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

# ACEFormer™

| | |
|---|---|
| Registration number: | EPD-Kiwa-EE-158053-EN |
| Issue date: | 22-12-2023 |
| Valid until: | 22-12-2028 |
| Declaration owner: | Gold-Joint Industry Co., Ltd. |
| Publisher: | Kiwa-Ecobility Experts |
| Program operator: | Kiwa-Ecobility Experts |
| Status: | verified |

# 1 General information

## 1.1 PRODUCT

ACEFormer™

## 1.2 REGISTRATION NUMBER

EPD-Kiwa-EE-158053-EN

## 1.3 VALIDITY

**Issue date:** 22-12-2023

**Valid until:** 22-12-2028

## 1.4 PROGRAM OPERATOR

Kiwa-Ecobility Experts
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13355 Berlin
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*(Head of Kiwa-Ecobility Experts)*

Prof. Dr. Frank Heimbecher

*(Chairman of the independent expert committee - Kiwa-Ecobility Experts)*

## 1.5 OWNER OF THE DECLARATION

**Manufacturer:** Gold-Joint Industry Co., Ltd.

**Address:** No.33, Jing 3 Rd. Wuqi Dist., 43541 Taichung City, Taiwan (R.O.C.)

**E-mail:** marketing@geoace.com

**Website:** www.geoace.com

**Production location:** Gold-Joint Industry Co., Ltd.

**Address production location:** No.33, Jing 3 Rd. Wuqi Dist., 43541 Taichung City

## 1.6 VERIFICATION OF THE DECLARATION

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

☐ Internal ☑ External

Elisabeth Amat Guasch, Greenize

## 1.7 STATEMENTS

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

## 1.8 PRODUCT CATEGORY RULES

Kiwa-Ecobility Experts (Kiwa-EE) – General Product Category Rules (2022-02-14)

Kiwa-Ecobility Experts (Kiwa-EE) – Specific Product Category Rules: Geosynthetic products (2023-07-21)

# 1 General information

## 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 R<THiNK:** Ecobility Experts | EN15804+A2

**LCA software*:** Simapro 9.1

**Characterization method:** EN 15804 +A2 Method v1.0

**LCA database profiles:** EcoInvent version 3.6

**Version database:** v3.15 (2023-07-12)

** Used for calculating the characterized results of the Environmental profiles within R<THiNK.*

## 1.11 LCA BACKGROUND REPORT

This EPD is generated on the basis of the LCA background report 'ACEFormer™' with the calculation identifier ReTHiNK-58053.

# 2 Product

## 2.1 PRODUCT DESCRIPTION

ACEFormer™ geotextile mattress is a dual-layer structured fabric, capable of being filled with high-strength fine aggregate concrete or cement mortar to function as a protective lining system. Its merits include adaptability to various terrains, simple and rapid construction, excellent integrity once installed, and strong resistance to erosion. The geotextile mattress can be installed on land, underwater, or steep slopes for applications such as riverbank revetment, channel protection, underwater lining, and pipeline protection. Customized to meet local conditions, the geotextile mattress offers superb flexibility and presents significant advantages over traditional concrete solutions due to its ability to conform excellently to diverse application environments.

The following products are covered in this EPD: V-Type, F-Type, L-Type, T-Type, U-Type and P-Type.

| ACEFormer™ | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Product Properties | | | | | | | | |
| | Test | SI Unit | P - Type | L - Type | F - Type | U - Type | T - Type | V - Type |
| Unit Weight ±20% | ISO 9864 | g/m² | 520 | 520 | 520 | 520 | 520 | 520 |
| Mechanical Index Properties | | | | | | | | |
| Tensile Strength, $T_{ult}$ - MD min | ISO 10319 | kN/m | 50 | 50 | 50 | 50 | 50 | 50 |
| Tensile Strength, $T_{ult}$ - CD min | ISO 10319 | kN/m | 50 | 50 | 50 | 50 | 50 | 50 |
| Nominal Elongation - MD | ISO 10319 | % | 15 | 15 | 15 | 15 | 15 | 15 |
| Nominal Elongation - CD | ISO 10319 | % | 20 | 20 | 20 | 20 | 20 | 20 |
| Hydraulic Properties | | | | | | | | |
| Flow Velocity (50mm head) | ISO 11058 | m/sec | $12.5x10^{-3}$ | $12.5x10^{-3}$ | $12.5x10^{-3}$ | $12.5x10^{-3}$ | $12.5x10^{-3}$ | $12.5x10^{-3}$ |
| Characteristic Opening Size ($O_{90}$) | ISO 12956 | mm | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |

## 2.2 APPLICATION (INTENDED USE OF THE PRODUCT)

ACEFormer™ geotextile mattresses are specialized for hydraulic and erosion control uses. Notably, they're employed in riverbank stabilization projects, where they are studied for their ability to prevent soil erosion, especially with the rise in flood events. Their utility in preserving both natural habitats and human-made structures near coastlines is under scrutiny. ACEFormer™ also find use in scour prevention. They're applied at the bases of structures like piers and embankments, where water-induced erosion could threaten stability. Engineers are assessing their short and long-term performance in these contexts.

Further versatility is seen in applications like slope stabilization and constructing revetments. Their adaptability suits them for projects with diverse demands.

## 2.3 REFERENCE SERVICE LIFE

**RSL PRODUCT**

According to application standards (EN 13249-13257, EN 13265, and EN 15381) and the Taiwanese Design Code, the typical Reference Service Life (RSL) of ACEFormer™ is approximately 50 years.

**USED RSL (YR) IN THIS LCA CALCULATION:**

50

## 2.4 TECHNICAL DATA

See above (2.1).

## 2.5 SUBSTANCES OF VERY HIGH CONCERN

The product contains less than 0.1% of substances included in the “Candidate list of substances of very high concern for authorisation” (SVHC).

## 2.6 DESCRIPTION PRODUCTION PROCESS

PET yarn and PP yarn are the raw materials used in the production of ACEFormer™. Prior to production, the original yarn must be twisted into processed yarn, an operation carried out by external partners. Once the twisting process is complete, the yarn is trucked back to the Gold-Joint factory for further processing.

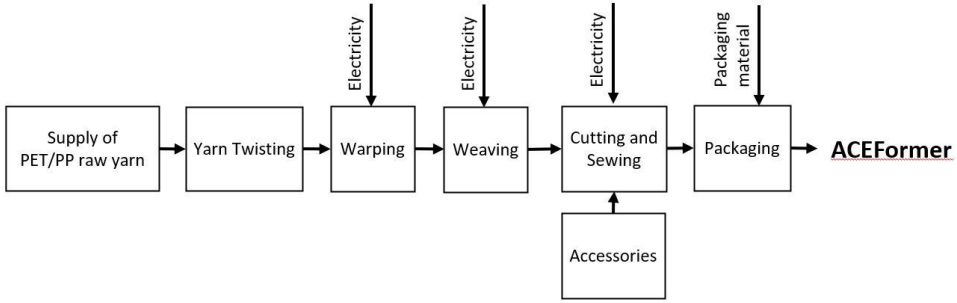
Post the warping process, the processed yarn can be fed into the production line for weaving geotextile mattresses. Weaving is a fabric production method where two distinct sets of yarn interlace at right angles, forming a longitudinal warp direction (machine direction) and a transversal weft direction (cross-machine direction). Through specific design of the textile structure, both single-layer and double-layer fabrics can be produced, with their sizes adjustable based on application requirements.

After weaving, the fabric is rolled onto beams and sent to the internal processing department for sewing operations. Since geotextile mattresses are custom-made products, the processing is done according to the specifications, forms, sizes, and accessories required by the order. Before the sewing process begins, the fabric is inspected for defects. The fabric is then cut and

# 2 Product

sewn according to order requirements, and necessary parts (e.g., handler loops, zippers) are sewn and affixed to the product.

Upon completion, quality control personnel measure the final product's dimensions and count the number of accessories using a production checklist. After careful inspection of the sewing areas, the product is folded and packaged.




## 2.7 CONSTRUCTION DESCRIPTION

The construction process of ACEFormer™ can be divided into the following parts:

- Preparation of the site
- Placement of ACEFormer™
- Anchorage process
- Filling of the panels with flowable concrete/mortar

# 3 Calculation rules

## 3.1 DECLARED UNIT

**One square meter ACEFormer™**

$m^2$ of ACEFormer™. The following products are covered in this EPD: V-Type, F-Type, L-Type, T-Type, U-Type and P-Type.

reference_unit: square meter (m2)

## 3.2 CONVERSION FACTORS

| Description | Value | Unit |
|---|---|---|
| reference_unit | 1 | m2 |
| weight_per_reference_unit | 1.417 | kg |
| Conversion factor to 1 kg | 0.705862 | m2 |

## 3.3 SCOPE OF DECLARATION AND SYSTEM BOUNDARIES

This is a Cradle to gate with options, modules C1-C4 and module D LCA. The life cycle stages included are as shown below:

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

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

The modules of the EN15804 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

The input data are representative for ACEFormer™, a product of Gold-Joint Industry Co., Ltd.. The data are representative for Asia.

## 3.5 CUT-OFF CRITERIA

**Product Stage (A1-A3)**

All input flows (e.g. raw materials, transportation, energy use, packaging, etc.) and output flows (e.g. production waste) are considered in this LCA. The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass.

**Construction process stage (A4-A5)**

All input flows (e.g. transportation to the construction site, additional raw material use for construction, installation energy (use)of energy use for assembly , etc.) and output flows (e.g. construction waste, packaging waste, etc.) are considered in this LCA. The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass.

**End of life stage (C1-C4)**

All input flows (e.g. energy use for demolition or disassembly, transport to waste processing, etc.) and output flows (e.g. end-of-life waste processing of the product, etc.) are considered in this LCA. The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass.

**Benefits and Loads beyond the system boundary (Module D)**

# 3 Calculation rules

All benefits and loads beyond the system boundary resulting from reusable products, recyclable materials and/or useful energy carriers leaving the product system are considered in this LCA.

## 3.6 ALLOCATION

Allocation is based on physical characteristics (mass). The production data was calculated according to the annual quantity by mass. The raw materials and energy were calculated according to this allocation key.

## 3.7 DATA COLLECTION & REFERENCE TIME PERIOD

All process-specific data was collected for the operating year 2021.

## 3.8 ESTIMATES AND ASSUMPTIONS

Almost all the datasets selected for the LCA refer to the RoW as the geographical reference, as there were no specific environmental profiles available.

Gold-Joint delivers its product to different countries, so the calculation of transport to construction site (A4) was done by taking the average distance, weighted by the proportion of product shipped to each country. For module A4, a data set for a non-specific truck and a transoceanic ship was used.

A scaling method was used to calculate the LCA results for the different ACEFormer™ products. The scaling was done on the basis of mass per square meter. As a result of scaling there are results for both the fixed and the scalable part of the scaling function. The fixed part means that this number is the same for each product in the product group and the scalable part is the part that depends on the mass per unit area of the product. In order to calculate the correct number of each environmental impact category for each of the products in the product group, the following calculation should be done:

[number fixed part]+([specific mass]*[number scalable part])

The inputs PET raw yarn, PP raw yarn and PP chips also did not have a linear dependence on the specific mass. As they are the main inputs present in the product, the linear dependence on the specific mass of the sum of these 3 inputs was calculated instead of considering the inputs separately.

The stirring materials (colour masterbatch, anti-UV masterbatch, thermoplastic elastomer) and auxiliary materials were scaled to the amount of PP chips. This is because these materials are only involved in the mixing process of the self-extruded material and not in the outsourced yarn production.

The linear dependence of energy consumption on specific mass has been calculated by taking into account the sum of production energy and yarn twisting energy (which is outsourced).

For C1 the method and amount of the generic data set 'Polyester weefsel' from chapter 22.46 Grondwapening en grondscheiding of the DuboCalc programme (database version NMD 1.8 - 5.01.14052018) was used. In this generic data set, 0.0013h work per $m^2$ of geotextile was assumed.

## 3.9 DATA QUALITY

All process-specific data was collected for the 2021 operating year and is therefore up-to-date. The data is based on the annual average. In order to ensure comparability of the results, only consistent background data of the Ecoinvent database V3.6 was used in the LCA (e.g., records on energy, transportation, and supplies), which refers to reference year 2019. The database is regularly reviewed and thus complies with the requirements of EN 15804 (background data not older than 10 years). All consistent datasets contained in the Ecoinvent database are documented and can be viewed in the online Ecoinvent documentation. The primary data were provided by Gold-Joint. The life cycle was modelled with the R<THiNK EPD App.

## 3.10 GUARANTEES OF ORIGIN

In this EPD, the local based approach was considered for the LCA, therefore no guaranties of origin (GO) are needed.

# 3 Calculation rules

## 3.12 SCALING

| Parameter | Value |
|---|---|
| Scaling type | Linear |
| Description dimension | Specific mass |
| Dimension | 0.000 |
| Scalable dimension | 1.000 |
| Unit dimension | kg/m² |

# 4 Scenarios and additional technical information

## 4.1 TRANSPORT TO CONSTRUCTION SITE (A4)

For the transport from production place to assembly/user, the following scenario is assumed for module A4 of this EPD.

| | Value and unit |
|---|---|
| Vehicle type used for transport | Transoceanic ship / Lorry unspecified |
| Fuel type and consumption of vehicle | |
| Distance | 2274 km |
| Capacity utilisation (including empty returns) | |
| Bulk density of transported products | |
| Volume capacity utilisation factor | |

## 4.2 ASSEMBLY (A5)

The following information describes the scenarios for flows entering the system and flows leaving the system at module A5.

### FLOWS ENTERING THE SYSTEM

There are no significant environment impacts as a result of materials or energy used in the construction stage (A5).

### FLOWS LEAVING THE SYSTEM

The following output flows leaving the system at module A5 are assumed.

| Description | Value | Unit |
|---|---|---|
| Output materials as result of loss during construction | 5 | % |
| Output materials as result of waste processing of materials used for installation/assembly at the building site | 0.000 | kg |
| Output materials as result of waste processing of used packaging | 0.012 | kg |

## 4.3 DE-CONSTRUCTION, DEMOLITION (C1)

The following information describes the scenario for demolition at end of life.

| Description | Amount | Unit |
|---|---|---|
| Hydraulic excavator (average) [NMD] | 0.001 | hr |

# 4 Scenarios and additional technical information

## 4.4 TRANSPORT END-OF-LIFE (C2)

The following distances and transport conveyance are assumed for transportation during end of life for the different types of waste processing.

| Waste Scenario | Transport conveyance | Not removed (stays in work) [km] | Landfill [km] | Incineration [km] | Recycling [km] | Re-use [km] |
|---|---|---|---|---|---|---|
| PE/PP soil reinforcement (geotextile and geogrid 54) | Lorry (Truck), unspecified (default) \| market group for (GLO) | 0 | 100 | 150 | 50 | 0 |
| finishes (adhered to wood, plastic, metal) (NMD ID 2) | Lorry (Truck), unspecified (default) \| market group for (GLO) | 0 | 100 | 150 | 50 | 0 |

The transport conveyance(s) used in the scenario(s) for transport during end of life has the following characteristics.

| | Value and unit |
|---|---|
| Vehicle type used for transport | Lorry (Truck), unspecified (default) \| market group for (GLO) |
| Fuel type and consumption of vehicle | not available |
| Capacity utilisation (including empty returns) | 50 % (loaded up and return empty) |
| Bulk density of transported products | inapplicable |
| Volume capacity utilisation factor | 1 |

## 4.5 END OF LIFE (C3, C4)

The scenario(s) assumed for end of life of the product are given in the following tables.
First the assumed percentages per type of waste processing are displayed, followed by the assumed amounts.

| Waste Scenario | Region | Not removed (stays in work) [%] | Landfill [%] | Incineration [%] | Recycling [%] | Re-use [%] |
|---|---|---|---|---|---|---|
| PE/PP soil reinforcement (geotextile and geogrid 54) | NL | 25 | 0 | 70 | 5 | 0 |
| finishes (adhered to wood, plastic, metal) (NMD ID 2) | NL | 0 | 0 | 100 | 0 | 0 |

# 4 Scenarios and additional technical information

| Waste Scenario | Not removed (stays in work) [kg] | Landfill [kg] | Incineration [kg] | Recycling [kg] | Re-use [kg] |
|---|---|---|---|---|---|
| PE/PP soil reinforcement (geotextile and geogrid 54) | 0.447 | 0.000 | 1.251 | 0.089 | 0.000 |
| **Total** | **0.447** | **0.000** | **1.251** | **0.089** | **0.000** |

## 4.6 BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY (D)

The presented Benefits and loads beyond the system boundary in this EPD are based on the following calculated Net output flows in kilograms and Energy recovery displayed in MJ Lower Heating Value.

| Waste Scenario | Net output flow [kg] | Energy recovery [MJ] |
|---|---|---|
| PE/PP soil reinforcement (geotextile and geogrid 54) | 0.071 | 27.664 |
| finishes (adhered to wood, plastic, metal) (NMD ID 2) | 0.000 | 0.000 |
| **Total** | **0.071** | **27.664** |

# 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 end-points 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 Results

## 5.1 ENVIRONMENTAL IMPACT INDICATORS PER SQUARE METER (FIXED PART)

### CORE ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

| Abbreviation | Unit | A1 | A2 | A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|
| AP | mol H+ eqv. | -4.40E-3 | -2.22E-4 | -4.63E-3 | -2.84E-4 | -4.83E-4 | 7.12E-4 | -3.12E-5 | -3.14E-4 | -8.56E-6 | 3.98E-4 |
| GWP-total | kg CO2 eqv. | -1.04E+0 | -6.83E-3 | -1.12E+0 | -2.42E-2 | -1.19E-1 | 6.81E-2 | -5.38E-3 | -6.96E-1 | -1.37E-2 | 3.57E-1 |
| GWP-b | kg CO2 eqv. | -2.44E-3 | 2.07E-6 | 4.62E-3 | -1.50E-5 | 5.25E-3 | 1.89E-5 | -2.48E-6 | -1.01E-4 | -1.06E-5 | 2.83E-4 |
| GWP-f | kg CO2 eqv. | -1.03E+0 | -6.83E-3 | -1.12E+0 | -2.42E-2 | -1.24E-1 | 6.81E-2 | -5.37E-3 | -6.95E-1 | -1.37E-2 | 3.57E-1 |
| GWP-luluc | kg CO2 eqv. | -6.25E-4 | -4.72E-6 | -6.66E-5 | -1.00E-5 | -3.64E-5 | 5.37E-6 | -1.97E-6 | -5.65E-5 | -4.85E-7 | 1.95E-5 |
| EP-m | kg N eqv. | -8.22E-4 | -5.46E-5 | -6.12E-4 | -7.04E-5 | -7.98E-5 | 3.14E-4 | -1.10E-5 | -8.57E-5 | -5.19E-6 | 1.02E-4 |
| EP-fw | kg P eqv. | -2.37E-4 | -2.80E-8 | -4.47E-5 | -2.85E-7 | -1.41E-5 | 2.48E-7 | -5.42E-8 | -2.10E-6 | -1.76E-8 | 9.85E-7 |
| EP-T | mol N eqv. | -8.57E-3 | -6.07E-4 | -6.84E-3 | -7.85E-4 | -8.60E-4 | 3.45E-3 | -1.21E-4 | -9.55E-4 | -3.15E-5 | 1.12E-3 |
| ODP | kg CFC 11 eqv. | -3.61E-8 | -1.37E-9 | -4.99E-8 | -5.15E-9 | -5.18E-9 | 1.47E-8 | -1.19E-9 | -2.13E-8 | -3.04E-10 | 4.24E-8 |
| POCP | kg NMVOC eqv. | -3.25E-3 | -1.57E-4 | -2.03E-3 | -2.15E-4 | -2.88E-4 | 9.49E-4 | -3.46E-5 | -2.57E-4 | -1.21E-5 | 4.11E-4 |
| ADP-f | MJ | -2.79E+1 | -8.73E-2 | -1.51E+1 | -3.57E-1 | -2.20E+0 | 9.37E-1 | -8.10E-2 | -5.42E-1 | -2.32E-2 | 6.68E+0 |
| ADP-mm | kg Sb-eqv. | -1.38E-5 | -5.08E-8 | -1.59E-6 | -4.23E-7 | -8.09E-7 | 1.04E-7 | -1.36E-7 | -8.92E-7 | -1.05E-8 | 4.26E-7 |
| WDP | m3 world eqv. | -4.11E-1 | -1.27E-4 | -1.50E-1 | -1.57E-3 | -2.89E-2 | 1.26E-3 | -2.90E-4 | -3.55E-2 | -9.95E-4 | 5.39E-2 |

**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)

# 5 Results

### ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN15084+A2

| Abbreviation | Unit | A1 | A2 | A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ETP-fw | CTUe | -1.35E+1 | -5.62E-2 | -1.14E+1 | -2.94E-1 | -1.43E+0 | 5.65E-1 | -7.23E-2 | -8.74E+0 | -2.47E-2 | 5.22E-1 |
| PM | disease incidence | -3.65E-8 | -2.10E-10 | -1.16E-8 | -1.71E-9 | -2.55E-9 | 1.89E-8 | -4.83E-10 | -2.54E-9 | -1.62E-10 | 1.87E-9 |
| HTP-c | CTUh | -3.42E-10 | -3.87E-12 | -2.38E-10 | -9.65E-12 | -3.20E-11 | 1.97E-11 | -2.34E-12 | -1.33E-10 | -6.48E-13 | 3.01E-11 |
| HTP-nc | CTUh | -8.87E-9 | -4.49E-11 | -7.90E-9 | -2.98E-10 | -9.08E-10 | 4.85E-10 | -7.91E-11 | -2.76E-9 | -1.61E-11 | 5.18E-10 |
| IR | kBq U235 eqv. | -4.77E-2 | -3.74E-4 | -4.52E-2 | -1.52E-3 | -4.79E-3 | 4.02E-3 | -3.40E-4 | -2.22E-3 | -9.10E-5 | 2.61E-3 |
| SQP | Pt | -1.75E+0 | -1.18E-2 | -1.39E+0 | -2.27E-1 | -1.76E-1 | 1.20E-1 | -7.03E-2 | -2.00E-1 | -5.49E-2 | -3.67E-2 |

**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 | AAcidification 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 |

# 5 Results

| ILCD classification | Indicator | Disclaimer |
|---|---|---|
| | 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 ENVIRONMENTAL IMPACT INDICATORS PER SQUARE METER (SCALABLE PART)

**CORE ENVIRONMENTAL IMPACT INDICATORS EN15804+A2**

| Abbreviation | Unit | A1 | A2 | A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|
| AP | mol H+ eqv. | 2.11E-2 | 1.02E-3 | 2.88E-2 | 1.41E-3 | 2.70E-3 | 0.00E+0 | 1.50E-4 | 1.51E-3 | 4.13E-5 | -1.94E-3 |
| GWP-total | kg CO2 eqv. | 4.95E+0 | 3.19E-2 | 6.94E+0 | 1.21E-1 | 7.80E-1 | 0.00E+0 | 2.59E-2 | 3.36E+0 | 6.63E-2 | -1.74E+0 |
| GWP-b | kg CO2 eqv. | 1.10E-2 | -9.06E-6 | -2.87E-2 | 7.46E-5 | -8.54E-4 | 0.00E+0 | 1.20E-5 | 4.86E-4 | 5.10E-5 | -1.38E-3 |
| GWP-f | kg CO2 eqv. | 4.94E+0 | 3.19E-2 | 6.97E+0 | 1.20E-1 | 7.80E-1 | 0.00E+0 | 2.59E-2 | 3.36E+0 | 6.63E-2 | -1.74E+0 |
| GWP-luluc | kg CO2 eqv. | 2.92E-3 | 2.18E-5 | 5.14E-4 | 4.99E-5 | 1.90E-4 | 0.00E+0 | 9.50E-6 | 2.73E-4 | 2.34E-6 | -1.02E-4 |
| EP-m | kg N eqv. | 3.90E-3 | 2.50E-4 | 3.83E-3 | 3.51E-4 | 4.42E-4 | 0.00E+0 | 5.30E-5 | 4.13E-4 | 2.50E-5 | -4.96E-4 |
| EP-fw | kg P eqv. | 1.08E-3 | 1.35E-7 | 2.59E-4 | 1.42E-6 | 6.78E-5 | 0.00E+0 | 2.62E-7 | 1.01E-5 | 8.50E-8 | -4.86E-6 |
| EP-T | mol N eqv. | 4.08E-2 | 2.78E-3 | 4.27E-2 | 3.91E-3 | 4.79E-3 | 0.00E+0 | 5.84E-4 | 4.61E-3 | 1.52E-4 | -5.46E-3 |
| ODP | kg CFC 11 eqv. | 2.04E-7 | 6.41E-9 | 3.18E-7 | 2.57E-8 | 3.39E-8 | 0.00E+0 | 5.72E-9 | 1.03E-7 | 1.46E-9 | -2.06E-7 |
| POCP | kg NMVOC eqv. | 1.55E-2 | 7.21E-4 | 1.29E-2 | 1.07E-3 | 1.59E-3 | 0.00E+0 | 1.67E-4 | 1.24E-3 | 5.82E-5 | -2.01E-3 |

**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)

# 5 Results

| Abbreviation | Unit | A1 | A2 | A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ADP-f | MJ | 1.35E+2 | 4.09E-1 | 9.59E+1 | 1.78E+0 | 1.19E+1 | 0.00E+0 | 3.91E-1 | 2.62E+0 | 1.12E-1 | -3.25E+1 |
| ADP-mm | kg Sb-eqv. | 6.52E-5 | 2.51E-7 | 1.08E-5 | 2.11E-6 | 4.17E-6 | 0.00E+0 | 6.57E-7 | 4.30E-6 | 5.07E-8 | -2.09E-6 |
| WDP | m3 world eqv. | 1.96E+0 | 6.23E-4 | 9.49E-1 | 7.81E-3 | 1.55E-1 | 0.00E+0 | 1.40E-3 | 1.71E-1 | 4.80E-3 | -2.63E-1 |

**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 EN15084+A2

| Abbreviation | Unit | A1 | A2 | A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ETP-fw | CTUe | 6.49E+1 | 2.66E-1 | 7.27E+1 | 1.47E+0 | 9.10E+0 | 0.00E+0 | 3.49E-1 | 4.22E+1 | 1.19E-1 | -2.55E+0 |
| PM | disease incidence | 1.80E-7 | 1.03E-9 | 7.52E-8 | 8.53E-9 | 1.40E-8 | 0.00E+0 | 2.33E-9 | 1.23E-8 | 7.80E-10 | -9.18E-9 |
| HTP-c | CTUh | 1.61E-9 | 1.80E-11 | 1.41E-9 | 4.81E-11 | 1.88E-10 | 0.00E+0 | 1.13E-11 | 6.43E-10 | 3.13E-12 | -1.47E-10 |
| HTP-nc | CTUh | 4.22E-8 | 2.16E-10 | 4.90E-8 | 1.49E-9 | 5.34E-9 | 0.00E+0 | 3.81E-10 | 1.33E-8 | 7.76E-11 | -2.53E-9 |
| IR | kBq U235 eqv. | 2.29E-1 | 1.75E-3 | 2.77E-1 | 7.60E-3 | 2.65E-2 | 0.00E+0 | 1.64E-3 | 1.07E-2 | 4.39E-4 | -1.28E-2 |
| SQP | Pt | 8.50E+0 | 6.39E-2 | 9.22E+0 | 1.13E+0 | 1.03E+0 | 0.00E+0 | 3.39E-1 | 9.63E-1 | 2.65E-1 | -5.89E-1 |

**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 | AAcidification potential, Accumulated Exceedance (AP) | None |
| | | None |

# 5 Results

| ILCD classification | Indicator | Disclaimer |
|---|---|---|
| ILCD type / level 3 | Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater) | |
| | 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 |
| | 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 Results

## 5.3 ENVIRONMENTAL IMPACT INDICATORS PER SQUARE METER (FIXED PART)

### PARAMETERS DESCRIBING RESOURCE USE

| Abbreviation | Unit | A1 | A2 | A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PERE | MJ | -5.77E-1 | -5.88E-4 | -6.28E-1 | -5.33E-3 | -6.16E-2 | 5.07E-3 | -1.01E-3 | -5.49E-2 | -4.11E-4 | 6.91E-3 |
| PERM | MJ | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| PERT | MJ | -5.77E-1 | -5.88E-4 | -6.28E-1 | -5.33E-3 | -6.16E-2 | 5.07E-3 | -1.01E-3 | -5.49E-2 | -4.11E-4 | 6.91E-3 |
| PENRE | MJ | -1.92E+1 | -9.26E-2 | -1.59E+1 | -3.79E-1 | -1.81E+0 | 9.95E-1 | -8.60E-2 | -5.76E-1 | -2.47E-2 | 6.54E+0 |
| PENRM | MJ | -1.08E+1 | 0.00E+0 | -1.16E-1 | 0.00E+0 | -5.47E-1 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 8.12E-1 |
| PENRT | MJ | -3.00E+1 | -9.26E-2 | -1.60E+1 | -3.79E-1 | -2.36E+0 | 9.95E-1 | -8.60E-2 | -5.76E-1 | -2.47E-2 | 7.36E+0 |
| SM | Kg | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| RSF | MJ | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| NRSF | MJ | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| FW | M3 | -1.04E-2 | -4.54E-6 | -4.29E-3 | -5.14E-5 | -7.59E-4 | 4.83E-5 | -9.87E-6 | -1.04E-3 | -2.43E-5 | 7.70E-4 |

**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 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HWD | Kg | -1.77E-5 | -7.97E-8 | -6.39E-6 | -7.09E-7 | -1.28E-6 | 2.55E-6 | -2.05E-7 | -1.03E-6 | -3.53E-8 | 6.90E-6 |
| NHWD | Kg | -6.99E-2 | -2.02E-4 | -5.88E-2 | -1.55E-2 | -1.12E-2 | 1.11E-3 | -5.14E-3 | -1.34E-2 | -9.28E-2 | 3.33E-3 |
| RWD | Kg | -1.85E-5 | -6.07E-7 | -3.83E-5 | -2.34E-6 | -3.04E-6 | 6.51E-6 | -5.32E-7 | -1.95E-6 | -1.38E-7 | 3.34E-6 |

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

# 5 Results

### ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

| Abbreviation | Unit | A1 | A2 | A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CRU | Kg | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| MFR | Kg | 0.00E+0 | 0.00E+0 | -4.50E-8 | 0.00E+0 | 1.91E-3 | 0.00E+0 | 0.00E+0 | -1.85E-2 | 0.00E+0 | 0.00E+0 |
| MER | Kg | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| EET | MJ | 0.00E+0 | 0.00E+0 | -1.68E-1 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | -2.37E+0 |
| EEE | MJ | 0.00E+0 | 0.00E+0 | -9.74E-2 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | -1.37E+0 |

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

## 5.4 ENVIRONMENTAL IMPACT INDICATORS PER SQUARE METER (SCALABLE PART)

### PARAMETERS DESCRIBING RESOURCE USE

| Abbreviation | Unit | A1 | A2 | A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PERE | MJ | 2.71E+0 | 2.83E-3 | 3.98E+0 | 2.66E-2 | 3.50E-1 | 0.00E+0 | 4.90E-3 | 2.65E-1 | 1.98E-3 | -1.66E-1 |
| PERM | MJ | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| PERT | MJ | 2.71E+0 | 2.83E-3 | 3.98E+0 | 2.66E-2 | 3.50E-1 | 0.00E+0 | 4.90E-3 | 2.65E-1 | 1.98E-3 | -1.66E-1 |
| PENRE | MJ | 9.29E+1 | 4.35E-1 | 9.93E+1 | 1.89E+0 | 9.99E+0 | 0.00E+0 | 4.15E-1 | 2.78E+0 | 1.19E-1 | -3.18E+1 |
| PENRM | MJ | 5.16E+1 | 0.00E+0 | 2.56E+0 | 0.00E+0 | 2.71E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | -3.99E+0 |
| PENRT | MJ | 1.44E+2 | 4.35E-1 | 1.02E+2 | 1.89E+0 | 1.27E+1 | 0.00E+0 | 4.15E-1 | 2.78E+0 | 1.19E-1 | -3.58E+1 |
| SM | Kg | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| RSF | MJ | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| NRSF | MJ | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| FW | M3 | 4.95E-2 | 2.21E-5 | 2.70E-2 | 2.56E-4 | 4.11E-3 | 0.00E+0 | 4.76E-5 | 5.03E-3 | 1.17E-4 | -3.77E-3 |

**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

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### OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

| Abbreviation | Unit | A1 | A2 | A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HWD | Kg | 8.19E-5 | 3.93E-7 | 4.01E-5 | 3.54E-6 | 6.72E-6 | 0.00E+0 | 9.91E-7 | 4.99E-6 | 1.70E-7 | -3.35E-5 |
| NHWD | Kg | 3.29E-1 | 1.67E-3 | 3.67E-1 | 7.74E-2 | 6.56E-2 | 0.00E+0 | 2.48E-2 | 6.45E-2 | 4.48E-1 | -1.64E-2 |
| RWD | Kg | 1.02E-4 | 2.84E-6 | 2.39E-4 | 1.17E-5 | 1.84E-5 | 0.00E+0 | 2.57E-6 | 9.40E-6 | 6.66E-7 | -1.63E-5 |

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

### ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

| Abbreviation | Unit | A1 | A2 | A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CRU | Kg | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| MFR | Kg | 0.00E+0 | 0.00E+0 | 3.75E-4 | 0.00E+0 | 4.49E-3 | 0.00E+0 | 0.00E+0 | 8.94E-2 | 0.00E+0 | 0.00E+0 |
| MER | Kg | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| EET | MJ | 0.00E+0 | 0.00E+0 | 7.80E-1 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 1.15E+1 |
| EEE | MJ | 0.00E+0 | 0.00E+0 | 4.53E-1 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 6.68E+0 |

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

# 5 Results

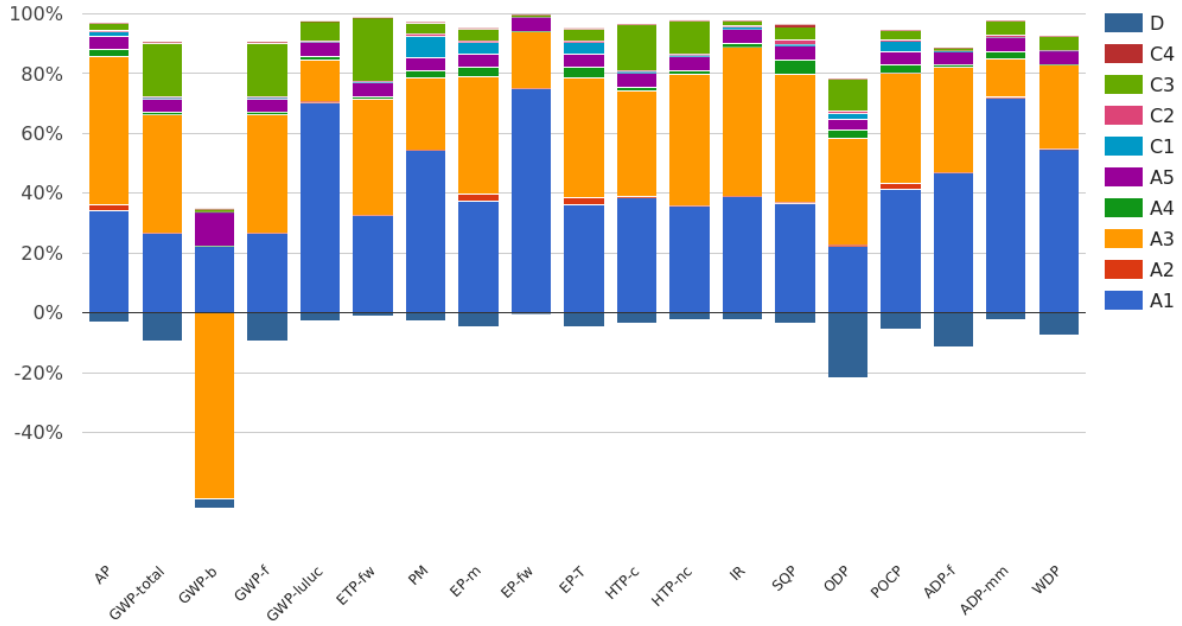
## 5.5 INFORMATION ON BIOGENIC CARBON CONTENT PER SQUARE METER

### BIOGENIC CARBON CONTENT

The following Information describes the biogenic carbon content in (the main parts of) the product at the factory gate per square meter:

| Biogenic carbon content | Amount | Unit |
|---|---|---|
| Biogenic carbon content in the product | 0 | kg C |
| Biogenic carbon content in accompanying packaging | 0 | kg C |

# 6 Interpretation of results




As shown in the figure below, the production process (A3) and raw material supply (A1) dominate in most environmental core indicators. The highest influence on the Global Warming Potential (GWP-total) have production process (A3) and waste processing (C3) . Transports (A2, C2) have rather a minor impact within all core indicators.

# 7 References

**ISO 14040**
ISO 14040:2006-10, Environmental management - Life cycle assessment - Principles and framework; EN ISO 14040:2006

**ISO 14044**
ISO 14044:2006-10, Environmental management - Life cycle assessment - Requirements and guidelines; EN ISO 14040:2006

**ISO 14025**
ISO 14025:2011-10: Environmental labels and declarations — Type III environmental declarations — Principles and procedures

**EN 15804+A2**
EN 15804+A2: 2019: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

**PCR A:** General Program Category Rules for Construction Products from the EPD program Kiwa-Ecobility Experts, 2022-02-14

**PCR B:** Product Category Rules (PCR) from the Kiwa-Ecobility Experts (Kiwa-EE) – Specific Product Category Rules: Geosynthetic products, 2023-07-21

# 8 Contact information

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|---|---|---|
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