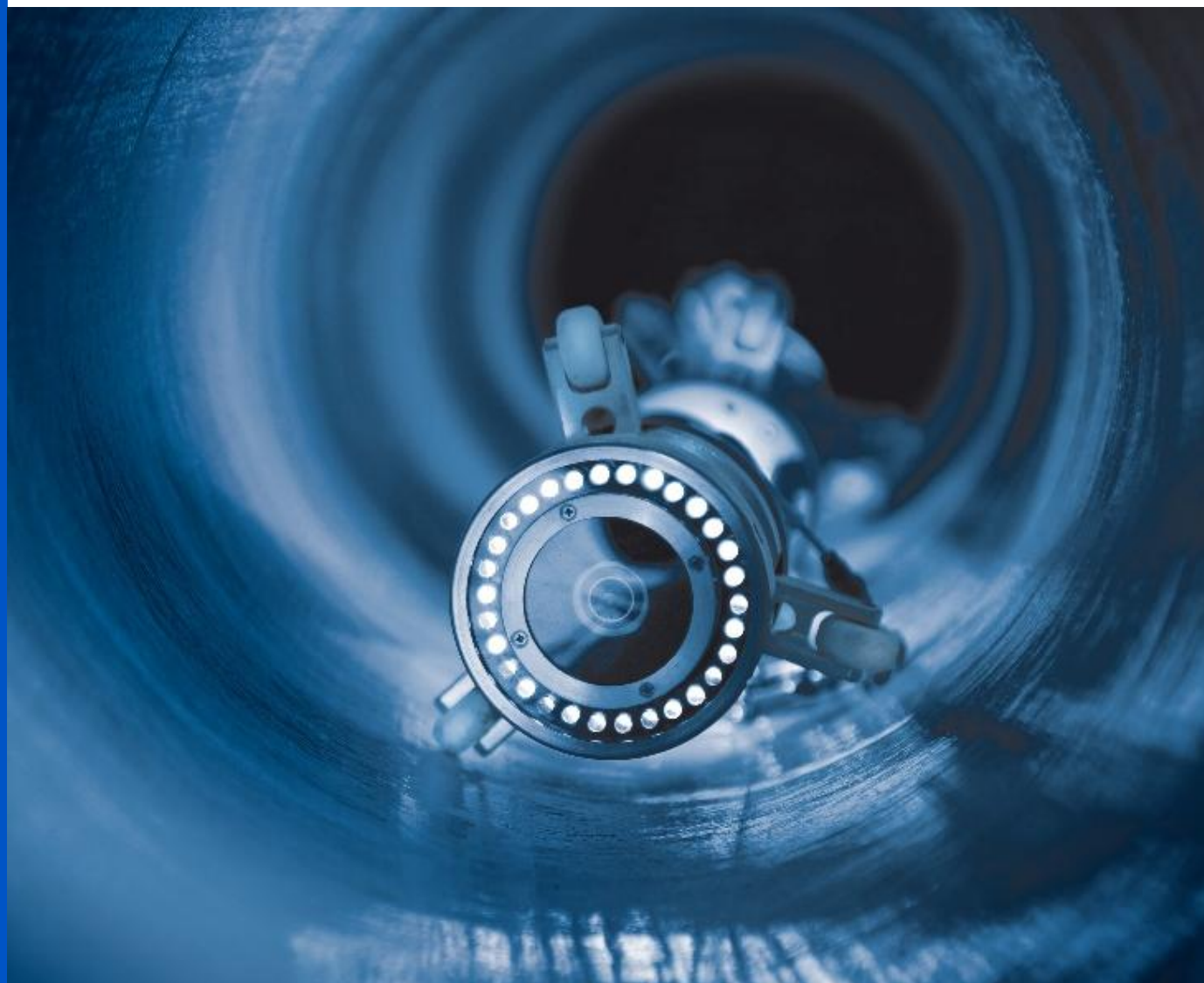


Environmental Product Declaration (EPD)
According to ISO 14025 and EN 15804+A2

ALPHALINER 500G

Registration number:	EPD-Kiwa-EE-000490-EN
Issue date:	16.07.2026
Valid until:	16.07.2031
Declaration owner:	RelineEurope GmbH
Publisher:	Kiwa-Ecobility Experts
Program operator:	Kiwa-Ecobility Experts
Status:	verified



1 General information

1.1 PRODUCT

ALPHALINER 500G

The product is suitable for the trenchless renovation of gravity sewer and stormwater pipes of diameters typically between 150 and 2000 mm. The product is made of a glass fiber reinforced plastic which is covered on the inside and outside by thermoplastic films.

First an uncured, flexible hose is produced which can be introduced into damaged gravity sewer or stormwater pipes through the existing manholes thus avoiding the need to open the surface or dig trenches. In a second step the product is inflated inside the pipe so that it closely adheres to the wall of the damaged pipe. Finally, the material is cured by applying ultraviolet light.

After installation, the product forms a new inner pipe within an existing pipe that has reached the end of its service life. The liner partially takes over the function of the old pipe.

This EPD covers all products listed below that are sold under the name ALPHALINER 500G.

For this EPD the product variants are structured in four size categories:

1. Small diameter configuration
2. Medium diameter configuration
3. Large diameter configuration
4. Extra-large diameter configuration

Detailed specifications of these size categories are described in section 2.1. PRODUCT DESCRIPTION. For each size category a representative configuration of the product is chosen and within each size category the calculated specific environmental impacts vary less than 10 % from this average value (see Sec. 6.2).

1.2 REGISTRATION NUMBER

EPD-Kiwa-EE-000490-EN

1.3 VALIDITY

Issue date: 16.07.2026

Valid until: 16.07.2031

1.4 PROGRAM OPERATOR

Kiwa-Ecobility Experts
Wattstraße 11-13
13355 Berlin
Germany



Raoul Mancke

(Head of program operations,
Kiwa-Ecobility Experts)



Onur Üzümlü

(Verification body, Kiwa-
Ecobility Experts)

1.5 OWNER OF THE DECLARATION

Declaration owner: RelineEurope GmbH

Address: Große Ahlmühle 31, 76865 Rohrbach

E-mail: sustainability@relineeurope.com

Website: <https://www.relineeurope.com/>

Production location: RelineEurope GmbH

Address production location: Große Ahlmühle 31, 76865 Rohrbach

1.6 VERIFICATION OF THE DECLARATION

The independent verification is in accordance with ISO 14025:2011. The LCA is in compliance with ISO 14040:2006 and ISO 14044:2006. EN 15804:2012+A2:2019 serves as the core PCR.

☐ Internal ☒ External



Patrick Wortner

(Third party verifier)

1.7 STATEMENTS

The owner of this EPD shall be liable for the underlying information and evidence. The program operator Kiwa-Ecobility Experts shall not be liable with respect to manufacturer data, life cycle assessment data and evidence.

EPDs which do not comply with EN 15804 are not comparable.

1.8 PRODUCT CATEGORY RULES

Kiwa-EE GPI R.4.0

Kiwa-Ecobility Experts, General Programme Instructions “Product Level”, Program EE 1201 (18.12.2025)

Kiwa-EE GPI R.4.0 Annex B1

Kiwa-Ecobility Experts, General Programme Instructions “Product Level” – Annex B1 Environmental Information Programme according to EN 15804 / ISO 21930, Program EE 1203 (18.12.2025)]

1.9 COMPARABILITY

In principle, a comparison or assessment of the environmental impacts of different products is only possible if they have been prepared in accordance with EN 15804. For the evaluation of the comparability, the following aspects have to be considered in particular: PCR used, functional or declared unit, geographical reference, the definition of the system boundary, declared modules, data selection (primary or secondary data, background database, data quality), scenarios used for use and disposal phases, and the life cycle inventory (data collection, calculation methods, allocations, validity period). PCRs and general program instructions of different EPDs programs may differ. Comparability needs to be evaluated. For further guidance, see EN 15804+A2 (5.3 Comparability of EPD for construction products) and ISO 14025 (6.7.2 Requirements for comparability).

1.10 CALCULATION BASIS

LCA method: [EN15804+A2]

LCA software: LCA for Experts (Sphera) 10.9.5.2

Characterization method: EN 15804 +A2 Method v1.0

LCA database profiles: MLC (Sphera)

Version database: 2026.1

1.11 PROJECT REPORT

This EPD is generated on the basis of the following report:

ALPHALINER_500G_LCA_report_Version_4.00.docx

2 Product

2.1 PRODUCT DESCRIPTION

The product is made of a glass fiber reinforced plastic wall which consists of glass fibers and unsaturated polyester resin. The wall material is covered on the inside and outside by thermoplastic films.

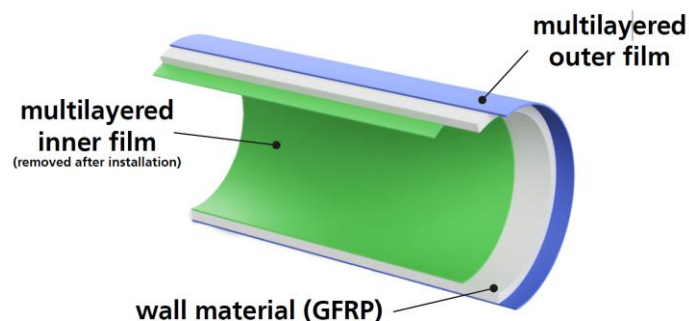


Figure 1: Schematic sketch of the product

The product is intended for the trenchless renovation of gravity sewers or stormwater pipes. It is available in diameters ranging from 140 mm to 2000 mm. For this EPD, the product is grouped into four size classes, because the impact of the declared unit slightly differs for the classes.

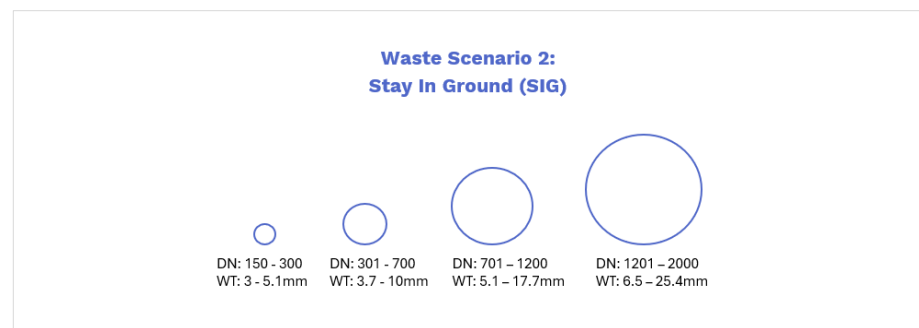
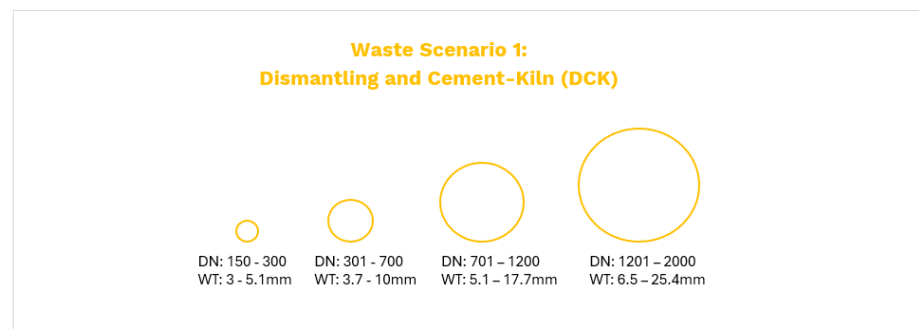
The classes considered are

- Small diameter configuration
 - The reference liner has a diameter (DN) of 250 mm and a wall thickness of 3,7 mm + 0,4 mm safety margin.
 - This is valid for all liners which have a diameter between 150 and 300 mm and a wall thickness (WT) of 3 to 5.1 mm
- Medium diameter configuration
 - The reference liner has a diameter (DN) of 500 mm and a wall thickness of 5,8 mm + 0,4 mm safety margin.
 - This is valid for all liners which have a diameter between 301 and 700 mm and a wall thickness (WT) of 3.7 to 10 mm + 0,4 mm safety margin.

- Large diameter configuration
 - The reference liner has a diameter (DN) of 900 mm and a wall thickness of 9,3 mm + 0,4 mm safety margin.
 - This is valid for all liners which have a diameter between 701 and 1200 mm and a wall thickness (WT) of 5.1 to 17.7 mm + 0.4 mm safety margin.
- Extra-large diameter configuration
 - The reference liner has a diameter (DN) of 1500 mm and a wall thickness of 15.6 mm + 0.4 mm safety margin.
 - This is valid for all liners with diameters between 1201 and 2000 mm and a wall thickness (WT) of 6.5 mm to 25.4 mm.

The EPD results for the **Small-diameter configuration** with **waste scenario 1 “Dismantling & Cement Kiln”** (the liner is cut into pieces and removed from the pipe) represent the **worst-case scenario** and are therefore presented as the reference case in Section 5 of this document. The results for the **remaining three diameter configurations** as well as for **waste scenario 2 “Stay-In-Ground”** (liner remains in the ground, no contributions to C1-C4 and D occur) are provided in the Annex (Section 7).

For ease of navigation, the different diameter configurations as well as different waste scenarios are highlighted accordingly in the schemes below.



Product specification

The composition of the product is described in the following table: All materials are virgin; no secondary material is used.

Materials	Weight [m-%]
Unsaturated polyester resin	approx. 57% of wall material
Glass fibers	approx. 43% of wall material
Thermoplastic films	approx. 170 µm (inside) approx. 500 µm (outside)

2.2 APPLICATION (INTENDED USE OF THE PRODUCT)

The product is used for the trenchless renovation of gravity sewer liners and stormwater pipes.

After installation the product forms a new, inner pipe inside an existing pipe which reached the end of its life. The liner partially takes over the function of the old pipe.

The product complies among others with standards of *Deutsches Institut für Bautechnik*, Germany (DIBT), *Centre Scientifique et Technique du Bâtiment*, France (CSTB), *Water Research Centre*, England and Wales (WRc) as well as with the *Qualitätssicherung in der Kanalsanierung*, Switzerland (QUIK). (Web links see Sec. 8)

Certificates can be obtained from the manufacturer.

2.3 REFERENCE SERVICE LIFE (RSL)

RSL PRODUCT

The RSL is estimated by various tests (Accelerated stress test ISO 11296-4, long-term ring test DIN EN 761, abrasion test DIN EN 295-3). All three tests simulate a constant load over the 100-year lifetime of a liner. Since the liner is not destroyed after these tests the actual lifetime will be longer than 100 years.

USED RSL (YR) IN THIS CALCULATION

The RSL is 100 years.

2.4 TECHNICAL DATA

The declared unit is 1 kg of the product. Therefore, technical data vary due to the specific

configuration of the product. Besides the composition already given in Sec. 2.1, only the density is applicable.

Description	Unit	Value
Density	kg/m ³	1500

The table below provides information on the weight of the referenced product variants per meter. By multiplying this value by the impacts of the declared unit the impact per meter of each product can be calculated.

Weight per meter liner in kg

Density: 1.5 g/cm³

	Wall Thickness [mm]			
	3.7	5.8	9.3	15.6
DN250	5.5			
DN500		15.9		
DN900			43.3	
DN1500				116.3

2.5 SUBSTANCES OF VERY HIGH CONCERN

The product consists of thermoplastic films (PE, PP, PET, PVC), glass fibers and unsaturated polyester resin which contains styrene. None of these components belongs to the group of substances of very high concern as listed by ECHA. This is verified by comparing it with the list published online by ECHA:

https://echa.europa.eu/de/candidate-list-table?p_p_id=dislists_WAR_dislistsportlet&p_p_lifecycle=1&p_p_state=normal&p_p_mode=view&_dislists_WAR_dislistsportlet_javax.portlet.action=searchDislists, assessed on 26 November 2025

2.6 DESCRIPTION OF THE PRODUCTION PROCESS

The production of the ALPHALINER begins with the fabrication of a multiaxial glass fiber reinforcement at our facility in Rheine. This multiaxial reinforcement is subsequently impregnated with resin in a controlled wet-out process and then stored in light-impermeable protective foil for a minimum of 24 hours. During this storage period, the resin undergoes a controlled viscosity increase (thickening process).

The impregnated multiaxial reinforcement is then wrapped around a transparent inner foil in a winding process. Two longitudinal glass fiber tapes are integrated to prevent the liner from stretching during suspension in the manhole.

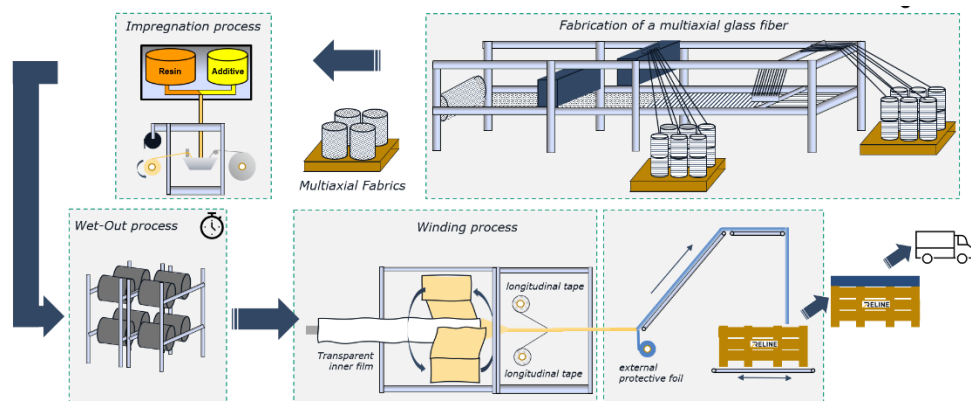


Figure 2: Detailed view of the manufacturing process (Modul A3)

Finally, the liner is covered with an external protective foil, which provides protection against UV radiation and mechanical damage. At this stage, the liner takes the form of a resin-impregnated flexible hose. This hose is folded and can be transported easily to the installation site. Here, the liner is inserted into the old, damaged gravity sewer or stormwater pipe usually through existing manholes for inspection and connection of the lines (Figure 3). Therefore, no destruction of surface structures is usually required (trenchless method).



Figure 3: The liner is taken from the transport box and inserted in the gravity sewer or stormwater pipe © RelineEurope GmbH

The liner is then sealed at both ends and inflated by internal air pressure to press the liner against the host pipe wall and compact the material for homogenous material properties. The liner is then cured by ultraviolet light. Therefore, in the inside of the inflated liner, a light train is installed and pulled with a defined curing speed, depending on size and diameter (Figure 4)



Figure 4: Inside view of a liner during curing with UV light. © RelineEurope GmbH

The main process steps within the life cycle are shown in Figure 5. Unsaturated resin, glass fiber, and (multilayered) plastic films are produced and purchased for the manufacturing of the liners. These are then processed into a liner. Production waste is recycled thermally with energy recovery. Transport to the construction site and installation are not considered (shown in gray). After the service life, the liner can be cut into pieces which are removed from the gravity sewer and stormwater pipes. These parts undergo thermal recovery. Incineration is possible in waste incineration facilities, but is generally preferable in cement kilns.

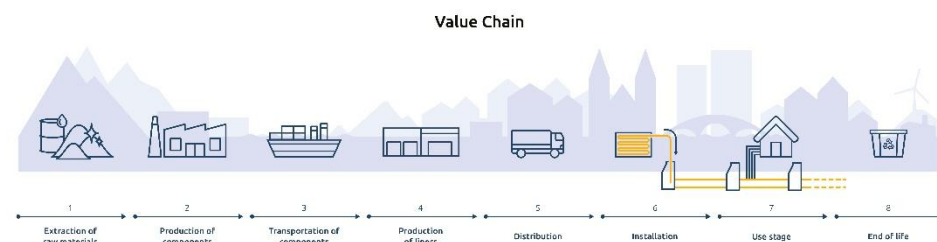


Figure 5: Graphic schematic process flow diagram for life cycle

3 Calculation rules

3.1 DECLARED UNIT

The declared unit is 1 kg of the product. The composition of the product varies. Therefore, 4 size classes are declared separately and the values given are representative for one class each.

3.2 CONVERSION FACTORS

Description	Value	Unit
Reference unit	1.0	kg
Weight per reference unit	1.0	kg
Conversion factor to 1 kg	1.000000	kg

3.3 SCOPE OF THE DECLARATION AND SYSTEM BOUNDARIES

This EPD is of the type cradle to gate with options including modules C1-C4 and module D

The assessment covers the potential environmental burdens of liner cradle-to-gate including disassembly and the end-of-life. It covers the extraction of raw materials, the transport to the factory, the production of the materials needed for the liner (mainly glass fibers, unsaturated polyester resin and thermoplastic films). Furthermore, it covers the production of the uncured liner in the factory.

It omits the final installation (A4, A5) which mainly consists of transport, handling and curing in place, due to its lower importance and to be comparable to other EPDs which also omit these phases.

A previously performed LCA by the authors shows the low contribution of the final installation to the overall environmental impacts. Liners require a negligible amount of installation effort. Particularly during installation, the glass liner method can avoid breaking up the road surface, excavation work, transportation and replacement of the asphalt while the energy costs of installing the glass liners are minimal. For example, installation causes between 1 % and 7 % of the climate impact and between 1 % and 5 % of the fossil resource consumption only.

Disassembly after its service life is taken into account. Finally, the end-of-life of the liner is calculated as well. However, the liners have a very long lifespan. Therefore, only estimates of the future technologies based on actual technologies available for treating GFRP waste could be used.

The following life cycle stages are considered while always in-spec operations of the processes are assumed.

According to DIN EN 15804 the following modules are considered

(X = module declared, ND = module not declared)

A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

The modules of EN15804+A2 contain the following:

Module A1 = Raw material supply	Module B5 = Refurbishment
Module A2 = Transport	Module B6 = Operational energy use
Module A3 = Manufacturing	Module B7 = Operational water use
Module A4 = Transport	Module C1 = De-construction / Demolition
Module A5 = Construction - Installation process	Module C2 = Transport
Module B1 = Use	Module C3 = Waste Processing
Module B2 = Maintenance	Module C4 = Disposal
Module B3 = Repair	Module D = Benefits and loads beyond the product system boundaries
Module B4 = Replacement	

3.4 REPRESENTATIVENESS

This EPD is representative of the ALPHALINER 500G, a product of RelineEurope GmbH.

This EPD is of type: *Manufacturer-specific EPD – Typical representative product*

Production, dismantling and end-of-life are considered to be in Central Europe. Therefore, German or European datasets are used.

3.5 CUT-OFF CRITERIA

All primary data collected during operation, i.e., all input and output materials used, the thermal energy used, and electricity consumption, are taken into account.

The transport routes of the preliminary products were considered at 100 % of the mass of the products.

The rules for excluding inputs and outputs set out in DIN EN 15804 have been followed. Based on the data analysis, it can be assumed that the neglected processes per life cycle stage do not exceed 1 % of the mass or primary energy. In total, 5 % of the energy and mass input is complied with for the neglected processes (modules A1-A3). Material and energy flows of less than 1 % were also taken into account for the calculation of the life cycle assessment.

The liners are packed in wooden boxes for transport. This packaging is not considered in this study due to its minimal impact.

The infrastructure of the production plant is excluded from the calculation. However, the energy demand is included because the total consumption of electricity and fuels is divided by the production amount of liners because the non-production share is negligible. This is conservative because it slightly overestimates the energy consumption of production.

3.6 ALLOCATION

Allocations in production were avoided.

However, handling of multifunctionality might be included in the datasets of MLC used and is conducted according to Sphera's modelling principles (Sphera Solutions GmbH 2025).

In the foreground system, it is only used to model waste, whether from the production stage or the end of the liner's life. In both cases the avoided-burden approach is applied and credits for the recovered energy are given.

3.7 DATA COLLECTION & REFERENCE TIME PERIOD

The reference time period for data collection was January 1st, 2023 to December 31st, 2023.

3.8 ESTIMATES AND ASSUMPTIONS

For the distance to the waste incineration a distance of 50 km is assumed and for the distance to the cement kiln a distance of 200 km is assumed.

3.9 DATA QUALITY

MLC Database (Version 2026.1) of Sphera was used for the model. Except that a few datasets of ecoinvent database were required to calculate the fuel mix of the cement kiln, which has only a very small influence on the total result (only for D-module).

Quality requirement	Specific requirement	Data quality level	Notes
Time-related coverage	Primary data from 2023, (Jan. – Dec.) background data from MLC 2026.1).	Very Good	
	The materials are purchased from German suppliers. Therefore, German datasets are used.	Good	MLC 2026.1
Geographical coverage	Manufacturing mainly requires electricity and heat. German datasets for electricity and fuels are used	Very Good	MLC 2026.1
	Credits for waste incineration are based on German electricity and heat recovery.	Good	MLC 2026.1
Technical representativeness	The data of the foreground processes are very representative, because they are based on production data.	Very Good	
	The RSL of the product is 100 years. Therefore, EoL technology can only be a rough estimate based on actual technology.	Fair	

3.10 POWER MIX

For electricity the market-based approach is used. Reline uses renewable energy certificates for 100% of the electricity purchased. The certified electricity consists of hydropower from Norway and Spain. No on-site electricity generation is included in the LCA.

The GWP of electricity use is 0.0346 kg CO₂ per kWh.

Heat at the production site is provided by LPG, Gas Oil, wood pellets and natural gas.

Neither electricity nor heat have a significant impact on the result.

4 Scenarios and additional technical information

4.1 RAW MATERIAL SUPPLY (A1)

No different scenarios are used for the material supply. The raw materials are purchased on the German market

4.2 TRANSPORT (A2)

No different scenarios are used for transport. Transport distances are calculated from RelineEurope GmbH's database of suppliers.

4.3 MANUFACTURING (A3)

No different scenarios are used for manufacturing.

4.4 TRANSPORT TO CONSTRUCTION SITE (A4)

N.D.

4.5 ASSEMBLY (A5)

N.D.

4.6 USE (B1)

N.D.

4.7 MAINTENANCE (B2)

N.D.

4.8 REPAIR (B3)

N.D.

4.9 REPLACEMENT (B4)

N.D.

4.10 REFURBISHMENT (B5)

N.D.

4.11 OPERATIONAL ENERGY USE (B6)

N.D.

4.12 OPERATIONAL WATER USE (B7)

N.D.

4.13 DE-CONSTRUCTION, DEMOLITION (C1)

Two scenarios are considered which are assumed to be representative.

- **Dismantling and cement kiln (DCK)**
The liner is cut into pieces and removed from the pipe. The energy for this is provided by a diesel-driven generator. The material is transported to a cement factory and burned in the kiln. Credits are given for the substitution of the actual average fuel used in cement kilns. The calculation of the fuel mix is shown in Blömer (2025).
- **Stay in ground (SIG)**
The liners remain in the ground and no contribution to C1-C4 and D occur.

4.14 TRANSPORT END-OF-LIFE (C2)

- DCK: An extended transport distance of 200 km is assumed due to reduced availability of cement kilns.
- SIG: no contribution

4.15 END OF LIFE (C3, C4)

- DCK: 95% of the material is burned in a cement kiln and the emissions are accounted for. 5% of the material is directly landfilled.
- SIG: no contribution

4.16 BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY (D)

95% of the material is burned in cement kilns. The polymer replaces ordinary fuel and credits are given. The glass is incorporated into the cement clinker. Here, no credits are given.

5 Results

For the impact assessment, the characterization factors of the LCIA method EN 15804 +A2 Method v1.0 are used. Long-term emissions (>100 years) are not considered in the impact assessment. The results of the impact assessment are only relative statements that do not make any statements about endpoints of the impact categories, exceedance of threshold values, safety margins or risks. The following tables show the results of the indicators of the impact assessment, of the use of resources as well as of waste and other output flows.

5.1 ENVIRONMENTAL IMPACT INDICATORS PER 1 kg

Small diameter configuration – Waste scenario 1 : DCK (Dismantling and cement kiln)



CORE ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
AP	mol H ⁺ eqv.	7.51E-03	6.22E-05	3.38E-05	7.61E-03	4.13E-04	1.87E-05	5.72E-03	8.93E-06	-9.01E-03
GWP-total	kg CO ₂ eqv.	2.39E+00	5.01E-02	1.25E-01	2.56E+00	3.11E-02	1.50E-02	1.25E+00	1.46E-03	-1.31E+00
GWP-b	kg CO ₂ eqv.	1.54E-02	-7.89E-04	3.91E-02	5.38E-02	-1.78E-03	-2.37E-04	0.00E+00	1.37E-06	-2.01E-01
GWP-f	kg CO ₂ eqv.	2.37E+00	5.04E-02	8.37E-02	2.50E+00	3.25E-02	1.51E-02	1.25E+00	1.46E-03	-1.11E+00
GWP-luluc	kg CO ₂ eqv.	8.00E-04	5.58E-04	2.09E-03	3.44E-03	3.43E-04	1.67E-04	0.00E+00	1.94E-06	-1.44E-04
EP-m	kg N eqv.	1.39E-03	2.41E-05	8.31E-06	1.42E-03	1.97E-04	7.23E-06	1.96E-03	1.94E-06	-3.09E-03
EP-fw	kg P eqv.	3.63E-06	1.01E-07	9.09E-08	3.82E-06	6.19E-08	3.02E-08	0.00E+00	8.42E-07	-1.25E-07
EP-T	mol N eqv.	1.54E-02	2.66E-04	1.81E-04	1.59E-02	2.16E-03	7.99E-05	2.15E-02	2.13E-05	-3.39E-02
ODP	kg CFC 11 eqv.	2.37E-11	2.49E-14	7.01E-12	3.07E-11	1.53E-14	7.49E-15	0.00E+00	9.25E-15	-2.81E-12
POCP	kg NMVOC eqv	5.66E-03	5.90E-05	2.74E-05	5.74E-03	5.56E-04	1.77E-05	5.51E-03	6.08E-06	-8.65E-03
ADP-f	MJ	5.32E+01	6.43E-01	-4.28E-01	5.34E+01	3.95E-01	1.93E-01	0.00E+00	2.40E-02	-4.09E+00
ADP-mm	kg Sb-eqv.	6.17E-07	4.31E-09	-5.41E-09	6.16E-07	2.65E-09	1.29E-09	0.00E+00	1.17E-10	-1.86E-08
WDP	m ³ world eqv.	1.28E-01	1.76E-04	2.18E-02	1.50E-01	1.08E-04	5.28E-05	0.00E+00	1.82E-04	-2.16E-03

AP=Acidification (AP) | **GWP-total**=Global warming potential (GWP-total) | **GWP-b**=Global warming potential - Biogenic (GWP-b) | **GWP-f**=Global warming potential - Fossil (GWP-f) | **GWP-luluc**=Global warming potential - Land use and land use change (GWP-luluc) | **EP-m**=Eutrophication marine (EP-m) | **EP-fw**=Eutrophication, freshwater (EP-fw) | **EP-T**=Eutrophication, terrestrial (EP-T) | **ODP**=Ozone depletion (ODP) | **POCP**=Photochemical ozone formation - human health (POCP) | **ADP-f**=Resource use, fossils (ADP-f) | **ADP-mm**=Resource use, minerals and metals (ADP-mm) | **WDP**=Water use (WDP)

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
ETP-fw	CTUe	2.80E+01	5.57E-01	1.16E-01	2.87E+01	3.43E-01	1.67E-01	2.21E-01	5.49E-02	-1.88E+00
PM	Disease incidence	5.44E-08	5.62E-10	1.46E-10	5.51E-08	5.52E-10	1.69E-10	2.02E-08	9.30E-11	-3.40E-08
HTP-c	CTUh	6.08E-10	9.96E-12	-4.46E-13	6.17E-10	6.48E-12	2.99E-12	1.92E-08	7.73E-13	-2.85E-08
HTP-nc	CTUh	1.91E-08	3.83E-10	3.27E-10	1.98E-08	2.59E-10	1.15E-10	4.55E-12	1.42E-11	-9.65E-10
IR	kBq U-235 eqv.	3.33E-02	6.45E-05	-1.83E-03	3.15E-02	3.97E-05	1.94E-05	0.00E+00	3.36E-05	-3.71E-03
SQP	Pt	1.25E+01	1.86E-01	6.45E-01	1.33E+01	1.15E-01	5.59E-02	0.00E+00	5.44E-03	-3.46E-01

ETP-fw=Ecotoxicity, freshwater (ETP-fw) | **PM**=Particulate Matter (PM) | **HTP-c**=Human toxicity, cancer (HTP-c) | **HTP-nc**=Human toxicity, non-cancer (HTP-nc) | **IR**=Ionising radiation, human health (IR) | **SQP**=Land use (SQP)

CLASSIFICATION OF DISCLAIMERS TO THE DECLARATION OF CORE AND ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS

ILCD classification	Indicator	Disclaimer
ILCD type / level 1	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
ILCD type / level 2	Acidification potential. Accumulated Exceedance (AP)	None
	Eutrophication potential. Fraction of nutrients reaching freshwater end compartment (EP-freshwater)	None
	Eutrophication potential. Fraction of nutrients reaching marine end compartment (EP-marine)	None
	Eutrophication potential. Accumulated Exceedance (EP-terrestrial)	None
	Formation potential of tropospheric ozone (POCP)	None
	Potential Human exposure efficiency relative to U235 (IRP)	1
ILCD type / level 3	Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	2
	Abiotic depletion potential for fossil resources (ADP-fossil)	2
	Water (user) deprivation potential. deprivation-weighted water consumption (WDP)	2
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2
	Potential Comparative Toxic Unit for humans (HTP-c)	2
	Potential Comparative Toxic Unit for humans (HTP-nc)	2
	Potential Soil quality index (SQP)	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 disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

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 experienced with the indicator.

5.2 INDICATORS DESCRIBING RESOURCE USE AND ENVIRONMENTAL INFORMATION BASED ON LIFE CYCLE INVENTORY (LCI) PER 1 kg

Small diameter configuration – Waste scenario 1 : DCK



PARAMETERS DESCRIBING RESOURCE USE

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
PERE	MJ	6.52E+00	5.04E-02	1.98E-01	6.77E+00	3.10E-02	1.51E-02	0.00E+00	4.33E-03	-7.73E-01
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	6.52E+00	5.04E-02	1.98E-01	6.77E+00	3.10E-02	1.51E-02	0.00E+00	4.33E-03	-7.73E-01
PENRE	MJ	5.32E+01	6.43E-01	-4.28E-01	5.34E+01	3.95E-01	1.93E-01	0.00E+00	2.40E-02	-4.09E+00
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	5.32E+01	6.43E-01	-4.28E-01	5.34E+01	3.95E-01	1.93E-01	0.00E+00	2.40E-02	-4.09E+00
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m³	8.15E-03	1.91E-05	1.23E-03	9.40E-03	1.18E-05	5.74E-06	0.00E+00	5.27E-06	-4.04E-04

PERE=renewable primary energy ex. raw materials | **PERM**=renewable primary energy used as raw materials | **PERT**=renewable primary energy total | **PENRE**=non-renewable primary energy ex. raw materials | **PENRM**=non-renewable primary energy used as raw materials | **PENRT**=non-renewable primary energy total | **SM**=use of secondary material | **RSF**=use of renewable secondary fuels | **NRSF**=use of non-renewable secondary fuels | **FW**=use of net fresh water

OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
HWD	kg	1.53E-08	3.68E-11	-1.04E-09	1.43E-08	2.26E-11	1.10E-11	0.00E+00	6.12E-12	-1.69E-09
NHWD	kg	1.04E-01	1.22E-04	4.11E-03	1.08E-01	7.51E-05	3.67E-05	0.00E+00	4.98E-02	-8.76E-04
RWD	kg	3.41E-04	6.97E-07	-1.40E-05	3.28E-04	4.28E-07	2.09E-07	0.00E+00	2.59E-07	-3.96E-05

HWD=hazardous waste disposed | **NHWD**=non-hazardous waste disposed | **RWD**=radioactive waste disposed

ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CRU=Components for re-use | **MFR**=Materials for recycling | **MER**=Materials for energy recovery | **EET**=Exported Energy Thermic | **EEE**=Exported Energy Electric

5.3 INFORMATION ON BIOGENIC CARBON CONTENT PER [enter reference unit (e.g. kilogram)]

The following information is valid for all sizes and all scenarios.

The following information describes the biogenic carbon content in (the main parts of) the product at the factory gate per kilogram:

Biogenic carbon content	Amount	Unit
Biogenic carbon content in the product	0.0	kg C
Biogenic carbon content in accompanying packaging	Not considered	kg C

UPTAKE OF BIOGENIC CARBON DIOXIDE

The following amount of carbon dioxide uptake is taken into account. Related uptake and release of carbon dioxide in downstream processes are not taken into account in this number although they do appear in the presented results. One kilogram of biogenic carbon content is equivalent to 44/12 kg of biogenic carbon dioxide uptake.

Uptake biogenic carbon dioxide	Amount	Unit
Product	0.0	kg CO ₂ (biogenic)
Packaging	Not considered	kg CO ₂ (biogenic)

5.4 Additional environmental information

For readers of this EPD and users of the product, the declared unit must be converted to the specific product variant of interest, taking into account the relevant nominal diameter, wall thickness, and length. The declared unit alone does not directly indicate the environmental impacts of a particular product configuration. To provide meaningful and practical information, indicative environmental impacts for three of the most frequently ordered product variants are presented below, each calculated for a length of 50 meters:

Sample Configuration	Diameter DN [mm]	Wallthickness [mm]	Mass per meter [kg/m]
1	200	3.0	3.7
2	300	3.7	6.6
3	500	4.4	12.7

These results represent additional, calculated examples derived from the declared unit and do not constitute new or alternative declared units. Such illustrative conversions are fully in line with EN 15804 when presented within the section “Additional environmental information,” and serve to improve applicability and understanding for EPD readers.



Figure 6: Additional environmental information for 50 m of liner of configuration 1

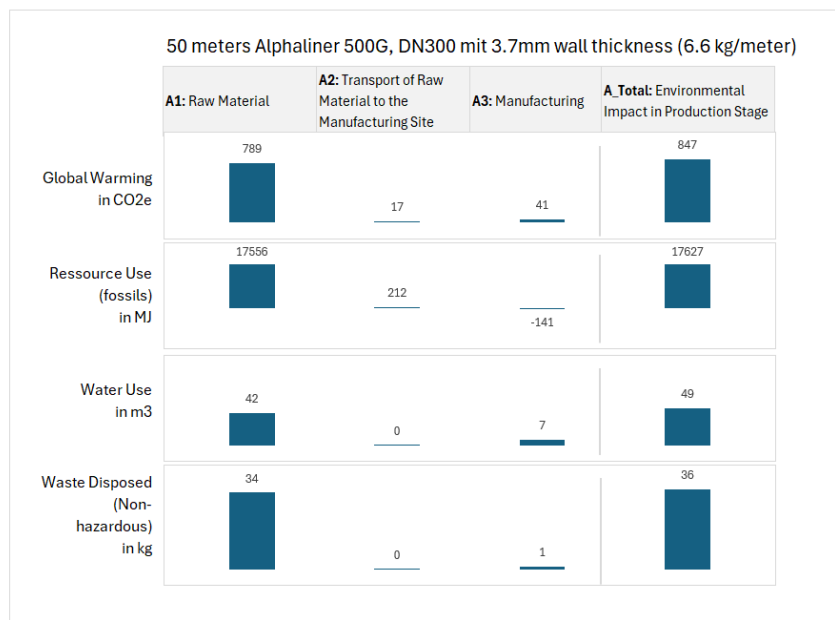


Figure 7: Additional environmental information for 50 m of liner of configuration 2

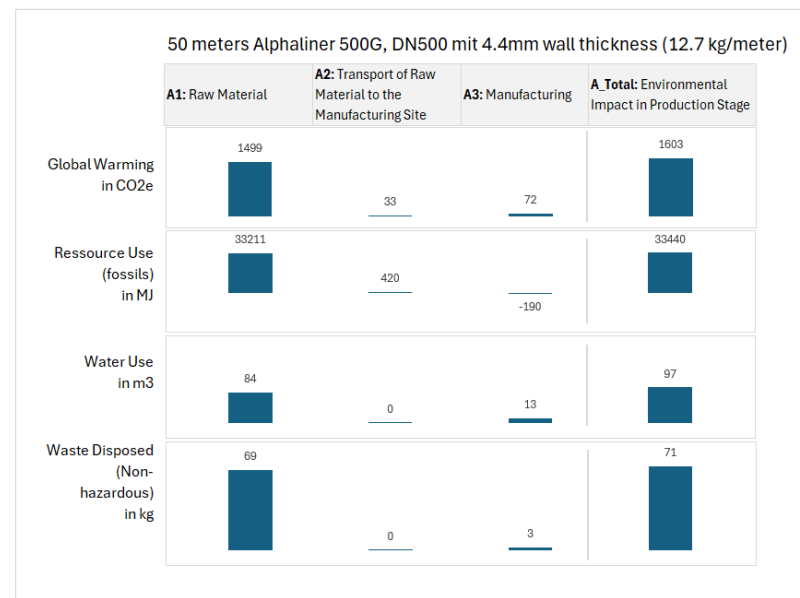


Figure 8: Additional environmental information for 50 m of liner of configuration 3

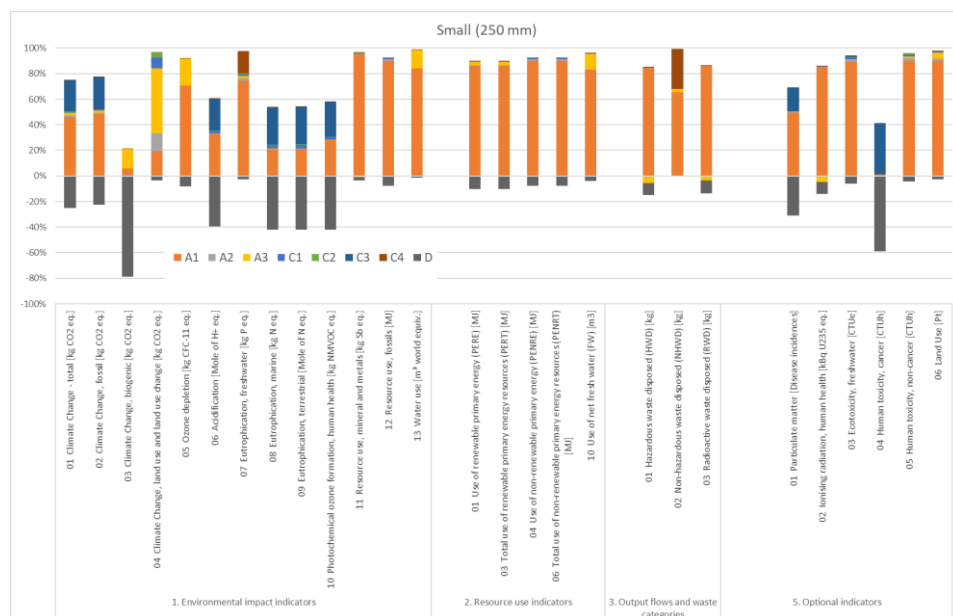
In practice, many authorities responsible for gravity sewer and stormwater pipes like cities or municipalities use climate change impact of one meter of pipe when looking at the most relevant environmental impact of the products installed. For their convenience the climate change impact per 1 m for each liner specification can be provided upon request directly by RelineEurope GmbH:

sustainability@relineeurope.com

6 Interpretation of results

6.1 CONTRIBUTION ANALYSIS

Contribution analysis for the modules



The figure shows the contribution analysis of the small liner. The other size classes show nearly the same results with minor differences. Therefore, these figures are omitted here but are included in the report.

It can be observed that A1 (orange) dominates most of the environmental impacts. In addition, the credits given in module D for replacing fuels in cement plants are sometimes dominating the impact. This is for example the case in the use of renewable primary energy or hazardous waste disposal.

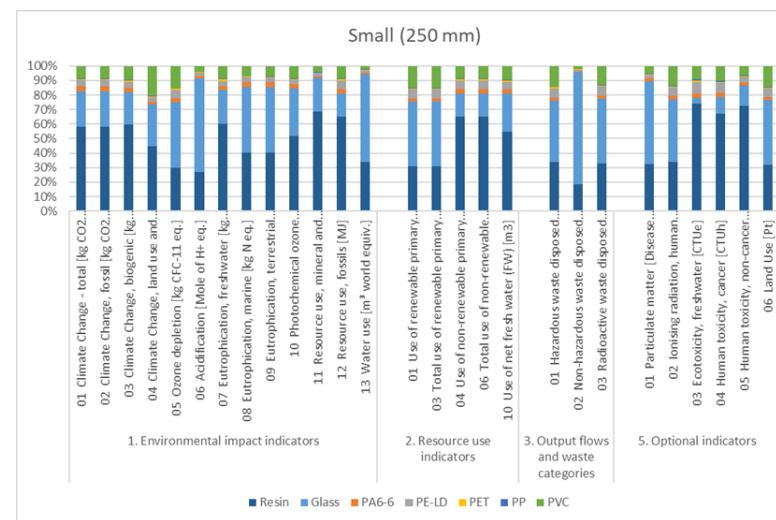
Contribution analysis of raw materials (A1)

The contribution analysis of raw materials, mainly resin, glass fiber and various plastics for films are presented in the figure below. The figure shows the contribution analysis of the small liner. The other size classes show nearly the same results with minor differences. Therefore, these figures are omitted here but are included in the report.

It can be seen that in all impact categories resin and glass together (i.e. the wall material) dominate the impacts. This is mostly due to the high mass share of the wall material compared to the films. Only the share of resin and glass varies for different impact categories.

The plastics used in the films contribute little to the impacts with increasing importance for smaller liners due to the increased surface to volume ratio.

For the films PVC has the highest contribution.

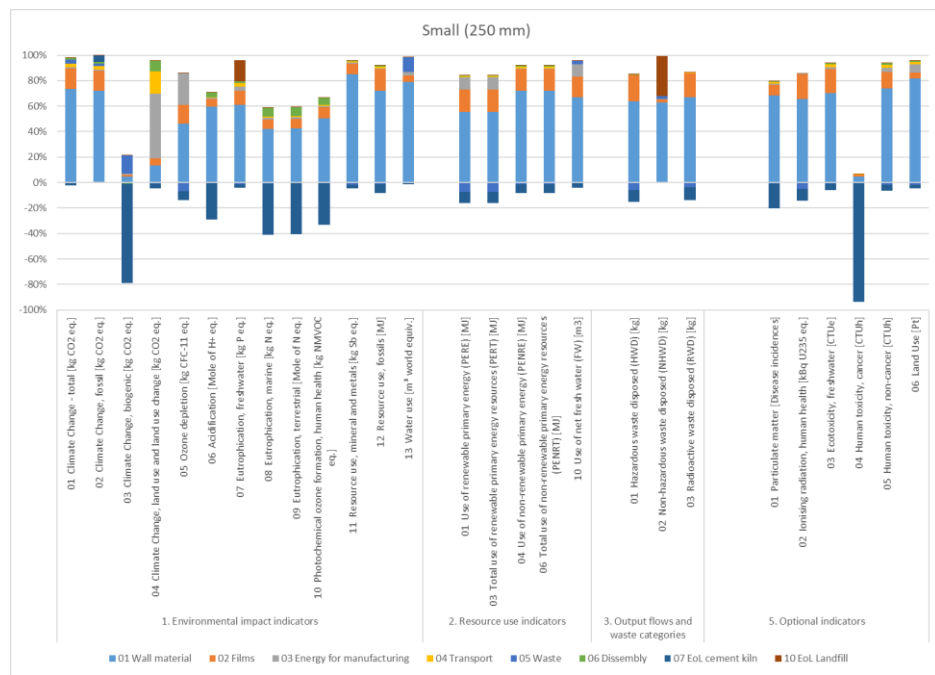


Contribution of raw materials (A1) for small liners

Analysis of the contribution of inputs

To better understand the contributions, the environmental impacts of the wall material, films, energy for manufacturing, transport, waste, disassembly, EoL cement kiln, and EoL landfill were calculated individually. Their results are presented in figure below. The figure shows the contribution analysis of the small liner. The other size classes show nearly the same results with minor differences. Therefore, these figures are omitted here but are included in the report.

It can be seen that wall material and the credit from energy recovery in cement plants dominate most environmental impact categories. Transportation contributes to climate impacts from land use through the use of biofuels. The films are more relevant for smaller liners than for larger ones. Land use is also influenced by energy consumption. Disassembly plays only a minor role, as does the disposal of production waste (05 waste). There tend to be no major changes between the size categories.



Contribution of various processes for small liners

6.2 SENSITIVITY ANALYSES

	Extra-Large	Large	Medium	Small
1. Environmental impact indicators				
01 EN15804+A2 (EF 3.1) Climate Change - total [kg CO2 eq.]	1,5%	1,3%	1,5%	0,9%
02 EN15804+A2 (EF 3.1) Climate Change, fossil [kg CO2 eq.]	1,4%	1,2%	1,4%	0,8%
03 EN15804+A2 (EF 3.1) Climate Change, biogenic [kg CO2 eq.]	-0,3%	-0,4%	-0,2%	-0,1%
04 EN15804+A2 (EF 3.1) Climate Change, land use and land use change [kg CO2 eq.]	-0,3%	-0,3%	0,0%	0,1%
05 EN15804+A2 (EF 3.1) Ozone depletion [kg CFC-11 eq.]	0,4%	0,4%	1,1%	1,5%
06 EN15804+A2 (EF 3.1) Acidification [Mole of H+ eq.]	-4,1%	-3,9%	-4,2%	-3,4%
07 EN15804+A2 (EF 3.1) Eutrophication, freshwater [kg P eq.]	-0,5%	-0,5%	-0,3%	-0,1%
08 EN15804+A2 (EF 3.1) Eutrophication, marine [kg N eq.]	-3,3%	-3,2%	-3,3%	-2,6%
09 EN15804+A2 (EF 3.1) Eutrophication, terrestrial [Mole of N eq.]	-3,1%	-3,0%	-3,0%	-2,3%
10 EN15804+A2 (EF 3.1) Photochemical ozone formation, human health [kg NMVOC eq.]	-1,1%	-1,1%	-1,0%	-0,7%
11 EN15804+A2 (EF 3.1) Resource use, mineral and metals [kg Sb eq.]	-2,6%	-2,5%	-2,6%	-2,0%
12 EN15804+A2 (EF 3.1) Resource use, fossils [MJ]	1,2%	1,0%	1,4%	1,0%
13 EN15804+A2 (EF 3.1) Water use [m³ world equiv.]	-1,7%	-1,7%	-1,9%	-1,9%
2. Resource use indicators				
01 EN15804+A2 Use of renewable primary energy (PERE) [MJ]	0,9%	0,9%	1,7%	2,1%
03 EN15804+A2 Total use of renewable primary energy resources (PERT) [MJ]	0,9%	0,9%	1,7%	2,1%
04 EN15804+A2 Use of non-renewable primary energy (PENRE) [MJ]	1,2%	1,0%	1,4%	1,0%
06 EN15804+A2 Total use of non-renewable primary energy resources (PENRT) [MJ]	1,2%	1,0%	1,4%	1,0%
10 EN15804+A2 Use of net fresh water (FW) [m³]	1,5%	1,4%	1,7%	1,1%
3. Output flows and waste categories				
01 EN15804+A2 Hazardous waste disposed (HWD) [kg]	2,3%	2,2%	2,9%	2,7%
02 EN15804+A2 Non-hazardous waste disposed (NHWD) [kg]	-2,8%	-2,7%	-2,7%	-2,1%
03 EN15804+A2 Radioactive waste disposed (RWD) [kg]	2,3%	2,1%	2,6%	2,2%
5. Optional indicators				
5a. Optional indicators detailed				
01 EN15804+A2 (EF 3.1) Particulate matter [Disease incidences]	-2,5%	-2,4%	-2,4%	-1,8%
02 EN15804+A2 (EF 3.1) Ionising radiation, human health [kBq U235 eq.]	2,0%	1,9%	2,5%	2,3%
03 EN15804+A2 (EF 3.1) Ecotoxicity, freshwater [CTUe]	2,2%	2,0%	2,3%	1,7%
04 EN15804+A2 (EF 3.1) Human toxicity, cancer [CTUh]	-0,3%	-0,4%	-0,2%	-0,1%
05 EN15804+A2 (EF 3.1) Human toxicity, non-cancer [CTUh]	-1,0%	-1,0%	-0,7%	-0,4%
06 EN15804+A2 (EF 3.1) Land Use [Pt]	-4,0%	-3,8%	-4,0%	-3,0%

The products are grouped into four size classes, and each class is represented by one set of environmental parameters, although the composition slightly varies in each group due to changing volume to surface ratio. The figure shows the maximum deviation in each group for all environmental parameters reported. The deviation is not higher than + 10%.

7 Annex

Small diameter configuration – Waste scenario 2: SIG (Stay in ground)

CORE ENVIRONMENTAL IMPACT INDICATORS EN15804+A2



Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
AP	mol H ⁺ eqv.	7.51E-03	6.22E-05	3.38E-05	7.61E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-total	kg CO ₂ eqv.	2.39E+00	5.01E-02	1.25E-01	2.56E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-b	kg CO ₂ eqv.	1.54E-02	-7.89E-04	3.91E-02	5.38E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-f	kg CO ₂ eqv.	2.37E+00	5.04E-02	8.37E-02	2.50E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-luluc	kg CO ₂ eqv.	8.00E-04	5.58E-04	2.09E-03	3.44E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-m	kg N eqv.	1.39E-03	2.41E-05	8.31E-06	1.42E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-fw	kg P eqv.	3.63E-06	1.01E-07	9.09E-08	3.82E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-T	mol N eqv.	1.54E-02	2.66E-04	1.81E-04	1.59E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ODP	kg CFC 11 eqv.	2.37E-11	2.49E-14	7.01E-12	3.07E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
POCP	kg NMVOC eqv	5.66E-03	5.90E-05	2.74E-05	5.74E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADP-f	MJ	5.32E+01	6.43E-01	-4.28E-01	5.34E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADP-mm	kg Sb-eqv.	6.17E-07	4.31E-09	-5.41E-09	6.16E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
WDP	m ³ world eqv.	1.28E-01	1.76E-04	2.18E-02	1.50E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

AP=Acidification (AP) | GWP-total=Global warming potential (GWP-total) | GWP-b=Global warming potential - Biogenic (GWP-b) | GWP-f=Global warming potential - Fossil (GWP-f) | GWP-luluc=Global warming potential - Land use and land use change (GWP-luluc) | EP-m=Eutrophication marine (EP-m) | EP-fw=Eutrophication, freshwater (EP-fw) | EP-T=Eutrophication, terrestrial (EP-T) | ODP=Ozone depletion (ODP) | POCP=Photochemical ozone formation - human health (POCP) | ADP-f=Resource use, fossils (ADP-f) | ADP-mm=Resource use, minerals and metals (ADP-mm) | WDP=Water use (WDP)

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
ETP-fw	CTUe	2.80E+01	5.57E-01	1.16E-01	2.87E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PM	Disease incidence	5.44E-08	5.62E-10	1.46E-10	5.51E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HTP-c	CTUh	6.08E-10	9.96E-12	-4.46E-13	6.17E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HTP-nc	CTUh	1.91E-08	3.83E-10	3.27E-10	1.98E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
IR	kBq U-235 eqv.	3.33E-02	6.45E-05	-1.83E-03	3.15E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SQP	Pt	1.25E+01	1.86E-01	6.45E-01	1.33E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

PARAMETERS DESCRIBING RESOURCE USE

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
PERE	MJ	6.52E+00	5.04E-02	1.98E-01	6,77E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0,00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	6.52E+00	5.04E-02	1.98E-01	6,77E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRE	MJ	5.32E+01	6.43E-01	-4.28E-01	5,34E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0,00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	5.32E+01	6.43E-01	-4.28E-01	5,34E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM	kg	0.00E+00	0.00E+00	0.00E+00	0,00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0,00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0,00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m³	8.15E-03	1.91E-05	1.23E-03	9,40E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

PERE=renewable primary energy ex. raw materials | **PERM**=renewable primary energy used as raw materials | **PERT**=renewable primary energy total | **PENRE**=non-renewable primary energy ex. raw materials | **PENRM**=non-renewable primary energy used as raw materials | **PENRT**=non-renewable primary energy total | **SM**=use of secondary material | **RSF**=use of renewable secondary fuels | **NRSF**=use of non-renewable secondary fuels | **FW**=use of net fresh water

OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
HWD	kg	1.53E-08	3.68E-11	-1.04E-09	1.43E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	1.04E-01	1.22E-04	4.11E-03	1.08E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RWD	kg	3.41E-04	6.97E-07	-1.40E-05	3.28E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

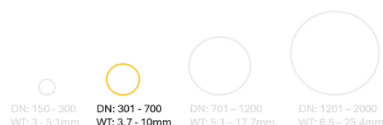
HWD=hazardous waste disposed | **NHWD**=non-hazardous waste disposed | **RWD**=radioactive waste disposed

ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CRU=Components for re-use | **MFR**=Materials for recycling | **MER**=Materials for energy recovery | **EET**=Exported Energy Thermic | **EEE**=Exported Energy Electric

Medium diameter configuration – Waste scenario 1 : DCK (Dismantling and cement kiln)



CORE ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
AP	mol H ⁺ eqv.	7.69E-03	6.39E-05	5.42E-05	7.80E-03	4.37E-04	1.87E-05	5.72E-03	8.93E-06	-9.01E-03
GWP-total	kg CO ₂ eqv.	2.36E+00	5.15E-02	1.13E-01	2.52E+00	3.30E-02	1.50E-02	1.25E+00	1.46E-03	-1.31E+00
GWP-b	kg CO ₂ eqv.	1.52E-02	-8.10E-04	3.93E-02	5.36E-02	-1.88E-03	-2.37E-04	0.00E+00	1.37E-06	-2.01E-01
GWP-f	kg CO ₂ eqv.	2.34E+00	5.17E-02	7.13E-02	2.47E+00	3.45E-02	1.51E-02	1.25E+00	1.46E-03	-1.11E+00
GWP-luluc	kg CO ₂ eqv.	7.54E-04	5.73E-04	2.09E-03	3.42E-03	3.63E-04	1.67E-04	0.00E+00	1.94E-06	-1.44E-04
EP-m	kg N eqv.	1.38E-03	2.47E-05	1.53E-05	1.42E-03	2.09E-04	7.23E-06	1.96E-03	1.94E-06	-3.09E-03
EP-fw	kg P eqv.	3.62E-06	1.03E-07	1.08E-07	3.83E-06	6.56E-08	3.02E-08	0.00E+00	8.42E-07	-1.25E-07
EP-T	mol N eqv.	1.54E-02	2.73E-04	2.55E-04	1.59E-02	2.29E-03	7.99E-05	2.15E-02	2.13E-05	-3.39E-02
ODP	kg CFC 11 eqv.	2.28E-11	2.56E-14	7.56E-12	3.03E-11	1.62E-14	7.49E-15	0.00E+00	9.26E-15	-2.81E-12
POCP	kg NMVOC eqv	5.64E-03	6.06E-05	4.12E-05	5.74E-03	5.89E-04	1.77E-05	5.51E-03	6.08E-06	-8.65E-03
ADP-f	MJ	5.23E+01	6.61E-01	-2.99E-01	5.27E+01	4.19E-01	1.93E-01	0.00E+00	2.40E-02	-4.09E+00
ADP-mm	kg Sb-eqv.	6.31E-07	4.43E-09	-3.33E-09	6.32E-07	2.81E-09	1.29E-09	0.00E+00	1.17E-10	-1.86E-08
WDP	m ³ world eqv.	1.33E-01	1.81E-04	2.03E-02	1.53E-01	1.15E-04	5.28E-05	0.00E+00	1.83E-04	-2.16E-03

AP=Acidification (AP) | **GWP-total**=Global warming potential (GWP-total) | **GWP-b**=Global warming potential - Biogenic (GWP-b) | **GWP-f**=Global warming potential - Fossil (GWP-f) | **GWP-luluc**=Global warming potential - Land use and land use change (GWP-luluc) | **EP-m**=Eutrophication marine (EP-m) | **EP-fw**=Eutrophication. freshwater (EP-fw) | **EP-T**=Eutrophication. terrestrial (EP-T) | **ODP**=Ozone depletion (ODP) | **POCP**=Photochemical ozone formation - human health (POCP) | **ADP-f**=Resource use. fossils (ADP-f) | **ADP-mm**=Resource use. minerals and metals (ADP-mm) | **WDP**=Water use (WDP)

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
ETP-fw	CTUe	2.72E+01	5.72E-01	1.61E-01	2.80E+01	3.63E-01	1.67E-01	2.21E-01	5.49E-02	-1.88E+00
PM	Disease incidence	5.52E-08	5.77E-10	3.11E-10	5.61E-08	5.84E-10	1.69E-10	2.02E-08	9.30E-11	-3.40E-08
HTP-c	CTUh	5.92E-10	1.02E-11	2.05E-12	6.04E-10	6.86E-12	2.99E-12	1.92E-08	7.74E-13	-2.85E-08
HTP-nc	CTUh	1.91E-08	3.93E-10	4.56E-10	2.00E-08	2.75E-10	1.15E-10	4.55E-12	1.42E-11	-9.65E-10
IR	kBq U-235 eqv.	3.22E-02	6.63E-05	-1.50E-03	3.07E-02	4.20E-05	1.94E-05	0.00E+00	3.36E-05	-3.71E-03
SQP	Pt	1.29E+01	1.91E-01	7.09E-01	1.38E+01	1.21E-01	5.59E-02	0.00E+00	5.44E-03	-3.46E-01

ETP-fw=Ecotoxicity, freshwater (ETP-fw) | **PM**=Particulate Matter (PM) | **HTP-c**=Human toxicity, cancer (HTP-c) | **HTP-nc**=Human toxicity, non-cancer (HTP-nc) | **IR**=Ionising radiation, human health (IR) | **SQP**=Land use (SQP)

PARAMETERS DESCRIBING RESOURCE USE

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
PERE	MJ	6.26E+00	5.18E-02	3.37E-01	6.65E+00	3.28E-02	1.51E-02	0.00E+00	4.34E-03	-7.73E-01
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	6.26E+00	5.18E-02	3.37E-01	6.65E+00	3.28E-02	1.51E-02	0.00E+00	4.34E-03	-7.73E-01
PENRE	MJ	5.23E+01	6.61E-01	-2.99E-01	5.27E+01	4.19E-01	1.93E-01	0.00E+00	2.40E-02	-4.09E+00
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	5.23E+01	6.61E-01	-2.99E-01	5.27E+01	4.19E-01	1.93E-01	0.00E+00	2.40E-02	-4.09E+00
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m³	8.00E-03	1.97E-05	1.22E-03	9.25E-03	1.25E-05	5.75E-06	0.00E+00	5.27E-06	-4.04E-04

PERE=renewable primary energy ex. raw materials | **PERM**=renewable primary energy used as raw materials | **PERT**=renewable primary energy total | **PENRE**=non-renewable primary energy ex. raw materials | **PENRM**=non-renewable primary energy used as raw materials | **PENRT**=non-renewable primary energy total | **SM**=use of secondary material | **RSF**=use of renewable secondary fuels | **NRSF**=use of non-renewable secondary fuels | **FW**=use of net fresh water

OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
HWD	kg	1.47E-08	3.78E-11	-8.40E-10	1.39E-08	2.40E-11	1.10E-11	0.00E+00	6.12E-12	-1.69E-09
NHWD	kg	1.08E-01	1.25E-04	4.33E-03	1.12E-01	7.96E-05	3.67E-05	0.00E+00	4.98E-02	-8.76E-04
RWD	kg	3.31E-04	7.16E-07	-1.20E-05	3.20E-04	4.54E-07	2.09E-07	0.00E+00	2.59E-07	-3.96E-05

HWD=hazardous waste disposed | **NHWD**=non-hazardous waste disposed | **RWD**=radioactive waste disposed

ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CRU=Components for re-use | **MFR**=Materials for recycling | **MER**=Materials for energy recovery | **EET**=Exported Energy Thermic | **EEE**=Exported Energy Electric

Medium diameter configuration – Waste scenario 2 : SIG (Stay in ground)



CORE ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
AP	mol H ⁺ eqv.	7.69E-03	6.39E-05	5.42E-05	7.80E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-total	kg CO ₂ eqv.	2.36E+00	5.15E-02	1.13E-01	2.52E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-b	kg CO ₂ eqv.	1.52E-02	-8.10E-04	3.93E-02	5.36E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-f	kg CO ₂ eqv.	2.34E+00	5.17E-02	7.13E-02	2.47E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-luluc	kg CO ₂ eqv.	7.54E-04	5.73E-04	2.09E-03	3.42E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-m	kg N eqv.	1.38E-03	2.47E-05	1.53E-05	1.42E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-fw	kg P eqv.	3.62E-06	1.03E-07	1.08E-07	3.83E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-T	mol N eqv.	1.54E-02	2.73E-04	2.55E-04	1.59E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ODP	kg CFC 11 eqv.	2.28E-11	2.56E-14	7.56E-12	3.03E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
POCP	kg NMVOC eqv	5.64E-03	6.06E-05	4.12E-05	5.74E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADP-f	MJ	5.23E+01	6.61E-01	-2.99E-01	5.27E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADP-mm	kg Sb-eqv.	6.31E-07	4.43E-09	-3.33E-09	6.32E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
WDP	m ³ world eqv.	1.33E-01	1.81E-04	2.03E-02	1.53E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

AP=Acidification (AP) | **GWP-total**=Global warming potential (GWP-total) | **GWP-b**=Global warming potential - Biogenic (GWP-b) | **GWP-f**=Global warming potential - Fossil (GWP-f) | **GWP-luluc**=Global warming potential - Land use and land use change (GWP-luluc) | **EP-m**=Eutrophication marine (EP-m) | **EP-fw**=Eutrophication, freshwater (EP-fw) | **EP-T**=Eutrophication, terrestrial (EP-T) | **ODP**=Ozone depletion (ODP) | **POCP**=Photochemical ozone formation - human health (POCP) | **ADP-f**=Resource use, fossils (ADP-f) | **ADP-mm**=Resource use, minerals and metals (ADP-mm) | **WDP**=Water use (WDP)

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
ETP-fw	CTUe	2.72E+01	5.72E-01	1.61E-01	2.80E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PM	Disease incidence	5.52E-08	5.77E-10	3.11E-10	5.61E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HTP-c	CTUh	5.92E-10	1.02E-11	2.05E-12	6.04E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HTP-nc	CTUh	1.91E-08	3.93E-10	4.56E-10	2.00E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
IR	kBq U-235 eqv.	3.22E-02	6.63E-05	-1.50E-03	3.07E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SQP	Pt	1.29E+01	1.91E-01	7.09E-01	1.38E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

ETP-fw=Ecotoxicity, freshwater (ETP-fw) | **PM**=Particulate Matter (PM) | **HTP-c**=Human toxicity, cancer (HTP-c) | **HTP-nc**=Human toxicity, non-cancer (HTP-nc) | **IR**=Ionising radiation, human health (IR) | **SQP**=Land use (SQP)

PARAMETERS DESCRIBING RESOURCE USE

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
PERE	MJ	6.26E+00	5.18E-02	3.37E-01	6.65E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	6.26E+00	5.18E-02	3.37E-01	6.65E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRE	MJ	5.23E+01	6.61E-01	-2.99E-01	5.27E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	5.23E+01	6.61E-01	-2.99E-01	5.27E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m³	8.00E-03	1.97E-05	1.22E-03	9.25E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

PERE=renewable primary energy ex. raw materials | **PERM**=renewable primary energy used as raw materials | **PERT**=renewable primary energy total | **PENRE**=non-renewable primary energy ex. raw materials | **PENRM**=non-renewable primary energy used as raw materials | **PENRT**=non-renewable primary energy total | **SM**=use of secondary material | **RSF**=use of renewable secondary fuels | **NRSF**=use of non-renewable secondary fuels | **FW**=use of net fresh water

OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
HWD	kg	1.47E-08	3.78E-11	-8.40E-10	1.39E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	1.08E-01	1.25E-04	4.33E-03	1.12E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RWD	kg	3.31E-04	7.16E-07	-1.20E-05	3.20E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

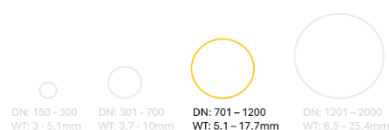
HWD=hazardous waste disposed | **NHWD**=non-hazardous waste disposed | **RWD**=radioactive waste disposed

ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CRU=Components for re-use | **MFR**=Materials for recycling | **MER**=Materials for energy recovery | **EET**=Exported Energy Thermic | **EEE**=Exported Energy Electric

Large diameter configuration – Waste scenario 1 : DCK (Dismantling and cement kiln)



CORE ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
AP	mol H ⁺ eqv.	7.82E-03	6.52E-05	7.08E-05	7.95E-03	4.55E-04	1.87E-05	5.73E-03	8.95E-06	-9.03E-03
GWP-total	kg CO ₂ eqv.	2.34E+00	5.25E-02	1.03E-01	2.50E+00	3.43E-02	1.51E-02	1.25E+00	1.47E-03	-1.31E+00
GWP-b	kg CO ₂ eqv.	1.51E-02	-8.27E-04	3.94E-02	5.37E-02	-1.96E-03	-2.37E-04	0.00E+00	1.38E-06	-2.02E-01
GWP-f	kg CO ₂ eqv.	2.33E+00	5.28E-02	6.15E-02	2.44E+00	3.59E-02	1.52E-02	1.25E+00	1.46E-03	-1.11E+00
GWP-luluc	kg CO ₂ eqv.	7.25E-04	5.84E-04	2.11E-03	3.42E-03	3.78E-04	1.68E-04	0.00E+00	1.94E-06	-1.44E-04
EP-m	kg N eqv.	1.39E-03	2.52E-05	2.09E-05	1.43E-03	2.18E-04	7.25E-06	1.97E-03	1.94E-06	-3.10E-03
EP-fw	kg P eqv.	3.62E-06	1.05E-07	1.21E-07	3.85E-06	6.82E-08	3.03E-08	0.00E+00	8.44E-07	-1.25E-07
EP-T	mol N eqv.	1.54E-02	2.79E-04	3.15E-04	1.60E-02	2.38E-03	8.01E-05	2.15E-02	2.13E-05	-3.39E-02
ODP	kg CFC 11 eqv.	2.22E-11	2.61E-14	8.02E-12	3.02E-11	1.69E-14	7.50E-15	0.00E+00	9.28E-15	-2.81E-12
POCP	kg NMVOC eqv	5.64E-03	6.18E-05	5.25E-05	5.76E-03	6.13E-04	1.77E-05	5.52E-03	6.09E-06	-8.67E-03
ADP-f	MJ	5.18E+01	6.74E-01	-1.96E-01	5.23E+01	4.36E-01	1.93E-01	0.00E+00	2.40E-02	-4.09E+00
ADP-mm	kg Sb-eqv.	6.42E-07	4.51E-09	-1.66E-09	6.45E-07	2.92E-09	1.30E-09	0.00E+00	1.17E-10	-1.86E-08
WDP	m ³ world eqv.	1.36E-01	1.84E-04	1.91E-02	1.56E-01	1.19E-04	5.29E-05	0.00E+00	1.83E-04	-2.17E-03

AP=Acidification (AP) | **GWP-total**=Global warming potential (GWP-total) | **GWP-b**=Global warming potential - Biogenic (GWP-b) | **GWP-f**=Global warming potential - Fossil (GWP-f) | **GWP-luluc**=Global warming potential - Land use and land use change (GWP-luluc) | **EP-m**=Eutrophication marine (EP-m) | **EP-fw**=Eutrophication. freshwater (EP-fw) | **EP-T**=Eutrophication. terrestrial (EP-T) | **ODP**=Ozone depletion (ODP) | **POCP**=Photochemical ozone formation - human health (POCP) | **ADP-f**=Resource use. fossils (ADP-f) | **ADP-mm**=Resource use. minerals and metals (ADP-mm) | **WDP**=Water use (WDP)

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
ETP-fw	CTUe	2.68E+01	5.84E-01	1.98E-01	2.76E+01	3.78E-01	1.68E-01	2.21E-01	5.50E-02	-1.88E+00
PM	Disease incidence	5.59E-08	5.89E-10	4.44E-10	5.70E-08	6.08E-10	1.69E-10	2.03E-08	9.32E-11	-3.40E-08
HTP-c	CTUh	5.82E-10	1.04E-11	4.06E-12	5.96E-10	7.14E-12	3.00E-12	1.92E-08	7.75E-13	-2.85E-08
HTP-nc	CTUh	1.91E-08	4.01E-10	5.61E-10	2.01E-08	2.86E-10	1.15E-10	4.56E-12	1.42E-11	-9.67E-10
IR	kBq U-235 eqv.	3.15E-02	6.76E-05	-1.24E-03	3.03E-02	4.37E-05	1.94E-05	0.00E+00	3.36E-05	-3.71E-03
SQP	Pt	1.33E+01	1.95E-01	7.63E-01	1.42E+01	1.26E-01	5.60E-02	0.00E+00	5.46E-03	-3.47E-01

ETP-fw=Ecotoxicity, freshwater (ETP-fw) | **PM**=Particulate Matter (PM) | **HTP-c**=Human toxicity, cancer (HTP-c) | **HTP-nc**=Human toxicity, non-cancer (HTP-nc) | **IR**=Ionising radiation, human health (IR) | **SQP**=Land use (SQP)

PARAMETERS DESCRIBING RESOURCE USE

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
PERE	MJ	6.09E+00	5.28E-02	4.49E-01	6.60E+00	3.42E-02	1.52E-02	0.00E+00	4.34E-03	-7.75E-01
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	6.09E+00	5.28E-02	4.49E-01	6.60E+00	3.42E-02	1.52E-02	0.00E+00	4.34E-03	-7.75E-01
PENRE	MJ	5.18E+01	6.74E-01	-1.96E-01	5.23E+01	4.36E-01	1.93E-01	0.00E+00	2.40E-02	-4.09E+00
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	5.18E+01	6.74E-01	-1.96E-01	5.23E+01	4.36E-01	1.93E-01	0.00E+00	2.40E-02	-4.09E+00
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m³	7.92E-03	2.01E-05	1.22E-03	9.16E-03	1.30E-05	5.76E-06	0.00E+00	5.28E-06	-4.05E-04

PERE=renewable primary energy ex. raw materials | **PERM**=renewable primary energy used as raw materials | **PERT**=renewable primary energy total | **PENRE**=non-renewable primary energy ex. raw materials | **PENRM**=non-renewable primary energy used as raw materials | **PENRT**=non-renewable primary energy total | **SM**=use of secondary material | **RSF**=use of renewable secondary fuels | **NRSF**=use of non-renewable secondary fuels | **FW**=use of net fresh water

OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
HWD	kg	1.43E-08	3.86E-11	-6.78E-10	1.37E-08	2.49E-11	1.11E-11	0.00E+00	6.13E-12	-1.69E-09
NHWD	kg	1.11E-01	1.28E-04	4.51E-03	1.16E-01	8.28E-05	3.67E-05	0.00E+00	4.99E-02	-8.78E-04
RWD	kg	3.25E-04	7.30E-07	-1.04E-05	3.15E-04	4.72E-07	2.10E-07	0.00E+00	2.59E-07	-3.97E-05

HWD=hazardous waste disposed | **NHWD**=non-hazardous waste disposed | **RWD**=radioactive waste disposed

ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CRU=Components for re-use | **MFR**=Materials for recycling | **MER**=Materials for energy recovery | **EET**=Exported Energy Thermic | **EEE**=Exported Energy Electric

Large diameter configuration – Waste scenario 2 : SIG (Stay in ground)



CORE ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
AP	mol H ⁺ eqv.	7.82E-03	6.52E-05	7.08E-05	8.03E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-total	kg CO ₂ eqv.	2.34E+00	5.25E-02	1.03E-01	2.69E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-b	kg CO ₂ eqv.	1.51E-02	-8.27E-04	3.94E-02	5.38E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-f	kg CO ₂ eqv.	2.33E+00	5.28E-02	6.15E-02	2.64E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-luluc	kg CO ₂ eqv.	7.25E-04	5.84E-04	2.11E-03	2.23E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-m	kg N eqv.	1.39E-03	2.52E-05	2.09E-05	1.41E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-fw	kg P eqv.	3.62E-06	1.05E-07	1.21E-07	5.03E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-T	mol N eqv.	1.54E-02	2.79E-04	3.15E-04	1.55E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ODP	kg CFC 11 eqv.	2.22E-11	2.61E-14	8.02E-12	1.42E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
POCP	kg NMVOC eqv	5.64E-03	6.18E-05	5.25E-05	5.91E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADP-f	MJ	5.18E+01	6.74E-01	-1.96E-01	5.42E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADP-mm	kg Sb-eqv.	6.42E-07	4.51E-09	-1.66E-09	6.18E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
WDP	m ³ world eqv.	1.36E-01	1.84E-04	1.91E-02	1.54E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

AP=Acidification (AP) | **GWP-total**=Global warming potential (GWP-total) | **GWP-b**=Global warming potential - Biogenic (GWP-b) | **GWP-f**=Global warming potential - Fossil (GWP-f) | **GWP-luluc**=Global warming potential - Land use and land use change (GWP-luluc) | **EP-m**=Eutrophication marine (EP-m) | **EP-fw**=Eutrophication, freshwater (EP-fw) | **EP-T**=Eutrophication, terrestrial (EP-T) | **ODP**=Ozone depletion (ODP) | **POCP**=Photochemical ozone formation - human health (POCP) | **ADP-f**=Resource use, fossils (ADP-f) | **ADP-mm**=Resource use, minerals and metals (ADP-mm) | **WDP**=Water use (WDP)

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
ETP-fw	CTUe	2.68E+01	5.84E-01	1.98E-01	2.76E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PM	Disease incidence	5.59E-08	5.89E-10	4.44E-10	5.70E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HTP-c	CTUh	5.82E-10	1.04E-11	4.06E-12	5.96E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HTP-nc	CTUh	1.91E-08	4.01E-10	5.61E-10	2.01E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
IR	kBq U-235 eqv.	3.15E-02	6.76E-05	-1.24E-03	3.03E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SQP	Pt	1.33E+01	1.95E-01	7.63E-01	1.42E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

ETP-fw=Ecotoxicity, freshwater (ETP-fw) | **PM**=Particulate Matter (PM) | **HTP-c**=Human toxicity, cancer (HTP-c) | **HTP-nc**=Human toxicity, non-cancer (HTP-nc) | **IR**=Ionising radiation, human health (IR) | **SQP**=Land use (SQP)

PARAMETERS DESCRIBING RESOURCE USE

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
PERE	MJ	6.09E+00	5.28E-02	4.49E-01	6.60E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	6.09E+00	5.28E-02	4.49E-01	6.60E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRE	MJ	5.18E+01	6.74E-01	-1.96E-01	5.23E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	5.18E+01	6.74E-01	-1.96E-01	5.23E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m³	7.92E-03	2.01E-05	1.22E-03	9.16E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

PERE=renewable primary energy ex. raw materials | **PERM**=renewable primary energy used as raw materials | **PERT**=renewable primary energy total | **PENRE**=non-renewable primary energy ex. raw materials | **PENRM**=non-renewable primary energy used as raw materials | **PENRT**=non-renewable primary energy total | **SM**=use of secondary material | **RSF**=use of renewable secondary fuels | **NRSF**=use of non-renewable secondary fuels | **FW**=use of net fresh water

OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
HWD	kg	1.43E-08	3.86E-11	-6.78E-10	1.37E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	1.11E-01	1.28E-04	4.51E-03	1.16E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RWD	kg	3.25E-04	7.30E-07	-1.04E-05	3.15E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

HWD=hazardous waste disposed | **NHWD**=non-hazardous waste disposed | **RWD**=radioactive waste disposed

ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CRU=Components for re-use | **MFR**=Materials for recycling | **MER**=Materials for energy recovery | **EET**=Exported Energy Thermic | **EEE**=Exported Energy Electric

Extra large diameter configuration – Waste scenario 1 : DCK Dismantling and cement kiln)



CORE ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
AP	mol H ⁺ eqv.	7.88E-03	6.58E-05	8.30E-05	8.03E-03	4.65E-04	1.87E-05	5.72E-03	8.93E-06	-9.01E-03
GWP-total	kg CO ₂ eqv.	2.32E+00	5.30E-02	9.54E-02	2.47E+00	3.51E-02	1.50E-02	1.25E+00	1.46E-03	-1.31E+00
GWP-b	kg CO ₂ eqv.	1.49E-02	-8.35E-04	3.94E-02	5.35E-02	-2.01E-03	-2.37E-04	0.00E+00	1.37E-06	-2.01E-01
GWP-f	kg CO ₂ eqv.	2.31E+00	5.33E-02	5.39E-02	2.41E+00	3.67E-02	1.51E-02	1.25E+00	1.46E-03	-1.11E+00
GWP-luluc	kg CO ₂ eqv.	7.03E-04	5.90E-04	2.11E-03	3.40E-03	3.87E-04	1.67E-04	0.00E+00	1.94E-06	-1.44E-04
EP-m	kg N eqv.	1.38E-03	2.55E-05	2.51E-05	1.43E-03	2.23E-04	7.23E-06	1.96E-03	1.94E-06	-3.09E-03
EP-fw	kg P eqv.	3.61E-06	1.06E-07	1.31E-07	3.84E-06	6.98E-08	3.02E-08	0.00E+00	8.42E-07	-1.25E-07
EP-T	mol N eqv.	1.54E-02	2.82E-04	3.60E-04	1.60E-02	2.44E-03	7.99E-05	2.15E-02	2.13E-05	-3.39E-02
ODP	kg CFC 11 eqv.	2.17E-11	2.64E-14	8.34E-12	3.01E-11	1.73E-14	7.49E-15	0.00E+00	9.25E-15	-2.81E-12
POCP	kg NMVOC eqv	5.62E-03	6.24E-05	6.08E-05	5.74E-03	6.27E-04	1.77E-05	5.51E-03	6.08E-06	-8.65E-03
ADP-f	MJ	6.47E-07	4.56E-09	-3.90E-10	6.52E-07	2.99E-09	1.29E-09	0.00E+00	1.17E-10	-1.86E-08
ADP-mm	kg Sb-eqv.	5.13E+01	6.80E-01	-1.17E-01	5.18E+01	4.46E-01	1.93E-01	0.00E+00	2.40E-02	-4.09E+00
WDP	m ³ world eqv.	1.38E-01	1.86E-04	1.82E-02	1.56E-01	1.22E-04	5.28E-05	0.00E+00	1.82E-04	-2.16E-03

AP=Acidification (AP) | **GWP-total**=Global warming potential (GWP-total) | **GWP-b**=Global warming potential - Biogenic (GWP-b) | **GWP-f**=Global warming potential - Fossil (GWP-f) | **GWP-luluc**=Global warming potential - Land use and land use change (GWP-luluc) | **EP-m**=Eutrophication marine (EP-m) | **EP-fw**=Eutrophication, freshwater (EP-fw) | **EP-T**=Eutrophication, terrestrial (EP-T) | **ODP**=Ozone depletion (ODP) | **POCP**=Photochemical ozone formation - human health (POCP) | **ADP-f**=Resource use, fossils (ADP-f) | **ADP-mm**=Resource use, minerals and metals (ADP-mm) | **WDP**=Water use (WDP)

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
ETP-fw	CTUe	2.63E+01	5.89E-01	2.25E-01	2.72E+01	3.86E-01	1.67E-01	2.21E-01	5.49E-02	-1.88E+00
PM	Disease incidence	5.62E-08	5.94E-10	5.43E-10	5.73E-08	6.22E-10	1.69E-10	2.02E-08	9.30E-11	-3.40E-08
HTP-c	CTUh	5.73E-10	1.05E-11	5.56E-12	5.89E-10	7.30E-12	2.99E-12	1.92E-08	7.73E-13	-2.85E-08
HTP-nc	CTUh	1.91E-08	4.05E-10	6.38E-10	2.01E-08	2.93E-10	1.15E-10	4.55E-12	1.42E-11	-9.65E-10
IR	kBq U-235 eqv.	3.09E-02	6.83E-05	-1.04E-03	2.99E-02	4.47E-05	1.94E-05	0.00E+00	3.36E-05	-3.71E-03
SQP	Pt	1.35E+01	1.97E-01	8.00E-01	1.45E+01	1.29E-01	5.59E-02	0.00E+00	5.44E-03	-3.46E-01

ETP-fw=Ecotoxicity, freshwater (ETP-fw) | **PM**=Particulate Matter (PM) | **HTP-c**=Human toxicity, cancer (HTP-c) | **HTP-nc**=Human toxicity, non-cancer (HTP-nc) | **IR**=Ionising radiation, human health (IR) | **SQP**=Land use (SQP)

PARAMETERS DESCRIBING RESOURCE USE

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
PERE	MJ	5.96E+00	5.33E-02	5.32E-01	6.54E+00	3.49E-02	1.51E-02	0.00E+00	4.33E-03	-7.73E-01
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	5.96E+00	5.33E-02	5.32E-01	6.54E+00	3.49E-02	1.51E-02	0.00E+00	4.33E-03	-7.73E-01
PENRE	MJ	5.13E+01	6.80E-01	-1.17E-01	5.18E+01	4.46E-01	1.93E-01	0.00E+00	2.40E-02	-4.09E+00
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	5.13E+01	6.80E-01	-1.17E-01	5.18E+01	4.46E-01	1.93E-01	0.00E+00	2.40E-02	-4.09E+00
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m³	7.83E-03	2.02E-05	1.21E-03	9.06E-03	1.33E-05	5.74E-06	0.00E+00	5.27E-06	-4.04E-04

PERE=renewable primary energy ex. raw materials | **PERM**=renewable primary energy used as raw materials | **PERT**=renewable primary energy total | **PENRE**=non-renewable primary energy ex. raw materials | **PENRM**=non-renewable primary energy used as raw materials | **PENRT**=non-renewable primary energy total | **SM**=use of secondary material | **RSF**=use of renewable secondary fuels | **NRSF**=use of non-renewable secondary fuels | **FW**=use of net fresh water

OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
HWD	kg	1.40E-08	3.89E-11	-5.53E-10	1.35E-08	2.55E-11	1.10E-11	0.00E+00	6.12E-12	-1.69E-09
NHWD	kg	1.13E-01	1.29E-04	4.63E-03	1.18E-01	8.47E-05	3.67E-05	0.00E+00	4.98E-02	-8.76E-04
RWD	kg	3.19E-04	7.37E-07	-9.15E-06	3.11E-04	4.83E-07	2.09E-07	0.00E+00	2.59E-07	-3.96E-05

HWD=hazardous waste disposed | **NHWD**=non-hazardous waste disposed | **RWD**=radioactive waste disposed

ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CRU=Components for re-use | **MFR**=Materials for recycling | **MER**=Materials for energy recovery | **EET**=Exported Energy Thermic | **EEE**=Exported Energy Electric

Extra large diameter configuration – Waste scenario 2 : SIG (Stay in ground)



CORE ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
AP	mol H ⁺ eqv.	7.88E-03	6.58E-05	8.30E-05	8.03E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-total	kg CO ₂ eqv.	2.32E+00	5.30E-02	9.54E-02	2.47E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-b	kg CO ₂ eqv.	1.49E-02	-8.35E-04	3.94E-02	5.35E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-f	kg CO ₂ eqv.	2.31E+00	5.33E-02	5.39E-02	2.41E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-luluc	kg CO ₂ eqv.	7.03E-04	5.90E-04	2.11E-03	3.40E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-m	kg N eqv.	1.38E-03	2.55E-05	2.51E-05	1.43E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-fw	kg P eqv.	3.61E-06	1.06E-07	1.31E-07	3.84E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-T	mol N eqv.	1.54E-02	2.82E-04	3.60E-04	1.60E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ODP	kg CFC 11 eqv.	2.17E-11	2.64E-14	8.34E-12	3.01E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
POCP	kg NMVOC eqv	5.62E-03	6.24E-05	6.08E-05	5.74E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADP-f	MJ	5.13E+01	6.80E-01	-1.17E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADP-mm	kg Sb-eqv.	6.47E-07	4.56E-09	-3.90E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
WDP	m ³ world eqv.	1.38E-01	1.86E-04	1.82E-02	1.56E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

AP=Acidification (AP) | **GWP-total**=Global warming potential (GWP-total) | **GWP-b**=Global warming potential - Biogenic (GWP-b) | **GWP-f**=Global warming potential - Fossil (GWP-f) | **GWP-luluc**=Global warming potential - Land use and land use change (GWP-luluc) | **EP-m**=Eutrophication marine (EP-m) | **EP-fw**=Eutrophication, freshwater (EP-fw) | **EP-T**=Eutrophication, terrestrial (EP-T) | **ODP**=Ozone depletion (ODP) | **POCP**=Photochemical ozone formation - human health (POCP) | **ADP-f**=Resource use, fossils (ADP-f) | **ADP-mm**=Resource use, minerals and metals (ADP-mm) | **WDP**=Water use (WDP)

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
ETP-fw	CTUe	2.63E+01	5.89E-01	2.25E-01	2.72E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PM	Disease incidence	5.62E-08	5.94E-10	5.43E-10	5.73E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HTP-c	CTUh	5.73E-10	1.05E-11	5.56E-12	5.89E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HTP-nc	CTUh	1.91E-08	4.05E-10	6.38E-10	2.01E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
IR	kBq U-235 eqv.	3.09E-02	6.83E-05	-1.04E-03	2.99E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SQP	Pt	1.35E+01	1.97E-01	8.00E-01	1.45E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

ETP-fw=Ecotoxicity, freshwater (ETP-fw) | **PM**=Particulate Matter (PM) | **HTP-c**=Human toxicity, cancer (HTP-c) | **HTP-nc**=Human toxicity, non-cancer (HTP-nc) | **IR**=Ionising radiation, human health (IR) | **SQP**=Land use (SQP)

PARAMETERS DESCRIBING RESOURCE USE

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
PERE	MJ	5.96E+00	5.33E-02	5.32E-01	6.54E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	5.96E+00	5.33E-02	5.32E-01	6.54E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRE	MJ	5.13E+01	6.80E-01	-1.17E-01	5.18E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	5.13E+01	6.80E-01	-1.17E-01	5.18E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m³	7.83E-03	2.02E-05	1.21E-03	9.06E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

PERE=renewable primary energy ex. raw materials | **PERM**=renewable primary energy used as raw materials | **PERT**=renewable primary energy total | **PENRE**=non-renewable primary energy ex. raw materials | **PENRM**=non-renewable primary energy used as raw materials | **PENRT**=non-renewable primary energy total | **SM**=use of secondary material | **RSF**=use of renewable secondary fuels | **NRSF**=use of non-renewable secondary fuels | **FW**=use of net fresh water

OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
HWD	kg	1.40E-08	3.89E-11	-5.53E-10	1.35E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	1.13E-01	1.29E-04	4.63E-03	1.18E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RWD	kg	3.19E-04	7.37E-07	-9.15E-06	3.11E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

HWD=hazardous waste disposed | **NHWD**=non-hazardous waste disposed | **RWD**=radioactive waste disposed

ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

Abbreviation	Unit	A1	A2	A3	A1 - A3	C1	C2	C3	C4	D
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CRU=Components for re-use | **MFR**=Materials for recycling | **MER**=Materials for energy recovery | **EET**=Exported Energy Thermic | **EEE**=Exported Energy Electric

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