Environmental
Product
Declaration
According to EN15804+A2 (+indicators A1)

This declaration is for:
binderholz CLT BBS XL
Note: this EPD includes two distinct end-of-life scenarios.

Provided by:
Binderholz Bausysteme GmbH

program operator
Stichting MRPI®
publisher
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www.mrpi.nl

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1.1.00657.2024
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20-09-2029

COMPANY INFORMATION

binderholz

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PRODUCT

binderholz CLT BBS XL

DECLARED UNIT/FUNCTIONAL UNIT

1 m^3

DESCRIPTION OF PRODUCT

binderholz CLT BBS is a solid wooden construction element in panel form that consists of softwood layers that are glued together at right angles to each other.

MRPI® REGISTRATION

1.1.00657.2024

DATE OF ISSUE

20-09-2024

EXPIRY DATE

20-09-2029

VISUAL PRODUCT

SCOPE OF DECLARATION

This MRPI®-EPD certificate is verified by Tim Mol, EcoReview. The LCA study has been done by Odile Koenders, SGS Search. The certificate is based on an LCA-dossier according to EN15804+A2 (+indicators A1). It is verified according to the 'MRPI®-EPD verification protocol November 2020.v4.0'. EPD's of construction products may not be comparable if they do not comply with EN15804+A2. Declaration of SVHC that are listed on the 'Candidate list of Substances of Very High Concern for authorisation' when content exceeds the limits for registration with ECHA.

MORE INFORMATION

https://www.binderholz.com/en-us/products/clt-bbs/

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DEMONSTRATION OF VERIFICATION
CEN standard EN15804 serves as the core PCR(a)
Independent verification of the declaration an data according to EN15804+A2 (+indicators A1) internal: external: x
Third party verifier: Tim Mol, EcoReview
[a] PCR = Product Category Rules

DETAILED PRODUCT DESCRIPTION

EPD structure

This EPD for the CLT of Binderholz contains two datasets: one scenario follows the NMD waste scenario; and one scenario is for 100% reuse. As the construction industry is increasingly focussing on having circular products that can be reused, a scenario with 100% reuse is presented in the results here. These results can only be used if reuse in the end-of-life scenario can be guaranteed.

Production

binderholz CLT BBS XL consists of at least three panel lamellae that are glued together crosswise, after having been kiln dried and been graded according to strength, either visually or using machinery.

Kiln dried softwood lamellae with a wood moisture of 11 % +/-2 % are used in production. These are pre-planed on four sides and graded according to strength, either visually or by means of machinery. If individual lamellae posses strength-reducing properties, these can be cut out, and be joined together to form lamellae of unlimited length. The range of thickness for the individual planed lamellae is between 17 and 45 mm at a width ranging between 80 and 250 mm.

One component polyurethane adhesives (1-K-PUR) are used for surface bonding of the board layers. Hot-melt adhesives and small amounts of melamine-urea-formaldehyde glues (MUF) are used for gluing the narrow sides of the lamellae.

Delivery

binderholz CLT BBS XL is available in the following dimensions:
Thickness: 51 to 315 mm
Width: up to 3,5 m
Length: up to 22,00 m

Wood moisture content 11 % +/- 2 % on delivery.

Use stage

The components indicated apply for the composition during the period of use. Around 207 kg of carbon are bound in one m³ of binderholz CLT BBS XL with a moisture content of 11% while in use. This corresponds to a full oxidation of around 760 kg CO2 equivalent.

No risks to water, air, and soil can arise if binderholz CLT BBS XL is used as intended. No health damage or adverse effects are to be expected based on current knowledge. With regard to formaldehyde, binderholz CLT BBS XL is to be considered low in emission, due to the low adhesive content, the product's structure, and its type of use (formaldehyde emission class E1 according to EN 14080).

The components and production processes of binderholz CLT BBS XL correspond to those of glued laminated timber (glulam). Glulam has been used in construction for more than 100 years. If used as intended, a limit of durability is therefore not known or to be expected.
It is therefore assumed that if used as intended, the duration of use of binderholz CLT BBS XL corresponds to the overall service life of the respective building. Therefore a RSL of up to 100 years is assumed in this LCA.

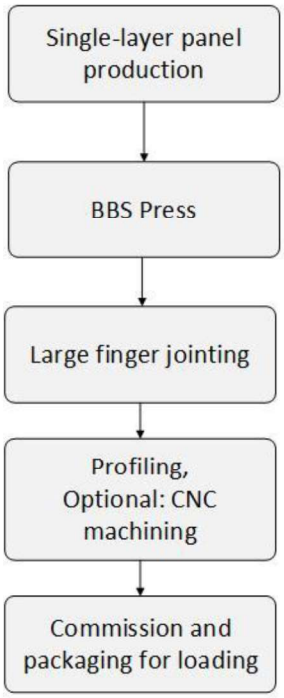
Thanks to its monolithic structure, binderholz CLT BBS XL can be provided for further or re-use without problems, in the context of selective dismantling. If material re-use is not possible, binderholz CLT BBS XL can be used for producing process heat and electricity, thanks to its high heating value of approx. 19 MJ/kg.

Detailed information is available at www.binderholz.com.

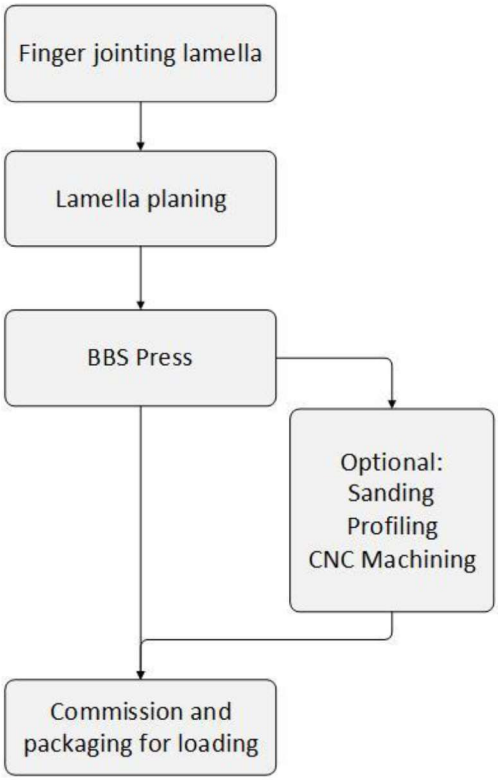
Component (> 1%)	(%)
Softwood (primarily spruce)	99,10 %
Adhesives	0,90 %

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USER STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport gate to site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse- Recovery – Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
X= Modules Assessed ND= Not Declared																

CLT BBS SYS



CLT BBS XL



CALCULATION RULES

Declared unit

The declared unit for the life cycle assessment is 1 m³ of binderholz CLT BBS SYS 125 (with a mass of 467 kg/m³ and a wood moisture content of 11 % ± 2 %)

Reference service life

The reference service life (RSL) differs per application. Per sfB-code is the RSL provided follow the SBR Reference service life of construction products:

- External wall, constructive has a 100 year RSL.
- Interior wall, constructive has a 100 year RSL.
- Floor, constructive has a 75 year RSL.
- Stairs and slopes has a 50 year RSL.
- Roof, constructive has a 100 year RSL.
- Columns and beams has a 100 year RSL.
- Supporting structures, walls and floors has a 75 year RSL.

Data collection

Input- and output data has been provided by binderholz of the production year 2021 for the following inventory categories:

- Materials (raw materials and auxiliary materials);
- Energy (electricity and heat);
- Emissions to air, water and soil.

Allocations

The material and energy needed has been determined by allocating the total needed energy/materials of 2021 for the CLT BBS to the total amount of CLT BBS produced in cubic meters.

During the production of the CLT, other products are produced as well. An economic allocation is done to attribute the impact of the production to the respective products in modules A1, A2 and A3. The impact allocated to the CLT of the product stage is 99,2%

Cut-off criteria

This LCA contains all relevant data. The following processes are not included in this LCA:

- Assumed is that the maintenance and use of auxiliary equipment have a negligible contribution to the total (<1%). Because of this, these processes are not taken in account in this LCA, except such processes that are included in the Ecoinvent background data.
- Assumed is that the capital goods and infrastructure processes have a negligible contribution. These processes are not taken in account in this LCA, except such processes that are included in the Ecoinvent background data.

There is no reason to believe that relevant in- or outputs are excluded from this study.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

Product stage (A1-A3)

This stage consists of the extraction of raw materials, energy which occurs upstream to the manufacturing process, transportation of raw materials, processing of the raw materials into the final product with all processes and energy required for production as well as packaging materials. The binderholz CLT BBS XL consist of softwood as well as 1-K-PUR and hot-melt adhesives.

Data collection was performed by Binderholz Bausysteme GmbH in cooperation with some suppliers. The manufacturer compiled mass and energy balances based on average production in year 2021.

The production facility in Unternberg buys renewable electricity, in Burgbernheim the national grid electricity is used. The data collection of the capital goods in the production facilities has been allocated based on mass output of products.

For the cultivation of wood, no primary data could be obtaines as the sources are from several suppliers.

Construction process stage (A4 and A5)

Products are transported to customers with a truck of more than 32 metric ton with the EURO6 classification, the loading degree has ben adjusted to 83,37% of the trucks. Since customers are located throughout the country (the Netherlands) an average distance of 645 km is assumed.

Module A5 includes the installation on site, for which an installation loss of 1 % and installation with a wheel loader is assumed, as well as the processing of packaging waste up to the end-of-waste state. The production loss has deviated of the 3% prefab

installation loss as accounted for in the NMD Assessment method as the production loss due to post-productions to be delivered is <1% in 2021.

Use stage (B1-B7)
The product as assessed for this EPD does not require maintenance during the use phase.

End of life stage (C1-C4)
For the end of life stage, a de-installation with a wheel loader is assumed, followed by a transport of the panels from the demolition site to waste treatment facilities. The product can then be recycled, incinerated or send to landfill at the end-of-life stage. In this EPD two different scenarios are calculated.

Scenario 1 - NMD waste scenario
This scenario follows the NMD waste scenario for wooden products (80 % incineration, 10 % recycling, 5 % landfill, 5 % reuse).

Scenario 2 - 100 % Reuse
As the construction industry is increasingly focusing on having circular products that can be reused, a additional scenario for 100 % reuse of the CLT BBS is presented. These results can only be used when reuse in the end-of-life scenario can be guaranteed.

Transport to waste treatment facilities	Distance	Unit
Recycling & reuse	50	km
Landfill	100	km
Incineration	150	km

End-of-life scenario	Scenario NMD waste scenario (%)	Scenario 100% reuse (%)
Recycling	10%	0%
Re-use	5%	100%
Landfill	5%	0%
Incineration	80%	0%

Benefits and loads beyond the system boundaries (D)
Avoided production of material due to recycling and reuse as well as avoided electricity and heat production from incineration are included in this module. For recycling, the avoided production of wood chips is considered. For reuse, the product stages (A1-A3) are considered to be avoided.

For energy recovery, the average efficiency of waste incineration plants in the Netherlands is used i.e. 18 % electricity and 31 % heat, biomass and fossil resources are distinguished. The avoided energy processes are calculated based on the amount of material that is incinerated and their respective Lower Heating Values.

DECLARATION OF SVHC
No substances of very high concern are present in concentrations greater than 0.1% by weight in the product.

REFERENCES
NMD Bepalingsmethode Milieuprestatie Bouwwerken 1.1, NMD March 2022.

EN 15804:2012+A2:2019 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products.

ISO, 2006. “Environmental management. Life cycle assessment - Principles and framework”. ISO 14040:2006.

ISO, 2006. “Environmental management. Life cycle assessment – Requirements and Guidelines”. ISO 14044:2006.

ISO, 2000. “Environmental labels and declarations – Type III environmental declarations”, ISO/TR 14025:2000.

REMARKS
These results with the scenario of 100% reuse in the end-of-life scenario can only be used when it can be guaranteed that the CLT will be reused.

ENVIRONMENT IMPACT NMD waste scenario's (core indicators A1)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
ADPE	kg Sb eq.	1,15 E-03	3,92 E-04	4,61 E-04	2,00 E-03	3,40 E-04	3,87 E-05	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,17 E-05	2,12 E-04	2,38 E-05	2,64 E-06	-4,74 E-04
ADPF	MJ	6,89 E+02	2,12 E+02	5,33 E+02	3,06 E+02	3,06 E+02	1,01 E+02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	7,98 E+01	1,24 E+02	4,59 E+01	5,91 E+00	-5,15 E+02
GWP	kg CO2 eq.	4,40 E+01	1,42 E+01	3,60 E+01	9,41 E+01	1,89 E+01	1,22 E+01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,63 E+00	8,15 E+00	1,20 E+01	1,78 E+00	-3,62 E+01
ODP	Kg CFC11 eq.	4,89 E-06	2,59 E-06	2,02 E-06	9,50 E-06	3,73 E-06	1,17 E-06	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	9,89 E-07	1,51 E-06	4,82 E-07	6,19 E-08	-7,94 E-06
POCP	Kg ethene eq.	1,58 E-01	7,13 E-03	1,02 E-02	1,76 E-01	1,21 E-02	3,89 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,73 E-03	4,89 E-03	1,55 E-02	5,54 E-04	-8,31 E-02
AP	kg SO2 eq.	2,92 E-01	3,60 E-02	9,81 E-02	4,26 E-01	4,98 E-02	3,02 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,32 E-02	3,51 E-02	8,22 E-02	1,63 E-03	-3,49 E-01
EP	kg (PO4) 3- eq.	1,48 E-01	5,49 E-03	2,86 E-02	1,82 E-01	8,03 E-03	7,36 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	4,86 E-03	7,00 E-03	2,12 E-02	6,85 E-04	-1,29 E-01
Toxicity indicators for Dutch market																			
HTP	kg DCB-Eq	2,99 E+01	5,69 E+00	7,47 E+00	4,31 E+01	9,34 E+00	2,60 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,73 E+00	3,49 E+00	1,00 E+01	1,43 E-01	-4,26 E+01
FAETP	kg DCB-Eq	1,74 E+00	1,57 E-01	2,15 E-01	2,11 E+00	2,54 E-01	1,14 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,31 E-02	1,02 E-01	9,06 E-02	2,77 E-03	-9,59 E-01
MAETP	kg DCB-Eq	1,30 E+03	6,01 E+02	7,64 E+02	2,66 E+03	9,99 E+02	2,35 E+02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,10 E+02	3,65 E+02	2,64 E+02	1,04 E+01	-1,33 E+03
TETP	kg DCB-Eq	5,11 E-01	2,02 E-02	2,45 E-01	7,77 E-01	3,01 E-02	2,56 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,67 E-02	1,23 E-02	1,10 E-02	4,84 E-04	-3,00 E-01
ECI	euro	7,97 E+00	1,51 E+00	3,28 E+00	1,28 E+01	2,21 E+00	1,08 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,96 E-01	9,84 E-01	2,08 E+00	1,17 E-01	-8,58 E+00
ADPF	kg Sb eq.	3,31 E-01	1,02 E-01	2,57 E-01	6,90 E-01	1,47 E-01	4,87 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,84 E-02	5,98 E-02	2,21 E-02	2,84 E-03	-2,48 E-01

ADPE = Abiotic Depletion Potential for non-fossil resources
ADPF = Abiotic Depletion Potential for fossil resources
GWP = Global Warming Potential
ODP = Depletion potential of the stratospheric ozone layer
POCP = Formation potential of tropospheric ozone photochemical oxidants
AP = Acidification Potential of land and water
EP = Eutrophication Potential
HTP = Human Toxicity Potential
FAETP = Fresh water aquatic ecotoxicity potential
MAETP = Marine aquatic ecotoxicity potential
TETP = Terrestrial ecotoxicity potential
ECI = Environmental Cost Indicator
ADPF = Abiotic Depletion Potential for fossil resources expressed in [kg Sb-eq.]

ENVIRONMENT IMPACT NMD waste scenario's (core indicators A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	-8,09 E+02	1,43 E+01	1,33 E+02	-6,62 E+02	1,91 E+01	1,23 E+01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,66 E+00	8,22 E+00	7,34 E+02	4,03 E+01	-3,70 E+01
GWP-fossil	kg CO2 eq.	4,44 E+01	1,43 E+01	3,59 E+01	9,46 E+01	1,91 E+01	1,23 E+01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,65 E+00	8,21 E+00	1,20 E+01	2,74 E-01	-3,66 E+01
GWP-biogenic	kg CO2 eq.	-8,55 E+02	5,89 E-03	9,69 E+01	-7,59 E+02	8,17 E-03	4,09 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,19 E-03	3,52 E-03	7,22 E+02	4,00 E+01	0,00 E+00
GWP-luluc)	kg CO2 eq.	1,58 E+00	5,10 E-03	5,06 E-02	1,63 E+00	5,81 E-03	1,75 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	8,44 E-04	2,91 E-03	1,94 E-03	1,17 E-04	-3,47 E-01
ODP	kg CFC11 eq.	5,63 E-06	3,24 E-06	1,78 E-06	1,07 E-05	4,68 E-06	1,45 E-06	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,24 E-06	1,89 E-06	5,10 E-07	7,72 E-08	-8,25 E-06
AP	mol H+ eq.	4,18 E-01	4,40 E-02	1,28 E-01	5,90 E-01	6,14 E-02	4,10 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,14 E-02	4,68 E-02	1,21 E-01	2,15 E-03	-5,21 E-01
EP-freshwater	kg PO4 eq.	1,65 E-02	1,14 E-04	5,09 E-03	2,17 E-02	1,52 E-04	2,60 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,64 E-05	6,76 E-05	1,15 E-04	5,20 E-06	-3,52 E-03
EP-marine	kg N eq.	1,51 E-01	8,93 E-03	2,61 E-02	1,86 E-01	1,35 E-02	1,53 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,20 E-02	1,67 E-02	5,54 E-02	1,42 E-03	-1,70 E-01
EP-terrestrial	mol N eq.	1,55 E+00	9,99 E-02	3,55 E-01	2,00 E+00	1,50 E-01	1,68 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,31 E-01	1,84 E-01	6,35 E-01	7,96 E-03	-2,39 E+00
POCP	kg NMVOC eq.	5,27 E-01	3,70 E-02	7,90 E-02	6,43 E-01	5,89 E-02	4,50 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,41 E-02	5,27 E-02	1,66 E-01	2,85 E-03	-5,29 E-01
ADP-minerals & metals	kg Sb eq.	1,15 E-03	3,92 E-04	4,61 E-04	2,00 E-03	3,40 E-04	3,87 E-05	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,17 E-05	2,12 E-04	2,38 E-05	2,64 E-06	-4,74 E-04
ADP-fossil	MJ, net calorific value	6,73 E+02	2,16 E+02	4,97 E+02	1,39 E+03	3,10 E+02	1,02 E+02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	8,14 E+01	1,26 E+02	4,37 E+01	5,89 E+00	-5,00 E+02
WDP	m3 world eq. Deprived	2,94 E+01	6,08 E-01	3,94 E+00	3,40 E+01	1,01 E+00	5,47 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,58 E-01	3,87 E-01	1,39 E+00	2,51 E-01	-5,09 E+00

GWP-total = Global Warming Potential total
GWP-fossil = Global Warming Potential fossil fuels
GWP-biogenic = Global Warming Potential biogenic
GWP-luluc = Global Warming Potential land use and land use change
ODP = Depletion potential of the stratospheric ozone layer
AP = Acidification Potential, Accumulated Exceedence
EP-freshwater = Eutrophication Potential, fraction of nutrients reaching freshwater end compartment
EP-marine = Eutrophication Potential, fraction of nutrients reaching marine end compartment
EP-terrestrial = Eutrophication Potential, Accumulated Exceedence
POCP = Formation potential of tropospheric ozone photochemical oxidants
ADP-minerals&metals = Abiotic Depletion Potential for non-fossil resources [2]
ADP-fossil = Abiotic Depletion for fossil resources potential [2]
WDP = Water (user) deprivation potential, deprivation-weighted water consumption [2]

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

ENVIRONMENT IMPACT NMD waste scenario's (additional indicators A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	Disease incidence	5,39 E-06	9,06 E-07	1,71 E-06	8,01 E-06	1,67 E-06	2,12 E-07	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	9,19 E-08	7,41 E-07	9,60 E-07	4,08 E-08	-9,36 E-06
IRP	kBq U235 eq.	1,52 E+00	9,42 E-01	1,70 E+00	4,17 E+00	1,35 E+00	4,25 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,54 E-01	5,51 E-01	1,63 E-01	2,34 E-02	-1,60 E+00
ETP-fw	CTUe	3,31 E+03	1,73 E+02	6,27 E+02	4,11 E+03	2,47 E+02	9,99 E+01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,11 E+01	1,02 E+02	1,12 E+02	5,51 E+00	-1,93 E+03
HTP-c	CTUh	2,17 E-07	4,86 E-09	1,49 E-08	2,36 E-07	5,99 E-09	1,39 E-08	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	9,85 E-09	3,64 E-09	1,12 E-07	1,64 E-10	-9,34 E-08
HTP-nc	CTUh	5,07 E-06	1,83 E-07	5,07 E-07	5,75 E-06	2,70 E-07	1,58 E-07	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	8,33 E-08	1,22 E-07	3,69 E-07	6,27 E-09	-3,23 E-06
SQP	----	4,99 E+04	1,50 E+02	3,50 E+02	5,04 E+04	3,55 E+02	5,26 E+02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,11 E+01	1,08 E+02	1,33 E+01	1,40 E+01	-3,22 E+04

PM = Potential incidence of disease due to PM emissions
IRP = Potential Human exposure efficiency relative to U235 [1]
ETP-fw = Potential Comparative Toxic Unit for ecosystems [2]
HTP-c = Potential Comparative Toxic Unit for humans [2]
HTP-nc = Potential Comparative Toxic Unit for humans, non-cancer [2]
SQP = Potential soil quality index [2]

Disclaimer [1]
- This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste.

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

OUTPUT FLOWS AND WASTE CATEGORIES NMD waste scenario's (A1 / A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	3,01 E-03	5,62 E-04	6,57 E-04	4,23 E-03	7,51 E-04	2,78 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,14 E-04	3,22 E-04	1,05 E-04	9,06 E-06	-1,43 E-03
NHWD	kg	5,56 E+00	1,04 E+01	3,07 E+00	1,91 E+01	2,69 E+01	1,06 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,00 E-01	7,81 E+00	2,56 E+00	2,36 E+01	-1,19 E+01
RWD	kg	2,04 E-03	1,47 E-03	2,09 E-03	5,59 E-03	2,12 E-03	6,55 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,55 E-04	8,57 E-04	1,66 E-04	3,54 E-05	-2,28 E-03
CRU	kg	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,38 E+01	0,00 E+00	0,00 E+00
MFR	kg	0,00 E+00	0,00 E+00	-6,03 E+01	-6,03 E+01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	4,76 E+01	0,00 E+00	0,00 E+00
MER	kg	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	-1,72 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,81 E+02	0,00 E+00	0,00 E+00
EEE	MJ	0,00 E+00	0,00 E+00	-1,41 E+02	-1,41 E+02	0,00 E+00	-1,25 E+01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,13 E+03	0,00 E+00	0,00 E+00
ETE	MJ	0,00 E+00	0,00 E+00	-2,43 E+02	-2,43 E+02	0,00 E+00	-2,15 E+01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,95 E+03	0,00 E+00	0,00 E+00

HWD = Hazardous Waste Disposed
NHWD = Non Hazardous Waste Disposed
RWD = Radioactive Waste Disposed
CRU = Components for reuse
MFR = Materials for recycling
MER = Materials for energy recovery
EEE = Exported Electrical Energy
ETE = Exported Thermal Energy

RESOURCE USE NMD waste scenario's (A1 / A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	2,82 E+03	3,08 E+00	1,08 E+03	3,91 E+03	3,90 E+00	1,07 E+02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	9,29 E-01	1,81 E+00	-6,28 E+03	-3,31 E+02	-6,56 E+03
PERM	MJ	7,45 E+03	0,00 E+00	-8,37 E+02	6,61 E+03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	6,28 E+03	3,31 E+02	0,00 E+00
PERT	MJ	1,03 E+04	3,08 E+00	2,48 E+02	1,05 E+04	3,90 E+00	1,07 E+02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	9,29 E-01	1,81 E+00	3,04 E+00	1,09 E-01	-6,56 E+03
PENRE	MJ	5,82 E+02	2,29 E+02	4,78 E+02	1,29 E+03	3,29 E+02	1,78 E+02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	8,65 E+01	1,34 E+02	4,69 E+01	6,26 E+00	-5,37 E+02
PENRM	MJ	1,37 E+02	0,00 E+00	5,41 E+01	1,91 E+02	0,00 E+00	-6,94 E+01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
PENRT	MJ	7,19 E+02	2,29 E+02	5,32 E+02	1,48 E+03	3,29 E+02	1,09 E+02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	8,65 E+01	1,34 E+02	4,69 E+01	6,26 E+00	-5,37 E+02
SM	kg	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
RSF	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
NRSF	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
FW	m3	9,40 E-01	2,30 E-02	3,61 E-01	1,32 E+00	3,53 E-02	2,32 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	6,35 E-03	1,43 E-02	1,92 E-01	6,18 E-03	-1,68 E-01

PERE = Use of renewable energy excluding renewable primary energy resources
PERM = Use of renewable energy resources used as raw materials
PERT = Total use of renewable primary energy resources
PENRE = Use of non-renewable primary energy resources excluding non-renewable energy resources used as raw materials
PENRM = Use of non-renewable primary energy resources used as raw materials
PENRT = Total use of non-renewable primary energy resources
SM = Use of secondary materials
RSF = Use of renewable secondary fuels
NRSF = Use of non-renewable secondary fuels
FW = Use of net fresh water

BIOGENIC CARBON CONTENT NMD waste scenario's (A1 / A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
BBCpr	Kg C	-2,34 E+02	0,00 E+00	2,62 E+01	-2,07 E+02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,97 E+02	1,04 E+01	0,00 E+00
BCCpa	kg C	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00

BCCpr = Biogenic carbon content in product
BCCpa = Biogenic carbon content in packaging

ENVIRONMENT IMPACT 100% reuse waste scenario (core indicators A1)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
ADPE	kg Sb eq.	1,15 E-03	3,92 E-04	4,61 E-04	2,00 E-03	3,40 E-04	3,87 E-05	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,17 E-05	8,02 E-05	0,00 E+00	0,00 E+00	-2,00 E-03
ADPF	MJ	6,89 E+02	2,12 E+02	5,33 E+02	3,06 E+02	3,06 E+02	1,01 E+02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	7,98 E+01	4,69 E+01	0,00 E+00	0,00 E+00	-1,49 E+03
GWP	kg CO2 eq.	4,40 E+01	1,42 E+01	3,60 E+01	9,41 E+01	1,89 E+01	1,22 E+01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,63 E+00	3,07 E+00	0,00 E+00	0,00 E+00	-9,70 E+01
ODP	Kg CFC11 eq.	4,89 E-06	2,59 E-06	2,02 E-06	9,50 E-06	3,73 E-06	1,17 E-06	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	9,89 E-07	5,70 E-07	0,00 E+00	0,00 E+00	-9,83 E-06
POCP	Kg ethene eq.	1,58 E-01	7,13 E-03	1,02 E-02	1,76 E-01	1,21 E-02	3,89 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,73 E-03	1,85 E-03	0,00 E+00	0,00 E+00	-1,76 E-01
AP	kg SO2 eq.	2,92 E-01	3,60 E-02	9,81 E-02	4,26 E-01	4,98 E-02	3,02 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,32 E-02	1,32 E-02	0,00 E+00	0,00 E+00	-4,28 E-01
EP	kg (PO4) 3- eq.	1,48 E-01	5,49 E-03	2,86 E-02	1,82 E-01	8,03 E-03	7,36 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	4,86 E-03	2,64 E-03	0,00 E+00	0,00 E+00	-1,82 E-01
Toxicity indicators for Dutch market																			
HTP	kg DCB-Eq	2,99 E+01	5,69 E+00	7,47 E+00	4,31 E+01	9,34 E+00	2,60 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,73 E+00	1,32 E+00	0,00 E+00	0,00 E+00	-4,32 E+01
FAETP	kg DCB-Eq	1,74 E+00	1,57 E-01	2,15 E-01	2,11 E+00	2,54 E-01	1,14 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,31 E-02	3,85 E-02	0,00 E+00	0,00 E+00	-2,11 E+00
MAETP	kg DCB-Eq	1,30 E+03	6,01 E+02	7,64 E+02	2,66 E+03	9,99 E+02	2,35 E+02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,10 E+02	1,38 E+02	0,00 E+00	0,00 E+00	-2,67 E+03
TETP	kg DCB-Eq	5,11 E-01	2,02 E-02	2,45 E-01	7,77 E-01	3,01 E-02	2,56 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,67 E-02	4,66 E-03	0,00 E+00	0,00 E+00	-7,77 E-01
ECI	euro	7,97 E+00	1,51 E+00	3,28 E+00	1,28 E+01	2,21 E+00	1,08 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,96 E-01	3,71 E-01	0,00 E+00	0,00 E+00	-1,29 E+01
ADPF	kg Sb eq.	3,31 E-01	1,02 E-01	2,57 E-01	6,90 E-01	1,47 E-01	4,87 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,84 E-02	2,26 E-02	0,00 E+00	0,00 E+00	-7,16 E-01

ADPE = Abiotic Depletion Potential for non-fossil resources
ADPF = Abiotic Depletion Potential for fossil resources
GWP = Global Warming Potential
ODP = Depletion potential of the stratospheric ozone layer
POCP = Formation potential of tropospheric ozone photochemical oxidants
AP = Acidification Potential of land and water
EP = Eutrophication Potential
HTP = Human Toxicity Potential
FAETP = Fresh water aquatic ecotoxicity potential
MAETP = Marine aquatic ecotoxicity potential
TETP = Terrestrial ecotoxicity potential
ECI = Environmental Cost Indicator
ADPF = Abiotic Depletion Potential for fossil resources expressed in [kg Sb-eq.]

ENVIRONMENT IMPACT 100% reuse waste scenario (core indicators A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	-8,09 E+02	1,43 E+01	1,33 E+02	-6,62 E+02	1,91 E+01	1,23 E+01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,66 E+00	3,10 E+00	7,60 E+02	0,00 E+00	-9,91 E+01
GWP-fossil	kg CO2 eq.	4,44 E+01	1,43 E+01	3,59 E+01	9,46 E+01	1,91 E+01	1,23 E+01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,65 E+00	3,10 E+00	0,00 E+00	0,00 E+00	-9,75 E+01
GWP-biogenic	kg CO2 eq.	-8,55 E+02	5,89 E-03	9,69 E+01	-7,59 E+02	8,17 E-03	4,09 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,19 E-03	1,33 E-03	7,60 E+02	0,00 E+00	0,00 E+00
GWP-luluc)	kg CO2 eq.	1,58 E+00	5,10 E-03	5,06 E-02	1,63 E+00	5,81 E-03	1,75 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	8,44 E-04	1,10 E-03	0,00 E+00	0,00 E+00	-1,63 E+00
ODP	kg CFC11 eq.	5,63 E-06	3,24 E-06	1,78 E-06	1,07 E-05	4,68 E-06	1,45 E-06	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,24 E-06	7,14 E-07	0,00 E+00	0,00 E+00	-1,10 E-05
AP	mol H+ eq.	4,18 E-01	4,40 E-02	1,28 E-01	5,90 E-01	6,14 E-02	4,10 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,14 E-02	1,77 E-02	0,00 E+00	0,00 E+00	-5,92 E-01
EP-freshwater	kg PO4 eq.	1,65 E-02	1,14 E-04	5,09 E-03	2,17 E-02	1,52 E-04	2,60 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,64 E-05	2,55 E-05	0,00 E+00	0,00 E+00	-2,17 E-02
EP-marine	kg N eq.	1,51 E-01	8,93 E-03	2,61 E-02	1,86 E-01	1,35 E-02	1,53 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,20 E-02	6,32 E-03	0,00 E+00	0,00 E+00	-1,87 E-01
EP-terrestrial	mol N eq.	1,55 E+00	9,99 E-02	3,55 E-01	2,00 E+00	1,50 E-01	1,68 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,31 E-01	6,96 E-02	0,00 E+00	0,00 E+00	-2,01 E+00
POCP	kg NMVOC eq.	5,27 E-01	3,70 E-02	7,90 E-02	6,43 E-01	5,89 E-02	4,50 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,41 E-02	1,99 E-02	0,00 E+00	0,00 E+00	-6,46 E-01
ADP-minerals & metals	kg Sb eq.	1,15 E-03	3,92 E-04	4,61 E-04	2,00 E-03	3,40 E-04	3,87 E-05	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,17 E-05	8,02 E-05	0,00 E+00	0,00 E+00	-2,00 E-03
ADP-fossil	MJ, net calorific value	6,73 E+02	2,16 E+02	4,97 E+02	1,39 E+03	3,10 E+02	1,02 E+02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	8,14 E+01	4,76 E+01	0,00 E+00	0,00 E+00	-1,43 E+03
WDP	m3 world eq. Deprived	2,94 E+01	6,08 E-01	3,94 E+00	3,40 E+01	1,01 E+00	5,47 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,58 E-01	1,46 E-01	0,00 E+00	0,00 E+00	-3,42 E+01

GWP-total = Global Warming Potential total
GWP-fossil = Global Warming Potential fossil fuels
GWP-biogenic = Global Warming Potential biogenic
GWP-luluc = Global Warming Potential land use and land use change
ODP = Depletion potential of the stratospheric ozone layer
AP = Acidification Potential, Accumulated Exceedence
EP-freshwater = Eutrophication Potential, fraction of nutrients reaching freshwater end compartment
EP-marine = Eutrophication Potential, fraction of nutrients reaching marine end compartment
EP-terrestrial = Eutrophication Potential, Accumulated Exceedence
POCP = Formation potential of tropospheric ozone photochemical oxidants
ADP-minerals&metals = Abiotic Depletion Potential for non-fossil resources [2]
ADP-fossil = Abiotic Depletion for fossil resources potential [2]
WDP = Water (user) deprivation potential, deprivation-weighted water consumption [2]

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

ENVIRONMENT IMPACT 100% reuse waste scenario (additional indicators A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	Disease incidence	5,39 E-06	9,06 E-07	1,71 E-06	8,01 E-06	1,67 E-06	2,12 E-07	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	9,19 E-08	2,80 E-07	0,00 E+00	0,00 E+00	-8,02 E-06
IRP	kBq U235 eq.	1,52 E+00	9,42 E-01	1,70 E+00	4,17 E+00	1,35 E+00	4,25 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,54 E-01	2,08 E-01	0,00 E+00	0,00 E+00	-4,18 E+00
ETP-fw	CTUe	3,31 E+03	1,73 E+02	6,27 E+02	4,11 E+03	2,47 E+02	9,99 E+01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,11 E+01	3,86 E+01	0,00 E+00	0,00 E+00	-4,11 E+03
HTP-c	CTUh	2,17 E-07	4,86 E-09	1,49 E-08	2,36 E-07	5,99 E-09	1,39 E-08	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	9,85 E-09	1,38 E-09	0,00 E+00	0,00 E+00	-2,37 E-07
HTP-nc	CTUh	5,07 E-06	1,83 E-07	5,07 E-07	5,75 E-06	2,70 E-07	1,58 E-07	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	8,33 E-08	4,60 E-08	0,00 E+00	0,00 E+00	-5,76 E-06
SQP	----	4,99 E+04	1,50 E+02	3,50 E+02	5,04 E+04	3,55 E+02	5,26 E+02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,11 E+01	4,07 E+01	0,00 E+00	0,00 E+00	-5,04 E+04

PM = Potential incidence of disease due to PM emissions
IRP = Potential Human exposure efficiency relative to U235 [1]
ETP-fw = Potential Comparative Toxic Unit for ecosystems [2]
HTP-c = Potential Comparative Toxic Unit for humans [2]
HTP-nc = Potential Comparative Toxic Unit for humans, non-cancer [2]
SQP = Potential soil quality index [2]

Disclaimer [1]
- This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste.

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

OUTPUT FLOWS AND WASTE CATEGORIES 100% reuse waste scenario unit (A1 / A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	3,01 E-03	5,62 E-04	6,57 E-04	4,23 E-03	7,51 E-04	2,78 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,14 E-04	1,22 E-04	0,00 E+00	0,00 E+00	-4,29 E-03
NHWD	kg	5,56 E+00	1,04 E+01	3,07 E+00	1,91 E+01	2,69 E+01	1,06 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,00 E-01	2,95 E+00	0,00 E+00	0,00 E+00	-1,91 E+01
RWD	kg	2,04 E-03	1,47 E-03	2,09 E-03	5,59 E-03	2,12 E-03	6,55 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,55 E-04	3,24 E-04	0,00 E+00	0,00 E+00	-5,62 E-03
CRU	kg	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	4,76 E+02	0,00 E+00	0,00 E+00
MFR	kg	0,00 E+00	0,00 E+00	-6,03 E+01	-6,03 E+01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
MER	kg	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	-1,72 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
EEE	MJ	0,00 E+00	0,00 E+00	-1,41 E+02	-1,41 E+02	0,00 E+00	-1,25 E+01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,19 E+03	0,00 E+00	0,00 E+00
ETE	MJ	0,00 E+00	0,00 E+00	-2,43 E+02	-2,43 E+02	0,00 E+00	-2,15 E+01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,05 E+03	0,00 E+00	0,00 E+00

HWD = Hazardous Waste Disposed
NHWD = Non Hazardous Waste Disposed
RWD = Radioactive Waste Disposed
CRU = Components for reuse
MFR = Materials for recycling
MER = Materials for energy recovery
EEE = Exported Electrical Energy
ETE = Exported Thermal Energy

RESOURCE USE 100% reuse waste scenario (A1 / A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	2,82 E+03	3,08 E+00	1,08 E+03	3,91 E+03	3,90 E+00	1,07 E+02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	9,29 E-01	6,83 E-01	-6,61 E+03	0,00 E+00	-1,05 E+04
PERM	MJ	7,45 E+03	0,00 E+00	-8,37 E+02	6,61 E+03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	6,61 E+03	0,00 E+00	0,00 E+00
PERT	MJ	1,03 E+04	3,08 E+00	2,48 E+02	1,05 E+04	3,90 E+00	1,07 E+02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	9,29 E-01	6,83 E-01	0,00 E+00	0,00 E+00	-1,05 E+04
PENRE	MJ	5,82 E+02	2,29 E+02	4,78 E+02	1,29 E+03	3,29 E+02	1,78 E+02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	8,65 E+01	5,05 E+01	0,00 E+00	0,00 E+00	-1,53 E+03
PENRM	MJ	1,37 E+02	0,00 E+00	5,41 E+01	1,91 E+02	0,00 E+00	-6,94 E+01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
PENRT	MJ	7,19 E+02	2,29 E+02	5,32 E+02	1,48 E+03	3,29 E+02	1,09 E+02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	8,65 E+01	5,05 E+01	0,00 E+00	0,00 E+00	-1,53 E+03
SM	kg	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
RSF	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
NRSF	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
FW	m3	9,40 E-01	2,30 E-02	3,61 E-01	1,32 E+00	3,53 E-02	2,32 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	6,35 E-03	5,38 E-03	0,00 E+00	0,00 E+00	-1,33 E+00

PERE = Use of renewable energy excluding renewable primary energy resources
PERM = Use of renewable energy resources used as raw materials
PERT = Total use of renewable primary energy resources
PENRE = Use of non-renewable primary energy resources excluding non-renewable energy resources used as raw materials
PENRM = Use of non-renewable primary energy resources used as raw materials
PENRT = Total use of non-renewable primary energy resources
SM = Use of secondary materials
RSF = Use of renewable secondary fuels
NRSF = Use of non-renewable secondary fuels
FW = Use of net fresh water

BIOGENIC CARBON CONTENT 100% reuse waste scenario (A1 / A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
BBCpr	Kg C	-2,32 E+02	0,00 E+00	2,49 E+01	-2,07 E+02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,07 E+02	0,00 E+00	0,00 E+00
BCCpa	kg C	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00

BCCpr = Biogenic carbon content in product
BCCpa = Biogenic carbon content in packaging