EPD®

REHABILITATION SERVICES OF HIGHWAYS, STREETS AND ROADS

PCR 2012:01-SUB-PCR-K

Sub-PCR to PCR 2012:01 (v2.34)

INTRODUCTION

This document is a sub-PCR to *PCR 2012:01 Construction products and construction services*, version 2.34, available at www.environdec.com Please note that it is **not** a PCR in its own, but intended to be a further specification of a specific product group to be used together with PCR 2012:01. See Figure 1 for the role of this sub-PCR.

For more details about the scope of this sub-PCR see the Section 1 of this document and Section 7 of PCR 2012:01.

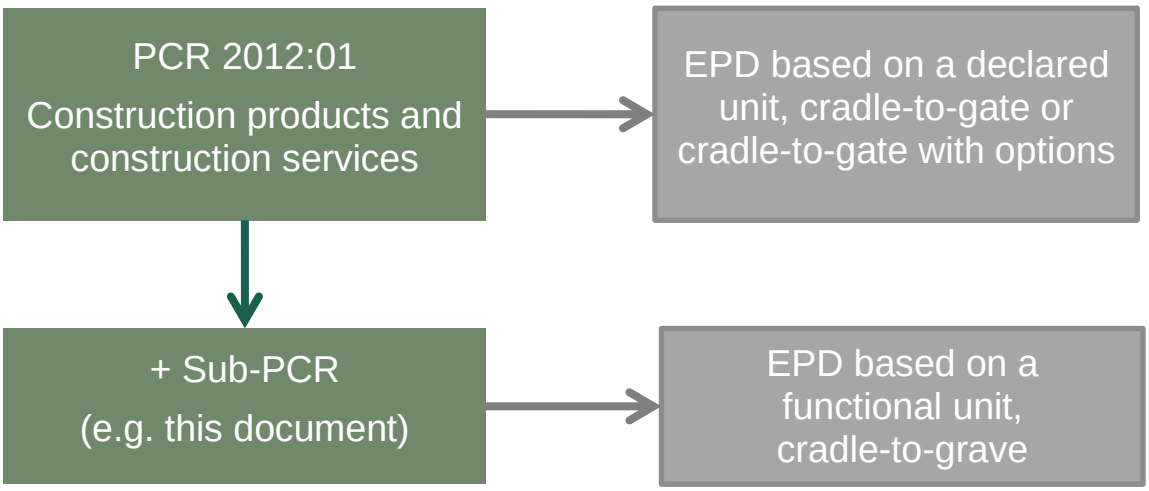


Figure 1 Overview of PCR 2012:01 and its sub-PCRs to create EPDs with different scopes.

This sub-PCR has been developed in the following procedure:

1. Draft proposed (industry stakeholders);
2. Coordination of this document in relation to the PCR for Construction product and construction services and other similar documents (Secretariat of the International EPD® System and PCR Moderator of PCR for Construction product and construction services);
3. Open consultation period;
4. Review and approval (Technical Committee of the International EPD® System);
5. Publication on www.environdec.com

1 GENERAL INFORMATION

Name:	Rehabilitation services of highways, streets and roads
Programme operator:	EPD International AB
Date:	2021-11-08
Registration no:	PCR 2012:01-Sub-PCR-K
This sub- PCR was prepared by	Solid Forest S.L.
Appointed PCR moderator:	Rubén Jiménez de la Iglesia, rubenjimenez@solidforest.com
Open consultation period:	2018-05-25 – 2018-07-25
Review panel for this PCR:	The Technical Committee of the International EPD® System. Full list of TC members available on www.environdec.com/TC
Valid within the following geographical representativeness:	Global
PCR language:	English. The English version takes precedence over any translated versions.
Valid until:	2022-02-28 *The validity of this sub-PCR is dependent on the validity of PCR 2012:01 Construction products and construction services.*

This document provides further specification to PCR 2012:01 Construction products and construction services, Version 2.34.

This sub-PCR is publicly available on www.environdec.com. It is a living document. If relevant changes in the LCA methodology or in the technology for the product category occur, the documents will be revised, and any changes will be published on the website.

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

The EPD shall refer to a specific PCR version number, as well as this sub-PCR. The production of new PCR versions does not affect the EPD certification period.

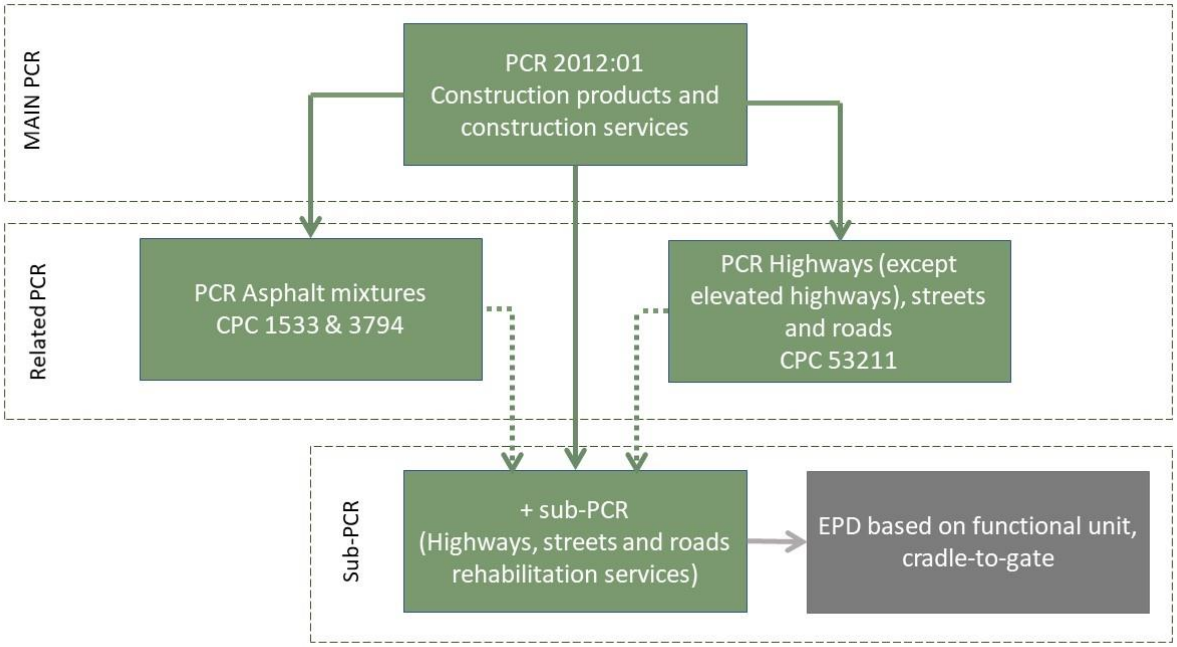
1.1 RELATED PCRS

In the International EPD® System there are two other PCRs related to this Sub-PCR:

- "PCR Highways (except elevated highways), streets and roads CPC 53211" defines the rules to develop EPD for construction projects of highways, roads or streets.
- "PCR Asphalt mixtures CPC 1533 & 3794" defines the rules to develop EPD for bitumen and asphalt manufacturing.

PCR CPC 53211 and PCR CPC 1533 & 3794 are deeply related to this Sub-PCR and many sections of this document refers to PCR Highways (except elevated highways), streets and roads CPC 53211 document and PCR Asphalt mixtures CPC 1533 & 3794 document.

Figure 1: Relation between PCR 2012:01, PCR CPC 1533 & 3794, PCR CPC 53211 and this Sub-PCRs.



2 DEFINITION OF THE SERVICE GROUP

This document provides Sub Product Category Rules (Sub-PCR) for the assessment of the environmental performance of Rehabilitation Projects of Highways, Streets and Roads corresponding to UN CPC 54211 (General construction services of highways [except elevated highways], streets and roads) and the declaration of this performance by an EPD.

This UN CPC subclass includes:

- repair, alteration and restoration services for:
  - formations for highways (except elevated highways), roads, streets, other vehicular and pedestrian ways and open car parks,
  - footpaths, traffic-calming structures, cycle tracks, etc.,
  - vehicular and pedestrian underpasses and overpasses,
- construction or restoration of road surface and parking lots with asphalt, concrete, etc.,
- installation services of crash barriers, low separating walls, traffic signs, etc.,
- creation, maintenance and signposting of tracks and paths,
- painting services of markings on roads, parking lots and similar surfaces.

This UN SPC subclass does not include:

- construction services of elevated highways, tunnels and bridges, cf. 5422.

Even when the UN CPC 54211 subclass does not include construction services of elevated highways, tunnels and bridges the rehabilitation of pavements on bridges or in tunnels and the rehabilitation of elevated highways IS INCLUDED in this Sub-PCR.

The construction of new elements or the use of new techniques, including electronic products like HVAC products, that modify the Service Life (SL) of a highway, street or road ARE INCLUDED in this Sub-PCR.

The construction of new wildlife underpasses and the water underpasses during the rehabilitation project ARE INCLUDED in this Sub-PCR.

The maintenance of auxiliary elements like signposting, road lighting, painting, crash barriers etc. is NOT INCLUDED in this Sub-PCR.

2.1 SPECIFICATION OF THE SERVICE

Additional to the general information defined in PCR 2012:01 “Construction products and construction services” section 9.1, the following mandatory and recommended information about the rehabilitation company and the rehabilitation project shall be included in the EPD:

Mandatory information	Contractors in charge of the rehabilitation of the road
	Short description of organisations, including information on products- or management system-related certifications (e.g., ISO Type I ecolabels, ISO 9001- and 14001-certificates, EMAS-registrations etc.) and other relevant work the organisations wants to communicate (e.g. SA 18000, supply-chain management, social responsibility - SR etc.). An environmental management system may be cited.
Recommended information	All parts, constructors and managers should be described even if the rehabilitation works comprises parts with different managers and/or different technical characteristics.

Required mandatory and recommended information about the rehabilitation project is given in the table below.

Mandatory information	The location, boundaries and design of the rehabilitation works (share of open section) shall be described. A simple visual representation.
	Unequivocal identification of the road according to the CPC classification system.
	Rehabilitation technique applied.
	Traffic Management System characteristics.
	Description of the intended use.
	Road type (e.g. freeway, highway).
	Junctions.
	Speed limits.
	Number of lanes before and after rehabilitation.
	Road width.
	Pavement type.
	Road side equipment such as traffic barriers and road lightning.
	Regular need of operation and maintenance after rehabilitation.
Recommended information	Trade name (if found relevant).
	Short description of the underlying LCA-based information (e.g.

	summary of an existing LCA study or similar studies).
	Annual average daily traffic (AADT).
	Bearing capacity.
	Geology, geography and climate may be described if relevant.

3 FUNCTIONAL UNIT

There are two mandatory functional units:

- The first and main functional unit of the EPD shall be one square meter of rehabilitated road. In the EPD the environmental impacts shall be given firstly per functional unit including all life cycle stages.
- In addition, to support comparability, the environmental impacts shall also be reported per functional unit divided by years of estimated service life[1] (ESL) of the highway after the rehabilitation, for example, if a rehabilitation action has an ESL of X year, the environmental impacts from the rehabilitation service shall be divided by X. The environmental impacts from all the materials and works required for maintenance after the rehabilitation of the road shall be included based on their ESL value. The impacts shall be calculated based on the required service life (RSL) of each material, for example; if a material has a RSL of X year, the environmental impact from that material shall be the impact divided by X.

To support comparability, there are two recommendations for the environmental impacts report:

- The environmental impacts should be reported allocated to freight and passenger transports measured as Annual Average Daily Traffic (AADT), that is performed on the infrastructure for freight and passenger transports respectively. The allocation to freight and passenger measured as Annual Average Daily Traffic (AADT) shall be performed on the infrastructure for freight and passenger transports respectively. Freight transports then get the share AADT(freight)/AADT(total) and passenger transports get the share AADT(passenger)/AADT(total).
- The overall road rehabilitation service environmental impacts shall be reported too.

4 REFERENCE SERVICE LIFE (RSL)

The service life of the highway, road or street rehabilitation service is the period between rehabilitation projects. Rehabilitation projects are usually tackle when performance of the highway does not meet initial requirements and maintenance is no longer possible.

[1] See section 9

The boundary of the EPD should include the maintenance works after the rehabilitation and before the next rehabilitation work.

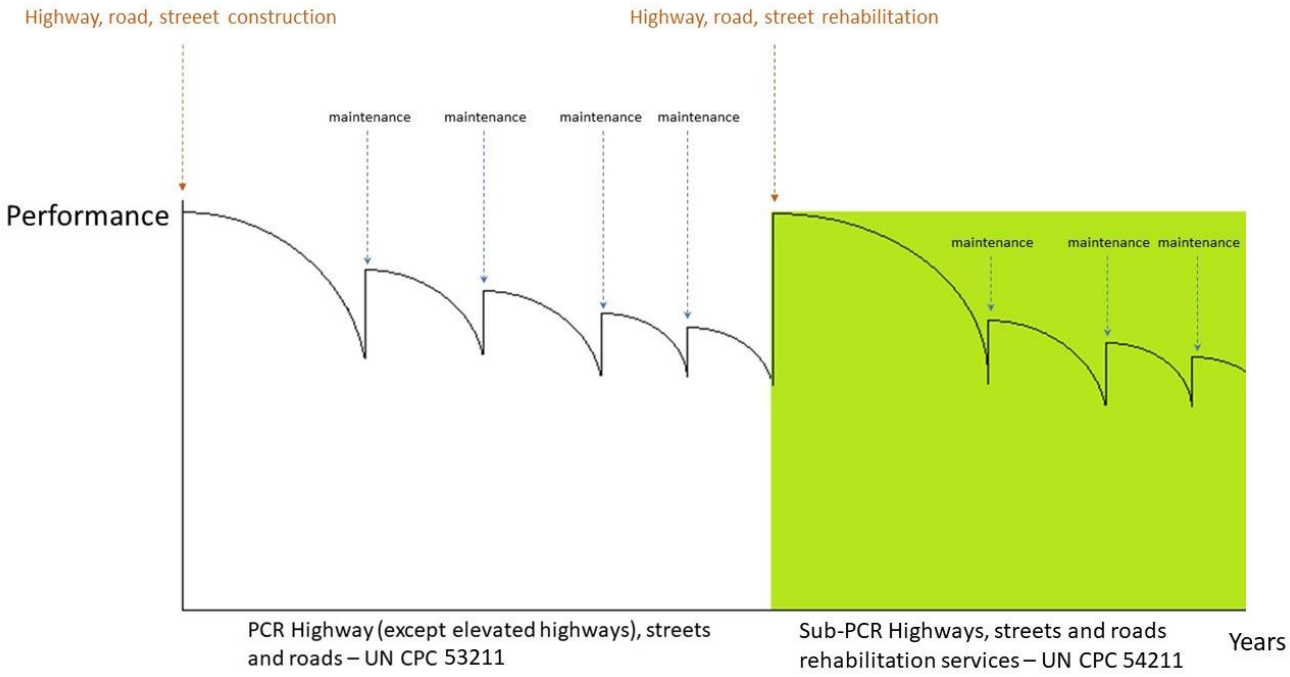


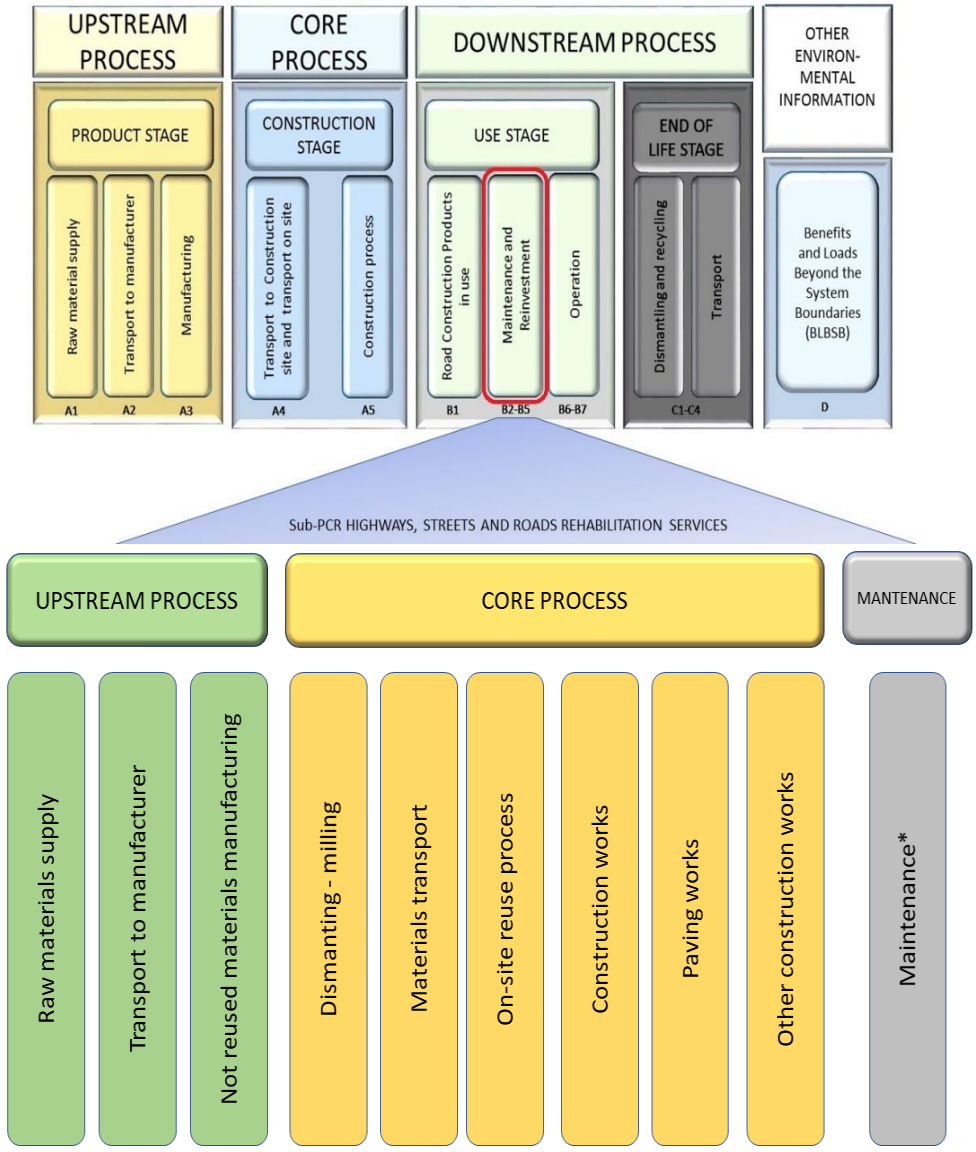
Figure 2: Activities included in the Sub-PCR are coloured in green.

The application of new techniques in the rehabilitation works to lengthen the periodicity or reduce the number of maintenance works of the highway shall be described in the EPD.

The construction of new elements or the use of new techniques that could modify the service life of the highway or the necessary maintenance works shall be described in the EPD.

5 LIFE CYCLE STAGES INCLUDED

The scope of this Sub-PCR for Rehabilitation Services of Highways, Roads and Streets can be considered as the “replacement” process numbered B4 in the LCI of a highway, road or street construction project according to the PCR “Construction products and construction services 2012:01”.



* Shall be considered all the maintenance works before the next rehabilitation project or the end of life of the highway.

Figure 3: Life cycle stages of Sub-PCR Highways, street and roads rehabilitation services as part of the PCR Highways, streets and roads construction LCI.

The LCA shall include the process of the rehabilitation service from A1 to B7, as defined by the PCR 2012:01 Construction products and construction services. C1-C4 process, corresponding to end of life stages, shall not be included in the LCA of a rehabilitation service.

Other important considerations about process and elements that shall or shall not be included in the EPDs are listed below:

- If the rehabilitation project includes the rehabilitation of pavements on bridges, in tunnels or the rehabilitation of elevated highways these shall be include in the EPD.
- The construction of new elements or the use of new techniques, including electronic products like HVAC products, that modify the Estimated Service Life (ESL) of a highway, street or road shall be included in the EPD.

- The construction of new wildlife underpasses and the water underpasses during the rehabilitation project shall be included in the EPD.
- The maintenance of auxiliary elements like signposting, road lighting, painting, crash barriers etc. shall not be included in the EPD.
- Since the product must be designed to be “deconstructed”, the study and design stage of the rehabilitation works shall be included in the EPD.

In harmonisation to “PCR Highways (except elevated highways), streets and roads CPC 53211” the processes in the EPD shall be divided into:

- Upstream processes.
- Core processes.
- Downstream processes.

To support comparability, the overall environmental impact shall be reported separately by upstream, core and downstream stages.

In the EPD the overall environmental impact of the rehabilitation work shall be reported, including all the cycles stages.

5.1 UPSTREAM PROCESSES

5.1.1 RAW MATERIAL SUPPLY

- Extraction of raw materials used in the manufacture of components with a not on-site recycled origin (not extracted and reused in the same rehabilitation project).

5.1.2 TRANSPORT

- Transport to the factory where raw materials are processed.
- Internal transports.

5.1.3 MANUFACTURING (NEITHER ON-SITE RECYCLED MATERIALS NOR MATERIALS MANUFACTURED FROM CONSTRUCTION SITE WASTE FRACTIONS)

- Production of new road pavement materials (e.g. bitumen, cement, gravel production, etc.).
- Production of compounds added to recycled materials.
- Production of road substructure materials (e.g. production of piles, ballast, etc.).
- Production of auxiliary products (e.g. detergents for cleaning, etc.)
- Packaging.

The environmental impacts of asphalt mixtures used in the rehabilitation service must have been elaborated following the PCR Asphalt Mixtures UN CPC 1533 & 3794 in the International EPD® System.

5.2 CORE PROCESSES

5.2.1 TRANSPORT

- Transport to the rehabilitation site.
- Transport on the rehabilitation site.

5.2.2 DISMANTLING

- Milling.

- Collection of waste fraction from the deconstruction site.
- On-site sorting of the materials.

5.2.3 ON-SITE OR OFF-SITE RECYCLING

- Waste processing of the materials intended for reuse (consider only materials used in the current rehabilitation project).
- Materials manufactured from construction site waste fractions.
- Compounds added to recycled materials.
- Transportation of recycled materials.

The environmental performance of compounds used in the rehabilitation service must have been calculated following the PCR Asphalt Mixtures UN CPC 1533 & 3794 in the International EPD® System.

If specific data is used to calculate the environmental performance of material manufactured from construction site waste fractions or on-site recycled, the environmental impact must be calculated using the PCR Asphalt Mixtures UN CPC 1533 & 3794 in the International EPD® System.

5.2.4 CONSTRUCTION WORKS

- Preparatory works (construction of new temporally lanes, traffic modifications, etc.).
- Ground works.
- Construction of new road substructure, if necessary.
- Application of new road pavements.
- Construction of disembarkation and parking spaces for maintenance vehicles.
- On-site energy generation.
- Waste treatment of waste generated during construction.

5.3 DOWNSTREAM PROCESSES

5.3.1 MAINTENANCE

- Maintenance works required after rehabilitation.
- Modifications to the maintenance works of the highway after rehabilitation.

5.3.2 OTHER WORKS

- Construction of elements that could extend the lifetime of the highway.

The report in the EPD of environmental benefits and loads beyond the system boundaries (BLBSB) resulting from reusable and recyclable materials and/or useful energy carriers leaving a product system e.g. as secondary materials or fuels is recommended.

6 OTHER ENVIRONMENTAL INDICATORS

Additionally to the environmental impacts defined in PCR 2012:01 “Construction products and construction services” section 9.2, the following mandatory impacts information shall be reported in the EPD:

- Particulate Matter/Respiratory Inorganics: Particulate Matter/Respiratory Inorganics express as kg PM2,5 (Particulate Matter with a diameter of 2,5 µm or less.) equivalent.
- Human Toxicity with cancer effects: Expressed as CTUh (Comparative Toxic Unit for humans).
- Human Toxicity with non-cancer effects: Expressed also as CTUh (Comparative Toxic Unit for humans).
- Direct Land Use Change: All greenhouse gas emissions and removals arising from direct land use change shall be assessed and reported separately in accordance with the IPCC Guidelines for National Greenhouse Gas Inventories. The results shall be reported in CO2e.
- Water scarcity potential: Provides information related to the availability of water in different geographical locations and is expressed in cubic metres (m^3 eq).

The characterisation models and factors to use for these impact categories are available on the website www.environdec.com and are updated on a regular basis based on the latest development in LCA methodology and ensuring market stability of EPDs.

Other environmental information may be calculated and reported in the EPD including: Impacts on biodiversity (permeability of transport corridors, safety and mortality, disturbance of surrounding habitats, natural flora and fauna and created natural values), noise and vibration (direct impact from rehabilitation works, impact on relevant areas, undertaken improvements of noise impact and vibrations), urban heat island effect and permanent deforestation.

7 CHANGES IN THIS SUB-PCR

VERSION 2019-04-01

- Original version of sub-PCR, based on PCR 2012:01 *Construction products and construction services*, Version 2.3.

VERSION 2020-02-18

- Updated validity to 2020-09-01 to align with version 2.31 of PCR 2012:01.

VERSION 2020-07-02

- Updated validity to 2020-12-31 to align with version 2.32 of PCR 2012:01.

VERSION 2020-09-18

- Updated validity to 2021-12-31 to align with version 2.33 of PCR 2012:01.

VERSION 2021-11-08

- Updated validity to 2022-02-28 to align with version 2.34 of PCR 2012:01.

8 REFERENCES

- Product Category Rules and PCR basic module 2012:01, *Construction product and Construction services*. The International EPD System, version 2.0, dated 2015-03-03.
- “PCR Highways (except elevated highways), streets and roads CPC 53211” defines the rules to develop EPD for construction projects of highways, roads or streets.
- “PCR Asphalt mixtures CPC 1533 & 3794” defines the rules to develop EPD for bitumen and asphalt manufacturing.

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