CONSTRUCTION PRODUCTS

PCR 2019:14
VERSION 1.3.4

VALID UNTIL: 2025-06-20

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1 INTRODUCTION

1.1 GENERAL

This document constitutes Product Category Rules (PCR) developed in the framework of the International EPD System: a programme for type III environmental declarations[1] according to ISO 14025:2006. Environmental Product Declarations (EPD) are voluntary documents for a company or organisation to present transparent information about the life cycle environmental impact for their goods or services.

The rules for the overall administration and operation of the programme are the General Programme Instructions, publicly available at www.environdec.com. A PCR complements the General Programme Instructions and the standards by providing specific rules, requirements and guidelines for developing an EPD for one or more specific product categories (see Figure 1). A PCR should enable different practitioners using the PCR to generate consistent results when assessing products of the same product category.

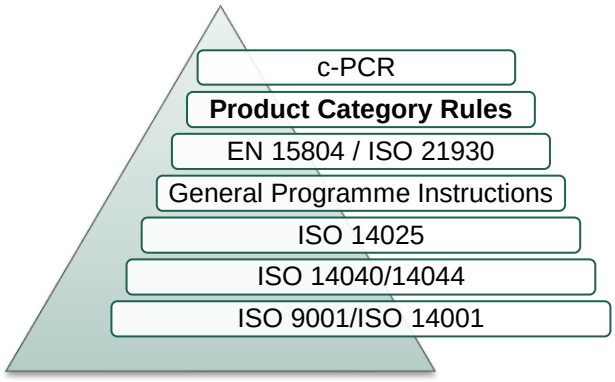

Figure 1 This PCR in relation to the hierarchy of standards and other documents.

Within the present PCR, the following terminology is adopted:

- The term “shall” is used to indicate what is obligatory.
- The term “should” is used to indicate a recommendation, rather than a requirement.
- The term “may” or “can” is used to indicate an option that is permissible

For the definition of terms used in the document, see the normative standards.

A PCR is valid for a pre-determined period of time to ensure that it is updated at regular intervals. The latest version of the PCR is available via www.environdec.com. Stakeholder feedback on PCRs is very much encouraged. Any comments on this PCR document may be given via the PCR Forum at www.environdec.com or sent directly to the PCR moderator during its development or during the period of validity.

Any references to this document should include the PCR registration number, name and version.

The programme operator maintains the copyright of the document to ensure that it is possible to publish, update when necessary, and available to all organisations to develop and register EPDs. Stakeholders participating in PCR development should be acknowledged in the final document and on the website.

[1] Type III environmental declarations in the International EPD® System are referred to as EPD, Environmental Product Declarations.

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1.2 ROLE OF THIS DOCUMENT AND COMPLEMENTARY PCRS

In the International EPD System, this main PCR for constructions products serves as the implementation of the European standard EN 15804:2012+A2:2019/AC:2021[2], and as a basis for the development of complementary PCRs (c-PCRs)[3].

This PCR shall be used together with EN 15804, and thus it does not repeat all rules and guidance in EN 15804. The PCR may be used together with ISO 21930:2017 if compliance with the latter standard is sought. See Section 1.4 and Section 1.5 for further information on how this PCR adds additional requirements and specifications compared to EN 15804, and how it aims to align with ISO 21930.

In the International EPD System, complementary PCRs (c-PCRs) may be adopted or developed for more specific product categories. If there is an applicable c-PCR for the product, it shall be used together with this PCR[4]. If more than one c-PCR is applicable, the EPD owner may choose to use any of them, but it is recommended to use the one that is more specific in scope in terms of product function. An alternative is to use, and verify the EPD towards, several applicable c-PCRs, as long as there are no conflicting requirements in the c-PCRs.

C-PCRs that still refer to version 3.01 of the GPI are applicable together with the present version of PCR 2019:14 (which is based on version 4.0 of the GPI).

This PCR allows for an EPD to be produced (see Figure 1 for an illustration) using

- this PCR only, or
- this PCR together with one or several c-PCRs available at www.environdec.com.

An EPD based only on this PCR shall use a declared unit (see Section 4.1), whereas an EPD based on this PCR together with a c-PCR may or shall use a functional unit if allowed or required, respectively, by the c-PCR. If a c-PCR is used, the EPD shall comply also with other requirements and specifications given in the c-PCR. If requirements in the PCR and the c-PCR differ, the requirements in the c-PCR take precedence over those in the PCR.

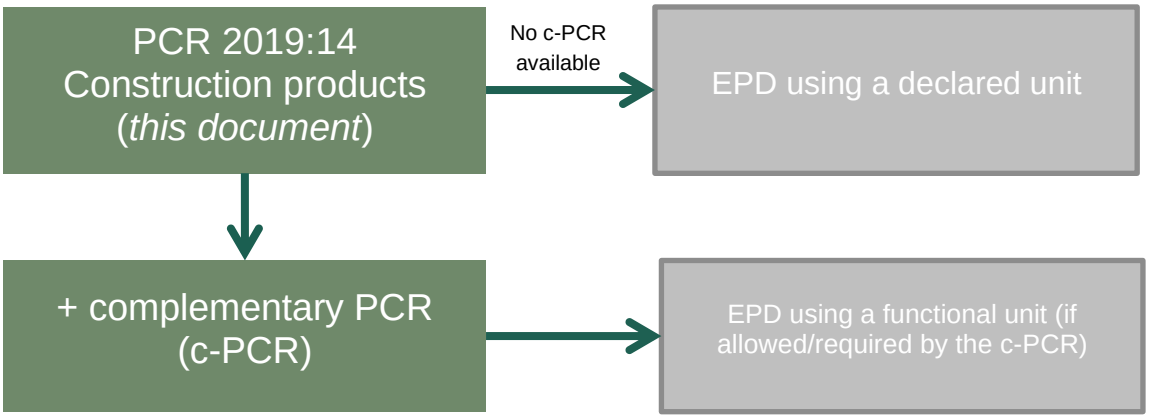

Figure 2 Overview of how this PCR document can be used directly, or together with a c-PCR, to develop an EPD. An EPD that uses a functional unit needs a c-PCR. An EPD based on a declared unit can be developed without a c-PCR.

1.3 DEVELOPMENT OF C-PCR

A complementary PCR (c-PCR) may be developed for a more specific category of construction products, for example cement or thermal insulation. Such a c-PCR should be the implementation of a standard from CEN Technical Committees, if available. Adoption of such CEN standards as c-PCRs are made by the Secretariat. If no such CEN standard is available, a c-PCR may be developed

[2] EN 15804:2012+A2:2019/AC:2021, Sustainability of construction works — Environmental product declarations – Core rules for the product category of construction products

[3] Over time, this PCR is intended to replace older stand-alone PCRs for construction products.

[4] When a c-PCR has been published, or made available, in the International EPD System, there is a 90 days transition period under which it is optional to use it. An EPD developer not using a c-PCR is recommended to check the PCR library when there is less than 90 days until the expected registration date of the EPD.

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within the framework of the International EPD System using the regular PCR development procedure. Read more at www.environdec.com.

A c-PCR should contain:

- general information, for example scope of the c-PCR, programme-related information and information about its development, and
- further specifications and additional requirements on LCA modelling and EPD content in relation to the main PCR (this document), for example regarding type(s) of EPD allowed, system boundaries, declared or functional unit, environmental performance indicators or additional information.

For the development of c-PCRs, the c-PCR template available at www.environdec.com shall be used.

All c-PCRs currently available or under development are displayed at www.environdec.com.

1.4 ADDITIONAL REQUIREMENTS COMPARED TO, AND SPECIFICATION OF, EN 15804

This PCR aims to provide a link between the rules in the General Programme Instructions (GPI) of the International EPD System, EN 15804:2012+A2.2019/AC:2021 and ISO 21930:2017. As such, the PCR introduces some requirements that are not found in EN 15804. These requirements are included in the below list and further described in subsequent sections. If an additional requirement or specification is missing in the below list, it is still valid.

- Additional requirements are introduced for an EPD of construction services (in contrast to goods) as outlined in ISO 21930:2017. For an EPD of construction services, inclusion of modules A4 and A5 is mandatory in addition to modules A1-A3
- Additional requirement that an EPD of type c, “cradle to grave and module D”, shall be based on a functional unit. In EN 15804, a declared unit may be used for this type of EPD. This PCR allows for the same type of EPD to be created, but the scope of the EPD shall be classified as an EPD type b, cradle to gate with options, modules A4-A5, modules B, modules C1–C4, and module D.
- Additional requirement that an EPD based on a functional unit shall use this PCR document together with a c-PCR available at www.environdec.com.
- Additional rules and specifications on EPDs of multiple products, by adding and specifying the rules of ISO 21930, see Section 2.2.2.1.
- Additional requirements on sector EPDs, see Section 2.2.2.2, and EPDs developed by traders, see Section 2.2.2.3.
- Additional requirements that an EPD describing a specific product shall be calculated using specific data for (at least) the processes for which the producer has operational control, i.e., module A3 for construction goods or modules A4-A5 for construction services. If the EPD owner is a trader, also module A4 is mandatory, see Section 2.2.2.3.
- Additional requirement of the EPD format, for example that an EPD shall specify its product category in accordance with the UN CPC classification system, if possible, and further alignments with the GPI of the International EPD System.
- The procedure for co-product allocation is further specified by merging specifications in ISO 21930 to the stepwise procedure in EN 15804, see Section 4.5.
- Additional clarifications and requirements on the modelling of infrastructure/capital goods and personnel activities compared to EN 15804 and ISO 21930, see Section 4.3.2.
- Additional requirements regarding transparency of the modelling of scrap, see Section 4.5.5.
- Additional requirements on the modelling of the generation of electricity, see Section 4.8.1.
- Additional requirement to report the climate impact (in kg CO_2 eq./kWh using the GWP-GHG indicator) of the electricity purchased in the manufacturing process in A3, see Section 4.8.1.
- A supplementary indicator for climate impact (GWP-GHG) shall be reported, see Section 5.4.5.
- Additional requirement to declare the results of modules A1-A3 in aggregated form. This solves the problem that EN 15804 and ISO 21930 assign some processes (e.g., generation of electricity) to different modules. By declaring modules A1-A3 in aggregated form, the EPD can comply with both EN 15804 and ISO 21930. See Section 5.4.5.

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- In addition to the core and additional indicators in EN 15804, this PCR allows the reporting of other environmental indicators such as the indicators in ISO 21930 and/or the indicators in the previous version of EN 15804 (EN 15804:2012+A1:2013), see Section 5.4.5.
- Additional requirements and recommendations on the content declaration compared to EN 15804 and ISO 21930, see Section 5.4.4.
- Additional rules for EPD validity and follow-up requirements to comply with the GPI, see Section 5.4.2.
- Additional specifications for the modelling of the GWP-biogenic and primary energy use indicators, see Annexes 2 and 3.

1.5 ADDITIONAL REQUIREMENTS TO COMPLY WITH ISO 21930

EPDs based on this PCR do not by default comply with ISO 21930. To claim compliance with ISO 21930, the following additional requirements, which are further described in subsequent sections, shall be met:

- Allocation requirements for production scrap from A1-A3 in EN 15804 and ISO 21930 are not fully compatible; if this influences the results, the EPD cannot comply with ISO 21930 unless it can be justified that conservative assumptions have been made, see Section 4.5.
- For EPDs of multiple products, compliance with ISO 21930 is only possible if variation between included products is lower than 10% for the results of all environmental impact indicators, see Section 2.2.2.1. Sector EPDs are exempt from this rule.
- To comply with ISO 21930, the indicators in ISO 21930 applicable for the geographical context of the EPD shall be declared.
- To comply with ISO 21930, the biogenic carbon content of product and packaging shall additionally be declared as kg CO_2 eq. per product or declared unit (see Section 5.4.4).

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2 GENERAL INFORMATION

2.1 ADMINISTRATIVE INFORMATION

Name:	Construction products
Registration number and version:	2019:14, version 1.3.4
Programme:	The International EPD System
Programme operator:	EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden. Website: www.environdec.com E-mail: info@environdec.com
PCR moderator:	Martin Erlandsson, IVL Swedish Environmental Research Institute, martin.erlandsson@ivl.se
PCR Committee:	IVL Swedish Environmental Research Institute Secretariat of the International EPD System
Date of publication and last revision:	2024-04-30 (version 1.3.4) A version history is available in Section 8.
Valid until:	2025-06-20
Schedule for renewal:	A PCR is valid for a pre-determined period of time to ensure that it is updated at regular intervals. When the PCR is about to expire the PCR moderator shall initiate a discussion with the Secretariat how to proceed with updating the document and renewing its validity. A PCR document may be revised during its period of validity provided significant and well-justified proposals for changes or amendments are presented. See www.environdec.com for up-to-date information and the latest version.
Standards conformance:	▪ General Programme Instructions of the International EPD System, version 4.0, based on ISO 14025:2006, ISO 14040:2006 and ISO 14044:2006/Amd:2017 ▪ EN 15804:2012+A2:2019/AC:2021 ▪ ISO 21930:2017. This standard is used in selected sections, such as allocation, when it provides additional but not contradictory rules to EN 15804. EPDs may comply with this standard if additional requirements are met, see Section 1.5. ▪ EN 50693. This standard is used for construction products that are also Electric and Electronic Equipment (EEE) products. All EPDs based on this PCR are compliant with EN 15804:2012+A2:2019/AC:2021. EPDs of EEE products may also be compliant with EN 50693, unless there are requirements in an applicable c-PCR that deviates from EN 50693. If additional requirements are followed, this PCR may also be used to develop EPDs compliant with ISO 21930:2017, see. Section 1.5.
PCR language(s):	This PCR was developed and is available in English. In case of translated versions, the English version takes precedence in case of any discrepancies.

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2.2 SCOPE OF PCR

2.2.1 PRODUCT CATEGORY DEFINITION AND DESCRIPTION

This document provides Product Category Rules (PCR) for the assessment of the environmental performance of *construction products*, defined to include both goods and services, and construction works (e.g. buildings, railways, highways), and the declaration of this performance by an EPD.

All construction goods and services for buildings and other construction works (including civil engineering works) are included in the scope, with the same product category definition as the standard EN 15804, as well as construction works. As the standard provides limited guidance on the definition of a construction product, the best available definition is found in the European construction product regulation (CPR):

> *"'construction product' means 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."*

There is no exhaustive list of products and product categories covered by this definition. All products that are covered by a harmonized standard for construction products according to the European construction product regulation (or the earlier construction product directive, CPD) should, however, be considered as construction products.[5]

The above definition is used in the present PCR, with the addition that the term "product" also encompasses services, which are not incorporated in a permanent manner in the constructions works but support the construction process or subsequent maintenance, and construction works.

This PCR can also be used for raw materials and intermediate products that can *among others* be used as input to construction products. If another PCR in the International EPD System covers this raw material/intermediate product, but that PCR does not comply with EN 15804, the present PCR may be used instead if there is a market demand for EPDs compliant with EN 15804. Note, however, that if another sector has requirements on LCA method and EPD content that deviate to those in EN 15804 and in the present PCR, there may be a need to issue two separate EPDs for the same raw material/intermediate product, following different PCRs and targeting different customers.

The International EPD System uses the UN CPC system for classification for PCRs. As this PCR covers a product category where the final sector of use is the defining factor, it is difficult to classify it according to the UN CPC system. The UN CPC codes listed in Table 1 are a non-exhaustive list of those included in the scope of this PCR if the products are incorporated in a permanent manner in construction works.

Table 1 Non-exhaustive list of UN CPC codes included in the scope of this PCR, if the application of the product is in construction.

CODE	UN CPC NAME
151	Monumental or building stone
153	Sands, pebbles, gravel, broken or crushed stone, natural bitumen and asphalt
154	Clays
311	Wood, sawn or chipped lengthwise, sliced or peeled, of a thickness exceeding 6 mm; railway or tramway sleepers (cross-ties) of wood, not impregnated
313	Wood in the rough, including those treated with paint, stains, creosote or other preservatives; railway or tramway sleepers (cross-ties) of wood, impregnated
314	Boards and panels
315	Veneer sheets; sheets for plywood; densified wood
316	Builders' joinery and carpentry of wood (including cellular wood panels, assembled parquet panels, shingles and shakes)
362	Other rubber products

[5] See https://ec.europa.eu/growth/single-market/european-standards/harmonised-standards/construction-products_en for a list of products that are covered by a harmonized standard.

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363	Semi-manufactures of plastics
369	Other plastics products
371	Glass and glass products
373	Refractory products and structural non-refractory clay products
374	Plaster, lime and cement
375	Articles of concrete, cement and plaster
376	Monumental or building stone and articles thereof
379	Other non-metallic mineral products n.e.c.
412	Products of iron or steel
415	Semi-finished products of copper, nickel, aluminium, lead, zinc and tin or their alloys
416	Other non-ferrous metals and articles thereof (including waste and scrap of some metals); cermets and articles thereof
421	Structural metal products and parts thereof
541	General construction services of buildings
542	General construction services of civil engineering works
543	Site preparation services
544	Assembly and erection of prefabricated constructions
545	Special trade construction services
546	Installation services
547	Building completion and finishing services

2.2.2 TYPE OF EPD AND INFORMATION MODULES INCLUDED

According to EN 15804 Section 5.2 the following type of EPDs are possible for construction products:

a) Cradle to gate with modules C1–C4 and module D (A1–A3 + C + D).

b) Cradle to gate with options, modules C1–C4, module D and with optional modules (A1–A3 + C + D and additional modules). The additional modules may be one or more selected from A4–A5 and/or B1–B7.

c) Cradle to grave and module D (A + B + C + D).

d) Cradle to gate (A1–A3).

e) Cradle to gate with options (A1–A3 and additional modules). The additional modules may be A4 and A5.

Besides the goods-oriented types of EPD listed above, this PCR also defines the following minimum scope for a construction service EPD:

f) Construction service EPD: Cradle to gate with modules A1-A5 and optional modules. Such an EPD will potentially be used as an information module in any life cycle stage B or C for a construction works.

EPDs of type d and type e in the list above shall only be used if the following three conditions are valid:

- the product or material is physically integrated with other products during installation so they cannot be physically separated from them at end of life,
- the product or material is no longer identifiable at end of life as a result of a physical or chemical transformation process, and
- the product or material does not contain biogenic carbon.

If the packaging contains more than 5% biogenic carbon, module A5 shall be included at least for balancing out the emission of this carbon, see Annex 2.

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Electric and Electronic Equipment (EEE) products included in the scope of this PCR, according to the definition in Section 2.2.1, shall include all B modules. This is in line with the requirements in EN 50693.

EPDs of type c in the list above are only possible when using this PCR together with a complementary PCR (c-PCR). This is a stricter requirement than in EN 15804.

Table 2 provides an overview of the life-cycle stages, types of EPDs, and requirements for inclusion depending on type of EPD.

Table 2 The life cycle of a construction product divided into life-cycle stages and information modules, and the requirements for inclusion depending on type of EPD.

Life-cycle stages	**Information modules**	**Type of EPD**			
		a) Cradle to gate with module C1-C4 and module D [1)]	b) Cradle to gate with options, module C1-C4, module D and optional modules [2)]	c) Cradle to grave and module D	f) Construction service EPD: Cradle to gate with modules A1-A5 and optional modules
A1-A3 Product stage	A1) Raw material supply	Mandatory	Mandatory	Mandatory	Mandatory
	A2) Transport				
	A3) Manufacturing				
A4-A5 Construction process stage	A4) Transport	—	Optional for goods Mandatory for services (see alternative f) *Recommended if a default scenario can be defined*	Mandatory	Mandatory
	A5) Construction installation				
B Use stage	B1) Use	—	Optional	Mandatory	Optional
	B2) Maintenance				
	B3) Repair				
	B4) Replacement				
	B5) Refurbishment				
	B6) Operational energy use				
	B7) Operational water use				
C End of life stage	C1) Deconstruction, demolition	Mandatory	Mandatory	Mandatory	Optional
	C2) Transport				
	C3) Waste processing				
	C4) Disposal				
D Benefits and loads beyond the system boundary	D) Reuse, recovery, recycling, potential	Mandatory	Mandatory	Mandatory	—
Declared or functional unit		Declared unit	Declared unit	Functional unit	Declared unit

1, 2) An EPD may exclude the declaration of modules C1-C4 and module D if the requirements listed in Section 2.2.2 are met. These EPDs are then referred to as “d) Cradle to gate (A1–A3)” and “e) Cradle to gate with options”, respectively.

2.2.2.1. EPD of multiple products

Several sets of results, reflecting different products, are not allowed to be declared in the same EPD. However, similar products from a single or several manufacturing sites covered by the same PCR and manufactured by the same company with the same major steps in the core processes may be grouped and thereby included in the same EPD. For such an EPD, there are three options:

- For each indicator, declare the average results of the included products. This average shall be weighted according to the production volumes of the included products, if relevant. In this option, the average content shall be declared in the content declaration.
- Declare the results of one of the included products – a representative product. The choice of the representative product shall be justified in the EPD, using, where applicable, statistical parameters. For example, the choice may be based on production volumes. In this option, the content of the representative product shall be declared in the content declaration.

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- Declare the worst-case result of the included products, for the included modules from A to C, per declared environmental performance indicator (i.e., the results of a “worst-case product”, which may be the results of one or several of the included products). In this option, the content declaration shall include the lowest amounts of recycled and biogenic content of the included products and their packaging, respectively, and the information on environmental and hazardous properties of substances contained in the products shall reflect the highest share and most hazardous such substances contained in the any of the included products. For other parts of the content declaration, the average content shall be declared.

For all options, the range of the content of the included products should be included in the content declaration, in addition to the average/representative/worst-case content as specified above.

For EPDs claiming compliance with ISO 21930, the above options are only possible if none of the declared environmental impact indicator results, aggregated over all included modules (from A to C), differ by more than 10% between any of the included products. If the EPD does not claim compliance with ISO 21930, variations above 10% are allowed, if justified in the LCA report and the EPD declares the variation of each impact indicator results for which the variation is above 10%.

The option chosen shall be clearly described at the cover page of the EPD, as “EPD of multiple products, based on the average results of the product group”, “EPD of multiple products, based on a representative product”, or “EPD of multiple products, based on worst-case results”.

In an EPD of multiple products based on average results or a representative product, the declared GWP-GHG result for modules A1-A3 (A1-A5 for services) should not differ by more than 10% compared to the GWP-GHG results any of the included products. When there are larger variations, the grouping of products/sites shall be justified in the LCA report.

In an EPD of multiple products, the difference (in %) between the declared GWP-GHG result, and the product with GWP-GHG results furthest away from the declared results, for modules A1-A3 (A1-A5 for services), shall be reported in the EPD (see Table 3 in Section 5.4.3 for an example of how this can be declared). If this difference is below 10%, “<10%” can be reported. Optionally, this variation can instead be declared as the difference between the declared result and lowest and highest result, respectively (e.g., as “+8/-12%”).

In an EPD of multiple products, the GWP-GHG results of the “best-case product” and/or “worst-case product”, defined as the product with lowest/highest GWP-GHG results, may be reported in a subsection of the environmental performance section (see Section 5.4.5) and the content of this product (or these products) may be additionally reported in the content declaration (Section 5.4.4).

Note that above paragraphs concern grouping of similar products, but not grouping of identical products (e.g., produced at different manufacturing sites or at different production lines at one site). Identical products here refer to products which are not marketed as different products and/or are in no other way distinguishable by a downstream customer (e.g., by colour, size, content or configuration). For identical products, variations due to, for example, manufacturing at several sites shall be treated as any other variation in production, by averaging over (normally) 1 year of production (and in such cases, variations above 10% are allowed also if compliance with ISO 21930 is claimed). However, the variation in GWP-GHG results for modules A1-A3 between sites shall still be reported in the EPD, if the variation is above 10%. The reported variation may be the difference between the declared results and the results of each of the included sites, or the difference between the declared results and the results of the sites with the highest and lowest results, respectively.

Although a variation above 10% is allowed in EPDs of identical products manufactured at several sites, it is recommended to separate the EPDs per site so that a variation below 10% is met, as certain national regulations considers an EPD to be “product-specific” only when the variation between sites is below 10%.

If an EPD covers several manufacturing sites in A3, the manufacturing sites shall be listed in the EPD.

2.2.2.2. Sector EPD

An industry association, or any other group of companies, may develop an EPD in the form of a sector EPD. A sector EPD declares the average product of multiple companies in a clearly defined sector in a clearly defined geographical area. For products covered in a sector EPD, the same declared/functional unit shall be applied.

Sector EPDs shall describe the products and companies that are covered by the EPD. If the GWP-GHG results of a sector EPD differ by more than 10% for A1-A3 (A1-A5 for services) between represented products and sites, these variations shall be reported in the EPD and the reason for the variations shall be qualitatively described (see Table 3 for an example of reporting the variation). If the variation is below 10%, the actual variation or “<10%” shall be declared.

Any communication of the results from a sector EPD should contain the information that the results are based on averages obtained from the sector as defined in the EPD. The communication shall not claim that the sector EPD results are representative for a certain manufacturer or its product.

Section 5.4.8 details more information that shall be declared in sector EPDs.

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2.2.2.3. EPD registered by traders

If the EPD owner is a trader (e.g., retailers, wholesalers), module A4 shall be included, at least covering transport to a central warehouse or to the border of the market of the EPD scope. In such cases, module A4 may also include a subsequent transport from the central warehouse or the border of the market to an average customer. If the declared product is produced by several suppliers, the variation in GWP-GHG results between suppliers (A1-A3) shall be declared, if the variation is above 10% (if the variation is below 10%, the actual variation or "<10%" shall be declared). If the product is produced at several manufacturing sites (which always is the case in case of several suppliers), the rules for such EPDs in Section 2.2.2.1 applies.

2.2.3 GEOGRAPHICAL REGION

This PCR may be used globally, aligning with the European standard EN 15804:2012+A2:2019/AC:2021 and the global standard ISO 21930:2017. See Section 1.5.

2.2.4 EPD VALIDITY

An EPD based on this PCR shall be valid from its registration and publication at www.environdec.com and for a five-year period starting from the date of the verification report ("approval date"), or until the EPD has been de-registered from the International EPD System.

An EPD shall be updated and re-verified during its validity if changes in technology or other circumstances have led to:

- an increase of 10% or more of any result of the indicators listed in Section 5.4.5,
- errors in the declared information, or
- significant changes to the declared product information, content declaration, or additional environmental information.

If such changes have occurred, but the EPD is not updated, the EPD owner shall contact the Secretariat to de-register the EPD to be removed from www.environdec.com.

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3 PCR REVIEW AND BACKGROUND INFORMATION

This PCR was developed in accordance with the process defined in the GPI of the International EPD System, including open consultation and review of the final draft PCR.

As the main purpose of this PCR is to serve as the implementation of EN 15804:2012+A2:2019/AC:2021 in the International EPD System, the Secretariat of the International EPD System has been involved in the preparation, and stakeholder feedback has mainly been considered during the open consultation phase rather than through involvement in the PCR committee.

3.1 PCR REVIEW

3.1.1 VERSION 1.0

PCR review panel:	The Technical Committee of the International EPD System. A full list of members available on www.environdec.com. The review panel may be contacted via info@environdec.com. Members of the Technical Committee were requested to state any potential conflict of interest with the PCR moderator or PCR committee and if so were excused from the review.
Chair of the PCR review:	Claudia A. Peña
Review dates:	2019-11-28 until 2019-12-18

3.1.2 VERSION 1.1

PCR review panel:	The Technical Committee of the International EPD System. A full list of members available on www.environdec.com. The review panel may be contacted via info@environdec.com. Members of the Technical Committee were requested to state any potential conflict of interest with the PCR moderator or PCR committee and if so were excused from the review.
Chair of the PCR review:	Claudia A. Peña
Review dates:	2020-07-10 until 2020-08-31

3.1.3 VERSION 1.2

PCR review panel:	The Technical Committee of the International EPD System. A full list of members available on www.environdec.com. The review panel may be contacted via info@environdec.com. Members of the Technical Committee were requested to state any potential conflict of interest with the PCR moderator or PCR committee and if so were excused from the review.
Chair of the PCR review:	Claudia A. Peña
Review dates:	2021-10-24 until 2021-12-10

3.1.4 VERSION 1.3.0

PCR review panel:	The Technical Committee of the International EPD System. A full list of members available on www.environdec.com. The review panel may be contacted via info@environdec.com.

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	Members of the Technical Committee were requested to state any potential conflict of interest with the PCR moderator or PCR committee and if so were excused from the review.
Chair of the PCR review:	*No chair appointed*
Review dates:	2023-03-21 until 2023-04-03

3.2 OPEN CONSULTATION

3.2.1 VERSION 1.0

Version 1.0 of this PCR was available for open consultation from 2019-04-09 until 2019-06-09, during which any stakeholder was able to provide comments by posting on the PCR forum on www.environdec.com or by contacting the PCR moderator.

Stakeholders were invited via e-mail or other means to take part in the open consultation and were encouraged to forward the invitation to other relevant stakeholders. The following stakeholders provided comments during the open consultation, and agreed to be listed as contributors to the PCR and at www.environdec.com:

- Rafael Bueno, University of Seville
- Rob Rouwette, Start2See

The draft PCR was revised significantly after the open consultation to take into account all requirements in the final version of the standard EN 15804:2012+A2:2019 after its publication.

3.3 EXISTING PCRS FOR THE PRODUCT CATEGORY

This PCR replaced the previous PCR 2012:01 Construction products and construction services in the International EPD System, which was based on the previous version of EN 15804 (EN 15804:2012+A1:2013) and ISO 21930:2007. This new PCR was the first known PCR globally on which an EPD could be developed to comply with both EN 15804:2012+A2:2019 (EN 15804:2012+A2:2019/AC:2021, as of version 1.2 of the PCR) and ISO 21930:2017. Existing PCRs with similar scope are available in other EPD programmes.

The old construction product PCR (PCR 2012:01) and this new PCR were available in parallel during a transition period that ended 2022-02-28.

3.4 REASONING FOR DEVELOPMENT OF PCR

This PCR was developed to enable publication of EPDs for construction products based on ISO 14025, ISO 14040/14044, ISO 21930, EN 15804, and other relevant standards to be used in different applications and target audiences.

This PCR can be used globally because the common method described results in an EPD that follows EN 15804 and ISO 21930 (if additional requirements specified in this document are fulfilled). Depending on the market where the EPD will be published, this PCR allows the use of environmental impact indicators that are relevant for that market. Alternatively, if relevant, multiple indicators may be displayed in the same EPD or in parallel EPDs, so that the EPD can be used on all markets where the product is sold.

3.5 UNDERLYING STUDIES

The methodological choices made during the development of this PCR (functional unit/declared unit, system boundary, allocation methods, impact categories, data quality rules, etc.) were primarily based on the following documents and standards:

- General application of LCA methodology of the International EPD System as described in Annex A of the General Programme Instructions version 4.0,
- ISO 21930:2017, and
- EN 15804:2012+A2:2019/AC:2021.

See Sections 1.4 and 1.5 for a description of how the rules in this PCR relates to those in the above listed standards.

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4 GOAL AND SCOPE, LIFE CYCLE INVENTORY AND LIFE CYCLE IMPACT ASSESSMENT

The goal of this section is to provide specific rules, requirements and guidelines for developing an EPD for the product category as defined in Section 2.2.1.

The requirements listed here are not complete as all requirements from EN 15804:2012+A2:2019/AC:2021 shall also be fulfilled.

4.1 FUNCTIONAL OR DECLARED UNIT

EPDs based on this PCR document without using a complementary PCR (c-PCR) shall use a declared unit, which shall be defined and specified in the International System of Units (SI units) and relate to the typical applications of products.

EPDs based on this PCR document together with a c-PCR may use a functional unit if allowed by the c-PCR. For information about c-PCR, see Section 1.2 and Section 1.3.

See Sections 6.3.2 and 6.3.3 in EN 15804.

For definitions of declared/functional unit, see Section A.2 of the GPI.

4.2 REFERENCE SERVICE LIFE (RSL)

See Section 6.3.4 and Annex A in EN 15804.

Note that the RSL of a product category is the reference time period to which the performance of a product may be related to in the functional unit (for a definition and description of RSL, see Section A.2.1 of the GPI). As such, the RSL can only be declared if defined as part of the FU according to a c-PCR, unless the PCR says otherwise (in some c-PCRs, the term RSL is defined differently than above).

4.3 SYSTEM BOUNDARIES

The system boundaries depend on the type of EPD that is declared, see Section 2.2.2.

This section only describes the additional requirements compared to, and further specifications of, EN 15804. For further information about requirements for system boundaries, see Sections 6.2 and 6.3.5 in EN 15804.

4.3.1 TRANSPORTATION IN A1

According to EN 15804, A1 shall include raw material extraction and processing and processing of secondary material input (e.g. recycling processes). Note that transportation between these processes shall also be accounted for in A1.

4.3.2 SYSTEM BOUNDARIES FOR INFRASTRUCTURE/CAPITAL GOODS AND EMPLOYEES

Personnel-related processes, such as transportation of employees to and from work, shall not be accounted for.

In general, the production and end-of-life processes of infrastructure or capital goods used in the product system should be excluded, unless there is evidence that they are relevant in terms of their environmental impact, or when a generic LCI dataset includes infrastructure/capital goods, and it is not possible, within reasonable effort, to subtract the data on infrastructure/capital goods from this dataset. If an infrastructure/capital good is produced with the intention to be used one or a few times only (e.g., a manufacturing plant or machinery constructed to produce only one product), this infrastructure/capital good shall be included.

The inclusion or exclusion of infrastructure/capital goods shall be transparently described for upstream, core and downstream processes in the LCA report and in the EPD.

If infrastructure/capital goods are included, the following disclaimer shall be included in the results sections of the LCA report and in the EPD (land use and toxicity indicators shall only be mentioned if declared in the EPD):

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The results of the impact categories abiotic depletion of minerals and metals, land use, human toxicity (cancer), human toxicity, non-cancer and ecotoxicity (freshwater) may be highly uncertain in LCAs that include capital goods/infrastructure in generic datasets, in case infrastructure/capital goods contribute greatly to the total results. This is because the LCI data of infrastructure/capital goods used to quantify these indicators in currently available generic datasets sometimes lack temporal, technological and geographical representativeness. Caution should be exercised when using the results of these indicators for decision-making purposes.

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

4.3.3 ENERGY CONSUMPTION FOR EEE PRODUCTS

EPDs of electrical and electronic equipment (EEE) shall include all B modules. Scenarios for module B6 shall represent normal (i.e. anticipated) use and be geographically representative and compliant with current regulations in the relevant geographic region. Key assumptions regarding the applied scenario in module B6 shall be documented in the EPD. Any c-PCR[6] to this main PCR covering EEE products shall provide a specific use scenario for the product category it covers.

4.4 CUT-OFF RULES

See EN 15804, Section 6.3.6.

LCI data shall according to EN 15804 include a minimum of 95% of total inflows (mass and energy) per module (e.g. A1-A3, A4-A5, B1-B5, B6-B7, C1-C4 and module D). In addition, this PCR applies the expanded cut-off rule of ISO 21930, which says that at least 95% of the environmental impact per module shall be included as well. Plausibility assessments and expert judgement can be used to demonstrate compliance with these criteria.

If less than 100% of the inflows or environmental impact are accounted for, proxy data (e.g., conservative estimates) or extrapolation should be used to achieve 100% completeness, as this is better than data gaps. Inflows not included in the LCA shall be documented in the EPD.

4.5 ALLOCATION RULES

Sections 4.5.1 and 4.5.2 provide guidance on the allocation of co-products and waste, respectively, and as such are further specifications of Sections 6.4.3.2 and 6.4.3.3 of EN 15804. First there is a clarification on which of the two allocation procedures to follow.

EN 15804 defines co-products as “any of two or more marketable materials, products or fuels from the same unit process, but which is not the object of assessment” and waste as a “substance or object which the holder discards or intends or is required to discard”. A further clarification is that waste, if eventually used for a specific purpose, requires further processing to cease being waste and thus leave the product system. A material or energy flow ceases being waste when all the criteria for end-of-waste state (see Section 4.5.2) are fulfilled. In other words, if any of the criteria is not fulfilled at some point, it is a waste and the waste allocation procedures of Section 4.5.2 shall be applied; if all criteria are always fulfilled, it is a co-product and the co-product allocation procedures of Section 4.5.1 shall be applied. This is the general rule for how to distinguish between co-products and waste, and thus decide which allocation procedure to use. There are, however, two exceptions to this general rule:

1. Flows that reach the end-of-waste state in modules A1-A3 shall be allocated as co-products, unless co-product allocation is not possible (see Section 6.3.5.2 of EN 15804)[7]. As consistent and uniform allocation procedures shall be applied for similar flows and processes throughout the study, inputs from modules A1-A3 of a previous product system (e.g., production scrap) shall be considered co-products of modules A1-A3 of the previous system and thus enter the product system with an environmental burden (following the rules for co-product allocation in Section 4.5.1).

[6] This shall be understood as any c-PCR developed and published within the International EPD System, after this rule was added to this PCR.

[7] On this aspect of allocation, EN 15804 differs from ISO 21930, which in its guidance on modelling of module A states that “these useable output flows [referring to waste that has become a useable output flow] shall not be considered as co-products but shall be considered waste and no allocation to secondary material, secondary fuels or recovered energy shall be permitted” (Section 7.1.7.2.7 of ISO 21930). If this aspect of allocation influences the results of the EPD, the EPD cannot claim to comply with ISO 21930 unless it can be justified that a conservative assumption has been made (yielding higher results than a strict application of ISO 21930); if so, this shall be described in the EPD.

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2. During the use (module B) and end-of-life (module C) stages, “all output from dismantling, deconstruction or demolition of the building, from maintenance, repair, replacement or refurbishing processes, all debris, all construction products, materials or construction elements etc., leaving the building, are at first considered to be waste” (Section 6.3.5.5 of EN 15804). In other words, such outputs form the building shall be modelled as waste, and be assumed to leave the product system when the end-of-waste criteria have been fulfilled, without an environmental burden (following the rules for waste allocation in Section 4.5.2)[8].

Irrespective of the allocation between product systems, the inherent properties of the product and the packaging, such as calorific content or biogenic or fossil carbon content, shall not be allocated away and shall always follow the physical downstream flow to the product system that finally uses it.

Section 4.5.5 includes guidance on the allocation of scrap.

Figure 3 illustrates when to apply co-product and waste allocation, respectively. Note that waste may be “marketable”; i.e., the definitions of waste and co-products from EN 15804, referred to in the figure, are not mutually exclusive and may need justification in the specific case.

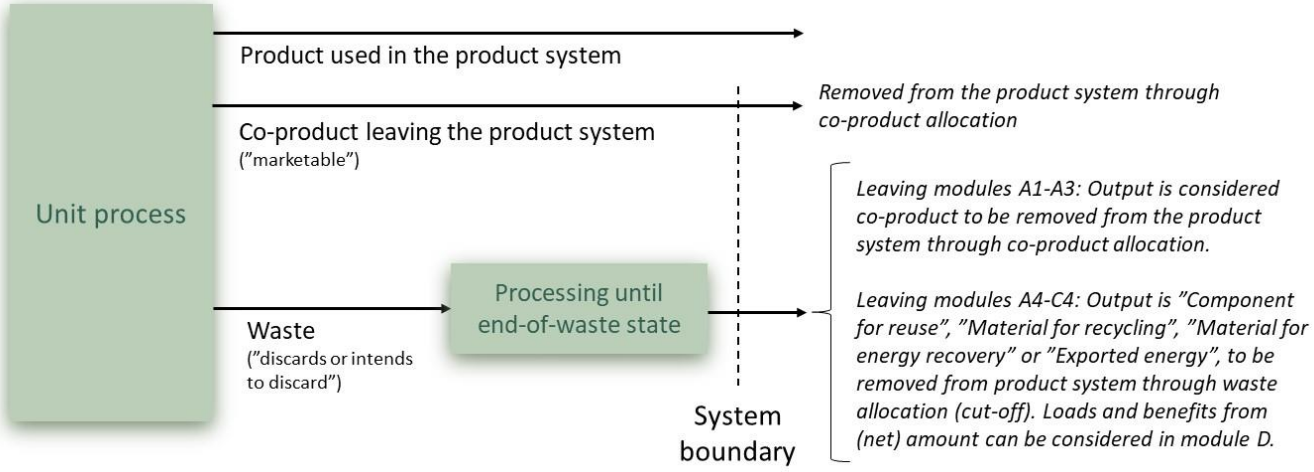

Figure 3 Illustration of when to use co-product or waste allocation.

4.5.1 ALLOCATION OF CO-PRODUCTS

This section provides a more detailed specification than Section 6.4.3.2 in EN 15804 as it aims to merge specifications given in ISO 21930 into the stepwise procedure in EN 15804.

In a co-product allocation, the sum of the allocated inputs and outputs to the products shall be equal to the total inputs and outputs from the same unit process, and consistent allocation procedures shall be uniformly applied to similar inputs and outputs of the system under consideration. This means that no double counting or omission of inputs or outputs through allocation is permitted (unless a conservative assumption is made, see below).

The following stepwise procedure shall be applied for allocation of co-products:

1. Allocation shall be avoided, if possible, by dividing the unit process into two or more sub-processes and collecting LCI data for each sub-process. This option shall not be used for *joint* co-production processes, which ISO 21930 describes as follows: “…if each of the co-products can be produced without the other(s) or the ratio of the co-products typically varies in normal production, then it is not a joint co-production process. By-products cannot be avoided and processes producing by-products are therefore joint co-production processes.”
2. Allocation shall be based on physical properties (e.g. mass, volume) when (i) there is a relevant underlying physical relationship between the products and co-products, and (ii) the difference in revenue per mass (or per energy unit in case of electricity, heat or similar) from the products and co-products is low. A relevant underlying physical relationship exists

[8] If the output has never ceased to fulfil the end-of-waste criteria, the system boundary shall be set after the last joint unit process.

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when the amounts of inputs and outputs are changed by quantitative changes in the amounts of products or functions delivered by the system.

3. In all other cases, allocation shall be based on economic values of the products and co-products when they leave the unit process. Economic values may, for example, be the revenue generated by each product and co-product. The revenue is the price multiplied by the output. For both price and output, representative values should be identified (e.g., rolling annual averages). If economic allocation is used, a sensitivity analysis exploring the influence of the choice of economic value shall be included in the LCA report.

If option 3 in the above stepwise procedure is applied and the input has no or negative economic value, it will not be allocated any environmental burden, which will yield the same result as applying waste allocation (the cut-off method) of Section 4.5.2 (and the same result as applying the allocation method of ISO 21930, see footnote 7 above). If applying co-production allocation yields the same result as applying waste allocation, the LCA report and the EPD shall still describe the applied allocation method as co-product allocation.

In co-product allocation, conservative assumptions may be done when the effort of allocation is disproportionate to any improvement in accuracy. For example, flows leaving the studied product system can be assumed to have no economic value and thereby allocated no environmental burden. Furthermore, if a co-product of a previous product system is an input to the product system under study, the conservative assumption is that it comes with an environmental burden. In the end, a conservative assumption shall always allocate more environmental burdens to the product that is the object of the EPD than would have been allocated with a strict application of the allocation procedure.

An example of when a conservative assumption is reasonable, is when it is unknown whether an input from a previous product system leaves that system from modules A1-A3 or from any subsequent module. Then the conservative assumption is to assume the input leaves from modules A1-A3 and thus is allocated as a co-product and assigned an environmental burden.

Allocated co-products shall not be accounted for in module D.

4.5.2 ALLOCATION OF WASTE

The allocation of waste shall follow the polluter-pays principle that is made operational according to the following rules.

The system boundary to the subsequent product system is set where the waste (e.g., the discarded product) reaches the end-of-waste state, i.e., when the material has become a usable flow (e.g., for reuse, energy recovery and/or recycling). The end-of-waste state is reached when all the following criteria are fulfilled:

- the recovered material or product (including, e.g., energyware such as fuel, electricity and heat) is commonly used for specific purposes;
- a market or demand, identified for example by a positive economic value, exists for such a recovered material or product;
- the recovered material or product fulfils the technical requirements for the specific purposes for which it is used and meets the existing legislation and standards applicable to its use; and
- the use of the recovered material or product will not lead to overall adverse environmental or human health impacts, which shall be understood as content of hazardous substances below limit values in applicable legislation.

Note that the “specific purpose” in this context is not restricted to the function of a certain product but can also be applied to material or energyware serving as input to the production process of another product.

At the system boundary, cut-off allocation shall be applied, i.e., all unit processes before the point of end-of-waste shall be assigned to the product system generating the waste and all unit processes after the point of end-of-waste shall be assigned to the subsequent product system (except outputs from modules A1-A3, which shall be allocated as co-products, see Section 4.5.1).

If a waste flow does not fulfil all of the end-of-waste criteria, and thus does not cross the system boundary, all waste treatment processes including those of disposal shall be assigned to the product system generating the waste (ISO 21930:2017).

Treatment of waste classified as hazardous, if not treated/upgraded and by legalisation reclassified as a product, will based on the above criteria always be allocated to the system generating this waste.

The above criteria means that if the waste incinerator gets paid for incinerating the material (i.e., the wasted material has a negative economic value), the end-of-waste state is reached *after* the incineration (regardless of thermal efficiency). This means that all the environmental burden of collection, pre-processing and incineration of the waste shall be assigned to the product system generating the waste, and all the environmental burden of processes after the end-of-waste has been reached, for example related to making use

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of the energy, shall be assigned to the product system using the energy. In contrast, if the end-of-waste state is reached *before* the incineration/combustion, the environmental burden of incineration/combustion (as well as processes occurring before incineration but after the end-of-waste has been reached, if any) shall be assigned to the product system using the energy. For example, this is the case if the waste incinerator pays for the material (i.e., the economic value of the material is positive) or receives it for free, and all other criteria for the end-of-waste state are also fulfilled.

Waste that has reached the end-of-waste state becomes a *secondary fuel* if it is subsequently incinerated/combusted and the energy is recovered[9]. If such a secondary fuel exits the product system, it shall be included in the declared output flow "materials for energy recovery" (see Section 7.2.4.4 of EN 15804) and be accounted for in module D (see Section 4.5.4). If such a secondary fuel (recovered from a previous product system) enters modules A1-A3 of the studied product system, it is recommended to declare in the EPD the GWP-GHG results of its combustion (in kg CO_2 eq. per kg fuel or per generated kWh/MJ).

If it is unknown whether the end-of-waste criteria are fulfilled, a conservative assumption shall be made (Section 7.1.6 of ISO 21930). This means that in case the product under study has generated the waste, the end-of-waste criteria shall be assumed not to be fulfilled and the further waste processing and waste incineration/disposal shall be assigned to the product.

As said in the introduction to Section 4.5, flows leaving the product system as outputs from the building, shall at first be considered to be waste, and leave the product system when reaching the end-of-waste state. If such an output never ceases to fulfil the end-of-waste criteria, the system boundary to the subsequent product system shall be set after the last joint unit process.

4.5.3 THERMAL EFFICIENCY OF INCINERATION/COMBUSTION

For waste that has not reached the end-of-waste state prior to its incineration, the thermal efficiency of the incineration process determines whether it shall be assigned to modules C3 or C4. If the thermal efficiency is higher than 60%, the incineration process is an energy recovery process and shall be assigned to C3. If the thermal efficiency is lower than 60%, the incineration process is a disposal process and shall be assigned to C4. See Figure 4. An exception is incineration of hazardous waste, which always shall be assigned to C4.

4.5.4 SEPARATE REPORTING ON RECYCLING, REUSE AND RECOVERY – MODULE D

Module D assesses the environmental impact of the net flows of recovered materials (recycled or reused) or energyware leaving modules A-C, see Section 6.4.3.3 of EN 15804. The environmental performance results declared in module D can be negative as well as positive depending on the scenario and assumptions made.

Module D is outside the product system (modules A-C). Therefore, inherent properties, such as biogenic carbon or inherent energy of the discarded product shall only be reported once in the declared product life cycle (A-D), and not be accounted for a second time in module D, to avoid double accounting[10].

Any declared net benefits and loads from net flows leaving the product system that have fulfilled all end-of-waste criteria shall be included in module D, except those which have been allocated as co-products in modules A1-A3 (see Section 6.3.5.2 of EN 15804 and Section 4.5 of this document).

Using the variables used in Annex D of EN 15804, the net flow can be described by the difference between $M_{MR\ in}$ and $M_{MR\ out}$, taking the material yield (here designated with Y) into account, where:

$M_{MR\ in}$ amount of input material to the product system that has been recovered (recycled or reused) from a previous system (determined at the system boundary).

$M_{MR\ out}$ amount of material exiting the system that will be recovered (recycled and reused) in a subsequent system. This amount is determined at end-of-waste point and is therefore equal to the output flow of "materials to recycling [kg]" reported for modules A4- C4.

[9] Strictly, it shall only be termed secondary fuel and energy recovery if the incineration process has a thermal efficiency of more than 60%. But as the fate is unknown and beyond the control of the EPD owner, and as module D shall be based on the most likely *scenario*, it is reasonable to assume that the thermal efficiency of the incineration/combustion of such an output flow always is above 60%, so that it always can be considered "material for energy recovery" and accounted for in module D.

[10] Note 2 in Section C.2.4 of EN 15804 state "The amount of CO_2 taken up in biomass and the equivalent amount of CO_2 emissions from the biomass at the point of complete oxidation results in zero net CO2 emissions when biomass carbon is not …" and Section 6.4.3.1 of EN 15804 states that "inherent properties … shall not be allocated but always reflect the physical flows."

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Y the material yield, between point of end-of-waste (M-EoW) in modules A4-C4 and point of substitution (M-DoS) in module D (when the material has been upgraded).

The following correction of equation D.6 in Annex D of EN 15804 is made: "Σ ($M_{MR\ out}$ - $M_{MR\ in}$) …" is replaced with "Σ Y· ($M_{MR\ out}$ - $M_{MR\ in}$) …".

When determining the scenario for $M_{MR\ out}$, the factor/ratio R2 from the Product Environmental Footprint (PEF) method can be used as default[11] to calculate the amount, unless the value of $M_{MR\ out}$ is given in an applicable c-PCR. If factors from a c-PCR or the PEF system are not used, this choice shall be justified in the EPD and the default c-PCR or PEF R2 values shall be reported in the EPD together with the used value.

The quality of the outgoing recovered (recycled or reused) material (QR_{Out}/Q_{Sub} in equation D.6), i.e., the quality of the recovered material at the point of substitution, can be based on its economic value if no other procedure to determine the quality is recommended or mandated by an applicable c-PCR. In many cases the ratio QR_{Out}/Q_{Sub} can be set to 1.

Note 1: If the energy efficiency of the combustion in module D is the same for the combusted discarded product as for the substituted energyware, the figure for exported energy shall be reported as a net zero.

Note 2: Figure 4 deviates from the informative Annex D of 15804:2012+A2:2019/AC:2021, as Annex D contradicts the standard itself (particularly Note 4 in Section 7.2.4.4 and the fact that conflicting rules are given on how flows shall be accounted for when calculating the "Materials for recycling" indicator).

Note 3: As Figure 4 clarifies, a flow leaving the product system cannot be declared both as a material for energy recovery and as exported energy. If the combustion/incineration takes place beyond the system boundary – which it does if the end-of-waste criteria are fulfilled before the combustion/incineration – the material leaves the product system as a material for energy recovery. If the incineration takes place within the system boundaries, the useful energy leaves the product system as exported energy.

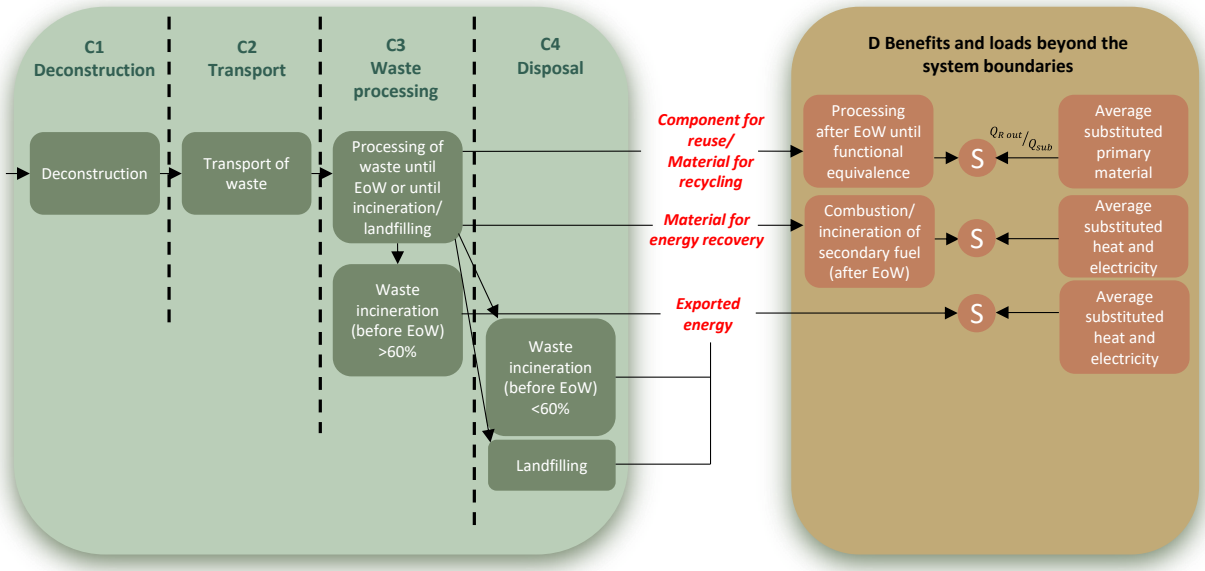

Figure 4 Illustration of the processes and flows of modules C and D.

4.5.5 GUIDANCE ON THE ALLOCATION OF SCRAP

Below is further guidance for how to interpret and apply the above rules for the allocation of scrap.

According to the above rules, the allocation of scrap depends on its origin. Scrap can originate from modules A1-A3, A4-A5, B2-B5, or C1-C4. Scrap from modules B and C shall be allocated as waste, see Section 4.5.2. Pre-consumer scrap, leaving the product system

[11] The latest version of R2 values available within the PEF Guidance document and supporting documentation shall be used. These are currently (April 2023) available in a file called "Annex_C_V2.1_May2020" available at https://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml. The source and version number used shall be included in the references of the EPD.

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from modules A1-A3, shall be allocated as a co-product, see Section 4.5.1. Because no omission of inputs or outputs through allocation shall be done, scrap entering a product system shall come with an environmental burden if it originated from modules A1-A3 of a previous product system, and the calculation of this burden shall be based co-product allocation. If, however, the pre-consumer scrap has zero or negative value, it will not be allocated any environmental burden even if co-product allocation is applied, as described in Section 4.5.1. How scrap from modules A4-A5 shall be allocated depends on whether it is defined as co-product or waste according to the definition in the introduction to Section 4.5.

More specific guidance on the allocation of scrap is given in the following:

- Scrap produced and used internally in the same product system is a case of closed-loop recycling; thereby no co-products leave the product system, and no allocation shall be done. For other scrap produced and used internally, within a company and/or a manufacturing site in modules A1-A3, co-production allocation shall be used, specifically economic allocation. Internal scrap value shall be used as a basis for this allocation, to account for different products produced in the same plant. If justified, this value may be zero (which shall still be considered economic allocation, but with a value of zero).
- For externally sourced pre-consumer scrap originating from modules A1-A3 in another product system, economic allocation may be based on real data (if known), an estimate (if real data is unknown) or a combination thereof. For example, economic allocation may be based on how much the user of the scrap pays for the scrap (real data), an estimate of the average value of the main product(s) being produced at the plant(s) from which the scrap is sourced, and the unallocated environmental burden of such products(s) according to a generic dataset (in case the dataset has already been allocated, i.e. it has assigned a burden to its scrap according to the co-production allocation rules in Section 4.5.1, data on that scrap may instead be directly used).
- For externally sourced post-consumer scrap, the default assumption shall be that the end-of-waste state, where the value of the scrap is at its minimum, is reached when the scrap is generated (e.g., upon the demolition of a building) and that it regains value as soon as it is collected and put in a waste container/skip. For example, for metal frames (or their offcuts) coming from a demolition site, it is from the point the steel is put in piles/skips that the material regains its value – any environmental burden from before this point is assigned to the previous product life cycle, and the environmental burdens of any subsequent transports or processing are assigned to the next product life cycle.
- If the shares of scrap originating from the product stage (A1-A3), construction stage (A4-A5), or use/end-of-life stages (B-C) are unknown, the average shares for scrap used in the sector can be assumed. If no data is available, it shall be assumed that all input scrap is from the product stage (A1-A3), as a conservative assumption.

If sector-averages or conservative assumptions are used to estimate the environmental burden of input scrap, the data cannot be qualified as specific data (see Section 5.4.3).

Some LCI databases include datasets that are described as being compliant with the allocation rules of EN 15804, but which have been modelled using cut-off allocation (i.e., waste allocation according to Section 4.5.2) for some production (A1-A3) scrap. Such datasets can be used without adjustments, if the production scrap has no, negligible, or negative economic value (as co-product allocation then yields the same or nearly the same result as cut-off allocation, see Section 4.5.2) or if it can be justified that co-product allocation is not possible (if so, the use of cut-off allocation shall be declared in the EPD). Otherwise, such datasets shall be adjusted by manually adding an environmental burden in compliance with EN 15804 or as a conservative assumption. A conservative assumption may, for example, be to add an environmental burden that correspond to primary production of the same material. If such a dataset is provided in an unallocated version, the LCA practitioner can use that version and manually apply the correct allocation procedure.

If post-industrial and/or post-consumer scrap is a main input to, or output from, the product system, the allocation procedure applied shall be clearly described in the EPD. This includes information on whether the allocation has been based on real data and/or estimates, and whether it is a conservative estimate. Furthermore, if the scrap inputs contribute more than 10% to the GWP-GHG results of modules A1-A3, the GWP-GHG intensity of that scrap (in kg CO_2 eq./tonne) shall be declared in the EPD, as well as the percentage of scrap that was assumed to come with, and without, an environmental burden.

4.6 DATA QUALITY REQUIREMENTS

The quality of the data used in the LCA model shall be addressed in the LCA report (termed “project report” in EN 15804). For further information see Sections 6.3.7, Section 6.3.8 and Annex E of EN 15804.

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4.7 IMPACT CATEGORIES AND IMPACT ASSESSMENT

See Section 5.4.5.

4.8 OTHER CALCULATION RULES AND SCENARIOS

See Sections 6.3 and 6.4 of EN 15804.

4.8.1 ELECTRICITY MODELLING

Generation of electricity used in the manufacturing process in module A3 shall accounted for in module A3 according to ISO 21930 and in module A1 according to EN 15804, but as the results of modules A1-A3 shall be declared in aggregated form (see Section 5.4.5) this difference is of no importance to the user of the EPD.

LCI data for the generation of electricity used in A1-A3 (A1-A5 for services) shall be chosen in this priority:

1. Specific electricity mix as generated, or purchased from an electricity supplier, demonstrated by a contractual instrument (Guarantee of Origin or similar).
2. Residual electricity mix of the electricity supplier on the market.
3. Residual electricity mix on the market.
4. Electricity consumption mix on the market. This option shall not be used for electricity used in processes over which the manufacturer (EPD owner) has direct control[12,13].

The residual electricity mix is the mix when all contract-specific electricity that has been sold to other customers has been subtracted from the total consumption mix. If the composition of the residual grid mix on the market has not been publicly disclosed, it may conservatively be estimated by subtracting renewables from the consumption mix on the market.

“The market” in the above hierarchy shall be defined as being the (residual or consumption) grid mix of the country where the electricity is used, with exceptions for specified countries for which sub-national (residual or consumption) grid mixes shall be used: Australia, Brazil, Canada, China, India, and USA.[14]

According to above hierarchy, Guarantees of Origin may be used to demonstrate that a specific electricity mix has been used. Also other contractual instruments may be used, as long as reliability, traceability, and the avoidance of double counting are ensured, which is the case if the instrument guarantees that the electricity product (adopted from ISO 14067):

- conveys the information associated with the unit of electricity delivered together with the characteristics for the generator,
- is assured with a unique claim,
- is tracked and redeemed, retired or cancelled by or on behalf of the reporting entity,
- is as close as possible to the period to which the contractual instrument is applied and comprises a corresponding timespan, and
- is produced within the country, or within the market boundaries where consumption occurs if the grid is interconnected[15].

The Guarantees of Origin (or similar) shall be valid for at least the upcoming year and the manufacturer shall make a commitment to buy Guarantees of Origin for the full validity period of the EPD. If the electricity mix changes during the EPD validity (e.g., if the Guarantees of Origin are no longer valid) in a way that has an impact on the results or other contents of the EPD, the rules in the GPI

[12] For electricity markets without trade of Guarantees of Origin (or similar), the residual mix will, however, be identical to the consumption mix.

[13] For European countries that are part of the Association of Issuing Bodies (AIB), modelling of residual electricity mixes on the market shall be based on the latest AIB data.

[14] This specification of how the market shall be defined was added as of version 1.2.5 of this PCR. To not interfere with ongoing EPD developments, there was a six-month transition period ending 2023-04-30 under which other definitions of the market were accepted.

[15] In Europe, the European Continental (UCTE), Nordic, United Kingdom, Ireland and Baltic electricity grids shall be considered to be interconnected.

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shall be followed. The EPD shall contain information on how electricity has been modelled for core processes, for example including whether Guarantees of Origin (or similar) and/or residual electricity mixes have been used.

In the verification process, documentation on the Guarantees of Origin (or similar) shall be provided to the verifier. The documentation shall include the electricity provider, the purchaser, the electricity mix, the amount of electricity (in kWh) covered, and the time periods for issue and validity of the Guarantees of Origin (or similar). The documentation should include addresses of the power plants, tracking numbers, and information on (direct) coupling (yes/no); if this information is not included, it shall be justified.

The EPD shall declare the energy source behind electricity used in the manufacturing process in A3 and its climate impact as kg CO_2 eq./kWh (using the GWP-GHG indicator).

Within an entity with one electricity supply and a single electricity contract (e.g., a manufacturing site) that produces more than one product, contractual instruments are not allowed to be assigned only to a subset of the products produced. In other words, if contractual instruments are purchased for 50% of the electricity used within the entity, the electricity used by each product shall to 50% be assumed to be the specific electricity mix demonstrated by the contractual instrument, and to 50% the residual electricity mix.

The EPD shall be updated if the electricity mix used changes during the validity of the EPD, for example if there are no longer any valid Guarantees of Origin for the A3 processes, and this increases the results of any of the environmental performance indicators by more than 10%

LCI data for the generation of electricity used in modules B-D shall be based on the electricity consumption mix on the market, except if the EPD owner has direct control over a particular process in module B or C (which, e.g., may be the case for EPDs of certain construction services); then the above hierarchy for module A is applicable for that process.

The above outlined market-based electricity modelling approach shall be used for the main environmental performance results. Additionally, results based on location-based electricity modelling (i.e., using the consumption mix on the market to model all electricity used in the product system and module D) may be declared in a subsection of the environmental performance section, see Section 5.4.5.

4.8.2 MASS BALANCE APPROACHES

Mass balance approaches (MBAs) are sometimes used in LCA contexts to claim, for example, biobased, renewable, and/or recycled product content. MBAs are based on organizations (e.g. integrated chemical production systems) and not on single product systems, and they apply calculations and mass balance criteria that are not based on the physical relationship between input resources and product content. This implies that if, for example, biobased, renewable or recycled raw materials are not physically present in the product, the content of the product may be accounted as being biobased, renewable or recycled. Because of this, the current position of the International EPD System is that MBAs do not follow the ISO 14040 series, EN 15804 and related standards and shall not be used in EPDs. If MBAs are further developed, exemptions may be done in specific PCRs. Such exemptions shall be justified and approved in the PCR development process. In the present PCR, no such exemptions are done.

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5 CONTENT AND FORMAT OF EPD

EPDs based on this PCR shall contain the information described in this section. Flexibility is allowed in the formatting and layout provided that the EPD still includes the prescribed information. A generic template for EPDs is available via www.environdec.com. The requirements listed here are not complete as all requirements in EN 15804:2012+A2:2019/AC:2021 shall also be met, as shall the requirements in the GPI unless these are in conflict with requirement in this PCR or in EN 15804. Note that requirements on the content of the LCA report, and other requirements for enabling and facilitating the verification of the EPD, in EN 15804 and the GPI shall also be met.

The EPD content shall:

- be in line with the requirements and guidelines in ISO 14020 (Environmental labels and declarations – General principles),
- be verifiable, accurate, relevant and not misleading, and
- not include rating, judgements or direct comparison with other products[16].

The EPD should be made with a reasonable number of pages for the intended audience and use.

The EPD shall be published digitally in a machine-readable format. For more information, see www.environdec.com. The content of EPDs published in machine-readable format shall correspond with the content of the underlying EPD.

5.1 EPD LANGUAGES

EPDs should be published in English but may also be published in additional languages. If the EPD is not available in English, it shall contain an executive summary in English including the main content of the EPD. This summary is part of the EPD and thus also subject to the verification procedure.

5.2 UNITS AND QUANTITIES

In addition to EN 15804, Section 6.3.10, the following requirements apply for units used:

- The International System of Units (SI units) shall be used[17], e.g., kilograms (kg), Joules (J) and metres (m). Reasonable multiples of SI units may be decided in the PCR to improve readability, e.g., grams (g) or megajoules (MJ). The following exceptions apply:
  - Resources used for energy input (primary energy) should be expressed as kilowatt-hours (kWh) or megajoules (MJ), including renewable energy sources, e.g., hydropower, wind power and geothermal power.
  - Water use should be expressed in cubic metres (m^3).
  - Temperature should be expressed in degrees Celsius (°C).
  - Time should be expressed in the units most practical, e.g., seconds, minutes, hours, days or years.
  - Results of the environmental performance indicators shall be expressed in the units prescribed by the impact assessment methods, e.g. kg CO_2 equivalents.
- Two (maximum three) significant figures[18] should be adopted for all results. The number of significant digits shall be appropriate and consistent.
- The thousand separator and decimal mark in the EPD shall follow one of the following styles (a number with six significant figures shown for illustration):
  - SI style (French version): 1 234,56
  - SI style (English version): 1 234.56

[16] Therefore, results of normalization are not allowed to be reported in the EPD.

[17] There are some exceptions in the indicator units, which are defined in Annex C of EN 15804.

[18] Significant figures are those digits that carry meaning contributing to its precision. For example, with two significant digits, the result of 123.45 shall be displayed as 120, and 0.12345 shall be displayed as 0.12. In scientific notation, these two examples would be displayed as $1.2*10^2$ and $1.2*10^{-1}$.

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In case of potential confusion or intended use of the EPD in markets where different symbols are used, the EPD shall state what symbols are used for thousand separator and decimal mark.

- Dates and times presented in the EPD should follow the format in ISO 8601. For years, the prescribed format is YYYY-MM-DD, e.g., 2017-03-26 for March 26th, 2017.

The reporting of missing indicator result shall follow the following rules:

- indicators not declared shall be marked as “ND”.
- if an indicator value has been calculated to be “zero”, or if the value of “zero” is plausible for this indicator e.g. there is no activity in the scenario, then “0” is declared for this indicator. The declaration of “–” as an indicator value is not allowed.

5.3 USE OF IMAGES IN EPD

Images used in the EPD, especially pictures featured on the cover page, may in themselves be interpreted as an environmental claim. Images such as trees, mountains or wildlife that are not related to the declared product shall therefore be used with caution and in compliance with national legislation and best available practices in the markets in which the EPD is intended to be used.

5.4 EPD REPORTING FORMAT

The reporting format of the EPD shall include the following sections:

- Cover page (see Section 5.4.1)
- Programme information (see Section 5.4.2)
- Product information (see Section 5.4.3)
- Content declaration (see Section 5.4.4)
- Documentation of scenario settings, see EN 15804 Table 10 for A4, Table 11 for A5, Table 12 for B1-5, Table 14 for B6-7 and Table 15 for C1-4
- Environmental performance (see Section 5.4.5)
- References (see Section 5.4.11)

The following sections may be included:

- Additional environmental information (see Section 5.4.6)
- Additional social and economic information (see Section 5.4.7)

The following sections shall be included, when applicable:

- Information related on EPDs of multiple products (see 2.2.2.1)
- Information related to Sector EPDs (see Section 2.2.2.2)
- Differences versus previous versions (see Section 5.4.10)
- Executive summary in English (see Section 5.4.12)

5.4.1 COVER PAGE

The cover page shall include:

- Product name and image.
- Name and logotype of EPD owner.
- The text “Environmental Product Declaration” and/or “EPD”.
- Programme: The International EPD System, www.environdec.com.
- Programme operator: EPD International AB.
- Logotype of the International EPD System.

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- EPD registration number as issued by the programme operator[19].
- Date of publication (issue): 20YY-MM-DD.
- Date of revision: 20YY-MM-DD, when applicable.
- Date of validity; 20YY-MM-DD.
- A note that *"An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com*."
- A statement of conformity with ISO 14025:2006.
- A statement of conformity with EN 15804:2012+A2:2019/AC:2021.
- A statement of conformity with ISO 21930:2017, when applicable.
- ECO EPD logotype as approved by the ECO Platform.
- For EPDs of multiple products: a statement that the EPD covers multiple products and a list of all products covered by the EPD (if the EPD covers more than 10 products, the list of products may instead be included on a later page in the EPD; then this page shall be referred to on the cover page) and information on the type of EPD: "EPD of multiple products, based on the average results of the product group", "EPD of multiple products, based on a representative product", or "EPD of multiple products, based on worst-case results".
- For Sector EPDs: a statement that the EPD is a Sector EPD.
- In the case of EPDs registered through a regional hub (a regional or national programme based on and fully aligned with the International EPD System through an agreement with the programme operator), "Programme", "Programme operator", and "Logotype" shall be expanded to include a reference to the regional programme and the organisation responsible for it.

Where applicable, the cover page shall also include the following information:

- Information about dual registration of EPD in another programme, such as registration number and logotype.
- A statement of conformity with other standards and methodological guidelines.

5.4.2 PROGRAMME INFORMATION

The programme information section of the EPD shall include:

- Address of programme operator: *EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden, E-mail: info@environdec.com*
- The following statement on the requirements for comparability of EPDs, adapted from ISO 14025: *"EPDs within the same product category but registered in different EPD programmes may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same version number up to the first two digits[20]) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison."*
- A statement that the EPD owner has the sole ownership, liability, and responsibility of the EPD
- Information about verification[21] and the used PCR (and c-PCR, if applicable) in a table with the following format and contents:

[19] The EPD shall not include a "registration number" if such is provided by the certification body providing the EPD verification, as such a number may be confused with the mandatory registration number issued by the programme operator.

[20] As an example, this means that EPDs registered under versions 1.2.4 and 1.2.5 of this PCR are comparable, if the other criteria for comparability are fulfilled.

[21] If the EPD has been verified by an approved individual verifier who has received contractual assistance from a certification body that is not accredited, this certification body shall not be included in this table.

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Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serve as the core Product Category Rules (PCR) *If the EPD complies with ISO 21930, "ISO standard ISO 21930" shall be added to the above text.*
Product category rules (PCR): PCR 2019:14 Construction products, version 1.3.3 *<name and version of c-PCR(s), if applicable>*
PCR review was conducted by: The Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.
Life cycle assessment (LCA)
LCA accountability: *<name, organization>*
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☐ EPD verification by individual verifier Third-party verifier: *<name, organisation, and signature of the third-party verifier>* Approved by: The International EPD System
OR
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☐ EPD verification by accredited certification body Third-party verification: *<name, organisation>* is an approved certification body accountable for the third-party verification The certification body is accredited by: *<name of accreditation body & accreditation number, where applicable>*
OR
Independent third-party verification of the declaration and data, according to ISO 14025:2006 via: ☐ EPD verification by EPD Process Certification* Third-party verification: *<name, organisation>* is an approved certification body accountable for third-party verification Third-party verifier is accredited by: *<name of accreditation body & accreditation number, where applicable>* *For EPD Process Certification, an accredited certification body certifies and reviews the management process and verifies EPDs published on a regular basis. For details about third-party verification procedure of the EPDs, see the GPI.
Procedure for follow-up of data during EPD validity involves third-party verifier[22]. ☐ Yes ☐ No

[22] Procedure for follow-up the validity of the EPD is at minimum required once a year with the aim of confirming whether the information in the EPD remains valid or if the EPD needs to be updated during its validity period (see the GPI). The follow-up can be organized entirely by the EPD owner or together with the original verifier via an agreement between the two parties. In both approaches, the EPD owner is responsible for the procedure being carried out. If a change that requires an update (see the GPI) is identified, the EPD shall be re-verified by a verifier.

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5.4.3 PRODUCT INFORMATION

The product information section of the EPD shall include:

- Name, address and other relevant contact information to EPD owner.
- Description of the organisation. This may include information on products- or management system-related certifications (e.g. ISO 14024 Type I environmental labels, ISO 9001- and 14001-certificates and EMAS-registrations) and other relevant work the organisation wants to communicate (e.g. SA 8000, supply-chain management and social responsibility).
- Name and location of production site(s).
- Product identification by name, image, and an unambiguous identification of the product by standards, concessions or other means.
- Identification of the product according to the UN CPC scheme system, if possible. Other relevant codes for product classification may also be included, for example:
  - Common Procurement Vocabulary (CPV),
  - United Nations Standard Products and Services Code® (UNSPSC),
  - Classification of Products by Activity (NACE/CPA),
  - Australian and New Zealand Standard Industrial Classification (ANZSIC), or
  - Global Trade Item Number (GTIN)[23, 24]. Note that if the GTIN used when ordering a product is different from the GTIN used when delivering a product, the GTIN used in the ordering system is preferable in an EPD.
- Description of the product, the technical purpose of the product, including its application/intended use.
- Geographical scope of the EPD, per module (see Table 3), i.e., which countries or regions have the processes in modules A1-A5 been modelled to represent, and which countries or regions have the use (module B) and end-of-life (module C) of the product been modelled to represent.
- Declared or functional unit, and conversion factor to mass if mass is not used as declared unit.
- Reference service life (RSL) and or technical/actual lifespan, if relevant.
- Declaration of the year(s) the data of the manufacturing processes in module A3 represent(s).
- Reference to the main database(s) for generic data and LCA software used, if relevant. If a pre-verified EPD tool is used.a reference to the tool version and verifier.
- System diagram of the processes included in the LCA, divided into the life cycle stages and information modules defined according to EN 15804 (and ISO 21930, when relevant). This diagram should also describe geography, share of specific data and, if applicable, variation in GWP-GHG results between products and sites. See Table 3 for an example.
- Description of the EPD system boundary as one of the options (a-f) in Section 2.2.2.
- Information on which life-cycle stages are not considered (if any), with a justification of the omission.
- References to any relevant websites for more information or explanatory materials.
- Information about scenarios and additional technical information as per Section 7.3 in EN 15804, when applicable,
- Energy sources of the electricity used in manufacturing processes of module A3 and its climate impact (in kg CO_2 eq./kWh using the GWP GHG indicator).
- If the scrap inputs contribute more than 10% to the GWP-GHG results of modules A1-A3: the climate impact (in kg CO_2 eq./tonne using the GWP GHG indicator) of each input scrap and the percentage of scrap that was assumed to come with, and without, an environmental burden.

This section may also include:

[23] GTINs need to be verified and accessible here: https://www.gs1.org/services/verified-by-gs1/results.

[24] If a Global Model Number (GMN) is established on the market, which groups several producer-specific GTINs to a common product type, GMN may be used instead of GTIN, or as a complement.

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- Name and contact information of organisation carrying out the underlying LCA study.
- Additional information about the underlying LCA-based information, such as assumptions, cut-off rules, data quality and allocation.

Table 3 Example for the reporting of modules declared, geographical scope, share of specific data (in GWP-GHG results) and variation in GWP-GHG results between products and sites. Share of specific data and variation shall be reported for A1-A3 in EPDs of goods and for A1-A5 in EPDs of services.

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared																	
Geography																	
Share of specific data						-	-	-	-	-	-	-	-	-	-	-	-
Variation – products						-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites						-	-	-	-	-	-	-	-	-	-	-	-

Guidance for filling in Table 3 (this guidance shall be followed also if Table 3 is not used as a template for reporting this data):

- Modules declared:
  - Modules declared shall be noted with “X”.
  - Modules not declared shall be marked as “ND”.
- Geography:
  - Geographical representation per module shall be reported. This reporting shall be done by the country code(s) (e.g. UK, FR, DE) and/or name of the region(s) (e.g. EU 27, Global).
- Share of specific data used:
  - The share of the GWP-GHG results in A1-A3 (A1-A5 for services) coming from specific data shall be reported in the EPD. If more than 90% specific data is used, “>90%" may be reported.

    Specific data is here defined as:
    - data gathered from the actual manufacturing plant where product-specific processes are carried out;
    - actual data from other parts of the life cycle traced to the product under study, for example site-specific data on the production of materials or generation of electricity provided by contracted suppliers[25];

[25] If several suppliers are used within a clearly defined sector in a clearly defined geographical area, and a Sector EPD exists for this sector, results from this Sector EPD may be used and is then qualified as being based on specific data.

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- transportation data is accepted as specific if distances, means of transportation, load factor, fuel consumption, etc., of contracted transportation providers are accounted for.
- data from databases on transportation and energyware that are combined with specific activity data (i.e., actual transportation and energy parameters as listed above)[26].

All other data is regarded as proxy data.

Note that the above definition of proxy data differs from the definition in the GPI.

When the EPD uses another EPD as a data source, it may not be possible to calculate the percentage of product-specific LCI data (for example if the other EPD has not reported this percentage, or the underlying LCA data cannot be accessed). If this is the case, an expert judgment on the amount of specific data may be made based on the information available in the EPD used as data source. If a larger share than 60% is estimated by this simplified approach, it shall be stated in the EPD that "The percentage of specific data is assumed to be larger than 60%, but it cannot be proved since one or several EPDs that are used as data sources lack information on the percentage of specific data used."

- Variation – products:
  - In an EPD of multiple products, the difference (in %) between the declared GWP-GHG result, and the product with GWP-GHG results furthest away from the declared results, for modules A1-A3 (A1-A5 for services), shall be reported in the EPD. If the difference is below 10%, the actual difference or "<10%" shall be reported. Optionally, this variation can instead be declared as the difference between the declared result and lowest and highest result, respectively (e.g., as "+8/-12%").
- Variation – sites:
  - If the EPD is based on multiple manufacturing sites, the difference in GWP-GHG results for modules A1-A3 (A1-A5 for services) between the reported result and the results for the underlying sites shall be reported in percentage, if the difference is above 10%. If the difference is below 10%, the actual difference or "<10%" shall be reported. If the results are for one manufacturing site, "0%" shall be declared.

5.4.4 CONTENT DECLARATION (INCLUDING PACKAGING)

The content declaration shall declare the weight of one unit of a product, as purchased or per declared unit, and contain information about the content of the product in the form of a list of materials and chemicals. The content declaration shall also include the weight and the content of packaging materials. The gross weight of material in the content declaration shall cover 100% of one unit of product and its packaging. If there is more than 5% (post-consumer) recycled or biogenic content in the product, this shall be declared (if below 5%, this may be declared). If there is more than 5% biogenic content in the packaging material, this shall be declared (if below 5%, this may be declared)[27]. Also (post-consumer) recycled content of the packaging material may be declared.

See examples of content declarations in Table 4 and Table 5. Column 4 in Table 4 corresponds to the mandatory reporting of "Table 9 — Information describing the biogenic carbon content at the factory gate" in EN 15804, why the biogenic content shall be reported in weight-% of product and in kg biogenic carbon (C) per product (one product unit) or declared unit. If the EPD claims compliance with ISO 21930, the biogenic carbon content of product and packaging shall additionally be declared as kg CO_2 eq. per product or declared unit.

[26] Other generic LCI data, e.g. on material production, combined with specific activity data is, however, not qualified as specific data.

[27] To avoid misunderstanding: only post-consumer materials (scraps) shall be considered as recovered material in the content declaration and in contrast to pre-consumer recycling will the environmental upstream impact from previous processes be set to zero for post-consumer recycled material, while pre-consumer recycling will be subject for co-product allocation (see Section 4.5 of this document and Section 6.3.5.2 of EN 15804). Note that *secondary materials* are defined differently and is therefore a complementary indicator included in the environmental performance result (see Section 5.4.5), which accounts for both pre-consumer and post-consumer waste as outlined in ISO 14021.

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Table 4 Example of content declaration of a product.

Product components	Weight, kg	Post-consumer recycled material, weight-% of product	Biogenic material, weight-% of product	Biogenic material, kg C/product or declared unit
Filler	15	10	0	0
Pigment	15	0	0	0
Polymer	10	20	10	5
Other	10	5	0	0
Sum	**50**	**35**	**10**	**5**

Table 5 Example of content declaration of packaging.

Packaging materials	Weight, kg	Weight-% (versus the product)	Biogenic material, kg C/product or declared unit
Steel	2	4	0
Sum	**2**	**4**	**0**

The declared share of biobased or recycled materials shall be based on the actual share of biobased/recycled material in the product (in average over the studied time period, normally 1 year of production). In other words, the share of biobased/recycled materials of, for example, global average production of the constituent materials, for example as stated in generic LCI datasets, shall not be used as the basis for the declaration of biobased/recycled content. As such, the declared content information may be different from the product content as stated in the LCA model (as this may partly be based on generic LCI data). If the share of biobased/recycled material is unknown, this part of the content declaration can be left out or be declared as 0% (a conservative estimate) or unknown.

The content declaration shall also include information on the environmental and hazardous properties of substances contained in the product, for substances in the Candidate List of Substances of Very High Concern (SVHC) which exceeds the limits for registration with the European Chemicals Agency (i.e., if the substance constitute more than 0.1% of the weight of the product). The Candidate List of SVHC is available via the European Chemicals Agency[28].The content declaration shall also include other information on substances with hazardous and toxic properties that can be of concern for human health and/or the environment, if required by normative standards or regulation applicable in the market for which the EPD is valid (ISO 21930). Note that declaration of toxic/hazardous substances shall be done irrespective of whether the substances have been included or excluded from the LCA model based on, for example, the cut-off rules.

In EPDs of multiple products or sector EPDs, it shall be described in the content declaration section what the content declaration represents. See Section 2.2.2.1 for related requirements for EPDs of multiple products.

5.4.5 ENVIRONMENTAL PERFORMANCE

The section on environmental performance results shall declare the results of the indicators, and the corresponding disclaimers, of EN 15804:2012+A2:2019/AC:2021[29]. In addition, the results of a supplementary indicator for climate impact shall be declared: GWP-GHG[30].

The GWP-GHG indicator is identical to GWP-total except that the characterisation factor (CF) for biogenic CO_2 is set to zero[31]. This means that the uptake and emissions of biogenic CO_2 are “balanced out” already in modules A1-A3, instead of in modules A1-A5 (for

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

[29] Note that this is slightly different from the default indicators for non-construction products in the International EPD® System, for which the indicators listed at www.environdec.com/indicators shall be used (as of version 2 of the default list, the difference is that some the inventory indicators are optional instead of mandatory).

[30] Note that the GWP-GHG indicator is termed GWP-IOBC/GHG in the ILCD+EPD+ data format.

[31] In previous versions of this PCR (version 1.0 and 1.1), the GWP-GHG indicator instead used the CFs of version 3.01 of the GPI, which created comparability with EPDs based on GPI 3.01 and the old version of EN 15804 (EN 15804:2012+A1:2013). As such, GWP-GHG results in EPDs based on this PCR shall not be compared with GWP-GHG results in EPDs based on the previous version of this PCR or PCR 2012:01 based on EN 15804+A1.

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packaging) or modules A-C (for product). The results over the entire product life cycle, from module A to C, are thus identical for GWP-GHG and GWP-total unless some of the uptake of biogenic CO_2 is released as another greenhouse gas (e.g., CH_4).

For modules A1-A3, the GWP-GHG results can alternatively be calculated as the GWP-total results plus the biogenic carbon content of the product and its packaging multiplied with 44/12 (i.e., this calculation balances out the uptake of biogenic CO_2 that ends up in the product or packaging with an emission of this carbon, in the form of biogenic CO_2).

The GWP-GHG indicator creates comparability with how climate declarations are calculated in various regulative contexts (e.g., national regulations on climate declarations). In particular, the GWP-GHG indicator allows direct comparison of the climate impact of modules A1-A3 of comparable products in different EPDs, without having to consider the biogenic content of the products. As such, the GWP-GHG indicator supports the modular principle. The GWP-GHG indicator shall, in EPDs based on this PCR, also be used for data quality calculations and for determining which products to include in the same EPD (see Section 4.6). See Annex 1 for CFs of the GWP-GHG indicator, and other climate impact indicators, for some of the most common greenhouse gases.

In addition to the mandatory indicators and characterisation methods described in EN 15804 and above, results of other indicators and characterisation methods may be reported in the EPD. For example, results for the default international or North American characterisation methods listed in ISO 21930:2017 may be declared (e.g., so that compliance with ISO 21930 can be claimed). If the indicators of ISO 21930 are reported:

- climate impact should be characterised using the method of the GWP-GHG indicator as described above, and
- formation of ground level of ozone should be characterised based on POFP from LOTOS-EUROS as applied in ReCiPe 2008.

Another example of indicators and characterisation methods that may be declared in addition to the mandatory ones, are those from EN 15804:2012+A1:2013. If declared, it shall be clear in the EPD that the indicators and characterisation methods are from EN 15804:2012+A1:2013, but other LCA rules (system boundaries, allocation, etc.) are according to EN 15804:2012+A2:2019; i.e., the results of the “A1 indicators” shall not be claimed to be compliant with EN 15804:2012+A1:2013.

For the CFs to be used, EN 15804 refers to the “EN 15804 reference package” available at the JRC webpage[32]. In February 2023, this reference package was updated to be based on the EF 3.1 package for CFs to be used in the PEF framework (note, however, that the packages named “EF 3.0” and “EF 3.1” are different from the EN 15804 packages). As takes time for LCA software providers to update the CFs in line with the latest version of the reference package, and not to interfere with ongoing EPD project, it is possible to continue using the old version (based on EF 3.0) during a transition period ending 2024-08-31. As of 2024-09-01, CFs based on EF 3.1 (or a later version, if available) shall be used. The EPD shall report whether the EN 15804 reference package based on EF 3.0, EF 3.1 or a later version has been used.

EN 15804 specifies “IPCC (2013)” (AR5) as the reference for the GWP indicators. However, note that JRC’s latest update of the EN 15804 reference package entails that that the CFs for the GWP indicators are based on IPCC (2021) (AR6). Moreover, note that the CFs listed by JRC includes *indirect* radiative forcing, as explained by Fazio et al. (2018)[33], which results in higher numerical values than the CFs in IPCC (2013) or IPCC (2021). Therefore, GWP results based on the CFs from the JRC website may not be comparable to GWP results based on CFs from IPCC (2021) (AR6), IPCC (2013) (AR5) or the earlier IPCC report AR4 (IPCC 2007) (the difference in practice between using AR4, AR5 and AR6 is often negligible). Also, note that the CFs in the EN 15804 reference package related to biogenic carbon differ from the CFs in the packages named “EF 3.0” or “EF 3.1”. These differences are illustrated in Annex 1, which lists some of the CFs of the GWP-GHG indicator of this PCR along with the GWP indicators of EN 15804:A1, EN 15804+A2 (based on EF 3.0), EN 15804 (based on EF 3.1) , EF 3.0, and EF 3.1.

EN 15804:2012+A2:2019/AC:2021 specifies additional environmental indicators that shall be declared in the LCA report and may be declared in the EPD. If not declared in the EPD, it is recommended that they are declared in a public annex to the EPD, to facilitate the modularity of the EPD system where an EPD may be used as input data for the creation of another EPD downstream in the value chain. If declared in an annex, the annex shall also include the appropriate disclaimers of Table 5 in EN 15804.

To allow the EPD to be compatible with the previous version of EN 15804 (EN 15804:2012+A1:2013), it is possible to also declare the results of the indicators required by the previous version in the EPD.

Note that the indicator “exported energy” of EN 15804 corresponds to the indicator “recovered energy” in ISO 21930, with the difference that the results of the former indicator shall be expressed per energy carrier (heat and electricity, respectively) whereas this is not a requirement in ISO 21930. It is, however, not in violation to ISO 21930 to separate the results of this indicator per energy carrier, and as such the declaration of this indicator according to EN 15804 is compliant with the requirements in ISO 21930.

[32] https://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml

[33] https://eplca.jrc.ec.europa.eu/permalink/TR_SupportingCF_FINAL.pdf

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An additional requirement in this PCR, compared to EN 15804, is that the results of modules A1-A3 shall be declared in aggregated form[34]. This solves the problem that EN 15804 and ISO 21930 assign some processes (e.g., generation of electricity) to different modules. By declaring modules A1-A3 in aggregated form, the EPD can comply with both EN 15804 and ISO 21930. Apart from this, the environmental performance results of individual information modules shall not be added up into any combination into a total or sub-total of the life-cycle stages A, B, C or D (see Section 7.5 of EN 15804).

If module C is included in the EPD, the EPD shall include a disclaimer discouraging the use of the results of modules A1-A3 (A1-A5 for services) without considering the results of module C.

It is recommended that the EPD is made digitally available according to the ILCD+EPD+ data format, where the "+" indicates that besides the environmental performance results, also the content declaration (Table 4) and the documentation of the numerical variation of the EPD result (Q metadata, see Table 3) are machine readable.

In connection to the results for the environmental impact indicators, the EPD shall include the following statement: "The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks."

The environmental performance section of the EPD shall only include one set of results (this change was implemented in version 4.0 of the GPI to improve machine-readability of EPDs and thereby facilitate digitalisation of the EPD system), except for results that can be declared in a separate subsection (see below).

In addition to the main environmental performance results, the environmental performance section may declare the following additional LCA results in a separate subsection:

- Results for additional scenarios for modules A4-C4. If this is done, the most representative scenario (for the geographical scope of the EPD) shall be declared as the main environmental performance results, and the other scenarios shall be declared in the separate subsection.
- Results of an alternative modelling approach, if such an alternative modelling approach is explicitly allowed by the applicable c-PCR or this PCR (this PCR allows two alternative results, see the next bullet points).
- Alternative GWP-biogenic results, using a method that allows consideration of permanent (more than 100 years) storage of biogenic carbon, either in the product, in a landfill, or as a consequence of applying carbon capture and storage (CCS) to the incineration of biogenic carbon. Note that the current method of EN 15804 does not allow consideration of permanent storage (in case of such storage, a virtual emission of biogenic CO_2 shall be added, see Annex 2).
- Alternative environmental performance results based on location-based electricity modelling, which means that the consumption mix on the market is used to model all electricity used in the product system (also the manufacturing processes in A3 and processes under operational control of the EPD owner).

The subsection with additional LCA results shall clearly describe the scenario/method used to calculate the results, including how it differs from the scenario/method of the main environmental performance results.

See Annex 2 and Annex 3 for clarifications and examples for assessing GWP-biogenic and the primary energy use indicators.

5.4.6 ADDITIONAL ENVIRONMENTAL INFORMATION

See Sections 5.4, 7.3 and 7.4 in EN 15804.

An EPD may include additional environmental information not derived from the LCA. The additional environmental information may cover various aspects of specific relevance for the product, for example:

- instruction for proper use of the product, e.g. to minimise the energy or water consumption or to improve the durability of the product;
- instructions for 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;

[34] But it is recommended to declare all modules (A1, A2, A3, etc.) separately in the LCA report.

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- 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,
- information regarding disposal of the product or inherent materials, and any other information considered necessary to minimise the product's end-of-life impacts,
- 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, and
  - information on where interested parties may find more details about the organisation's environmental work.

Any additional environmental information declared shall be substantiated and verifiable, and be derived using appropriate methods and be specific, accurate, not misleading, and relevant to the specific product. Quantitative information is preferred over qualitative information.

Furthermore, the additional environmental information may include conversion factors, see Section 5.4.6.1.

5.4.6.1. Conversion factors

Conversion factors may be included in an EPD for the purposes of:

- converting the declared results of a product group to results for specific products within the group, or
- converting the declared results to results for another declared/functional unit.

For the first of the above two purposes, the declared conversion factors can be applicable for the results of all declared modules or for a subset of modules (e.g., A1-A3), and for all declared indicators or for a subset of indicators (e.g., the GWP-GHG indicator). Such limitations in the applicability of the conversion factors shall be clearly stated in the EPD. For the modules and indicators to which the conversion factors are applicable, the results shall scale linearly with the conversion factor.

The conversion factors shall be verifiable, i.e., the underlying data for the conversion factors shall be provided in the LCA report.

The conversion factors shall be included in the section with additional environmental information (see Section 5.4.6), although they may be referred to in the results section.

Conversion factors can, however, not be included for the purpose of converting the declared results into results for products not covered by the EPD. The EPD is for a specific product or product group, and only the EPD content of that product/product group has been verified and may be considered EPD information.

5.4.7 ADDITIONAL SOCIAL AND ECONOMIC INFORMATION

The EPD may also include other relevant social and economic information as additional and voluntary information. This may be product information or a description of an organisation's overall work on social or economic sustainability, such as activities related to supply chain management or social responsibility.

Any additional social and economic information declared shall be substantiated and verifiable, and be derived using appropriate methods and be specific, accurate, not misleading, and relevant to the specific product. Quantitative information is preferred over qualitative information.

5.4.8 INFORMATION RELATED TO EPD OF MULTIPLE PRODUCTS

For EPDs of multiple products, the following information shall be included:

- if the EPD is based on average results, a description of how the averages have been determined, and
- if the EPD is based on a representative product, a justification for why this is representative.

See Section 2.2.2.1 for more requirements on such EPDs.

5.4.9 INFORMATION RELATED TO SECTOR EPD

For Sector EPDs, the following information shall be included:

- a list of the contributing manufacturers that the Sector EPD covers,

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- a description of how the selection of the sites/products has been done and how the average has been determined, and
- a statement that the document covers average values for an entire or partial product category (specifying the percentage of representativeness) and, hence, the declared product is an average that is not available for purchase on the market and that the results are not representative for any specific manufacturer or its product.

See Section 2.2.2.2 for more requirements on such EPDs.

5.4.10 DIFFERENCES VERSUS PREVIOUS VERSIONS

For EPDs that have been updated, the following information shall be included:

- a description of the differences versus previously published versions, for example a description of the percentage change in environmental performance results for all of the declared indicators, and the main reason for the change, and
- a revision date on the cover page (see Section 5.4.1).

5.4.11 REFERENCES

A list of references shall be included, including references to the GPI (including version number) and relevant standards and PCRs (registration number, name and version).

5.4.12 EXECUTIVE SUMMARY IN ENGLISH

For EPDs published in another language than English, an executive summary in English shall be included in the EPD. The executive summary shall contain relevant summarised information related to the programme, product, environmental performance, information related to pre-certified EPDs, and information related to Sector EPDs. Besides this, further information may be added such as additional environmental, social or economic information, references as well as differences versus previous EPD versions.

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6 GLOSSARY

°C	degrees Celsius
ANZSIC	Australian and New Zealand Standard Industrial Classification
c-PCR	complementary product category rules
CEN	European Committee for Standardisation
CF	Characterisation factor
CPD	Construction product directive
CPR	Construction product regulation
CPV	common procurement vocabulary
EPD	Environmental product declaration
g	gram
GHG	greenhouse gases
GMN	Global Model Number
GTIN	Global Trade Item Number
GWP	Global warming potential
ND	module or indicator not declared
ILCD	International Reference Life Cycle Data System
ISO	International Organization for Standardization
IPCC	Intergovernmental panel on climate change
J	joule
kg	kilogram
kWh	kilowatt hour
LCA	Life cycle assessment
LCI	Life cycle inventory
LCIA	Life cycle impact assessment
m	metre
m^2	square metre
m^3	cubic metre
MJ	megajoule
PCR	Product Category Rules
RSL	reference service life
SI	International System of Units
SVHC	Substances of Very High Concern
TC	Technical Committee
UN CPC	United Nations Central Product Classification
UNSPSC	United Nations Standard Products and Services Code

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7 REFERENCES

CEN (2013): EN 15804:2012+A1:2013, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.

CEN (2019): EN 50693 Product category rules for life cycle assessments of electronic and electrical products and systems.

CEN (2021): EN 15804:2012+A2:2019/AC:2021, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.

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Erlandsson M (1996): Methodology for Environmental Assessment of Wood-Based Products. General and specific questions related to the live cycle inventory. I 9608070. Trätek, Stockholm.

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ISO (2000): ISO 14020:2000, Environmental labels and declarations – General principles

ISO (2004): ISO 8601:2004 Data elements and interchange formats – Information interchange – Representation of dates and times

ISO (2006a): ISO 14025:2006, Environmental labels and declarations – Type III environmental declarations – Principles and procedures

ISO (2006b): ISO 14040:2006, Environmental management – Life cycle assessment – Principles and framework

ISO (2006c): ISO 14044: 2006, Environmental management – Life cycle assessment – Requirements and guidelines

ISO (2017): ISO 21930:2017, Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services

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8 VERSION HISTORY OF PCR

VERSION 1.0, 2019-12-20

Original version, replacing PCR 2012:01, complying with version 3.01 of the General Programme Instructions and EN 15804:2012+A2:2019.

VERSION 1.1, 2020-09-14

Changes in this update relate to the following:

- Clarification of Figure 2 and the allowed scopes
- Corrected error in Table 2: Module D is mandatory for an EPD with the scope “Cradle to grave and module D”
- Clarification regarding modelling of module D
- Averaging products in modules A1-A3
- Averaging manufacturing sites from the same company in modules A1-A3
- Sector EPD in modules A1-A3
- Recommendation that a Guarantee of Origin is valid at least for the upcoming used to be used as basis for the electricity mix
- Clarification regarding unit and declaration of eutrophication (aquatic freshwater)
- Clarification regarding the GWP-GHG indicator (including the addition of Annex 1)
- Recommendation to include additional environmental impact indicators from EN 15804 in a public annex to facilitate modularity
- Editorial changes for language and clarification

VERSION 1.11, 2021-02-05

Changes in this update concern:

- Clarification in Section 4.5.4 on what to include in modules C and D, respectively.
- Clarifications and adjustments in Section 4.8.1, regarding the selection of dataset for electricity, to be more aligned with the GPI. The hierarchy now allows, and encourages, the use of site-specific data in the modelling of all parts of the product life cycle.
- Clarification in 5.4.3, regarding the definition of specific data.
- Clarification in Section 5.4.4, regarding the declaration of SVHC.
- Clarification in Section 5.4.5 on what method to use to obtain eutrophication results in PO_4^{-3} eq.

VERSION 1.2, 2022-06-22

Changes in this update concern:

- Updates to comply with version 4.0 of the GPI, including the following changes:
  - Clarified rules on co-product and waste allocation in Section 4.5. Among others, this includes: guidance on when each set of allocation rules shall be applied; the allocation of waste in Section 4.5.2 now includes the interpretation of EN 15804 in version 4.0 of the GPI, regarding allocation when the waste incinerator gets paid for incinerating the material (this interpretation influences reporting in module D, why Section 4.5.4 has been revised); and clarification of the difference between EN 15804 and ISO 21930 regarding allocation rules for modules A1-A3. Related, Figure 4 has been added to illustrate the processes and flows of modules C and D, and Section 4.5.3 has been added to clarify how the thermal efficiency of incineration/combustion processes influences the modelling.
  - Changed and clarified rules on EPDs of multiple products, including clarifications on the three options (representative product or that average or highest results are declared), that the 10% rule is only applicable if representative product or

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average results are declared, and that only one set of results can be included in the section on environmental performance results. See Section 2.2.2.1 for more information. Related, it has been clarified that products produced at different sites may be *identical* products, and thus not subject to the rules of EPDs of multiple *similar* products, see Section 2.2.2.1; rules for converting results between products in a product group, or between declared/functional units, have been added, see Section 5.4.6.1; and it has been clarified that if several scenarios are declared these shall be included as additional environmental information, see Section 5.4.3.

- Updated rules on the reporting on Guarantees of Origin (or similar), see Section 4.8.1.
- Clarification related to mass balance approaches (MBA), see Section 4.8.2.
- Clarifications on the procedure for follow-up the validity of the EPD and the type of procedure to be declared in the EPD, see Section 5.4.2
- Mentioning of GTIN, and/or GMN when this is established, as an additional system to use for product classification in the EPD, see Section 5.4.3.
- Clarification and example how content declaration can include the mandatory information as given in EN 15804, see Section 5.4.4.

- Update to the latest version of EN 15804: EN 15804:2012+A2:2019/AC:2021 issued 18 August 2021, which corrects the unit for the impact category eutrophication aquatic freshwater. The result of eutrophication aquatic freshwater now only has to be given in kg P eq.
- Clarified and added additional requirements compared to EN 15804 and alignment with ISO 21930, see Sections 1.4 and 1.5.
- Clarified scope of the PCR, particularly that it is applicable for products that may, among others, be used in the construction Sector, see Section 2.2.
- Specifications for when a trader is the EPD owner, see Section 2.2.2.3.
- Changed requirement on declaring GWP-GHG results (per kWh) for electricity purchased for use in manufacturing process of module A3, if these results are more than 30% of the GWP-GHG results of modules A1-A3 (in the previous version, the requirement was to declare this if electricity use in module A3 was more than 30% of the *energy/electricity use* of modules A1-A3). See Section 4.8.1.
- Requirements that a variation of 0% shall be reported in EPDs of one product or site, see Section 5.4.3.
- Clarified rules on declaration of geographical scope, see Section 5.4.3.
- Clarification that the guidance for filling in Table 3 shall be followed also if the table is not used as a template, see Section 5.4.3.
- Clarification that the declared share of biobased or recycled materials shall be based on the actual share of biobased/recycled material in the product, and not the share of biobased/recycled materials of stated in generic LCI datasets, see Section 5.4.4.
- Updated CFs for the GWP-GHG indicator, see Section 5.4.5.
- Clarified that the additional environmental information may include information on permanent storage of biogenic carbon, and how this would influence GWP-biogenic results. see Section 5.4.6.
- Annex 2 added to describe and exemplify how GWP-biogenic results can be calculated and reported.

VERSION 1.2.1, 2022-07-04

Changes in this update are editorial, concerning the format of the document.

VERSION 1.2.2, 2022-07-05

Changes in this update are editorial.

VERSION 1.2.3, 2022-07-08

Changes in this update are editorial.

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VERSION 1.2.4, 2022-09-07

Correction made in Section 5.4.3 on the definitions of specific and proxy data. Before it was stated that the definitions of specific data in this PCR and the GPI differ, but this was incorrect – only the definitions of proxy data differ.

VERSION 1.2.5, 2022-11-01

- Editorial changes.
- More specific rules on the definition of the electricity market, see Section 4.8.1.
- The characterisation factors of EF 3.1, released in July 2022, were added to Table 6 of Annex 1.
- Added footnote to Annex 2, clarifying that the sub-indicators for GWP-biogenic shall not be declared in the EPD.

VERSION 1.3.0, 2023-06-20

Among others, this version includes the following changes and additions:

- Editorial changes.
- Clarification in Section 1.2 that several c-PCRs can be used, unless they have conflicting requirements.
- Added Section 1.5, with additional requirement for complying with ISO 21930.
- Clarifications on the scope of the PCR, see Section 2.2.
- Sections on EPDs of multiple products, sector EPDs and EPDs developed by traders have been moved to Section 2.2.2
- Changed rules for EPDs of multiple products (e.g., more relaxed regarding the 10% rule) and been further specified, see Section 2.2.2.1.
- Changes rules for EPDs of traders, see Section 2.2.2.3.
- Changed and clarified rules regarding RSL, see Section 4.2.
- Added clarifications and requirements on the modelling of infrastructure/capital goods and personnel activities, see Section 4.3.2.
- Clarified cut-off rules, see Section 4.4.
- Clarifications and further specifications in Section 4.5, on allocation rules, for example regarding the allocation of scrap.
- Added requirement regarding transparency of the modelling of scrap, see Section 4.5.5.
- Added requirements for EEE products, see Section 4.3.3.
- Clarified rules on electricity modelling, see Section 4.8.1.
- Changed requirement for declaring the GWG-results for electricity used in A3, see Section 4.8.1.
- Clarifications on mass balance approaches, see Section 4.8.2.
- Modified Table 3, see Section 5.4.3.
- Modified Table 4, see Section 5.4.4.
- Moved the declaration of any LCA-based information to the environmental performance section, see Section 5.4.5.
- Section on conversion factors moved to Section 5.4.6.1.
- Clarifications done in Annex 1 and Annex 2.
- Added Annex 3 to clarify and illustrate the modelling of the primary energy use indicators.

VERSION 1.3.1, 2023-07-08

Editorial change in Section 5.4.3, to correct unit to use in the declaration of the GWP-GHG results of scrap, from CO2 eq./kWh to CO2 eq./tonne.

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VERSION 1.3.2, 2023-12-08

- Editorial changes.
- Clarifications made in the rules for EPDs of multiple products in Section 2.2.2.1, regarding the more relaxed 10% rule (that was introduced as of version 1.3.0) and the rule to declare the variation of the GWP-GHG result for modules A1-A3, or A1-A5 for services (this rule is also stated in Section 5.4.3).
- The option for EPDs of multiple products, to also present the GWP-GHG results of the “best-case product”, has been expanded to enable declaration of the GWP-GHG results for the “worst-case product”, see Section 2.2.2.1.
- Clarification that the requirement in Section 4.3.3 for c-PCRs of EEE products to provide a specific use scenario, is valid for any c-PCR developed and published in the International EPD System after the rule was added in this PCR.
- The following change in requirements were done in Section 4.8.1 to comply with ECO Platform rules:
  - The permitted exception to the requirement to use specific electricity or residual mix for processes under the control of the EPD owner – for markets without a publicly available residual mix – has been removed. Instead, when the composition of the residual grid mix on the market has not been publicly disclosed, it may conservatively be estimated by subtracting renewables from the consumption mix on the market.
  - Free assignment of contractual instruments for electricity within a manufacturing site is no longer allowed. ECO Platform has decided that this shall be seen as a clarification of an already existing ECO Platform rule.
- Clarification in Section 5 that the EPD shall be published in machine-readable format (this requirement was already in place, although not stated in the PCR).
- Correction made in Section 5.4.5, that results over the entire product life cycle, from module A to C, are not always identical for GWP-GHG and GWP-total.
- Changed requirement for declaration of biogenic carbon content in product and packaging in Section 5.4.4, to be expressed per product or declared unit, rather than per kg. Related, added requirement for EPDs claiming compliance with ISO 21930, to also declare the biogenic carbon content in terms of kg CO_2 eq.

VERSION 1.3.3, 2024-03-01

Editorial changes:

- Paragraph added in Section 4.8.1 on the assignment of contractual instruments for electricity within an entity. This was referred to in the version history as of Version 1.3.2 (see above) but was missing in the section referred to.
- Updated examples for content declaration, see Table 4 and Table 5 in Section 5.4.4.
- Added mentioning of the sunset date for CFs based on EF 3.0, which has previously been announced on www.environdec.com. See Section 5.4.5.

VERSION 1.3.4, 2024-04-30

- Prolonged validity period with six months, until 2025-06-20, as an updating process has been initiated. The updated PCR (version 2.0.0) is expected to be published late 2024 or early 2025, which means there will be a transition period until 2025-06-20 under which this both versions are applicable.
- Implemented more flexibility to declare additional environmental performance results based on location-based electricity modelling, in a subsection of the environmental performance section, see Section 5.4.5. This was done to answer a market need for comparability of EPDs following different electricity modelling approaches.

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ANNEX 1: COMPARISON OF GWP CHARACTERISATION FACTORS IN DIFFERENT FRAMEWORKS

Table 6 Characterisation factors, in kg CO_2 equivalents per kg, for some of the emissions contributing to some of the GWP indicators in this PCR and EN 15804+A2 (based on EF 3.0 or EF 3.1, respectively), EF 3.0 (PEF), EF 3.1 (PEF), and EN 15804:A1. The characterisation factors for EF 3.0 and EF 3.1 are from the JRC website (https://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml).

	PCR 2019:14 and EN 15804+A2 (based on EF 3.0)			**PCR 2019:14 and EN 15804+A2 (based on EF 3.1)**			**EF 3.0 (PEF)**		**EF 3.1 (PEF)**		**EN 15804+A1 (IPCC AR4)**
	GWP-fossil	GWP-biogenic	GWP-GHG	GWP-fossil	GWP-biogenic	GWP-GHG	GWP-fossil	GWP-biogenic	GWP-fossil	GWP-biogenic	GWP
CO_2 fossil	1	0	1	1	0	1	1	0	1	0	1
CO_2 biogenic	0	1	0	0	1	0	0	0	0	0	0/1[35]
CH_4 fossil	36.8	0	36.8	29.8	0	29.8	36.8	0	29.8	0	25
CH_4 biogenic	0	36.8	36.8	0	29.8	29.8	0	34	0	27	25
N_2O	298	0	298	273	0	273	298	0	273	0	298

Note 1: As described in Section 5.4.5, the GWP-GHG indicator is identical to GWP-total except that the characterisation factor (CF) for biogenic CO_2 is set to zero. Otherwise, the same versions of CFs shall be used for GWP-GHG as used for the other GWP indicators declared in the EPD. If characterisations factors (CFs) for GWP-GHG are not found in the LCA software used, it is recommended to take a copy of the GWP-total CFs and then manually edit and set the CF for biogenic CO_2 biogenic emissions and uptake to zero (check that CFs are in line with the table above).

Note 2: CFs of biogenic CH_4 for the GWP indicators used in PCR 2019:14 and EN 15804+A2 include the effect of its decay product, biogenic CO_2. If not, the CF would have been 34 (as in EF 3.0) or 27 (as in EF 3.1) instead of 36.8 (in EN 15804+A2 based on EF 3.0) or 29.8 (in EN 15804+A2 based on EF 3.1) kg CO2 eq./kg.

[35] The European standard EN 16485, with product category rules for round and sawn timber, introduced an approach that made it possible to also report biogenic emission and uptake of carbon dioxide. This was however never addressed as an amendment to EN 15804+A1 that only refers to IPCC (2007), why different reporting approaches are applied in EPDs following EN 15804+A1.

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ANNEX 2: GUIDANCE TO CALCULATING GWP-BIOGENIC

This annex explains and illustrates the basic principles of collecting, reporting, and balancing the mass of biogenic carbon and calculating the GWP-biogenic results. The principles are based on EN 15804:2012+2019:A2/AC:2021.

Generally, the LCI shall separate between fossil and biogenic carbon (typically as biogenic CO_2, biogenic CH_4, etc). Furthermore, the LCI shall report GHG emissions that arise from land use or land-use change separately, which are neither included in the GWP-fossil or GWP-biogenic results, but in the GWP-luluc results, to avoid double accounting.

The amount of biogenic carbon is an inherent material property, which sometimes is not included, or correctly accounted for, in generic datasets available in LCA software. Therefore, the amount of biogenic carbon in the product or the packaging – which is needed to correctly calculate the GWP-biogenic results and account for the content declaration – may have to be checked and added manually.

If there is a biogenic CO_2 emission that is not from the burning or degradation of the product or its packaging, the initial uptake of this biogenic carbon shall be reported in the module where the emission occurs. This means that such emissions and uptakes will be balanced out in each individual module. When calculating the GWP-biogenic results, an emission of biogenic CO_2 and its uptake can therefore be set to zero for all flows that do not end up as content of the product or the packaging. Note that this concerns when the biogenic carbon is emitted as CO_2; if the biogenic carbon uptake is instead, for example, released as CH_4, the GWP-biogenic results will not be zero in each individual module.

In case the biogenic carbon ends up as product or packaging content, the biogenic CO_2 emissions of incinerating or degrading this carbon will then appear in module C (for product content) or in module A5 (for packaging content)[36]. If the biogenic carbon content of the product is not incinerated at end-of-life, for example because the carbon is permanently stored in the product (for more than 100 years) or because the carbon leaves the product system for reuse or recycling into a new product, a virtual emission of biogenic CO_2 shall be added to the module from which the carbon leaves the studied product system, which most often is module C (similarly an uptake of biogenic CO_2 shall be added in, e.g., module A1 if recycled/reused biogenic carbon is used as an input). Thus EN 15804 and this PCR do not allow credits due to delayed emissions or permanent storage of biogenic carbon when calculating the main results (see Section 5.4.2 of EN 15804) [37]. The biogenic carbon of packaging material is most often emitted as biogenic CO_2 emissions in module A5, and therefore the biogenic carbon stored in the packaging material can most often be balanced out within module A (summed over A1-A5; thus A5 needs to be reported in such cases). In the end, the sum of the sequestered biogenic carbon and the biogenic carbon emitted or leaving the product system in any other way during the product life cycle shall always be zero[38]. Related, note that biogenic carbon that ends up in product or packaging shall be separately declared in the content declaration, unless it is less than 5% of the mass of the product or the packaging, respectively (see Section 5.4.4 of this PCR and Section 6.4.4 of EN 15804).

If the packaging contains more than 5% biogenic carbon, the uptake of this biogenic carbon, as biogenic CO_2, in module A1 shall be balanced out by an equal amount of emission of biogenic CO_2 in module A5. Then module A5 shall, also in EPDs which otherwise have an A1-A3 scope, be included for this “balancing-out reporting”. Unless module A5 is fully included, this “balancing-out reporting” for module A5 shall be included in the declared A1-A3 results; if this is done, the EPD shall describe that the A1-A3 results includes the “balancing-out reporting” of the biogenic CO_2 of packaging released in module A5. If the packaging contains less than 5% biogenic carbon, this “balancing-out” of biogenic carbon may be done directly in module A1 instead.

Table 6 gives an example of how to account for biogenic carbon and calculate the GWP-biogenic results. First, it illustrates how the LCA practitioner needs to sum up the results of respective module. Note that the uptake and emitted biogenic CO_2 stored in the product or packaging shall be reported separately from other greenhouse gases (CH_4 etc.) that contribute to the GWP-biogenic results (see row 3 in Table 6). The LCA practitioner will now notice that, in this case, the LCI data on biogenic CO_2 provided by the

[36] According to Section 6.3.5.4.2 of EN 15804, there may also be end-of-life processes in module B, for example due to replacement of the product of part of the product, which may also give rise to biogenic CO_2 emissions. However, such emissions are balanced out by an equal amount of biogenic CO_2 uptake within the same module and can therefore be disregarded.

[37] In previous versions of the GPI (e.g., version 3.01), biogenic carbon stored for more than 100 years was assumed to create a carbon sink and thus lead to negative GWP-biogenic results. This is not allowed according to EN 15804+A2 and the present PCR. The results of such alternative modelling may, however, be declared in a separate subsection of the environmental performance section, see Section 5.4.5.

[38] Similarly, the sum of the inputs and outputs of biogenic carbon to module D, and thus the contribution of biogenic CO_2 uptake and emissions to the GWP-results, shall be zero. That is, if module D includes avoided production due to material reuse or recycling, or energy recovery, the avoided uptake of biogenic carbon in such production shall be assumed to be offset by a corresponding emission of biogenic CO_2 within module D.

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LCA software are not balanced out in each module – there are net biogenic CO_2 emissions of 200 kg in module A and 5 kg in module C – since the software and the database were not designed for this kind of calculation. This could be corrected by adding an uptake of biogenic CO_2 in the LCI within the same module, i.e. 200 kg in module A (presumably A1-A2) and 5 kg in module C, or by "neglecting" these emissions by setting their CFs to zero (see strikethrough in row 3 and the zeros added to each cell, since these flows are not stored as product or packaging content). Both alternatives follow the modular approach where the biogenic CO_2 emissions are balanced out in each module. In Table 6, the latter approach has been chosen, as described below.

Next step is to correctly account for the biogenic carbon in the product and its packaging. In the example, the total sequestration of biogenic carbon in the product amounts to 715 kg biogenic CO_2 (and no biogenic carbon in the packaging material). This amount of biogenic carbon will, if the product is incinerated at end of life, be emitted as biogenic CO_2 in module C and thus be balanced out over the product life cycle. Depending on the scenario, this amount may be divided into different C modules, but the sum shall always be the same as the uptake reported in modules A1-A3.

In the example of Table 6, it is now possible to calculate the GWP-biogenic results. The CF for the emissions of biogenic CO_2 is set to zero (blue added figures in the table, row 2). The biogenic carbon stored in the product and potentially in packaging is added to the LCI and a check is made that the total amount is zero over the full product life cycle. This biogenic mass balance check is typically documented in the LCA report.

Table 7 Example for illustrating the calculation of GWP-biogenic results (unit is CO_2 equivalents).

		A1-A2	A3	C1-C2	C3	Sum A-C	Comment
Row 1	GWP-biogenic (CO, CH_4 etc.)	2	1	0.5	2	5.5	Result from LCA tool
Row 2	GWP-biogenic (CO_2 for non-product/packaging content)	0	0 ~~200~~	0 ~~5~~	0	0 ~~205~~	Result from LCA tool
Row 3	GWP-biogenic (product or packaging content as CO_2)	-715			715		Manually added
Row 4	**GWP-biogenic (as reported in the EPD)[39]**	**-713**	**1**	**0.5**	**717**	**5.5**	Calculated

It is recommended to use the dry matter of any biogenic material that is reported in the LCI. It is also recommended to check that the combustion figures in the LCI are correct. An example for wood: the lower heat value for dry matter of a certain wood species is 19.2 MJ/kg and the carbon content can be set to 50%. It can now be calculated that 95 g CO_2/MJ is emitted when this wood is completely burned (1/19.2*0.5*44/12=0.095 kg CO_2/MJ). Moreover, the dry matter for this wood species is 390 kg/m^3, which is equal to a sequestration of 715 kg CO_2/m^3 (390*0.5*44/12) dry matter of wood.

[39] This is the indicator that is mandatory to declare in the environmental performance section of the EPD. The sub-indicators of row 1-3 shall not be declared in the EPD. Neither is there any requirement to declare the sub-indicators in the LCA report. Table 6 merely provides an example of how the GWP-biogenic results can be calculated, and this can be facilitated by calculating the three sub-indicators separately and then adding them up.

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ANNEX 3: GUIDANCE TO CALCULATING THE PRIMARY ENERGY USE INDICATORS

Among the indicators describing resource use, there are six indicators on the use of primary energy resources (in MJ, net calorific value). Three of the indicators are on the use of *renewable* energy resource, separated into energy used as raw materials (PERM), energy used as energy carriers (PERE), and the total renewable energy used as raw materials and energy carriers (PERT). The other three indicators are on the use of *non-renewable* energy use, separated into energy used as raw materials (PENRM), energy used as energy carriers (PENRE), and the total non-renewable energy used as raw materials and energy carriers (PENRT).

The energy used as raw materials is limited to the inherent energy of the product and the packaging. All other input of primary energy resources shall be considered as energy used as energy carrier.

If a material is first used as raw material in, for example, the packaging, and its energy content is later used as an energy carrier in the product system, it shall be classified as energy used as energy carrier, to avoid double counting of this energy.

The energy used as raw materials shall be calculated by multiplying the mass (kg) of each material of the product and packaging content, with the lower calorific value (MJ/kg) of this material.

As for the biogenic content (see Annex 2), inherent energy in the product or packaging (net calorific value) often needs to be checked and added manually when using LCA software, to ensure that the primary energy use is correctly separated into energy used as raw material and energy used as energy carrier and that no energy is unaccounted for. This also means that the inherent energy of input flows of reused or recycled material, or recovered energy, shall be considered. In other words, even if waste allocation (i.e., cut-off) has been used to allocate such input flows (i.e., they come without environmental burden), the energy that is in the flow shall be considered as an input of primary energy into the studied product system, following the rule in EN 15804 that inherent properties shall not be allocated away. Similarly, if materials leave the product system to reuse or recycling, or if energy leaves the product system (e.g., the useful energy from incineration or landfill with energy recovery), these flows shall be subtracted from the indicators of energy used as raw materials and energy carriers, respectively.

Based on different interpretations of EN 15804, there are three options for how to separate the use of primary energy into energy used as raw material and energy used as energy carrier: options A, B and C, as described below. Either option may be used. The option chosen shall be described in direct connection to the declaration of the results of the primary energy use indicators in the EPD.

In option A, the energy used as raw material shall be declared as an input to the module where it enters the product system (in module A1-A3) and as an equally large output from the product system where it exits the product system (i.e., module A5 for packaging content and module C3 and/or C4 for product content) for use in another product system or as waste. Outputs in the form of waste shall, in the module where the loss occurs, be reported as an input in the indicator for energy used as energy carriers (even if the energy is not used in the product system). The rationale behind this option is that the indicator for energy used as raw materials shall reflect the input of energy that becomes part of the product and packaging, and the output of this energy from the product system regardless of when and how it exits the product system. That is, this indicator shows how much energy that is stored in the product or packaging at any given time. At the end of module C, energy is no longer stored in the product, and the energy used as raw materials will therefore be zero over the product life cycle.

In option B, the energy used as raw material shall be declared as an input to the module where it enters the product system (often in module A1) and as an output from the product system if it exits the product system as useful energy (often from modules A5 or C3). Energy content that is wasted (e.g. in landfill or in incineration), remains as part of the indicator for energy used for raw materials, and shall *not* (in contrast to option A) be reported as an input of energy used for energy carriers. The rationale behind this option is that the indicator for energy used as raw materials shall reflect the energy used for the purpose of being raw material in the product or packaging, that is not subsequently transferred in useable form to another product system. In this option, energy used as raw material will often *not* be zero over the product life cycle.

In option C, the energy used as raw material shall be declared as an input to the module where it enters the product system (often module A1) and as an output from the product system if it exits the product system as useful energy (often from modules A5 or C3). Energy content that is wasted in a landfill (but only in landfill, in contrast to option B) remains as part of the indicator for energy used for raw materials and shall *not* (in contrast to option A) be reported as an input of energy used for energy carriers. The rationale behind this option is that the indicator for energy used as raw materials shall reflect the input of energy that becomes part of the product and packaging, that is not subsequently transferred in useable form to another product system, which here includes energy that is landfilled, as this is potentially available for future extraction and use in a product system. The rationale is close to the rationale of option A, but as in option B, energy used as raw material will often *not* be zero over the product life cycle.

An example is used to illustrate options A, B and C, see Table 8-9. In this example, only renewable primary energy use is considered, module B is disregarded, and the following applies:

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- 30 MJ of renewable energy is in the product and 10 MJ is in the product packaging.
- 60 MJ of renewable energy is used for energy purposes in A1-A3, 5 MJ in A4-A5, and 5 MJ in C1-C2.
- Packaging is incinerated without energy recovery in A5.
- The energy content of the product (30 MJ) is to one third material-recycled in C3 (with 100% recovery of material), to one third incinerated with energy recovery in C3 (with 90% recovery of energy), and to one third landfilled in C4 (without energy recovery). So, the energy that leaves the system in useful form are the two outputs from module C3: the energy content of the material for recycling (10 MJ) and the exported (thermal and/or electric) energy (9 MJ).

Note 1: The example was designed to illustrate different situations, and not to be as realistic as possible. For example, packaging is most often incinerated *with* energy recovery (in A5), which results in exported energy that would be modelled in the same way as the exported energy from incineration of the product in C3. So, even if not shown in the example, there is no difference – neither in option A nor B – in how the energy content of packaging and product are accounted for when calculating the primary energy use,

Note 2: The total primary energy use indicators are not affected by the choice between options A, B and C, but only the division of this into energy used as raw materials and energy used as energy carriers.

Table 8 Illustration of option A for modelling the primary energy use indicators.

Indicator	**A1-A3**	**A4A5**	**C1-C2**	**C3**	**C4**	**A-C**
PERE	**60 MJ**	5 + 10 (input from PERM) = **15 MJ**	**5 MJ**	**1 MJ** (input from PERM)	**10 MJ** (input from PERM)	**91 MJ**
PERM	**40 MJ** (input for product and packaging)	- 10 (loss in incineration of packaging, also reported as input to PERE) = -**10 MJ**	**0 MJ**	– 10 (output as material to recycling) – 9 (output as exported energy) – 1 (loss in incineration of product, also reported as input to PERE) = -**20 MJ**	– 10 (loss in landfill, also reported as input to PERE) = -**10 MJ**	**0 MJ** *This will always be zero over the product life cycle.*
PERT	**100 MJ**	**5 MJ**	**5 MJ**	**-19 MJ**	**0 MJ**	**91 MJ**

Table 9 Illustration of option B for modelling the primary energy use indicators.

Indicator	**A1-A3**	**A4-A5**	**C1-C2**	**C3**	**C4**	**A-C**
PERE	**60 MJ**	**5 MJ**	**5 MJ**	**0 MJ**	**0 MJ**	**70 MJ**
PERM	**40 MJ** (input for product and packaging)	**0 MJ** *Here there is a loss of 10 MJ in the incineration of the packaging, which is reported where this energy enters the system (in A1-A3)*	**0 MJ**	– 10 (output as material to recycling) – 9 (output as exported energy) = **-19 MJ** *Here there is a loss of 1 MJ in the incineration of the product, which is reported where the energy enters the system (in A1-A3)*	**0 MJ** *Here there is a loss of 10 MJ in the landfilling of the product, which is reported where the energy enters the system (in A1-A3)*	**21 MJ** *This is the energy used as raw material in product and packaging, minus the useable energy that has left the product system. It corresponds to the losses in A4-A5, C3 and C4.*
PERT	**100 MJ**	**5 MJ**	**5 MJ**	**-19 MJ**	**0 MJ**	**91 MJ**

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Table 10 Illustration of option C for modelling the primary energy use indicators.

Indicator	**A1-A3**	**A4-A5**	**C1-C2**	**C3**	**C4**	**A-C**
PERE	**60 MJ**	5 + 10 (input from PERM) = **15 MJ**	**5 MJ**	**1 MJ** (input from PERM)	**0 MJ**	**81 MJ**
PERM	**40 MJ** (input for product and packaging)	- 10 (loss in incineration of packaging, also reported as input to PERE) = **-10 MJ**	**0 MJ**	– 10 (output as material to recycling) – 9 (output as exported energy) – 1 (loss in incineration of product, also reported as input to PERE) = **-20 MJ**	**0 MJ** *The 10 MJ that here ends up in landfill, is not transferred to PERE (as in option A), as it is can potentially be extracted, for use in another product system, in the future*	**10 MJ** *This is the energy that remains in the landfill, for potential future extraction*
PERT	**100 MJ**	**5 MJ**	**5 MJ**	**-19 MJ**	**0 MJ**	**91 MJ**

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CONSTRUCTION PRODUCTS

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