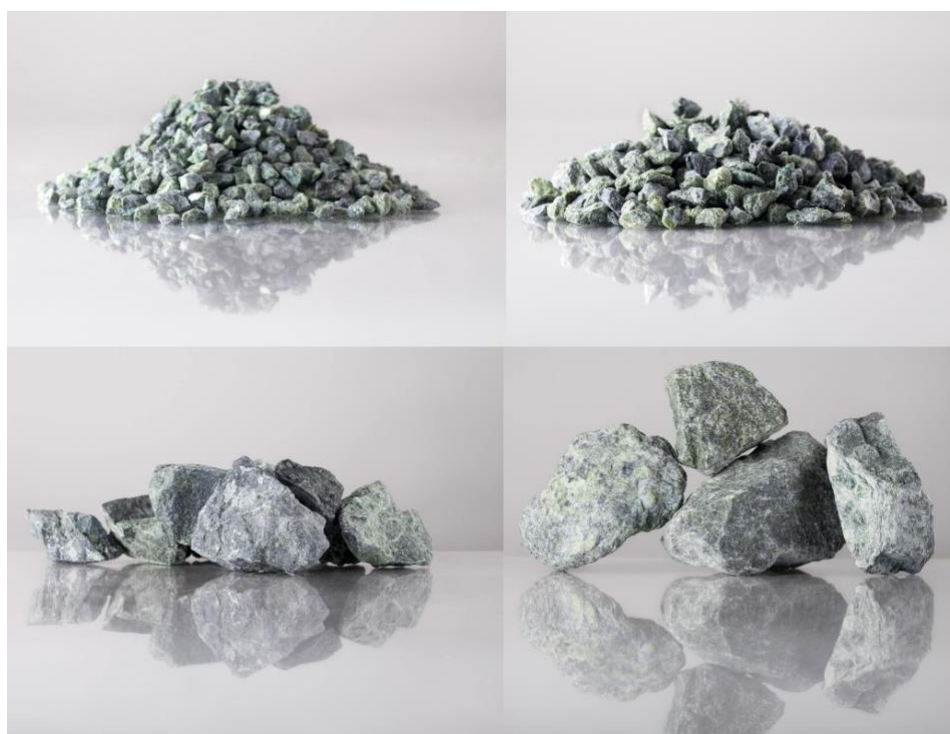


ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH:
EN 15804+A2 & ISO 14025

Product name:
Natural antigorite aggregates



EPD holder:
KOSD Wrocław Sp. z o.o.



Issued on 31 January 2026
Valid until 31 January 2031

GENERAL INFORMATION

EPD OWNER

Manufacturer / EPD Holder	KOSD Wrocław Sp. z o.o.
Address	Nasławice, ul. Komuny Paryskiej 50, 55-050 Sobótka, Poland
Contact details	Phone : +48 734 441 508 e-mail: sprzedaz@kosd.pl
Website	https://kosd.pl/

PRODUCT IDENTIFICATION

Product name	Natural antigorite aggregates
Place(s) of production	Poland

EPD INFORMATION

EPD Polska program operator	Multicert Sp. z o.o. Ul. Mydlarska 47, 04-690 Warszawa, Poland www.epd.org.pl , epd@epd.org.pl
EPD standards	This EPD is in accordance with EN 15804+A2 and ISO 14025 standards.
Product category rules	The CEN standard EN 15804+A2 serves as the core PCR.
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☒ External verification
EPD verifier	Izabela Sztamberek-Sochan, Ph.D.
EPD number	EPD-P 01.01.2026
Registration:	EPD Polska www.epd.org.pl
Publishing date	31 January 2026
EPD valid until	31 January 2031
Reasons for performing LCA	B2B
Accountability	The EPD Holder is responsible for the information provided and evidence. Multicert Sp. z o.o. does not hold responsibility for the manufacturer information, life cycle assessment data nor supporting evidence.

EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

COMPANY INFORMATION

HOLDER OF THE EPD

KOSD Wrocław Sp. z o.o.
Naślawice, ul. Komuny Paryskiej 50
55-050 Sobótka
Poland

KOSD Wrocław Sp. z o.o. is a Polish-owned company with over 50 years of experience in the extractive and construction materials sector. The origins of the company date back to 1956, when stone extraction activities were initiated under the regional road administration in Wrocław. Today, KOSD Wrocław operates as an independent producer of natural aggregates for construction and infrastructure applications, garden stones, decorative stones, mineral fertilizers and fillers for construction chemistry

The company operates its own quarry located in Naślawice (Sobótka municipality, Lower Silesia, Poland), approximately 30 km south-west of Wrocław. The quarry exploits a deposit of antigorite, which is recognised as a unique geological formation in Poland and one of the few such deposits in Europe.

Extraction is carried out using open-pit mining methods, including controlled blasting, in a multi-level excavation system. The extracted natural stone is processed on-site in a single production plant, where it undergoes mechanical crushing, screening and grading to produce a wide range of natural aggregates. Annual production exceeds 800,000 tonnes, with products supplied primarily to the domestic market by road and rail transport.

KOSD Wrocław implements quality and environmental management systems in accordance with ISO 9001:2015 and ISO 14001:2015, and operates a certified Factory Production Control (FPC) system in compliance with applicable European standards for construction aggregates.

The company is a member of the Polish Association of Aggregate Producers (PZPK) and Polish Association of Paint and Adhesive Manufacturers (PZPFiK)

The aggregates produced by KOSD Wrocław have been used in major infrastructure and construction projects in Poland, including motorways, express roads, airports and large public facilities, confirming their compliance with technical and performance requirements for demanding engineering applications.

PRODUCT INFORMATION

PRODUCT DESCRIPTION

The products covered by this EPD are natural aggregates manufactured by KOSD in Poland from natural stone extracted from KOSD's own quarry and processed at one integrated production site.

KOSD aggregates are produced from **antigorite** ("antygoryt"), a natural rock type characterised by a dense mineral structure and high mechanical robustness typical of hard rock aggregates. As a result, the produced aggregates are suitable for demanding construction and infrastructure applications where durable crushed stone and well-graded mixtures are required.

The EPD reports average environmental performance separately for the following four product groups:

- (i) Construction aggregates – coarse fractions resulting from primary screening (kliniec, tłuczeń, kruszywo gabionowe) (fractions: 4/31.5; 31.5/63; 50/150; 50/250) (hereinafter: **CA1**).
- (ii) Construction aggregates – continuously graded mixtures resulting from primary screening (mieszanki) (fractions: 0/31.5; 0/63) (hereinafter: **CA2**).
- (iii) Fine aggregates – graded crushed stone fractions resulting from secondary screening (grysy) and secondary products (fractions: 2/5; 4/8; 5/8; 8/11; 8/16; 11/16; 16/22) (hereinafter: **FA1**).
- (iv) Fine fractions – process fines (produkty poboczne / fines) (fractions: 0/5; 0/2) (hereinafter: **FA2**).

PRODUCT APPLICATION

- (i) Construction aggregates – CA1 (kliniec, tłuczeń; kruszywo gabionowe) 4/31.5; 31.5/63; 50/150; 50/250)

CA1 includes coarse crushed stone fractions used primarily in civil engineering and infrastructure works where a stable, load-bearing granular layer is required. Typical applications include:

- road and industrial pavement construction, including unbound base and subbase layers,
- embankments and general earthworks,
- drainage layers and mechanically stable fill (where grading is suitable),
- engineering works requiring coarse stone fill and mechanically interlocking aggregate.

(ii) Construction aggregates – CA2 (mieszanki; 0/31.5; 0/63)

CA2 comprises continuously graded aggregate mixtures commonly used as general-purpose construction aggregates. Typical applications include:

- subbase layers for roads, yards and parking areas,
- ground improvement and stabilisation works,
- backfilling and levelling, including filling voids and shaping formation levels,
- earthworks where a well-graded mineral material is required to achieve compaction and mechanical stability
- gabion aggregate used for filling gabion fences

(iii) Fine aggregates – FA1 (grysy and secondary products; 2/5; 4/8; 5/8; 8/11; 8/16; 11/16; 16/22)

FA1 includes graded crushed stone fractions intended for applications where controlled particle size distribution is required. Typical applications include:

- aggregates for bituminous mixtures (asphalt), subject to project-specific requirements,
- aggregates for concrete, where relevant performance requirements are met,
- drainage and filter layers and other engineered granular layers, depending on grading,
- general construction uses requiring narrowly graded fractions,
- stones for garden paths, borders around buildings and other decorative functions.

(iv) Fine fractions – FA2 (process fines; 0/2; 0/5)

FA2 consists of fine fractions generated during crushing and screening. Typical applications include:

- blending material for well-graded mixtures and earthworks applications,
- levelling, bedding and finishing layers, depending on project needs,
- auxiliary civil engineering applications where fine mineral material is required.

CARBON SEQUESTRATION POTENTIAL OF ANTIGORITE

A distinguishing characteristic of antigorite compared to other mineral materials is its theoretical potential for long-term CO₂ sequestration through mineral carbonation. Antigorite is exceptionally rich in magnesium oxide, which can chemically bind atmospheric CO₂.

Based on X-ray fluorescence (XRF) chemical analyses of rock samples from the KOSD antigorite deposit and applying the calculation methodology proposed by Renforth (2019), the mineralogical composition indicates a CO₂ removal potential of 705.1 kg of CO₂ per tonne of rock, assuming complete mineral dissolution under optimal conditions.

Note: At present, the manufacturer does not have empirical research data on CO₂ sequestration rates for the specific product applications described in this EPD. Due to this lack of application-specific studies and the slow kinetics of natural mineral carbonation under ambient conditions, this potential carbon sequestration has not been quantified or included in the life cycle assessment. The environmental impacts and benefits presented in this EPD do not account for any CO₂ removal through mineral carbonation.

LCA SCENARIOS FOR FINE AGGREGATES (FA GROUPS)

Due to the wide range of applications for fine aggregates (FA1 and FA2 groups), this EPD presents two alternative End-of-Life (EoL) scenarios to ensure accurate environmental impact reporting:

FA Bound Scenario: This scenario applies when fine aggregates are used in bound applications, such as ready-mix concrete or bituminous mixtures. The EoL modeling (Modules C and D) accounts for the higher energy intensity required for the demolition, crushing, and separation of the material from a solid matrix.

FA Unbound Scenario: This scenario applies when aggregates are used in unbound forms, such as road sub-bases, pipe bedding, or mechanical stabilization. The recovery process in this scenario involves lower environmental impacts, primarily associated with the mechanical excavation and processing of the material from construction layers.

Users of this EPD should select the scenario that best matches the intended final application of the product in their specific building or infrastructure project.

PRODUCT STANDARDS

The products covered by this EPD are manufactured under documented quality control and are supplied in accordance with the relevant European standards for aggregates, as applicable to the intended use:

- EN 13242 – Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction.
- EN 12620 – Aggregates for concrete.
- EN 13043 – Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas.
- EN 13450 – Aggregates for railway ballast (where applicable to the declared applications).

In addition, the aggregates are produced and tested in accordance with the relevant conformity assessment and test methods referenced in the above product standards, and are delivered to meet project-specific technical specifications and grading requirements.

PRODUCT RAW MATERIAL COMPOSITION

KOSD aggregates are produced from natural antigorite ("antygoryt") extracted from KOSD's own quarry. The finished products consist predominantly of inert mineral constituents characteristic of the quarried rock and are supplied as mechanically processed aggregates (crushed and screened to the declared grading).

REACH – SUBSTANCES OF VERY HIGH CONCERN (SVHC)

The products do not contain any REACH SVHC substances in amounts greater than 0,1% (1000 ppm).

PRODUCT LIFE-CYCLE

RAW MATERIALS ACQUISITION (A1)

Module A1 covers the quarrying operations associated with obtaining the natural stone used to produce KOSD aggregates. The process starts with the preparation of the rock face, followed by drilling and blasting to fragment the antigorite deposit. The blasted rock is then mechanically excavated and handled within the quarry area to produce run-of-quarry material suitable for further processing. Supporting activities include the use of auxiliary materials and consumables typical for quarry operations (e.g., explosives and detonators, drilling tools and wear parts), as well as the operation of mobile equipment.

The modelling approach is based on site-specific primary data for 2024 for key operational inputs (e.g., fuel and energy use of quarry equipment and auxiliary materials), complemented where needed by background datasets from the ecoinvent v3.9.1 database. Cut-off criteria were applied in accordance with EN 15804+A2, with minor flows excluded where they are not expected to materially influence the results.

TRANSPORT (A2)

Module A2 covers transport-related activities associated with the supply and internal logistics of the quarry and processing site. It includes:

- inbound transport of auxiliary and consumable materials required for quarrying and processing (e.g., explosives and other operating materials) to the site, modelled using road freight transport datasets (tonne-kilometres), and
- internal haulage and handling of run-of-quarry rock from the extraction area to the processing plant, as well as on-site transport of finished aggregate to designated stockpiles within the facility.

Internal transport operations are modelled based on measured diesel consumption of mobile/off-road equipment rather than tonne-kilometre datasets. As a result, Module A2 results reflect a combination of road freight transport for inbound deliveries and fuel-based modelling for internal haulage and on-site logistics.

Only relevant flows were included in line with the cut-off criteria defined in EN 15804+A2.

MANUFACTURING (A3)

Module A3 covers the manufacturing (processing) and, where applicable, packaging of KOSD natural aggregates carried out at the integrated quarry and processing facility in Poland.

The process begins with the delivery of run-of-quarry rock from the extraction area to the processing plant. The material is then subjected to a sequence of mechanical comminution and classification steps, typically including primary crushing, secondary and/or tertiary crushing (as required), and multi-deck screening to obtain the declared aggregate fractions. Depending on the target product group, the processing line is adjusted to produce continuously graded mixtures (e.g., 0/31.5 and 0/63), coarse construction fractions (kliniec and tłuczeń), graded fine fractions (grysy), and fine fractions (process fines). Where necessary, oversize material is returned to the crusher in a closed-loop arrangement to achieve the required grading.

To limit dust generation during crushing, screening and material transfer, the production process may include dust suppression measures, such as water spraying (sprinkling) at selected points of the processing line and/or stockpile handling areas, in line with site operational practices.

Energy use in this module is based on site-specific production data per declared unit and includes grid electricity consumed by crushing and screening equipment as well as auxiliary systems (e.g., conveyors, feeders, lighting and supporting utilities). Fuel consumption of mobile equipment directly supporting processing operations within the plant area (where applicable) is included in the production data for Module A3.

Manufacturing includes routine quality assurance checks, such as control of particle size distribution, visual inspection for consistency, and verification of compliance with internal procedures and project-specific requirements. Finished products are transferred to designated stockpiles and managed to maintain product identification and traceability.

Aggregates are generally supplied in bulk. As part of normal operations, the production is managed so that the generated size fractions—including fine fractions—are classified and marketed as products. Consequently, no process-specific mineral waste from aggregate production is assumed, as all mineral outputs are directed to product streams within the scope of this EPD. Where packaging is used for specific logistics needs, appropriate materials are applied to ensure protection during handling and storage.

END OF LIFE (C1, C2, C3, C4, D)

End-of-life modelling for KOSD aggregates reflects typical routes for mineral materials used in construction and landscaping. Depending on the application, different end-of-life scenarios are applied (unbound layers, bound layers, and decorative/loose-fill uses). Detailed parameter values and assumptions are reported in the Estimates and Assumptions section.

Module C1 (deconstruction/demolition)

C1 covers the removal of the aggregate from the application. For unbound layers this typically involves mechanical excavation. For bound applications (e.g., asphalt or concrete) it involves milling and/or demolition of the bound layer. For decorative/loose-fill uses, removal may be carried out by manual collection or light mechanical handling.

Module C2 (transport at end of life)

C2 covers the transport of removed material to the next treatment route. Depending on the scenario, this may involve transport to a recycling facility (unbound and bound applications) or local transport for direct reuse/re-sale (decorative/loose-fill applications).

Module C3 (waste processing)

C3 covers processing operations prior to recovery. For scenarios involving recycling, this typically includes crushing and screening to produce a recycled aggregate fraction. For decorative/loose-fill applications, the material may be directly reused without further processing.

Module C4 (disposal)

C4 covers the final disposal of any non-recovered fraction. For mineral construction and demolition residues, disposal is typically modelled as landfilling. In direct reuse scenarios, disposal may be avoided.

Module D (benefits and loads beyond the system boundary)

Module D reports potential benefits and loads associated with recovery routes, where applicable. For recycling scenarios, recovered material may substitute virgin aggregate. For direct reuse scenarios, the reused material may substitute new decorative aggregate.

LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Data reference period	2024 year
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DECLARED AND FUNCTIONAL UNIT

Declared Unit	1 tonne
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BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in the product, kg C:	-
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Biogenic carbon content in the packaging, kg C:	-
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SYSTEM BOUNDARY

This EPD is prepared in accordance with EN 15804 as a "cradle to gate with modules C1 – C4 and module D" declaration (A1–A3, C and D). The product stage (A1–A3) is quantified for the declared unit.

The end-of-life stage (C1–C4) is also modelled and reported based on representative scenarios reflecting typical handling routes for mineral aggregates in construction and landscaping applications. This includes Module C1 (deconstruction/demolition), Module C2 (transport at end of life), Module C3 (waste processing for recovery where applicable), and Module C4 (disposal of non-recovered fractions).

Module D is included where relevant and reports potential benefits and loads beyond the system boundary associated with recovery routes. Where recycling is assumed, recovered aggregate is modelled as substituting virgin aggregate; where direct reuse is assumed (e.g., decorative/loose-fill applications), reused material is modelled as substituting new decorative aggregate.

Table 2: system boundary diagram

Product stage		Assembly stage			Use stage							End of life stage				Beyond the system boundaries
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	MND	MNR	MNR	MNR	MNR	MNR	MNR	MNR	X	X	X	X	X
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deinstallation/Demolition	Transport	Waste processing	Disposal	Reuse / Recycling

X – module included/declared

MND – Module Not Declared

MNR – Module Not Relevant

CUT-OFF CRITERIA

The study declares and reports the life cycle stages and modules required by EN 15804:2012+A2:2019 within the scope of this EPD. No hazardous substances relevant to the LCA modelling have been intentionally excluded from the system boundary.

All major raw material and energy inputs are included. All inputs and outputs from unit processes for which data are available are taken into account in the calculations. No single neglected unit process exceeds 1% of the total mass or energy flows. The sum of all neglected input and output flows does not exceed 5% of the total mass or energy use, in line with the cut-off rules of EN 15804+A2.

The production of capital goods (equipment), construction of infrastructure, and the maintenance and operation of capital equipment are excluded. Personnel-related activities, as well as energy and water use associated with company management and sales/administrative activities, are also excluded.

ESTIMATES AND ASSUMPTIONS

The Life Cycle Assessment (LCA) was carried out in accordance with EN 15804+A2, applying the standard rules for impact indicators, system boundaries, data quality requirements, allocation procedures and the cut-off approach. The study models the product stage (Modules A1–A3) and the end-of-life stage (Modules C1–C4 and Module D). Modules A4 and A5 are not declared, as transport to site and installation impacts are highly project-specific and outside the scope of this Environmental Product Declaration (EPD). The main modelling assumptions are described below.

Where specific and up-to-date primary data could not be obtained, the study applied recognised industry-average assumptions and background datasets from ecoinvent v3.9.1. For electricity used in manufacturing, the emission factor applied was taken from the KOBiZE publication *Emission Factors for Electricity in Poland* (December 2025), i.e. 0.553 kg CO₂e/kWh. The study assumes that all key raw material and energy inputs are captured. Any omitted flows are estimated to represent less than 5% of total mass or energy use, with no individual flow exceeding 1%, consistent with the cut-off rules of EN 15804+A2.

Module A2 assumptions (transport and internal logistics):

Inbound deliveries of explosives and other auxiliary materials are modelled using road transport datasets based on distances from the company's 2024 logistics records. Internal transport of rock from the quarry to the processing plant and on-site transport of finished aggregate to stockpiles are modelled based on measured diesel consumption of mobile/off-road equipment (fuel-based modelling rather than tkm datasets).

End-of-life assumptions:

End-of-life modelling is based on representative scenarios reflecting typical routes for mineral aggregates in construction and landscaping applications. The end-of-life

assumptions applied in this EPD, including the main process steps, transport distances and recovery/disposal shares, are summarised in Table 3.

Table 3: End-of-life scenarios applied in this EPD (C1–C4, D)

Module	SA (CA1 & CA2) – Subbase & construction (unbound)	FA (FA1 & FA2) – Asphalt & concrete (bound)	FA (FA1 & FA2) – Garden paths & loose fill (decorative/direct reuse)
C1 - Deconstruction / removal	Excavation / mechanical removal of unbound layers	Milling/demolition of bound layers	Collection (manual or light mechanical handling)
C1 Energy intensity	2.0 MJ/t (diesel)	11.5 MJ/t (diesel)	0.5 MJ/t (diesel)
C2 – Transport at end of life	25 km to reuse/recycling site	50 km to facility handling reclaimed material (e.g., RAP processing/asphalt production)	30 km local reuse/re- sale
C3 – Waste processing	Crushing & screening prior to recycling; modelled using KOSD foreground inventory consistent with A1– A3	Crushing & screening prior to recycling; modelled using KOSD foreground inventory consistent with A1–A3 (conservative)	None (direct reuse without additional processing)
C4 – Disposal	5% landfill (non- recovered fraction)	5% landfill (non- recovered fraction)	0% landfill
D – Benefits beyond system boundary	Recycling: recovered aggregate substitutes virgin KOSD aggregate (reference: A1–A3)	Recycling: recovered material substitutes virgin high-quality KOSD aggregate (reference: A1–A3)	Direct reuse: reused aggregate substitutes new decorative KOSD aggregate (reference: A1–A3)
Recovery / disposal shares	95% recovery / 5% disposal	95% recovery / 5% disposal	100% direct reuse / 0% disposal

ALLOCATION

Allocation is performed in line with the requirements of EN 15804+A2. The production information compiled for 2024 covers all relevant KOSD aggregate product groups manufactured at the production site during that year, including the four EPD groups (CA1, CA2, FA1 and FA2).

Because the aggregates are produced within a shared quarrying and processing system using common equipment and utilities, allocation is based on physical relationships using a mass-based approach. Manufacturing and operating inputs and outputs are recorded for the site and allocated on a mass basis to the declared unit, i.e. 1 tonne (1 t) of aggregate for each product group.

DATA QUALITY

For foreground data, the LCA study uses high-quality primary information for the year 2024 provided by KOSD, including quarrying and processing inputs (fuels, electricity and auxiliary materials) as well as transport distances for inbound supplies. No supplier-specific EPDs were used as foreground inputs for the main material or energy flows.

All required background datasets were sourced from the ecoinvent v3.9.1 database available in the openLCA software environment, using consistent and well-documented datasets as provided through the ecoinvent database and its documentation.

GEOGRAPHIC REPRESENTATIVENESS

The product system is manufactured and managed in Poland (Europe).

1 ENVIRONMENTAL IMPACT DATA – CA1

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2 – [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
GWP-Total	kg CO2 eq.	3,58E-01	2,50E+00	9,07E-01	3,77E+00	MND	MNR	1,99E-01	2,51E+00	8,62E-01	4,27E-01	-3,58E+00
GWP-fossil	kg CO2 eq.	3,58E-01	2,50E+00	9,02E-01	3,76E+00	MND	MNR	1,98E-01	2,50E+00	8,57E-01	4,25E-01	-3,57E+00
GWP-biogenic	kg CO2 eq.	-1,34E-06	5,90E-04	5,01E-03	5,60E-03	MND	MNR	4,55E-05	2,00E-03	4,76E-03	1,95E-03	-5,32E-03
GWP-luluc	kg CO2 eq.	1,10E-04	2,90E-04	2,70E-04	6,70E-04	MND	MNR	2,23E-05	1,22E-03	2,60E-04	2,90E-04	-6,40E-04
ODP	kg CFC-11 eq.	9,29E-09	3,99E-08	4,19E-09	5,34E-08	MND	MNR	3,16E-09	5,68E-08	3,98E-09	9,61E-09	-5,07E-08
AP	mol H+ eq.	9,76E-02	2,30E-02	6,47E-03	1,27E-01	MND	MNR	1,84E-03	6,20E-03	6,15E-03	2,68E-03	-1,21E-01
EP-freshwater	kg P eq.	4,98E-05	7,77E-05	1,08E-03	1,21E-03	MND	MNR	6,09E-06	1,80E-04	1,03E-03	8,61E-05	-1,15E-03
EP-marine	kg N eq.	3,05E-02	1,07E-02	9,30E-04	4,21E-02	MND	MNR	8,50E-04	1,69E-03	8,90E-04	1,02E-03	-4,00E-02
EP-terrestrial	mol N eq.	5,05E-01	1,16E-01	8,12E-03	6,29E-01	MND	MNR	9,27E-03	1,73E-02	7,72E-03	1,09E-02	-5,98E-01
POCP	kg NMVOC eq.	8,99E-02	3,44E-02	2,37E-03	1,27E-01	MND	MNR	2,74E-03	1,01E-02	2,25E-03	3,69E-03	-1,20E-01
ADPE (disc.2)	kg Sb eq.	2,16E-06	5,33E-07	2,83E-07	2,98E-06	MND	MNR	3,85E-08	4,84E-06	2,68E-07	6,46E-07	-2,83E-06
ADPF (disc.2)	MJ, (NCV)	4,92E+00	3,30E+01	1,03E+01	4,83E+01	MND	MNR	2,62E+00	3,83E+01	9,83E+00	8,04E+00	-4,59E+01
WDP (disc.2)	m3 World eq.	2,38E-01	8,24E-02	1,94E-01	5,15E-01	MND	MNR	6,47E-03	1,97E-01	1,84E-01	4,74E-02	-4,89E-01
Acronyms	GWP-total – Climate change, total global warming potential; GWP-fossil – Climate change, fossil fuels; GWP-biogenic – Climate change, biogenic carbon; GWP-luluc – Climate change, land use and land use change; ODP – Ozone layer depletion; AP – Acidification of terrestrial and freshwater environments; EP-freshwater – Eutrophication, freshwater; EP-marine – Eutrophication, marine; EP-terrestrial – Eutrophication, terrestrial; POCP – Photochemical ozone formation (smog formation); ADPE – Abiotic depletion, minerals and metals; ADPF – Abiotic depletion, fossil fuels; WDP – Water scarcity (water use deprivation potential); NCV – net calorific value.											
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.											

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF - [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
PM	Disease Incidence	7,05E-07	6,35E-07	1,06E-08	1,35E-06	MND	MNR	5,07E-08	1,88E-07	1,00E-08	5,18E-08	-1,28E-06
IRP (disc.1)	kBq U235 eq.	1,28E-02	1,59E-02	2,97E-02	5,84E-02	MND	MNR	1,23E-03	4,79E-02	2,82E-02	1,45E-02	-5,55E-02
ETP-fw (disc.2)	CTUe	7,12E+01	1,57E+01	2,69E+00	8,95E+01	MND	MNR	1,24E+00	1,82E+01	2,55E+00	3,60E+00	-8,50E+01
HTP-c (disc.2)	CTUh	1,26E-10	7,65E-10	2,75E-10	1,17E-09	MND	MNR	6,05E-11	1,09E-09	2,62E-10	2,44E-10	-1,11E-09
HTP-nc (disc.2)	CTUh	4,72E-09	4,94E-09	1,01E-08	1,97E-08	MND	MNR	3,80E-10	2,34E-08	9,57E-09	3,04E-09	-1,87E-08
SQP (disc.2)	Dimensionless	6,34E-01	2,37E+00	2,20E+00	5,20E+00	MND	MNR	1,75E-01	3,86E+01	2,09E+00	1,44E+01	-4,94E+00
Acronyms	PM – Particulate matter emissions (potential incidence of disease); IRP – Ionising radiation, human health exposure potential; ETP-fw – Ecotoxicity, freshwater; HTP-c – Human toxicity, cancer effects; HTP-nc – Human toxicity, non-cancer effects; SQP – Land use related impacts, soil quality.											
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											
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.											

USE OF NATURAL RESOURCES – [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
PERE	MJ, (NCV)	1,71E-01	1,90E-01	9,53E-01	1,31E+00	MND	MNR	1,48E-02	5,56E-01	9,05E-01	1,63E-01	-1,25E+00
PERM	MJ, (NCV)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ, (NCV)	1,71E-01	1,90E-01	9,53E-01	1,31E+00	MND	MNR	1,48E-02	5,56E-01	9,05E-01	1,63E-01	-1,25E+00
PENRE	MJ, (NCV)	4,92E+00	3,30E+01	1,03E+01	4,83E+01	MND	MNR	2,62E+00	3,83E+01	9,83E+00	8,04E+00	-4,59E+01
PENRM	MJ, (NCV)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ, (NCV)	4,92E+00	3,30E+01	1,03E+01	4,83E+01	MND	MNR	2,62E+00	3,83E+01	9,83E+00	8,04E+00	-4,59E+01
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ, (NCV)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ, (NCV)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	1,39E-02	2,95E-03	2,80E-02	4,48E-02	MND	MNR	2,30E-04	6,72E-03	2,66E-02	6,63E-03	-4,26E-02
Acronyms	PERE – Use of renewable primary energy as energy carriers; PERM – Use of renewable primary energy resources as raw materials; PERT – Total use of renewable primary energy resources (PERE + PERM); PENRE – Use of non-renewable primary energy as energy carriers; PENRM – Use of non-renewable primary energy resources as raw materials; PENRT – Total use of non-renewable primary energy resources (PENRE + PENRM); SM – Use of secondary material; RSF – Use of renewable secondary fuels; NRSF – Use of non-renewable secondary fuels; FW – Net use of fresh water; NCV - net calorific value.											

OUTPUT FLOWS – [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	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	MND	MNR	0,00E+00	0,00E+00	9,50E+02	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	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	MND	MNR	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	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Acronyms	CRU – Components for re-use; MFR – Materials for recycling; MER – Materials for energy recovery; EEE – Exported electrical energy; EET – Exported thermal energy.											

WASTE – [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
HWD	kg	2,19E-05	2,20E-04	6,40E-06	2,48E-04	MND	MNR	1,75E-05	2,40E-04	6,08E-06	4,22E-05	-2,40E-04
NHWD	kg	1,40E-04	6,20E-04	1,50E-04	9,10E-04	MND	MNR	4,89E-05	9,00E-04	1,50E-04	5,00E+01	-8,60E-04
RWD	kg	3,27E-06	3,67E-06	7,30E-06	1,42E-05	MND	MNR	2,85E-07	1,16E-05	6,93E-06	3,56E-06	-1,35E-05
Acronyms	HWD – Hazardous waste disposed; NHWD – Non-hazardous waste disposed; RWD – Radioactive waste disposed.											

2 ENVIRONMENTAL IMPACT DATA – CA2

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2 – [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
GWP-Total	kg CO2 eq.	3,58E-01	2,38E+00	9,07E-01	3,64E+00	MND	MNR	1,99E-01	2,51E+00	8,62E-01	4,27E-01	-3,46E+00
GWP-fossil	kg CO2 eq.	3,58E-01	2,37E+00	9,02E-01	3,63E+00	MND	MNR	1,98E-01	2,50E+00	8,57E-01	4,25E-01	-3,45E+00
GWP-biogenic	kg CO2 eq.	-1,34E-06	5,60E-04	5,01E-03	5,57E-03	MND	MNR	4,55E-05	2,00E-03	4,76E-03	1,95E-03	-5,29E-03
GWP-luluc	kg CO2 eq.	1,10E-04	2,80E-04	2,70E-04	6,60E-04	MND	MNR	2,23E-05	1,22E-03	2,60E-04	2,90E-04	-6,20E-04
ODP	kg CFC-11 eq.	9,29E-09	3,79E-08	4,19E-09	5,14E-08	MND	MNR	3,16E-09	5,68E-08	3,98E-09	9,61E-09	-4,88E-08
AP	mol H+ eq.	9,76E-02	2,19E-02	6,47E-03	1,26E-01	MND	MNR	1,84E-03	6,20E-03	6,15E-03	2,68E-03	-1,20E-01
EP-freshwater	kg P eq.	4,98E-05	7,38E-05	1,08E-03	1,20E-03	MND	MNR	6,09E-06	1,80E-04	1,03E-03	8,61E-05	-1,14E-03
EP-marine	kg N eq.	3,05E-02	1,01E-02	9,30E-04	4,16E-02	MND	MNR	8,50E-04	1,69E-03	8,90E-04	1,02E-03	-3,95E-02
EP-terrestrial	mol N eq.	5,05E-01	1,10E-01	8,12E-03	6,23E-01	MND	MNR	9,27E-03	1,73E-02	7,72E-03	1,09E-02	-5,92E-01
POCP	kg NMVOC eq.	8,99E-02	3,26E-02	2,37E-03	1,25E-01	MND	MNR	2,74E-03	1,01E-02	2,25E-03	3,69E-03	-1,19E-01
ADPE (disc.2)	kg Sb eq.	2,16E-06	5,09E-07	2,83E-07	2,95E-06	MND	MNR	3,85E-08	4,84E-06	2,68E-07	6,46E-07	-2,81E-06
ADPF (disc.2)	MJ, (NCV)	4,92E+00	3,13E+01	1,03E+01	4,66E+01	MND	MNR	2,62E+00	3,83E+01	9,83E+00	8,04E+00	-4,43E+01
WDP (disc.2)	m3 World eq.	2,38E-01	7,83E-02	1,94E-01	5,11E-01	MND	MNR	6,47E-03	1,97E-01	1,84E-01	4,74E-02	-4,85E-01
Acronyms	GWP-total – Climate change, total global warming potential; GWP-fossil – Climate change, fossil fuels; GWP-biogenic – Climate change, biogenic carbon; GWP-luluc – Climate change, land use and land use change; ODP – Ozone layer depletion; AP – Acidification of terrestrial and freshwater environments; EP-freshwater – Eutrophication, freshwater; EP-marine – Eutrophication, marine; EP-terrestrial – Eutrophication, terrestrial; POCP – Photochemical ozone formation (smog formation); ADPE – Abiotic depletion, minerals and metals; ADPF – Abiotic depletion, fossil fuels; WDP – Water scarcity (water use deprivation potential); NCV – net calorific value.											
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.											

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF - [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
PM	Disease Incidence	7,05E-07	6,03E-07	1,06E-08	1,32E-06	MND	MNR	5,07E-08	1,88E-07	1,00E-08	5,18E-08	-1,25E-06
IRP (disc.1)	kBq U235 eq.	1,28E-02	1,51E-02	2,97E-02	5,76E-02	MND	MNR	1,23E-03	4,79E-02	2,82E-02	1,45E-02	-5,48E-02
ETP-fw (disc.2)	CTUe	7,12E+01	1,49E+01	2,69E+00	8,87E+01	MND	MNR	1,24E+00	1,82E+01	2,55E+00	3,60E+00	-8,43E+01
HTP-c (disc.2)	CTUh	1,26E-10	7,27E-10	2,75E-10	1,13E-09	MND	MNR	6,05E-11	1,09E-09	2,62E-10	2,44E-10	-1,07E-09
HTP-nc (disc.2)	CTUh	4,72E-09	4,70E-09	1,01E-08	1,95E-08	MND	MNR	3,80E-10	2,34E-08	9,57E-09	3,04E-09	-1,85E-08
SQP (disc.2)	Dimensionless	6,34E-01	2,26E+00	2,20E+00	5,09E+00	MND	MNR	1,75E-01	3,86E+01	2,09E+00	1,44E+01	-4,84E+00
Acronyms	PM – Particulate matter emissions (potential incidence of disease); IRP – Ionising radiation, human health exposure potential; ETP-fw – Ecotoxicity, freshwater; HTP-c – Human toxicity, cancer effects; HTP-nc – Human toxicity, non-cancer effects; SQP – Land use related impacts, soil quality.											
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											
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.											

USE OF NATURAL RESOURCES – [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
PERE	MJ, (NCV)	1,71E-01	1,80E-01	9,53E-01	1,30E+00	MND	MNR	1,48E-02	5,56E-01	9,05E-01	1,63E-01	-1,24E+00
PERM	MJ, (NCV)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ, (NCV)	1,71E-01	1,80E-01	9,53E-01	1,30E+00	MND	MNR	1,48E-02	5,56E-01	9,05E-01	1,63E-01	-1,24E+00
PENRE	MJ, (NCV)	4,92E+00	3,13E+01	1,03E+01	4,66E+01	MND	MNR	2,62E+00	3,83E+01	9,83E+00	8,04E+00	-4,43E+01
PENRM	MJ, (NCV)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ, (NCV)	4,92E+00	3,13E+01	1,03E+01	4,66E+01	MND	MNR	2,62E+00	3,83E+01	9,83E+00	8,04E+00	-4,43E+01
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ, (NCV)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ, (NCV)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	1,39E-02	2,80E-03	2,80E-02	4,47E-02	MND	MNR	2,30E-04	6,72E-03	2,66E-02	6,63E-03	-4,25E-02
Acronyms	PERE – Use of renewable primary energy as energy carriers; PERM – Use of renewable primary energy resources as raw materials; PERT – Total use of renewable primary energy resources (PERE + PERM); PENRE – Use of non-renewable primary energy as energy carriers; PENRM – Use of non-renewable primary energy resources as raw materials; PENRT – Total use of non-renewable primary energy resources (PENRE + PENRM); SM – Use of secondary material; RSF – Use of renewable secondary fuels; NRSF – Use of non-renewable secondary fuels; FW – Net use of fresh water; NCV - net calorific value.											

OUTPUT FLOWS – [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	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	MND	MNR	0,00E+00	0,00E+00	9,50E+02	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	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	MND	MNR	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	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Acronyms	CRU – Components for re-use; MFR – Materials for recycling; MER – Materials for energy recovery; EEE – Exported electrical energy; EET – Exported thermal energy.											

WASTE – [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
HWD	kg	2,19E-05	2,10E-04	6,40E-06	2,38E-04	MND	MNR	1,75E-05	2,40E-04	6,08E-06	4,22E-05	-2,30E-04
NHWD	kg	1,40E-04	5,90E-04	1,50E-04	8,80E-04	MND	MNR	4,89E-05	9,00E-04	1,50E-04	5,00E+01	-8,40E-04
RWD	kg	3,27E-06	3,49E-06	7,30E-06	1,41E-05	MND	MNR	2,85E-07	1,16E-05	6,93E-06	3,56E-06	-1,34E-05
Acronyms	HWD – Hazardous waste disposed; NHWD – Non-hazardous waste disposed; RWD – Radioactive waste disposed.											

3 ENVIRONMENTAL IMPACT DATA – FA1 BOUND

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2 – [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
GWP-Total	kg CO2 eq.	3,58E-01	2,48E+00	1,89E+00	4,73E+00	MND	MNR	1,14E+00	5,01E+00	1,80E+00	4,27E-01	-4,50E+00
GWP-fossil	kg CO2 eq.	3,58E-01	2,48E+00	1,88E+00	4,72E+00	MND	MNR	1,14E+00	5,01E+00	1,79E+00	4,25E-01	-4,48E+00
GWP-biogenic	kg CO2 eq.	-1,34E-06	5,80E-04	1,05E-02	1,10E-02	MND	MNR	2,60E-04	3,99E-03	9,94E-03	1,95E-03	-1,05E-02
GWP-luluc	kg CO2 eq.	1,10E-04	2,90E-04	5,60E-04	9,60E-04	MND	MNR	1,30E-04	2,44E-03	5,30E-04	2,90E-04	-9,10E-04
ODP	kg CFC-11 eq.	9,29E-09	3,96E-08	8,78E-09	5,77E-08	MND	MNR	1,81E-08	1,14E-07	8,34E-09	9,61E-09	-5,48E-08
AP	mol H+ eq.	9,76E-02	2,28E-02	1,35E-02	1,34E-01	MND	MNR	1,06E-02	1,24E-02	1,28E-02	2,68E-03	-1,27E-01
EP-freshwater	kg P eq.	4,98E-05	7,71E-05	2,25E-03	2,38E-03	MND	MNR	3,50E-05	3,70E-04	2,14E-03	8,61E-05	-2,26E-03
EP-marine	kg N eq.	3,05E-02	1,06E-02	1,95E-03	4,31E-02	MND	MNR	4,90E-03	3,38E-03	1,85E-03	1,02E-03	-4,09E-02
EP-terrestrial	mol N eq.	5,05E-01	1,15E-01	1,70E-02	6,37E-01	MND	MNR	5,33E-02	3,47E-02	1,61E-02	1,09E-02	-6,05E-01
POCP	kg NMVOC eq.	8,99E-02	3,41E-02	4,95E-03	1,29E-01	MND	MNR	1,58E-02	2,02E-02	4,70E-03	3,69E-03	-1,22E-01
ADPE (disc.2)	kg Sb eq.	2,16E-06	5,29E-07	5,93E-07	3,29E-06	MND	MNR	2,21E-07	9,69E-06	5,64E-07	6,46E-07	-3,12E-06
ADPF (disc.2)	MJ, (NCV)	4,92E+00	3,27E+01	2,16E+01	5,93E+01	MND	MNR	1,51E+01	7,66E+01	2,05E+01	8,04E+00	-5,63E+01
WDP (disc.2)	m3 World eq.	2,38E-01	8,18E-02	4,05E-01	7,25E-01	MND	MNR	3,72E-02	3,93E-01	3,85E-01	4,74E-02	-6,89E-01
Acronyms	GWP-total – Climate change, total global warming potential; GWP-fossil – Climate change, fossil fuels; GWP-biogenic – Climate change, biogenic carbon; GWP-luluc – Climate change, land use and land use change; ODP – Ozone layer depletion; AP – Acidification of terrestrial and freshwater environments; EP-freshwater – Eutrophication, freshwater; EP-marine – Eutrophication, marine; EP-terrestrial – Eutrophication, terrestrial; POCP – Photochemical ozone formation (smog formation); ADPE – Abiotic depletion, minerals and metals; ADPF – Abiotic depletion, fossil fuels; WDP – Water scarcity (water use deprivation potential); NCV – net calorific value.											
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.											

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF - [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
PM	Disease Incidence	7,05E-07	6,30E-07	2,21E-08	1,36E-06	MND	MNR	2,92E-07	3,77E-07	2,10E-08	5,18E-08	-1,29E-06
IRP (disc.1)	kBq U235 eq.	1,28E-02	1,57E-02	6,21E-02	9,07E-02	MND	MNR	7,09E-03	9,59E-02	5,90E-02	1,45E-02	-8,62E-02
ETP-fw (disc.2)	CTUe	7,12E+01	1,55E+01	5,61E+00	9,23E+01	MND	MNR	7,13E+00	3,65E+01	5,33E+00	3,60E+00	-8,77E+01
HTP-c (disc.2)	CTUh	1,26E-10	7,59E-10	5,75E-10	1,46E-09	MND	MNR	3,48E-10	2,18E-09	5,46E-10	2,44E-10	-1,39E-09
HTP-nc (disc.2)	CTUh	4,72E-09	4,90E-09	2,10E-08	3,06E-08	MND	MNR	2,18E-09	4,68E-08	2,00E-08	3,04E-09	-2,91E-08
SQP (disc.2)	Dimensionless	6,34E-01	2,36E+00	4,58E+00	7,57E+00	MND	MNR	1,01E+00	7,71E+01	4,35E+00	1,44E+01	-7,19E+00
Acronyms	PM – Particulate matter emissions (potential incidence of disease); IRP – Ionising radiation, human health exposure potential; ETP-fw – Ecotoxicity, freshwater; HTP-c – Human toxicity, cancer effects; HTP-nc – Human toxicity, non-cancer effects; SQP – Land use related impacts, soil quality.											
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											
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.											

USE OF NATURAL RESOURCES – [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
PERE	MJ, (NCV)	1,71E-01	1,88E-01	1,99E+00	2,35E+00	MND	MNR	8,50E-02	1,11E+00	1,89E+00	1,63E-01	-2,23E+00
PERM	MJ, (NCV)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ, (NCV)	1,71E-01	1,88E-01	1,99E+00	2,35E+00	MND	MNR	8,50E-02	1,11E+00	1,89E+00	1,63E-01	-2,23E+00
PENRE	MJ, (NCV)	4,92E+00	3,27E+01	2,16E+01	5,93E+01	MND	MNR	1,51E+01	7,66E+01	2,05E+01	8,04E+00	-5,63E+01
PENRM	MJ, (NCV)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ, (NCV)	4,92E+00	3,27E+01	2,16E+01	5,93E+01	MND	MNR	1,51E+01	7,66E+01	2,05E+01	8,04E+00	-5,63E+01
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ, (NCV)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ, (NCV)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	1,39E-02	2,92E-03	5,86E-02	7,54E-02	MND	MNR	1,33E-03	1,34E-02	5,56E-02	6,63E-03	-7,16E-02
Acronyms	PERE – Use of renewable primary energy as energy carriers; PERM – Use of renewable primary energy resources as raw materials; PERT – Total use of renewable primary energy resources (PERE + PERM); PENRE – Use of non-renewable primary energy as energy carriers; PENRM – Use of non-renewable primary energy resources as raw materials; PENRT – Total use of non-renewable primary energy resources (PENRE + PENRM); SM – Use of secondary material; RSF – Use of renewable secondary fuels; NRSF – Use of non-renewable secondary fuels; FW – Net use of fresh water; NCV - net calorific value.											

OUTPUT FLOWS – [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	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	MND	MNR	0,00E+00	0,00E+00	9,50E+02	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	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	MND	MNR	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	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Acronyms	CRU – Components for re-use; MFR – Materials for recycling; MER – Materials for energy recovery; EEE – Exported electrical energy; EET – Exported thermal energy.											

WASTE – [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
HWD	kg	2,19E-05	2,20E-04	1,35E-05	2,55E-04	MND	MNR	1,00E-04	4,70E-04	1,28E-05	4,22E-05	-2,40E-04
NHWD	kg	1,40E-04	6,10E-04	3,20E-04	1,07E-03	MND	MNR	2,80E-04	1,80E-03	3,10E-04	5,00E+01	-1,02E-03
RWD	kg	3,27E-06	3,64E-06	1,53E-05	2,22E-05	MND	MNR	1,64E-06	2,32E-05	1,45E-05	3,56E-06	-2,11E-05
Acronyms	HWD – Hazardous waste disposed; NHWD – Non-hazardous waste disposed; RWD – Radioactive waste disposed.											

4 ENVIRONMENTAL IMPACT DATA – FA1 UNBOUND

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2 – [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
GWP-Total	kg CO2 eq.	3,58E-01	2,48E+00	1,89E+00	4,73E+00	MND	MNR	4,96E-02	3,01E+00	0,00E+00	0,00E+00	-4,73E+00
GWP-fossil	kg CO2 eq.	3,58E-01	2,48E+00	1,88E+00	4,72E+00	MND	MNR	4,96E-02	3,00E+00	0,00E+00	0,00E+00	-4,72E+00
GWP-biogenic	kg CO2 eq.	-1,34E-06	5,80E-04	1,05E-02	1,10E-02	MND	MNR	1,14E-05	2,40E-03	0,00E+00	0,00E+00	-1,11E-02
GWP-luluc	kg CO2 eq.	1,10E-04	2,90E-04	5,60E-04	9,60E-04	MND	MNR	5,58E-06	1,47E-03	0,00E+00	0,00E+00	-9,60E-04
ODP	kg CFC-11 eq.	9,29E-09	3,96E-08	8,78E-09	5,77E-08	MND	MNR	7,89E-10	6,82E-08	0,00E+00	0,00E+00	-5,77E-08
AP	mol H+ eq.	9,76E-02	2,28E-02	1,35E-02	1,34E-01	MND	MNR	4,60E-04	7,44E-03	0,00E+00	0,00E+00	-1,34E-01
EP-freshwater	kg P eq.	4,98E-05	7,71E-05	2,25E-03	2,38E-03	MND	MNR	1,52E-06	2,20E-04	0,00E+00	0,00E+00	-2,38E-03
EP-marine	kg N eq.	3,05E-02	1,06E-02	1,95E-03	4,31E-02	MND	MNR	2,10E-04	2,03E-03	0,00E+00	0,00E+00	-4,31E-02
EP-terrestrial	mol N eq.	5,05E-01	1,15E-01	1,70E-02	6,37E-01	MND	MNR	2,32E-03	2,08E-02	0,00E+00	0,00E+00	-6,37E-01
POCP	kg NMVOC eq.	8,99E-02	3,41E-02	4,95E-03	1,29E-01	MND	MNR	6,90E-04	1,21E-02	0,00E+00	0,00E+00	-1,29E-01
ADPE (disc.2)	kg Sb eq.	2,16E-06	5,29E-07	5,93E-07	3,29E-06	MND	MNR	9,62E-09	5,81E-06	0,00E+00	0,00E+00	-3,29E-06
ADPF (disc.2)	MJ, (NCV)	4,92E+00	3,27E+01	2,16E+01	5,93E+01	MND	MNR	6,54E-01	4,59E+01	0,00E+00	0,00E+00	-5,93E+01
WDP (disc.2)	m3 World eq.	2,38E-01	8,18E-02	4,05E-01	7,25E-01	MND	MNR	1,62E-03	2,36E-01	0,00E+00	0,00E+00	-7,25E-01
Acronyms	GWP-total – Climate change, total global warming potential; GWP-fossil – Climate change, fossil fuels; GWP-biogenic – Climate change, biogenic carbon; GWP-luluc – Climate change, land use and land use change; ODP – Ozone layer depletion; AP – Acidification of terrestrial and freshwater environments; EP-freshwater – Eutrophication, freshwater; EP-marine – Eutrophication, marine; EP-terrestrial – Eutrophication, terrestrial; POCP – Photochemical ozone formation (smog formation); ADPE – Abiotic depletion, minerals and metals; ADPF – Abiotic depletion, fossil fuels; WDP – Water scarcity (water use deprivation potential); NCV - net calorific value.											
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.											

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF - [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
PM	Disease Incidence	7,05E-07	6,30E-07	2,21E-08	1,36E-06	MND	MNR	1,27E-08	2,26E-07	0,00E+00	0,00E+00	-1,36E-06
IRP (disc.1)	kBq U235 eq.	1,28E-02	1,57E-02	6,21E-02	9,07E-02	MND	MNR	3,10E-04	5,75E-02	0,00E+00	0,00E+00	-9,07E-02
ETP-fw (disc.2)	CTUe	7,12E+01	1,55E+01	5,61E+00	9,23E+01	MND	MNR	3,10E-01	2,19E+01	0,00E+00	0,00E+00	-9,23E+01
HTP-c (disc.2)	CTUh	1,26E-10	7,59E-10	5,75E-10	1,46E-09	MND	MNR	1,51E-11	1,31E-09	0,00E+00	0,00E+00	-1,46E-09
HTP-nc (disc.2)	CTUh	4,72E-09	4,90E-09	2,10E-08	3,06E-08	MND	MNR	9,49E-11	2,81E-08	0,00E+00	0,00E+00	-3,06E-08
SQP (disc.2)	Dimensionless	6,34E-01	2,36E+00	4,58E+00	7,57E+00	MND	MNR	4,38E-02	4,63E+01	0,00E+00	0,00E+00	-7,57E+00
Acronyms	PM – Particulate matter emissions (potential incidence of disease); IRP – Ionising radiation, human health exposure potential; ETP-fw – Ecotoxicity, freshwater; HTP-c – Human toxicity, cancer effects; HTP-nc – Human toxicity, non-cancer effects; SQP – Land use related impacts, soil quality.											
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											
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.											

USE OF NATURAL RESOURCES – [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
PERE	MJ, (NCV)	1,71E-01	1,88E-01	1,99E+00	2,35E+00	MND	MNR	3,70E-03	6,67E-01	0,00E+00	0,00E+00	-2,35E+00
PERM	MJ, (NCV)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ, (NCV)	1,71E-01	1,88E-01	1,99E+00	2,35E+00	MND	MNR	3,70E-03	6,67E-01	0,00E+00	0,00E+00	-2,35E+00
PENRE	MJ, (NCV)	4,92E+00	3,27E+01	2,16E+01	5,93E+01	MND	MNR	6,54E-01	4,59E+01	0,00E+00	0,00E+00	-5,93E+01
PENRM	MJ, (NCV)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ, (NCV)	4,92E+00	3,27E+01	2,16E+01	5,93E+01	MND	MNR	6,54E-01	4,59E+01	0,00E+00	0,00E+00	-5,93E+01
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ, (NCV)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ, (NCV)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	1,39E-02	2,92E-03	5,86E-02	7,54E-02	MND	MNR	5,79E-05	8,07E-03	0,00E+00	0,00E+00	-7,54E-02
Acronyms	PERE – Use of renewable primary energy as energy carriers; PERM – Use of renewable primary energy resources as raw materials; PERT – Total use of renewable primary energy resources (PERE + PERM); PENRE – Use of non-renewable primary energy as energy carriers; PENRM – Use of non-renewable primary energy resources as raw materials; PENRT – Total use of non-renewable primary energy resources (PENRE + PENRM); SM – Use of secondary material; RSF – Use of renewable secondary fuels; NRSF – Use of non-renewable secondary fuels; FW – Net use of fresh water; NCV - net calorific value.											

OUTPUT FLOWS – [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	1,00E+03	0,00E+00	0,00E+00
MFR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	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	MND	MNR	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	MND	MNR	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	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Acronyms	CRU – Components for re-use; MFR – Materials for recycling; MER – Materials for energy recovery; EEE – Exported electrical energy; EET – Exported thermal energy.											

WASTE – [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
HWD	kg	2,19E-05	2,20E-04	1,35E-05	2,55E-04	MND	MNR	4,38E-06	2,80E-04	0,00E+00	0,00E+00	-2,50E-04
NHWD	kg	1,40E-04	6,10E-04	3,20E-04	1,07E-03	MND	MNR	1,22E-05	1,08E-03	0,00E+00	0,00E+00	-1,07E-03
RWD	kg	3,27E-06	3,64E-06	1,53E-05	2,22E-05	MND	MNR	7,12E-08	1,39E-05	0,00E+00	0,00E+00	-2,22E-05
Acronyms	HWD – Hazardous waste disposed; NHWD – Non-hazardous waste disposed; RWD – Radioactive waste disposed.											

5 ENVIRONMENTAL IMPACT DATA – FA 2 BOUND

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2 – [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
GWP-Total	kg CO2 eq.	3,58E-01	2,52E+00	1,89E+00	4,78E+00	MND	MNR	1,14E+00	5,01E+00	1,80E+00	4,27E-01	-4,54E+00
GWP-fossil	kg CO2 eq.	3,58E-01	2,52E+00	1,88E+00	4,76E+00	MND	MNR	1,14E+00	5,01E+00	1,79E+00	4,25E-01	-4,52E+00
GWP-biogenic	kg CO2 eq.	-1,34E-06	5,90E-04	1,05E-02	1,11E-02	MND	MNR	2,60E-04	3,99E-03	9,94E-03	1,95E-03	-1,05E-02
GWP-luluc	kg CO2 eq.	1,10E-04	2,90E-04	5,60E-04	9,60E-04	MND	MNR	1,30E-04	2,44E-03	5,30E-04	2,90E-04	-9,20E-04
ODP	kg CFC-11 eq.	9,29E-09	4,03E-08	8,78E-09	5,83E-08	MND	MNR	1,81E-08	1,14E-07	8,34E-09	9,61E-09	-5,54E-08
AP	mol H+ eq.	9,76E-02	2,32E-02	1,35E-02	1,34E-01	MND	MNR	1,06E-02	1,24E-02	1,28E-02	2,68E-03	-1,28E-01
EP-freshwater	kg P eq.	4,98E-05	7,84E-05	2,25E-03	2,38E-03	MND	MNR	3,50E-05	3,70E-04	2,14E-03	8,61E-05	-2,26E-03
EP-marine	kg N eq.	3,05E-02	1,08E-02	1,95E-03	4,33E-02	MND	MNR	4,90E-03	3,38E-03	1,85E-03	1,02E-03	-4,11E-02
EP-terrestrial	mol N eq.	5,05E-01	1,17E-01	1,70E-02	6,39E-01	MND	MNR	5,33E-02	3,47E-02	1,61E-02	1,09E-02	-6,07E-01
POCP	kg NMVOC eq.	8,99E-02	3,47E-02	4,95E-03	1,30E-01	MND	MNR	1,58E-02	2,02E-02	4,70E-03	3,69E-03	-1,23E-01
ADPE (disc.2)	kg Sb eq.	2,16E-06	5,38E-07	5,93E-07	3,29E-06	MND	MNR	2,21E-07	9,69E-06	5,64E-07	6,46E-07	-3,13E-06
ADPF (disc.2)	MJ, (NCV)	4,92E+00	3,33E+01	2,16E+01	5,98E+01	MND	MNR	1,51E+01	7,66E+01	2,05E+01	8,04E+00	-5,69E+01
WDP (disc.2)	m3 World eq.	2,38E-01	8,32E-02	4,05E-01	7,26E-01	MND	MNR	3,72E-02	3,93E-01	3,85E-01	4,74E-02	-6,90E-01
Acronyms	GWP-total – Climate change, total global warming potential; GWP-fossil – Climate change, fossil fuels; GWP-biogenic – Climate change, biogenic carbon; GWP-luluc – Climate change, land use and land use change; ODP – Ozone layer depletion; AP – Acidification of terrestrial and freshwater environments; EP-freshwater – Eutrophication, freshwater; EP-marine – Eutrophication, marine; EP-terrestrial – Eutrophication, terrestrial; POCP – Photochemical ozone formation (smog formation); ADPE – Abiotic depletion, minerals and metals; ADPF – Abiotic depletion, fossil fuels; WDP – Water scarcity (water use deprivation potential); NCV – net calorific value.											
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.											

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF - [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
PM	Disease Incidence	7,05E-07	6,41E-07	2,21E-08	1,37E-06	MND	MNR	2,92E-07	3,77E-07	2,10E-08	5,18E-08	-1,30E-06
IRP (disc.1)	kBq U235 eq.	1,28E-02	1,60E-02	6,21E-02	9,10E-02	MND	MNR	7,09E-03	9,59E-02	5,90E-02	1,45E-02	-8,64E-02
ETP-fw (disc.2)	CTUe	7,12E+01	1,58E+01	5,61E+00	9,26E+01	MND	MNR	7,13E+00	3,65E+01	5,33E+00	3,60E+00	-8,79E+01
HTP-c (disc.2)	CTUh	1,26E-10	7,72E-10	5,75E-10	1,47E-09	MND	MNR	3,48E-10	2,18E-09	5,46E-10	2,44E-10	-1,40E-09
HTP-nc (disc.2)	CTUh	4,72E-09	4,98E-09	2,10E-08	3,07E-08	MND	MNR	2,18E-09	4,68E-08	2,00E-08	3,04E-09	-2,92E-08
SQP (disc.2)	Dimensionless	6,34E-01	2,39E+00	4,58E+00	7,61E+00	MND	MNR	1,01E+00	7,71E+01	4,35E+00	1,44E+01	-7,23E+00
Acronyms	PM – Particulate matter emissions (potential incidence of disease); IRP – Ionising radiation, human health exposure potential; ETP-fw – Ecotoxicity, freshwater; HTP-c – Human toxicity, cancer effects; HTP-nc – Human toxicity, non-cancer effects; SQP – Land use related impacts, soil quality.											
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											
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.											

USE OF NATURAL RESOURCES – [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
PERE	MJ, (NCV)	1,71E-01	1,92E-01	1,99E+00	2,35E+00	MND	MNR	8,50E-02	1,11E+00	1,89E+00	1,63E-01	-2,23E+00
PERM	MJ, (NCV)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ, (NCV)	1,71E-01	1,92E-01	1,99E+00	2,35E+00	MND	MNR	8,50E-02	1,11E+00	1,89E+00	1,63E-01	-2,23E+00
PENRE	MJ, (NCV)	4,92E+00	3,33E+01	2,16E+01	5,99E+01	MND	MNR	1,51E+01	7,66E+01	2,05E+01	8,04E+00	-5,69E+01
PENRM	MJ, (NCV)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ, (NCV)	4,92E+00	3,33E+01	2,16E+01	5,99E+01	MND	MNR	1,51E+01	7,66E+01	2,05E+01	8,04E+00	-5,69E+01
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ, (NCV)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ, (NCV)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	1,39E-02	2,97E-03	5,86E-02	7,55E-02	MND	MNR	1,33E-03	1,34E-02	5,56E-02	6,63E-03	-7,17E-02
Acronyms	PERE – Use of renewable primary energy as energy carriers; PERM – Use of renewable primary energy resources as raw materials; PERT – Total use of renewable primary energy resources (PERE + PERM); PENRE – Use of non-renewable primary energy as energy carriers; PENRM – Use of non-renewable primary energy resources as raw materials; PENRT – Total use of non-renewable primary energy resources (PENRE + PENRM); SM – Use of secondary material; RSF – Use of renewable secondary fuels; NRSF – Use of non-renewable secondary fuels; FW – Net use of fresh water; NCV - net calorific value.											

OUTPUT FLOWS – [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	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	MND	MNR	0,00E+00	0,00E+00	9,50E+02	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	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	MND	MNR	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	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Acronyms	CRU – Components for re-use; MFR – Materials for recycling; MER – Materials for energy recovery; EEE – Exported electrical energy; EET – Exported thermal energy.											

WASTE – [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
HWD	kg	2,19E-05	2,20E-04	1,35E-05	2,55E-04	MND	MNR	1,00E-04	4,70E-04	1,28E-05	4,22E-05	-2,50E-04
NHWD	kg	1,40E-04	6,30E-04	3,20E-04	1,09E-03	MND	MNR	2,80E-04	1,80E-03	3,10E-04	5,00E+01	-1,03E-03
RWD	kg	3,27E-06	3,70E-06	1,53E-05	2,22E-05	MND	MNR	1,64E-06	2,32E-05	1,45E-05	3,56E-06	-2,11E-05
Acronyms	HWD – Hazardous waste disposed; NHWD – Non-hazardous waste disposed; RWD – Radioactive waste disposed.											

6 ENVIRONMENTAL IMPACT DATA – FA2 UNBOUND

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2 – [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
GWP-Total	kg CO2 eq.	3,58E-01	2,52E+00	1,89E+00	4,78E+00	MND	MNR	4,96E-02	3,01E+00	0,00E+00	0,00E+00	-4,78E+00
GWP-fossil	kg CO2 eq.	3,58E-01	2,52E+00	1,88E+00	4,76E+00	MND	MNR	4,96E-02	3,00E+00	0,00E+00	0,00E+00	-4,76E+00
GWP-biogenic	kg CO2 eq.	-1,34E-06	5,90E-04	1,05E-02	1,11E-02	MND	MNR	1,14E-05	2,40E-03	0,00E+00	0,00E+00	-1,11E-02
GWP-luluc	kg CO2 eq.	1,10E-04	2,90E-04	5,60E-04	9,60E-04	MND	MNR	5,58E-06	1,47E-03	0,00E+00	0,00E+00	-9,70E-04
ODP	kg CFC-11 eq.	9,29E-09	4,03E-08	8,78E-09	5,83E-08	MND	MNR	7,89E-10	6,82E-08	0,00E+00	0,00E+00	-5,83E-08
AP	mol H+ eq.	9,76E-02	2,32E-02	1,35E-02	1,34E-01	MND	MNR	4,60E-04	7,44E-03	0,00E+00	0,00E+00	-1,34E-01
EP-freshwater	kg P eq.	4,98E-05	7,84E-05	2,25E-03	2,38E-03	MND	MNR	1,52E-06	2,20E-04	0,00E+00	0,00E+00	-2,38E-03
EP-marine	kg N eq.	3,05E-02	1,08E-02	1,95E-03	4,33E-02	MND	MNR	2,10E-04	2,03E-03	0,00E+00	0,00E+00	-4,32E-02
EP-terrestrial	mol N eq.	5,05E-01	1,17E-01	1,70E-02	6,39E-01	MND	MNR	2,32E-03	2,08E-02	0,00E+00	0,00E+00	-6,39E-01
POCP	kg NMVOC eq.	8,99E-02	3,47E-02	4,95E-03	1,30E-01	MND	MNR	6,90E-04	1,21E-02	0,00E+00	0,00E+00	-1,30E-01
ADPE (disc.2)	kg Sb eq.	2,16E-06	5,38E-07	5,93E-07	3,29E-06	MND	MNR	9,62E-09	5,81E-06	0,00E+00	0,00E+00	-3,29E-06
ADPF (disc.2)	MJ, (NCV)	4,92E+00	3,33E+01	2,16E+01	5,98E+01	MND	MNR	6,54E-01	4,59E+01	0,00E+00	0,00E+00	-5,98E+01
WDP (disc.2)	m3 World eq.	2,38E-01	8,32E-02	4,05E-01	7,26E-01	MND	MNR	1,62E-03	2,36E-01	0,00E+00	0,00E+00	-7,26E-01
Acronyms	GWP-total – Climate change, total global warming potential; GWP-fossil – Climate change, fossil fuels; GWP-biogenic – Climate change, biogenic carbon; GWP-luluc – Climate change, land use and land use change; ODP – Ozone layer depletion; AP – Acidification of terrestrial and freshwater environments; EP-freshwater – Eutrophication, freshwater; EP-marine – Eutrophication, marine; EP-terrestrial – Eutrophication, terrestrial; POCP – Photochemical ozone formation (smog formation); ADPE – Abiotic depletion, minerals and metals; ADPF – Abiotic depletion, fossil fuels; WDP – Water scarcity (water use deprivation potential); NCV – net calorific value.											
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.											

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF - [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
PM	Disease Incidence	7,05E-07	6,41E-07	2,21E-08	1,37E-06	MND	MNR	1,27E-08	2,26E-07	0,00E+00	0,00E+00	-1,37E-06
IRP (disc.1)	kBq U235 eq.	1,28E-02	1,60E-02	6,21E-02	9,10E-02	MND	MNR	3,10E-04	5,75E-02	0,00E+00	0,00E+00	-9,10E-02
ETP-fw (disc.2)	CTUe	7,12E+01	1,58E+01	5,61E+00	9,26E+01	MND	MNR	3,10E-01	2,19E+01	0,00E+00	0,00E+00	-9,26E+01
HTP-c (disc.2)	CTUh	1,26E-10	7,72E-10	5,75E-10	1,47E-09	MND	MNR	1,51E-11	1,31E-09	0,00E+00	0,00E+00	-1,47E-09
HTP-nc (disc.2)	CTUh	4,72E-09	4,98E-09	2,10E-08	3,07E-08	MND	MNR	9,49E-11	2,81E-08	0,00E+00	0,00E+00	-3,07E-08
SQP (disc.2)	Dimensionless	6,34E-01	2,39E+00	4,58E+00	7,61E+00	MND	MNR	4,38E-02	4,63E+01	0,00E+00	0,00E+00	-7,61E+00
Acronyms	PM – Particulate matter emissions (potential incidence of disease); IRP – Ionising radiation, human health exposure potential; ETP-fw – Ecotoxicity, freshwater; HTP-c – Human toxicity, cancer effects; HTP-nc – Human toxicity, non-cancer effects; SQP – Land use related impacts, soil quality.											
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											
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.											

USE OF NATURAL RESOURCES – [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
PERE	MJ, (NCV)	1,71E-01	1,92E-01	1,99E+00	2,35E+00	MND	MNR	3,70E-03	6,67E-01	0,00E+00	0,00E+00	-2,35E+00
PERM	MJ, (NCV)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ, (NCV)	1,71E-01	1,92E-01	1,99E+00	2,35E+00	MND	MNR	3,70E-03	6,67E-01	0,00E+00	0,00E+00	-2,35E+00
PENRE	MJ, (NCV)	4,92E+00	3,33E+01	2,16E+01	5,99E+01	MND	MNR	6,54E-01	4,59E+01	0,00E+00	0,00E+00	-5,99E+01
PENRM	MJ, (NCV)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ, (NCV)	4,92E+00	3,33E+01	2,16E+01	5,99E+01	MND	MNR	6,54E-01	4,59E+01	0,00E+00	0,00E+00	-5,99E+01
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ, (NCV)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ, (NCV)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	1,39E-02	2,97E-03	5,86E-02	7,55E-02	MND	MNR	5,79E-05	8,07E-03	0,00E+00	0,00E+00	-7,55E-02
Acronyms	PERE – Use of renewable primary energy as energy carriers; PERM – Use of renewable primary energy resources as raw materials; PERT – Total use of renewable primary energy resources (PERE + PERM); PENRE – Use of non-renewable primary energy as energy carriers; PENRM – Use of non-renewable primary energy resources as raw materials; PENRT – Total use of non-renewable primary energy resources (PENRE + PENRM); SM – Use of secondary material; RSF – Use of renewable secondary fuels; NRSF – Use of non-renewable secondary fuels; FW – Net use of fresh water; NCV - net calorific value.											

OUTPUT FLOWS – [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	0,00E+00	0,00E+00	1,00E+03	0,00E+00	0,00E+00
MFR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MNR	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	MND	MNR	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	MND	MNR	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	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Acronyms	CRU – Components for re-use; MFR – Materials for recycling; MER – Materials for energy recovery; EEE – Exported electrical energy; EET – Exported thermal energy.											

WASTE – [DU=1t]

Impact category	Unit	A1	A2	A3	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
HWD	kg	2,19E-05	2,20E-04	1,35E-05	2,55E-04	MND	MNR	4,38E-06	2,80E-04	0,00E+00	0,00E+00	-2,60E-04
NHWD	kg	1,40E-04	6,30E-04	3,20E-04	1,09E-03	MND	MNR	1,22E-05	1,08E-03	0,00E+00	0,00E+00	-1,08E-03
RWD	kg	3,27E-06	3,70E-06	1,53E-05	2,22E-05	MND	MNR	7,12E-08	1,39E-05	0,00E+00	0,00E+00	-2,22E-05
Acronyms	HWD – Hazardous waste disposed; NHWD – Non-hazardous waste disposed; RWD – Radioactive waste disposed.											

SCENARIO DOCUMENTATION

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity supply mix	100% national grid electricity (Poland), based on metered annual consumption/production data
Source and quality of electricity data (grid share)	Emission Factors for Electricity in Poland reported in December 2025 by KOBiZE – the National Centre for Emissions Management in Poland
Electricity CO ₂ / kWh (grid share only)	0,553 kg CO ₂ e / kWh

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EPD VERIFICATION:

The verification procedure of this Environmental Product Declaration (EPD) was carried out in accordance with ISO 14025. The EPD is valid for five years from the date of publication and may be updated earlier in case of significant changes. Renewal of validity requires review and, if necessary, updating.

EPD CONTRIBUTORS

Manufacturer representative

Miroslaw Kotowski

EPD verifier

Izabela Sztamberek-Sochan, Ph.D.

Note: The sole ownership, liability, and liability of this declaration are with the owner. Construction product declarations may not be comparable if they do not comply with EN 15804. For detailed information on comparability, please refer to EN 15804 and ISO 14025.



CERTIFICATE

TYPE III EPD DECLARATION

(ENVIRONMENTAL PRODUCT DECLARATION)

Reg. No. EPD-P 01.01.2026



This document confirms that the Environmental Product Declaration developed by **KOSD Wrocław Sp. z o.o.** for

NATURAL ANTIGORITE AGGREGATES

manufactured in accordance with standards:

EN 13242, EN 12620, EN 13043 and EN 13450

meets the requirements of standards **EN 15804:2012+A2:2019** and **ISO 14025**, and that the data contained therein has been prepared correctly.

The Declaration was published on January 31, 2026 and is valid until January 31, 2031, or until it is deregistered or its publication on the website www.epd.org.pl is discontinued.

Authenticity of this certificate can be confirmed in the public register at www.epd.org.pl



Izabela Sztamberek-Sochan, Ph.D.
EPD Polska Verifier



Grzegorz Suwara
CEO Multicert Sp. z o.o.

Warsaw, January 31, 2026