicable in combination with the multi-input/output allocation rules given above.

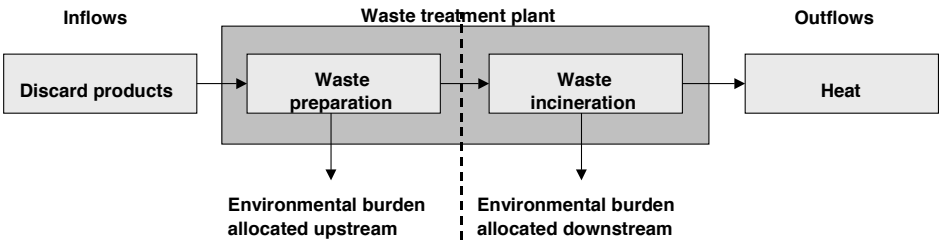

Figure 4 Multi-input/output allocation exemplified by a waste treatment plant with energy recovery, where both the inflows and outflows have positive market values.

Note: For this kind of allocation procedure, the recycling company pays for the discarded products that are used in the production of the outflows, which is sold on the market. Materials for energy recovery are identified based on the efficiency of energy recovery with a rate higher than 60 % without prejudice to existing legislation. These specifications, therefore, specifies the *polluters pay* (PP) allocation principle, as described in section A.7.1 in the Supporting Annexes to the GPI.

Note: The consequence of this allocation rule is that no detailed future scenario has to be defined concerning the secondary user in the recycling cascade, in order to describe the environmental performance of the initial product, i.e. the building product.[8]

Example: This allocation rule is relevant for a waste combustion plant, see Figure 4. The distributions of the plant's emissions and resource consumption are allocated to the delivered heat and electricity. Meanwhile, the waste handling before it entered the combustion step will be allocated to the upstream product systems.

2) SECOND ALLOCATION PROCEDURE (WORST CASE)

Another situation may occur where no information of the actual sub-process is available, often due to confidentiality issues. In such a case, the entire plant must be regarded as a black box. For this reason, an allocation for the entire product system and the overall representative environmental data shall be made according to the following procedure:

- Perform an allocation based on physical properties or aspects such as product content (for resource use), or specific melting energy by assuming generic energy losses (for energy use).
- For the remaining environmental impacts that cannot be allocated to the products according to the above procedure, economically-based allocation parameters may be used for allocation.

This allocation procedure shall be used with caution and only for the main products from the plant.

6.8 DATA QUALITY RULES

6.8.1 SPECIFIC DATA

If possible, specific data (often called site specific data) gathered from the sites where specific processes are carried out, shall be used for the core module and, in case of a cradle to grave EPD, also for the downstream module. The requirement for specific data also includes actual product weights, amounts of raw materials used and amounts of waste, etc.

If specific data are not available the general rule is to use other conservative data representative for the actual process and use the same methodology that is applied in this PCR.

Specific data for the generation of electricity bought shall be used if possible. The data should be verifiable by certificate of its origin, invoice or similar. If specific data are not available or if the purchased electricity is not specified for some parts, the electricity net mix used shall be for those parts, approximated as the official sold electricity mix in the country of manufacture, or region it is bought on. In the latter case it requires that the market represents a physical linked market grid that may account for several countries (like NordPool, except Iceland).

6.8.2 RULES FOR GENERIC DATA

For allowing the use of selected generic data, a number of pre-set characteristics must be fulfilled and demonstrated:

- Representativeness of the geographical area should adhere to "Data deriving from areas with the same legislative framework and the same energetic mix,"

[8] Please note that the allocation procedure on waste incineration in as described in section A.7.1 in the Supporting Annexes to the GPI, only is valid if the efficiency of energy recovery are lower than 60 %.

- Technological equivalence adhere to “Data deriving from the same chemical and physical processes or at least the same technology coverage (nature of the technology mix, e.g. weighted average of the actual process mix, best available technology or worst operating unit),”
- Boundaries towards nature adhere to “Data shall report all the quantitative information (resources, solid, liquid, gaseous emissions; etc.) necessary for the EPD,” and
- Boundaries towards technical systems adhere to “The boundaries of the considered life cycle stage shall be equivalent."

Table 4: Summary of data quality that shall be used for the EPD.

GPI module	Asset life cycle stages	Information module	Type of data to be used	
			Cradle to gate	Cradle to grave
UPSTREAM	A1) RAW MATERIAL SUPPLY	A1-3) MANUFACTURING PHASE	Specific	Specific
Core	A2) Transport			
	A3) Manufacturing			
DOWN-STREAM	A4) TRANSPORT	A4-5) MANUFACTURING PHASE	Specific	Specific
	A5) Installation process			
	B1) Material emission from usage*	B) Usage stage	N/A (excluded)	Specific
	B2) Maintenance			
	B3) Repair			
	B4) Replacement			
	B5) Refurbishment			
	B6) Use of energy			
	B7) Use of water			
	C1) Deconstruction, demolition	C) End of life	N/A (excluded)	Generic
	C2) Transport			
	C3) Waste processing			
	C4) Disposal			
Other environmental information	D) Reuse, recycle or recovery	D) Recyclability potentials	Generic	Generic

7 UPSTREAM MODULE

The processes listed in section 6.1 shall be included.

7.1 RAW MATERIAL – STAGE A1

If generic data are used for raw material acquiring it shall be stated in the EPD for which materials this is valid.

The type of electricity energy mix shall be documented in the EPD if it contributes to the overall impact stage A1 to A5 more than 30% (based on energy use).

8 CORE MODULE

The processes listed in section 6.2 shall be included

8.1 MANUFACTURING – LIFE CYCLE STAGE A3

Data used for the inventory shall not be older than three years and based on a yearly basis (typically the latest year). If it is normal that the environmental load fluctuates an average for these three years shall be used.

If specific data for parts of the core process is missing other generic data may be used and documented. The environmental impact of these data or processes where the other generic data are used must not exceed 10% of the overall environmental impact from the product system, accounted as GWP or energy consumption.

The electricity mix of energy shall be documented in the EPD. Note that the electricity generation process itself belongs to the upstream module.

9 DOWNSTREAM MODULE

The processes listed in section 6.3 may be included, according to rules given in section 6, Table 2.

9.1 TRANSPORTATION – STAGE A4

If the EPD shall include the transport from manufacture to an average converter, merchant or distribution platform, the type of transport and transport distance should be representative to actual conditions on the market for which the EPD is valid. The assign markets for the transportation figures shall be declared in the EPD. If relevant, several transportation data sets may be used and reported.

9.2 INSTALLATION – STAGE A5

If additional technical information is provided in the EPD for installation of the prefabricated building, the following information (but not limited to) shall be provided to specify the product's installation LCA scenarios, or to support development of such scenarios describing the product's installation at the level of the building assessment. Such parameters are expressed per functional unit:

- Ancillary materials for installation, specified by material [kg or other units as appropriate]
- Water use in [m^3]
- Other resource use [kg]
- Quantitative description of energy type and consumption during the installation process [kWh or MJ]
- Wastage of materials on the building site before waste processing, generated by the product's installation, specified by type [kg]
- Output materials, specified by type, as result of waste processing at the building site e.g. of collection for recycling, for energy recovery, disposal (specified by route) [kg]
- Direct emissions from installation to ambient air, soil and water [kg].

9.3 USAGE – STAGE B1-5

The usage stage covers Maintenance – B2, Repair – B3, Replacement – B4, Refurbishment – B4, and moreover if relevant (in a cradle-to-grave EDP); Operational energy use – B6, and Operational water use – B7. It is recognised that it may be difficult to separate all use stage processes and the connected aspects and impacts into these separate

modules. However any deviation from the categorisation of aspects and impacts into modules B1-B5 and B6-B7 shall be transparently reported and justified.

Reference service life (RSL)

A reference service life (RSL) may be used, where relevant, for the usage stage and is mandatory if a full life cycle is covered (see Table 2). The basis for handling of durability aspects is found in standard ISO 15686-8. This standard is part of a family of standards applicable for service life planning (ISO 15686-1 to -10). ISO/DTR 15686-4 deals with reporting of service life planning results by using IFC as specification (that is not fulfilled here).

The RSL or the estimated service life (ESL) is understood as the period of time after (typically planed) maintenance when the prefabricated building is replaced or the building element or the construction it is part of will be rebuild/renovated/restored. The replacement is here limited to cover service life caused by damage such as a break down or performance failure occurs (typically not planned) that requires a reparation activity to meet its required functions. Repair activates are typically related to parts of the building that have an error frequency. The nomenclature utilised in relation to the RSL and the related life cycle steps in ISO 21930 are listed below:

ISO 21930

- Maintenance — includes typically planned activities and typically results in a refurbishment
- Refurbishment maintenance) — also include rebuilding when the desired performance cannot be met (by
- Repair — repair is based on errors that are typically not planned or foreseen
- Replacement — a replacement is related to a repair cycle or a total break down

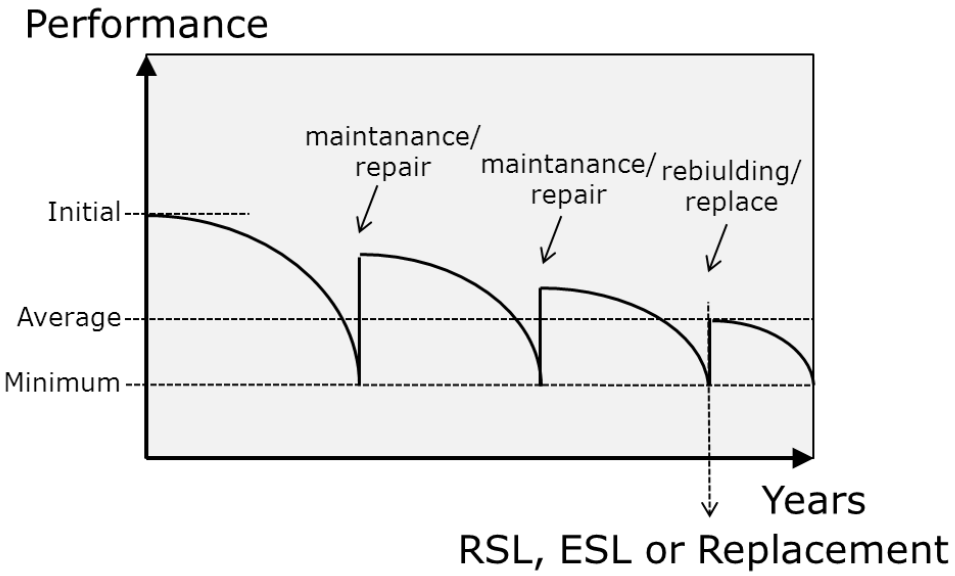

Figure 5:Relation between different service life categories, performance and maintenance respectively replace.

The relation between the service life categories RSL or ESL respective replacement is outlined in Figure 5. Besides the life cycle steps listed under the ‘Use stage’ (see Figure 2), ISO 21930 also includes a step named ‘Use’ as a subset. This subset, however, only handles environmental aspects and impacts arising from the building or its components as such during their normal usage, e.g. material emission of VOC to the indoor air etc.

A declared RSL shall be related to the declared functional technical performance and to any maintenance or repair necessary to provide the declared performance during the declared RSL or provided Estimated Service Life (ESL). The description of the RSL may be based on data collected as average data or at the beginning or end of the service life. The reference conditions for achieving the declared technical and functional performance and the declared RSL shall include the reference service life data as described below, where such parameters are expressed per functional or declared unit, further explained in ISO 15686-1, -2, -7 and -8:

- Declared product properties (at the gate) and finishes, etc., units as appropriate
- Design application parameters (if instructed by the manufacturer), including the references to the appropriate practices, units as appropriate
- An assumed quality of work, when installed in accordance with the manufacturer's instructions, units as appropriate
- Outdoor environment, (for outdoor applications), e.g. weathering, pollutants, UV and wind exposure, building orientation, shading, temperature, units as appropriate
- Indoor environment (for indoor applications), e.g. temperature, moisture, chemical exposure, units as appropriate
- Usage conditions, e.g. frequency of use, mechanical exposure, units as appropriate
- Maintenance e.g. required frequency, type and quality and replacement of replaceable components, units as appropriate

If additional technical information is provided in the EPD for products requiring maintenance, repair, replacement, refurbishment, the following information (but not limited to), shall be provided to specify the product's usage LCA scenarios, or to support development of such scenarios describing the product's usage at the level of the building assessment. Such parameters are expressed per functional or declared unit (B1-7):

B1 Material emission from usage

Module B1 accounts for material emission from normal use of the installed product in terms of any emissions to the environment (not covered by B2-B7). The module "Material emission from usage" covers environmental aspects and impacts arising from components of the building and installation works during the service life covering release of substances such as from the facade, roof, floor covering and other surfaces (interior or exterior) to indoor air, soil or water. This kind of information can be reported as part of the LCA and also reported as emissions under the EPD additional information heading on 'Release of dangerous substances during the use stage'. In this case information could also be given in relation to predefined emission realise classes[9]. In this cases information shall include

- Name of the classification system and the emission span and if appropriate the exact emission figure
- A statement if this emission is applicable for risk assessment, and if not what additional information or transformation that is required.

In the case that material emission is used and accounted for in the LCA, the following information shall be provided in the EPD:

- Essential information on material properties and information from leaching or emission test or likewise
- A description of the scenario used for calculation of emissions (mass flow to recipients)

B2 Maintenance

- Maintenance process, description or source where description can be found
- Maintenance cycle [number per RSL or year]
- Ancillary materials for maintenance, e.g. cleaning agent, specify materials [kg/cycle]
- Wastage material during maintenance, specify materials [kg]
- Net fresh water consumption during maintenance [m^3]
- Energy input during maintenance, e.g. vacuum cleaning and energy carrier type e.g electricity, and amount, if applicable and relevant [kWh]

B3 Repair

[9] In EC a number of such classes are supposed to be defined in relation to the forthcoming CE labelling according to the Construction Product Regulation (CPR), but are not limited to this system.

- Repair process, description or source where description can be found
- Inspection process, description or source where description can be found
- Repair cycle [number per RSL or year]
- Ancillary materials, e.g. lubricant, specify materials [m^3 or kg/cycle]
- Wastage material during repair, specify materials [kg]
- Net fresh water consumption during repair [m3]
- Energy input during repair, e.g. crane activity and energy carrier type e.g. electricity, and amount [kWh/RSL, kWh/cycle]

B4 Replacement

- Replacement cycle [number per RSL or year]
- Energy input during replacement, e.g. machineries activity and energy carrier type e.g. electricity and amount if applicable and relevant [kWh]
- Exchange of worn parts during the product's life cycle, e.g. zinc galvanised steel sheet, specify materials [kg]

B5 Refurbishment

- Refurbishment process, description or source where description can be found
- Refurbishment cycle [number per RSL or year]
- Energy input during refurbishment, e.g. machineries activity and energy carrier type e.g. electricity, and amount if applicable and relevant [kWh]
- Material input for refurbishment, e.g. lubricant, specify materials [m^3 or kg/cycle]
- Wastage material during refurbishment, specify materials [kg]
- Further assumptions for scenario development, e.g. frequency and time period of use, number of occupants, units as appropriate.

Operational energy use – B6 and Operational water use – B7

The information about the life cycle stages operational energy use or water use shall be referred to as information module B6 respectively B7.

If additional technical information is provided in the EPD for building integrated technical systems using energy or water related to the operation of the building, the following information shall be provided to specify the scenarios or to support the development of the use of energy and use of water scenarios at the building level expressed per functional or declared unit:

- Ancillary materials specified by material kg or units as appropriate
- Net fresh water consumption [m^3]
- Type of energy carrier, (e.g. electricity, natural gas, district heating [kWh]
- Power output of equipment [kW]
- Characteristic performance (e.g. energy efficiency, emissions, variation of performance with capacity utilisation etc, units as appropriate
- Further assumptions for scenario development, e.g. frequency and time period of use, number or occupants, units as appropriate.

9.4 END OF LIFE – STAGE C1-4

The usage stage covers Deconstruction, demolition – C1, Transport – C2, Waste processing– C3, Disposal – C4

Scenarios shall only model processes e.g. recycling systems that have been proven to be economically and technically viable. If additional technical information is provided in the EPD about end-of-life processes, the following information shall be provided for all construction products to specify the end-of-life scenarios used or to support development of the end-of-life scenarios at the building level, expressed per functional or declared unit:

- Collection process related to deconstruction/demolition, specified by type;
  - kg collected separately
  - kg collected with mixed construction waste
- Recovery system related to waste processing, specified by type;
  - kg for re-use
  - kg for recycling
  - kg for energy recovery
- Disposal related to waste processing, specified by type;
  - kg product or material for final deposition
- Other significant assumptions for scenario development e.g.,
  - transportation, units as appropriate

10 CONTENT OF THE EPD

10.1 PRODUCT RELATED INFORMATION

10.1.1 SPECIFICATION OF THE MANUFACTURING COMPANY

The EPD shall include the following information about the manufacturing company (mandatory information):

- Name of the manufacturing company
- Production site(s)
- Issuer and contacts
- Information on environmental management system

It is voluntary to include other information about the manufacturing company, such as:

- Specific aspects regarding the production
- Environmental policy
- Manufacturer’s logotype

10.1.2 SPECIFICATION OF THE PRODUCT

The EPD shall include a description of the product, its intended use and its classification number according to the UN CPC classification system (see http://unstats.un.org) if defined.

Relevant functional properties of the product may be included as part of the specification of the product or in relation to the declared unit.

10.1.3 FUNCTIONAL UNIT

The used functional unit shall be reported and explained if relevant, see section 3.

10.1.4 CONTENT OF MATERIALS AND CHEMICAL SUBSTANCES

A content declaration shall be included, see section 4.

10.2 ENVIRONMENTAL PERFORMANCE-RELATED INFORMATION

10.2.1 ENVIRONMENTAL PERFORMANCE DECLARATION - MINIMUM SET OF PARAMETERS FROM THE LCA STUDY, REPORTED PER FUNCTIONAL UNIT

In some cases certain modules may not be relevant to the environmental performance of a product. In such cases the irrelevant module shall be declared as “not relevant” or impossible to include if not construction context is given. Such a declaration shall not be regarded as an indicator result of zero.

10.2.2 RULES FOR DECLARING INFORMATION PER MODULE DERIVED FROM LCA

The environmental information of an EPD covering all life cycle stages (“Cradle to grave”) shall be subdivided into the information module groups A1-A3, B1-B5, B6-B7, C1-C4, and module D.

Module D may be addressed in the EPD and shall be reported under the EPD heading “Other environmental information”.

10.2.3 AGGREGATION OF INFORMATION MODULES

Module D shall not be aggregated with A, B or C modules.

10.2.4 POTENTIAL ENVIRONMENTAL IMPACT

The environmental impact per declared unit for the following environmental impact categories shall be reported in the EPD, divided into core, upstream and downstream module:

- Emissions and removals of greenhouse gases (expressed in global warming potential, GWP in a 100 year perspective)
- Emissions of ozone-depleting gases (expressed as the sum of ozone-depleting potential in CFC-11-equivalents, 20 years)
- Emissions of acidification gases (expressed as the sum of acidification potential expresses in SO_2 equivalents)
- Emissions of gases that contribute to the creation of ground level ozone (expressed as the sum of ozone-creating potential, C_2H_4 equivalents)
- Emissions of substances to water contributing to oxygen depletion (expressed as PO_4^{3-} equivalents).
- Depletion of abiotic resources – elements (expressed as kg antimony (Sb) equivalents)
- Depletion of abiotic resources – fossil fuels (expressed as MJ, net calorific value).

The reference characterisation factors are provided by the International EPD® System (www.environdec.com).

For Depletion of abiotic resources assessment, CML 2002[10] shall be used.

[10] Guinèe, J.B. et al., 2002. Handbook of Life Cicle Assessment: Operational Guide to the ISO Standards. Series: Eco-efficiency in industry and science. Kluwer Academic Publishers. Dordrecht

10.2.5 USE OF NATURAL RESOURCES

The collected raw data for resources consumption from the life cycle inventory work should be elaborated and reported under the following indicators (Table 5).

Table 5: Use of natural resources

Parameter	Unit (expressed per functional unit)
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ, net calorific value
Use of renewable primary energy resources used as raw materials	MJ, net calorific value
Total use of renewable primary energy resources (primary energy and primary and primary energy resources used as raw materials)	MJ, net calorific value
Use of non renewable primary energy excluding renewable primary energy resources used as raw materials	MJ, net calorific value
Use of non renewable primary energy resources used as raw materials	MJ, net calorific value
Total use of non renewable primary energy resources (primary energy and primary and primary energy resources used as raw materials)	MJ, net calorific value
Renewable resources without calorific value (such air)	kg
Non renewable resoruces without calorific value	kg
Use of secondary material	kg
Use of renewable secondary fuels	MJ, net calorific value
Use of non renewable secondary fuels	MJ, net calorific value
Recovered energy flows (such termal)	MJ, net calorific value
Net use of fresh water	m^3
Direct amount of water used by the core process	m^3

In order to identify the input part of renewable/non renewable primary energy used as an energy carrier and not used as raw materials, the parameter “use of renewable/non renewable primary energy excluding renewable/non renewable primary energy resources used as raw materials” is considered and can be calculated as the difference between the total input of primary energy and the input of energy resources used as raw materials.

Following, further details on the resource declaration are shown:

- All parameters shall not be aggregated but reported separately. Resources which contribute for less than 5% in each category shall be included in the resources list as “other”;
- Nuclear power shall be reported among the non-renewable resources without calorific value as kg of uranium calculated by converting the thermal energy (MJ) considering a reactor of III generation with an efficiency of 33%
- Data have to be reported using the SI units. Reasonable multiples could be adopted for a better understanding.
- The energy content into some products (such paper or plastic based products) it is useful information for the end of life management. For this reason the “energy content of product” shall be declared in MJ : its estimation shall be made considering the gross calorific value of the product. Only the energy that is suitable for an eventual energy recovery at the end of life shall be considered (energy content of steel due to its carbon content for example shall not be considered since it is not practically recoverable).

10.2.6 OTHER INDICATORS

The following indicators shall also be reported in the EPD per functional/declared unit [kg]:

Output flows:

- Components for re-use
- Materials for recycling
- Materials for energy recovery
- Exported energy [expressed as MJ per energy carrier]
- Hazardous waste (as defined by regional directives) disposed
- Non-hazardous waste disposed
- Radioactive waste disposed/stored

10.2.7 RELEASE OF DANGEROUS SUBSTANCES DURING THE USE STAGE

Information shall be provided for products release of dangerous substances to indoor air, soil and water during the use stage according to standards on measurement of release of regulated dangerous substances from the product using harmonised testing methods (e.g. according to the provisions of the respective Technical Committees for European product standards, when available). If such standards on measurement of release of regulated dangerous substances are not available, the EPD can lack this information. In the case that the product is subject for classification of emission realise this information and classification result should also be given see B1 under section 6.3.

10.3 ADDITIONAL ENVIRONMENTAL INFORMATION

It is required to include the following information in the EPD if the specific life cycle stage is included in the EPD:

- Module A4-5
  - See listed information requirements to include in the EPD in section 9.1-9.2.
- Module B1-B5
  - See listed information requirements to include in the EPD in section 9.3.
- Module C1-C4
  - See listed information requirements to include in the EPD in section 9.3.
- Module D
  - Result from life cycle stages beyond the initial product's LCA i.e. reuse, recycle or recovery shall, if it is included in the EPD be reported under the sub-heading 'Module D - Recyclability potentials'. Supplementary information that describes scenarios etc shall be given in the EPD.

An EPD may include additional environmental information not derived from the LCA-based calculations. In general, this part of the EPD describing additional environmental information may include various issues e.g. on specific information about the use and end-of-life, which has a special value covering e.g.:

- instruction for a proper use of the product, e.g. to minimise the energy or water consumption or to improve the durability of the product
- instructions for a proper maintenance and service of the product
- information on key parts of the product determining its durability
- information on recycling including e.g. suitable procedures for recycling the entire product or selected parts and the potential environmental benefits gained

- information on a suitable method of reuse of the product (or parts of the products) and procedures for disposal as waste at the end of its life cycle, and
- information regarding disposal of the product or inherent materials, and any other information considered necessary to minimise the product's end-of-life impacts.

Additional environmental information can also include a more detailed description of an organisation´s overall environmental work such as:

- the existence of a quality or environmental management system or any type of organised environmental activity,
- any activity related to supply chain management, social responsibility (SR) etc., and
- information on where interested parties may find more details about the organisation´s environmental work.

10.4 PROGRAMME RELATED INFORMATION AND MANDATORY STATENMENTS

The programme related part of the EPD shall include a set of mandatory statements and information listed below.

10.4.1 DIFFERENCES VERSUS PREVIOUS VERSIONS OF THE EPD

If relevant, specify the main causes of changes in the environmental performance in the EPD compared with previous EPD versions (described changes in brief if significant).

10.4.2 COMPARISONS OF EPDS WITHIN THIS PRODUCT CATEGORY

To be able to compare EPDs within this product category, they have to be based on this particular PCR. The user of the EPD information should be made aware of this by the inclusion of this statement in the EPD:

"EPDs from different programmes may not be comparable"

10.4.3 VERIFICATION AND REGISTRATION

The EPD shall give the following information about the verification process:

EPD Programme:	The International EPD® System. For more information — www.environdec.com
Registration no:	*Date*
Date of publication:	*Date*
EPD validity:	*Date*
EPD valid within the following geographical area:	*Specify relevant area, regions etc*
Generic PCR review conducted by *(if relevant)*:	*If a framework or so called generic PCR is based for the PCR work it shall be referred to here.*
PCR review conducted by:	*Name and organization of the chair, and information on how to contact the chair through the programme operator*
Independent verification of the declaration and data, according to ISO 14025:	*Internal, external or EPD process certificate, and if external name of the third party verifier.*
Accredited or approved by *(if*	*Name of the organisation*

relevant):	

10.4.4 REFERENCES

The EPD shall, if relevant, refer to:

- The underlying LCA
- The PCR used
- Other documents that verify and complement the EPD
- Instruction for recycling
- Programme instructions
- Sources of additional information

11 VALIDITY OF THE EPD

If changes in any of the environmental impacts are larger than ±5% the EPD shall be adjusted. Regardless, the EPD shall be reviewed every three years.

12 CHANGES IN THIS DOCUMENT

VERSION 1.0 2013-01-24

Original version.

ANNEX A – BASIS FOR ALLOCATION IN COMBINED HEAT AND ELECTRICITY PRODUCTION

The table below shows the facility parameters to be used in allocation for a number of different combined heat and power generation methods if new general accepted updated data is found.

Table A1:Facility parameters to be used in allocation for a number of different combined heat and power generation methods

Combined heat and power		**Alternative heat**	**Alternative electricity**
Fuel type	**Technology**	**Efficiency, heat** ηh **(%)**	**Efficiency, electricity** ηe **(%)**
Biofuel	Steam cycle, heat and power	90 %	38 %
	Steam cycle, heat and power, flue gas condensation	110 %	38 %
Waste	Steam cycle, heat and power,	90 %	35 %
	Steam cycle, heat and power, flue gas condensation	100 %	35 %
Black coal	Steam cycle, heat and power	90 %	46 %
Natural gas	Steam cycle, heat and power	90 %	47 %
	Steam cycle, heat and power flue gas condensation	105 %	47 %
	Combined cycle, heat and power	90 %	58 %
Oil	Steam cycle, heat and power	90 %	46 %