Environmental Product Declaration (EPD)
According to ISO 14025 and EN 15804+A2:2019

Circuit Breaker Bay GIS T155-7g

Registration number:	EPD-Kiwa-EE-204526-EN
Issue date:	27-05-2025
Valid until:	27-05-2030
Declaration owner:	Grid Solutions
Publisher:	Kiwa-Ecobility Experts
Programme operator:	Kiwa-Ecobility Experts
Status:	verified

1 General information

1.1 PRODUCT

Circuit Breaker Bay GIS T155-7g

1.2 REGISTRATION NUMBER

EPD-Kiwa-EE-204526-EN

1.3 VALIDITY

Issue date: 27-05-2025
Valid until: 27-05-2030

1.4 PROGRAMME OPERATOR

Kiwa-Ecobility Experts
Wattstraße 11-13
13355 Berlin
DE

Raoul Mancke

(Head of programme operations, Kiwa-Ecobility Experts)

Dr. Ronny Stadie

(Verification body, Kiwa-Ecobility Experts)

1.5 OWNER OF THE DECLARATION

Manufacturer: Grid Solutions
Address: 167 QUAI de la bataille de stalingrad , 92130 Issy-les-Moulineaux, France
E-mail: Solene.Michaud@gevernova.com
Website: www.gevernova.com/grid-solutions

Production location: Grid Solutions
Address production location: 1 rue Paul Doumer , 73 106 Aix-les-Bains, France

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+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-EE GPI R.2.0
Kiwa-Ecobility Experts, General Programme Instructions “Product Level”, SOP EE 1203_R. 2.0 (27.02.2025)

Kiwa-EE GPI R.2.0 Annex B1
Kiwa-Ecobility Experts, General Programme Instructions “Product Level” – Annex B1 Environmental Information Programme according to EN 15804 / ISO 21930, SOP EE 1203_R. 2.0 (27.02.2025)

EPDItaly007
Core Product Category Rules based on EN 50693 for electrical and electronic products Rev. 3.1 (2024-11-12)

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+A2:2019. 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 EPD program operators may differ. Comparability needs to be evaluated. For further guidance, see EN 15804+A2:2019 and ISO 14025.

1.10 CALCULATION BASIS

LCA method R<THINK: Ecobility Experts | EN15804+A2

LCA software*: Simapro 9.6

Characterization method: R<*THINK*.. characterization method (see references for more details)

LCA database profiles: ecoinvent (version 3.9.1)

Version database: v3.1.9 (20250306)

** Simapro is 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 'Circuit Breaker Bay GIS T155-7g' with the calculation identifier ReTHiNK-104526.

2 Product

2.1 PRODUCT DESCRIPTION

GE Vernova's T155-7g Gas Insulated Switchgear (GIS) is composed of different pressurized gas (g3) components. High voltage circuit breakers are mechanical switching devices which connect and interrupt current circuits (operating currents, called rated continuous currents and fault currents, called short circuit currents) and carry the nominal current in closed position. In open position and between phase to ground, it has to withstand the rated voltage. The role of the circuit breaker is to protect and control the electrical power grid. High voltage disconnectors are mechanical switches which isolates elements of the substation to guarantee safe operation on devices for example. Current transformers are used to decrease current intensity in a secondary circuit, in order to allow measurements of the electrical operations conditions.

The constituent materials for GE Circuit Breaker Bay GIS T155-7g are shown in the table below:

Material	Mass (kg)
Steel	1928.905
Stainless Steel	704.369
Cast and sintered irons	144.010
Aluminium and its alloys	6251.704
Copper and its alloys	580.005
Nickel and its alloys	0.628
Lead and its alloys (including Pb solders)	0.004
Tin and its alloys (including Pb-free solders)	4.877
Other non-ferrous metals and alloys	0.326
Other precious metals	0.003
Ceramics	0.000
Other inorganic materials	6.892
PolyVinylChloride (PVC)	29.594
PolyEthylene (PE)	18.872
PolyPropylene (PP)	0.037
PolyCarbonate (PC)	0.087
PolyOxyMethylene (POM)	0.758
Acrylonitrile-Butadiene-Styrene (ABS)	17.670
PolyAmide (PA)	67.266
PolyEthyleneTerephthalate (PET)	21.544
PolyButyleneTerephthalate (PBT)	0.870
Polytetrafluorethylene (PTFE)	14.061
Polymethylmethacrylate (PMMA)	3.451
Other filled thermoplastics	1.750
PolyAmide (PA)	4.042
PolyButyleneTerephthalate (PBT)	3.150
Polytetrafluorethylene (PTFE)	0.410
Other filled thermoplastics	0.023
Polyurethane (PUR)	0.491
Unsaturated polyester (UP)	0.828
Epoxy resin (EP)	410.740
Other duromers	19.800
NBR	7.130
EPDM	11.108
Other elastomers	15.057
Paper	12.154
Refrigerant gases and cryogens and other greenhouse gases	124.4
Oils and greases	0.537
Total	**10407.553**

The constituent materials for packaging and accessories are given below:

Packaging material	Mass (kg)
Plywood	1274.04
PE (polyethylene)	3.47
PP (Polypropylene)	1.59
PU (proxy for foam)	0.5

2 Product

PVC (Proxy for tape)	0.26
Sawn wood	761.2
Steel (screw)	0.7
Total	**2041.760**

2.2 APPLICATION (INTENDED USE OF THE PRODUCT)

To carry a rated continuous current of 5000A under normal circuit condition and withstand a rated voltage of 420kV, without interruption for a period of 40 years. To interrupt a rated short-circuit current of 63kA. To carry the short-circuit current during 3s. To measure the current. For temperature down to -25°C.

2.3 REFERENCE SERVICE LIFE

RSL PRODUCT

According to the manufacturer, the service life is estimated at 40 years, based on the provisions of IEC 62271-320 High-voltage switchgear and controlgear – Part 320: Type tests for high-voltage switchgear and controlgear.

USED RSL (YR) IN THIS LCA CALCULATION:

40

RSL PARTS

According to the manufacturer, the service life is estimated at 40 years, based on the provisions of IEC 62271-320 High-voltage switchgear and controlgear – Part 320: Type tests for high-voltage switchgear and controlgear.

Description	Material	RSL [yr]
Maintenance (B2)		
Gas leakage during RSL	g3	1

2.4 TECHNICAL DATA

Electrical characteristics of T155-7g bay are given in Table below:

Characteristics	Units	Value
Rated voltage	kVms	420
Rated nominal current	Ams	5000
Rated frequency	Hz	50/60
Rated short-circuit breaking current	kAms	63
Breaking time	ms	39
Electrical gas insulator		g3

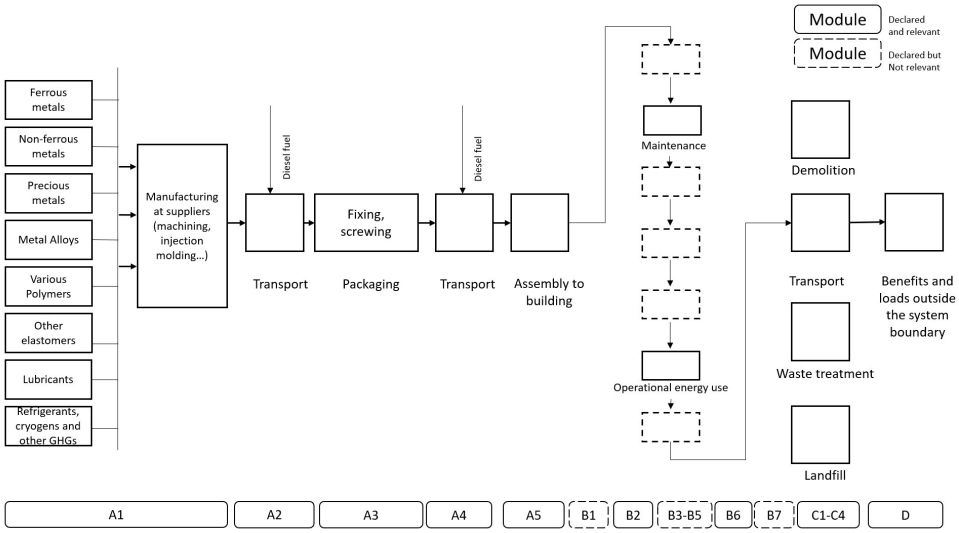
2.5 SUBSTANCES OF VERY HIGH CONCERN

According to manufacture, no substance present in the product with a concentration exceeding 0.1% of the total weight is included on the "List of Substances of Very High Concern" (SVHC) for authorization under REACH legislation.

2.6 DESCRIPTION PRODUCTION PROCESS

The product is manufactured using a variety of raw materials, including steel, aluminum, silicon, plastics, elastomers, durometers, and copper alloys. Component production takes place at external suppliers through processes such as machining and injection molding. These components are then transported by truck to the assembly facility located in France. At the French factory, the final product is assembled through mechanical operations such as fixing and screwing. The assembled units are packaged using wooden boxes and plastic protective materials before being prepared for delivery to the installation site. The energy consumption is calculated based on measured data from factory in France.

2 Product



2.7 CONSTRUCTION DESCRIPTION

For the installation of the product, it is assumed that 2 to 3 hours of the machinery operation would be needed, as per the manufacturer. The machinery are used to transport, position, and secure the voltage transformer within the assembly, ensuring accurate alignment and the safe handling of heavy components.

The installation process also involves manual labor and mechanical effort performed by qualified personnel, who are responsible for assembling, bolting, and connecting the components in accordance with standardized procedures and safety guideline

3 Calculation rules

3.1 FUNCTIONAL UNIT

Piece of the product

The function of the circuit breaker is to carry a rated continuous current of 5000A under normal circuit condition and withstand a rated voltage of 420kV, without interruption for a period of RSL. To interrupt a rated short-circuit current of 63kA. To carry the short-circuit current during 3s. To measure the current. For temperature down to -25°C.

Reference unit: piece (p)

3.2 CONVERSION FACTORS

Description	Value	Unit
Reference unit	1	p
Weight per reference unit	10407.553	kg
Conversion factor to 1 kg	0.000096	p

3.3 SCOPE OF DECLARATION AND SYSTEM BOUNDARIES

This is a Cradle to grave EPD. 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	X	X	X	X	X	X	X	X	X	X	X	X

The modules of the EN 15804 contain the following:

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

3.4 REPRESENTATIVENESS

This EPD is representative for Circuit Breaker Bay GIS T155-7g, a product of Grid Solutions . The results of this EPD are representative for European Union.

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

3 Calculation rules

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.

Use stage (B1-B7)
All (known) input flows (e.g. raw materials, transportation, energy use, packaging, etc.) and output flows (e.g. emissions to soil, air and water, construction waste, packaging waste, end-of-life waste, etc.) related to the building fabric 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. For demolition, energy consumption for deconstruction or dismantling according to Product Environmental Footprint Category Rules (PEFCRs)for Products Iin building , 2019 is applied.

Assumption for the demolition at EoL	Amount per kg of demolished material	Unit	Data set	Database
Diesel consumption in construction machine	0.0437	MJ/ kg	Thermal energy from light fuel oil	Sphera

Benefits and loads beyond the system boundary (Module D)
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.

Excluded Elements from LCA Calculation

- The transport of personnel to the plant;
- The transportation of personnel within the plant
- Research and development activities;
- Long-term emissions.

3.6 ALLOCATION

The allocation is carried out in accordance with the provisions of EN 15804+A2. The incoming energy, water and internal waste generation is distributed equally across all products using a method for allocating the power output. The energy requirements of production were allocated to the individual products on the basis of energy consumption measurements. Specific information on the allocations within the background data can be found in the documentation of the Ecoinvent datasets.

The transport of parts and materials to the assembly site was modeled based on the geographical repartition of suppliers and corresponding transport hypotheses.

3.7 DATA COLLECTION & REFERENCE PERIOD

All primary data were collected by manufacture of product for the reference year of 2023 covering the period from January to December 2023.

3.8 ESTIMATES AND ASSUMPTIONS

- Due to the large number of suppliers and associated data limitations, transport has been modeled using generic profiles representative of typical supply chains where specific data was not available. A company-specific transport profile has been applied to reflect realistic sourcing practices. The following assumptions apply:

1. Domestic sourcing (within France): Transported 1,000 km by freight lorry, 16–32 metric tons, EURO 6, diesel.
2. European sourcing (EU): Transported 3,500 km by freight lorry, 16–32 metric tons, EURO 6, diesel.
3. Global sourcing: Shipped 19,000 km by sea freight (oceanic container ship, heavy fuel oil) and transported a further 1,000 km by freight lorry, 16–32 metric tons, EURO 4, diesel.

- The G3 insulation gas consists of a C4F7N / O2 / CO2 mixture. This gas has been modelled separately based on the manufacturer's data and in accordance with the Grid Solutions harmonized standard document NT312440.
- C_4F_7N production has been modeled using assumptions and secondary data, including proxy datasets from ecoinvent. Results may differ from actual industrial production.
- A payload factor of 50 percent was used for all truck transports, which in fact corresponds to a full delivery and empty return trip. A data set for a non-specific truck was used.
- Consumption of 0.043 MJ diesel per kilogram of the products is assumed for the demolition of end-of-life products.
- During the demolition phase, a 0.09% leakage rate of g3 gas is assumed. This amount has been calculated and considered in the emissions calculation.

3 Calculation rules

- For the end-of-life scenario, the EU scenarios have been selected, as the product is market is in the EU.
- Module A4 (Transport) is calculated based on the assumption that the product is transported over a distance of 2,600 km from the factory in Aix-les-Bains, France, to Bergen, Norway. The transportation is assumed to involve a combination of road and sea freight, using the following datasets:

1. Transport, freight, lorry, unspecified {RER} | market for transport, freight, lorry, unspecified | Cut-off, U
2. Transport, freight, sea, container ship {GLO} | market for transport, freight, sea, container ship | Cut-off, U

- Module A5: No losses are expected in the installation of product and the energy required for installation is based on the data provided by the manufacturer.
- Among the B modules, only B2(Maintenance) and B6 (Operational Energy Use) are considered relevant; all other B modules have been excluded due to a lack of significant impacts:

1. The gas leakage during the use stage is considered as 0.5% per year during 40 years. This value comes from IEC 62271-320.
2. The operational energy use is calculated using the following formula: Energy use = Puse × 8,760 × RSL / 1,000.

Where: Puse = Power consumed by the circuit breaker (in watts) RSL = Reference Service Life (in years) 8,760 = Number of operating hours per year. The result is expressed in kilowatt-hours (kWh).

- End-of-life default scenarios suggested in IEC/TR 62635 (Annex D.3) are used.

3.9 DATA QUALITY

Both primary and secondary data have been used. All primary data were collected by the product manufacturer for the reference year 2023, covering the period from January to December. The main source of primary data is the bill of materials, supplemented by factory-specific data provided by the manufacturing facility in France.

For the data, which was needed for modelling but was not provided by the manufacturer and could not be influenced by them, generic data was used. Secondary data were sourced from the regularly updated Ecoinvent database (version 3.9.1), aligning with EN 15804 standards to ensure background data not exceeding 10 years.

ReTHINK EPD web application was used to model the life cycle for the production and disposal of the declared product systems. To ensure that the results are comparable, consistent background data from the international database Ecoinvent was used in the LCA (e.g. data records on energy, transport, auxiliary materials, and suppliers). Almost all consistent data sets contained in the Ecoinvent database are documented and can be viewed online.

The scenarios included are currently in use and are representative for one of the most likely scenario alternatives. According to the criteria of the “UN Environmental Global Guidance on LCA database development” mentioned in EN 15804+A2, the data quality for all three representativeness categories (geographical, technical and time) can be described as good.

3.10 POWER MIX

With regard to the energy consumption of production and operational use , the market-based approach was used in the LCA:

Electricity supply is based on the French national residual grid mix , using the dataset "Electricity, medium voltage {FR} | electricity, medium voltage, residual mix. This mix has a total Global Warming Potential (GWP) of 0.0813 kg CO_2 eq. per kWh.

Assuming that the operational energy use is based on the Norway national residual grid mix, using the dataset ''Electricity, medium voltage {NO}| electricity, medium voltage, residual mix | Cut-off, U''. This mix has a total Global Warming Potential (GWP) of 0.13423 kg CO_2 eq. per kWh.

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	Transport for installation (lorry & Sea)
Fuel type and consumption of vehicle	not available
Distance	2650 km
Capacity utilisation (including empty returns)	50 % (loaded up and return empty)
Bulk density of transported products	inapplicable
Volume capacity utilisation factor	1

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

For flows entering the system at A5 the following scenario is assumed for module A5.

	Value	Unit
Energy consumption for installation/assembly		
Installation Energy	3	hr

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	3	%
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	2041.760	kg

4.3 USE STAGE (B1)

No significant environment impact in the use stage modules, because there is no (significant) emission to air, soil or water.

4 Scenarios and additional technical information

4.4 MAINTENANCE (B2)

Technical maintenance is needed during Use Stage. For maintenance the scenario(s) as mentioned below are included in this EPD.

Description	Service cycle (yr)	Number of cycles (n)	Amount per cycle	Total Amount	Unit
Gas leakage during RSL	1	39	0.622	24.258	kg

4.5 REPAIR (B3)

Repairs are not applicable within the functional unit and to achieve the reference service life.

4.6 OPERATIONAL ENERGY USE (B6)

Description	Service cycle (yr)	Number of cycles (n)	Amount per cycle	Total Amount	Unit
Energy consumption	40	1.00	12894.72	12,894.72	kWh

4.7 OPERATIONAL WATER USE (B7)

Description	Service cycle (yr)	Number of cycles (n)	Amount per cycle	Total Amount	Unit

4.8 DE-CONSTRUCTION, DEMOLITION (C1)

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

Description	Amount	Unit
(ei3.9.1) Diesel, burned in machine (incl. emissions)	11.450	l
g3	0.112	kg

4.9 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.

4 Scenarios and additional technical information

Waste Scenario	Transport conveyance	Not removed (stays in work) [km]	Landfill [km]	Incineration [km]	Recycling [km]	Re-use [km]
Gas g3 waste scenario	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
Steel waste scenario	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
Cast Iron waste scenario	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
Aluminium waste scenario	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
Copper waste scenario	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
Metals, mixed	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
Lead	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
Other Inorganic materials	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
PVC	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
PE waste scenario	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
PC	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
PET waste scenario	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
ABS	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
PBT	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0

4 Scenarios and additional technical information

Waste Scenario	Transport conveyance	Not removed (stays in work) [km]	Landfill [km]	Incineration [km]	Recycling [km]	Re-use [km]
PMMA waste scenario	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
Unsaturated polyester	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
Epoxy resin	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
Other duromers	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
NBR	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
EPDM	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
Paper	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
Lubricating oil waste scenario	(ei3.9.1) 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	(ei3.9.1) 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 Scenarios and additional technical information

4.10 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 [%]
Gas g3 waste scenario	EU	1	0	39	60	0
Steel waste scenario	EU	0	6	0	94	0
Cast Iron waste scenario	EU	0	6	0	94	0
Aluminium waste scenario	EU	0	9	3	91	0
Copper waste scenario	EU	0	15	0	85	0
Metals, mixed	EU	0	30	0	70	0
Lead	EU	0	5	0	95	0
Other Inorganic materials	EU	0	85	5	10	0
PVC	EU	0	95	5	0	0
PE waste scenario	EU	0	9	1	90	0
PC	EU	0	95	5	0	0
PET waste scenario	EU	0	95	5	0	0
ABS	EU	0	25	1	74	0
PBT	EU	0	30	0	70	0
PMMA waste scenario	EU	0	30	70	0	0
Unsaturated polyester	EU	0	95	5	0	0
Epoxy resin	EU	0	95	5	0	0
Other duromers	EU	0	30	70	0	0
NBR	EU	0	9	1	90	0
EPDM	EU	0	30	70	0	0
Paper	EU	0	0	25	75	0
Lubricating oil waste scenario	EU	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]
Gas g3 waste scenario	1.244	0.000	48.516	74.640	0.000
Steel waste scenario	0.000	157.996	0.000	2475.278	0.000
Cast Iron waste scenario	0.000	8.641	0.000	135.369	0.000
Aluminium waste scenario	0.000	562.653	187.551	5689.051	0.000
Copper waste scenario	0.000	87.001	0.000	493.007	0.000
Metals, mixed	0.000	1.749	0.000	4.082	0.000
Lead	0.000	0.000	0.000	0.004	0.000
Other Inorganic materials	0.000	5.858	0.345	0.689	0.000
PVC	0.000	28.581	1.504	0.000	0.000
PE waste scenario	0.000	1.702	0.189	17.018	0.000
PC	0.000	0.083	0.004	0.000	0.000
PET waste scenario	0.000	102.677	5.404	0.000	0.000
ABS	0.000	4.418	0.177	13.076	0.000
PBT	0.000	1.206	0.000	2.814	0.000
PMMA waste scenario	0.000	1.567	3.657	0.000	0.000
Unsaturated polyester	0.000	0.787	0.041	0.000	0.000
Epoxy resin	0.000	390.203	20.537	0.000	0.000
Other duromers	0.000	10.457	24.400	0.000	0.000
NBR	0.000	0.642	0.071	6.417	0.000
EPDM	0.000	3.332	7.776	0.000	0.000
Paper	0.000	0.000	3.038	9.116	0.000
Lubricating oil waste scenario	0.000	0.000	0.537	0.000	0.000
Total	**1.244**	**1369.553**	**303.748**	**8920.560**	**0.000**

4.11 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.

4 Scenarios and additional technical information

Waste Scenario	Net output flow [kg]	Energy recovery [MJ]
Gas g3 waste scenario	74.640	0.000
Steel waste scenario	1573.200	0.000
Cast Iron waste scenario	87.933	0.000
Aluminium waste scenario	1071.542	0.000
Copper waste scenario	493.007	0.000
Metals, mixed	4.076	0.000
Lead	0.002	0.000
Other Inorganic materials	-4.010	0.000
PVC	0.000	32.581
PE waste scenario	17.018	8.027
PC	0.000	0.134
PET waste scenario	0.000	152.434
ABS	13.076	6.220
PBT	2.814	0.000
PMMA waste scenario	0.000	102.989
Unsaturated polyester	0.000	1.275
Epoxy resin	0.000	632.334
Other duromers	0.000	658.374
NBR	6.417	1.904
EPDM	0.000	207.686
Paper	9.116	42.904
Lubricating oil waste scenario	0.000	18.634
Total	**3348.829**	**1865.496**

5 Results

For the impact assessment long-term emissions (>100 years) are not considered. 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.

5.1 ENVIRONMENTAL IMPACT INDICATORS PER PIECE

CORE ENVIRONMENTAL IMPACT INDICATORS EN 15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq.	8.72E+4	2.99E+3	3.71E+3	9.39E+4	4.65E+3	6.26E+3	0.00E+0	1.34E+3	0.00E+0	0.00E+0	0.00E+0	1.74E+3	0.00E+0	4.65E+1	9.37E+1	2.07E+3	8.88E+1	-2.26E+4
GWP-f	kg CO_2 eq.	8.64E+4	2.99E+3	6.32E+3	9.58E+4	4.64E+3	3.17E+3	0.00E+0	1.34E+3	0.00E+0	0.00E+0	0.00E+0	1.74E+3	0.00E+0	4.64E+1	9.33E+1	2.04E+3	8.87E+1	-2.26E+4
GWP-b	kg CO_2 eq.	6.08E+2	9.60E-1	-2.62E+3	-2.01E+3	1.54E+0	3.09E+3	0.00E+0	3.37E-1	0.00E+0	0.00E+0	0.00E+0	1.09E+0	0.00E+0	7.08E-3	3.04E-2	2.65E+1	9.70E-2	3.13E+0
GWP-luluc	kg CO_2 eq.	1.77E+2	1.47E+0	1.02E+1	1.89E+2	2.27E+0	6.02E+0	0.00E+0	1.53E-1	0.00E+0	0.00E+0	0.00E+0	2.80E-1	0.00E+0	5.19E-3	3.33E-1	1.62E+0	2.96E-2	-6.26E+1
ODP	kg CFC 11 eq.	3.36E-3	7.10E-5	9.70E-4	4.41E-3	1.02E-4	2.16E-4	0.00E+0	5.76E-6	0.00E+0	0.00E+0	0.00E+0	4.00E-5	0.00E+0	6.64E-7	1.66E-6	3.05E-5	5.71E-7	-7.73E-2
AP	mol H+ eq.	8.50E+2	6.71E+0	2.17E+1	8.79E+2	2.22E+1	2.85E+1	0.00E+0	7.46E-1	0.00E+0	0.00E+0	0.00E+0	5.15E+0	0.00E+0	3.80E-1	4.47E-1	7.36E+0	2.07E-1	-5.14E+2
EP-fw	kg P eq.	4.75E+0	2.45E-2	2.32E-1	5.01E+0	3.80E-2	1.55E-1	0.00E+0	6.40E-3	0.00E+0	0.00E+0	0.00E+0	6.71E-2	0.00E+0	1.72E-4	9.28E-4	3.84E-2	8.49E-4	-1.45E+0
EP-m	kg N eq.	9.39E+1	1.66E+0	6.64E+0	1.02E+2	8.64E+0	3.70E+0	0.00E+0	1.17E-1	0.00E+0	0.00E+0	0.00E+0	1.05E+0	0.00E+0	1.75E-1	1.70E-1	1.32E+0	8.35E-2	-3.18E+1
EP-T	mol N eq.	1.09E+3	1.74E+1	7.38E+1	1.18E+3	9.33E+1	4.20E+1	0.00E+0	1.30E+0	0.00E+0	0.00E+0	0.00E+0	1.22E+1	0.00E+0	1.90E+0	1.81E+0	1.50E+1	6.59E-1	-4.05E+2

GWP-total=Global Warming Potential total (GWP-total) | **GWP-f**=Global Warming Potential fossil fuels (GWP-fossil) | **GWP-b**=Global Warming Potential biogenic (GWP-biogenic) | **GWP-luluc**=Global Warming Potential land use and land use change (GWP-luluc) | **ODP**=Depletion potential of the stratosperic ozon layer (ODP) | **AP**=Acidification potential, Accumulated Exceedance (AP) | **EP-fw**=Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-freshwater) | **EP-m**=Eutrophication potential, fraction of nutrients reaching marine end compartment (EP-marine) | **EP-T**=Eutrophication potential, Accumulated Exceedance (EP-terrestrial) | **POCP**=Formation potential of tropospheric ozone (POCP) | **ADP-mm**=Abiotic depletion potential for non fossil resources (ADP mm) | **ADP-f**=Abiotic depletion for fossil resources potential (ADP fossil) | **WDP**=Water (user) deprication potential, deprivation-weighted water consumption (WDP)

5 Results

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
POCP	kg NMVOC eq.	3.53E+2	1.03E+1	2.59E+1	3.89E+2	3.25E+1	1.38E+1	0.00E+0	5.16E-1	0.00E+0	0.00E+0	0.00E+0	3.69E+0	0.00E+0	5.64E-1	6.18E-1	4.95E+0	2.37E-1	-1.33E+2
ADP-mm	kg Sb-eq.	6.13E+0	9.76E-3	2.41E-2	6.16E+0	1.44E-2	1.92E-1	0.00E+0	1.49E-3	0.00E+0	0.00E+0	0.00E+0	2.09E-3	0.00E+0	2.05E-5	2.92E-4	3.90E-2	6.59E-5	-4.99E+0
ADP-f	MJ	9.21E+5	4.25E+4	2.22E+5	1.19E+6	6.70E+4	3.92E+4	0.00E+0	3.12E+3	0.00E+0	0.00E+0	0.00E+0	3.23E+4	0.00E+0	5.45E+2	1.34E+3	1.36E+4	5.19E+2	-2.13E+5
WDP	m3 world eq.	2.07E+4	1.76E+2	3.03E+3	2.39E+4	2.91E+2	7.54E+2	0.00E+0	6.52E+1	0.00E+0	0.00E+0	0.00E+0	1.31E+2	0.00E+0	1.42E+0	7.30E+0	1.58E+2	1.45E+1	-5.24E+3

GWP-total=Global Warming Potential total (GWP-total) | **GWP-f**=Global Warming Potential fossil fuels (GWP-fossil) | **GWP-b**=Global Warming Potential biogenic (GWP-biogenic) | **GWP-luluc**=Global Warming Potential land use and land use change (GWP-luluc) | **ODP**=Depletion potential of the stratosperic ozon layer (ODP) | **AP**=Acidification potential, Accumulated Exceedance (AP) | **EP-fw**=Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-freshwater) | **EP-m**=Eutrophication potential, fraction of nutrients reaching marine end compartment (EP-marine) | **EP-T**=Eutrophication potential, Accumulated Exceedance (EP-terrestrial) | **POCP**=Formation potential of tropospheric ozone (POCP) | **ADP-mm**=Abiotic depletion potential for non fossil resources (ADP mm) | **ADP-f**=Abiotic depletion for fossil resources potential (ADP fossil) | **WDP**=Water (user) deprication potential, deprivation-weighted water consumption (WDP)

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN 15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	disease incidence	6.29E-3	2.22E-4	3.82E-4	6.89E-3	4.55E-4	2.36E-4	0.00E+0	6.37E-6	0.00E+0	0.00E+0	0.00E+0	1.89E-5	0.00E+0	1.05E-5	9.21E-6	1.18E-4	3.60E-6	-2.46E-3
IR	kBq U235 eq.	1.92E+3	2.32E+1	1.60E+3	3.55E+3	3.46E+1	1.10E+2	0.00E+0	9.22E+0	0.00E+0	0.00E+0	0.00E+0	2.29E+2	0.00E+0	1.49E-1	5.21E-1	3.55E+1	7.02E-1	-1.15E+2
ETP-fw	CTUe	9.33E+5	2.09E+4	3.37E+4	9.87E+5	3.30E+4	3.26E+4	0.00E+0	9.54E+2	0.00E+0	0.00E+0	0.00E+0	3.42E+3	0.00E+0	2.57E+2	9.86E+2	1.19E+4	7.35E+3	-2.20E+5
HTP-c	CTUh	2.08E-4	1.36E-6	1.58E-5	2.26E-4	2.50E-6	1.07E-5	0.00E+0	1.21E-7	0.00E+0	0.00E+0	0.00E+0	3.36E-7	0.00E+0	1.29E-8	4.94E-8	1.25E-6	2.71E-8	-7.04E-5
HTP-nc	CTUh	6.78E-3	3.01E-5	2.22E-5	6.83E-3	5.18E-5	2.16E-4	0.00E+0	2.46E-6	0.00E+0	0.00E+0	0.00E+0	1.19E-5	0.00E+0	9.63E-8	1.07E-6	4.62E-5	6.06E-7	-5.96E-3

PM=Potential incidence of disease due to PM emissions (PM) | **IR**=Potential Human exposure efficiency relative to U235 (IRP) | **ETP-fw**=Potential Comparative Toxic Unit for ecosystems (ETP-fw) | **HTP-c**=Potential Comparative Toxic Unit for humans (HTP-c) | **HTP-nc**=Potential Comparative Toxic Unit for humans (HTP-nc) | **SQP**=Potential soil quality idex (SQP)

5 Results

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
SQP	Pt	3.68E+5	2.57E+4	4.52E+5	8.45E+5	5.02E+4	2.86E+4	0.00E+0	4.71E+2	0.00E+0	0.00E+0	0.00E+0	6.48E+3	0.00E+0	3.72E+1	1.05E+3	1.19E+4	8.53E+2	-1.50E+5

PM=Potential incidence of disease due to PM emissions (PM) | **IR**=Potential Human exposure efficiency relative to U235 (IRP) | **ETP-fw**=Potential Comparative Toxic Unit for ecosystems (ETP-fw) | **HTP-c**=Potential Comparative Toxic Unit for humans (HTP-c) | **HTP-nc**=Potential Comparative Toxic Unit for humans (HTP-nc) | **SQP**=Potential soil quality idex (SQP)

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

ILCD classification	Indicator	Disclaimer
ILCD type / level 1	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
ILCD type / level 2	Acidification potential, Accumulated Exceedance (AP)	None
	Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater)	None
	Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine)	None
	Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	None
	Formation potential of tropospheric ozone (POCP)	None
	Potential Human exposure efficiency relative to U235 (IRP)	1
ILCD type / level 3	Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	2
	Abiotic depletion potential for fossil resources (ADP-fossil)	2
	Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	2
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2
	Potential Comparative Toxic Unit for humans (HTP-c)	2
	Potential Comparative Toxic Unit for humans (HTP-nc)	2
	Potential Soil quality index (SQP)	2

Disclaimer 1 – This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

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

5 Results

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

PARAMETERS DESCRIBING RESOURCE USE

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	1.16E+5	6.66E+2	8.03E+4	1.97E+5	1.06E+3	6.03E+3	0.00E+0	2.22E+2	0.00E+0	0.00E+0	0.00E+0	3.03E+3	0.00E+0	3.98E+0	1.89E+1	1.49E+3	2.81E+1	-3.29E+4
PERM	MJ	1.68E+2	0.00E+0	1.57E+4	1.59E+4	0.00E+0	4.76E+2	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	0.00E+0	0.00E+0
PERT	MJ	1.16E+5	6.66E+2	9.59E+4	2.13E+5	1.06E+3	6.51E+3	0.00E+0	2.22E+2	0.00E+0	0.00E+0	0.00E+0	3.03E+3	0.00E+0	3.98E+0	1.89E+1	1.49E+3	2.81E+1	-3.29E+4
PENRE	MJ	9.01E+5	4.25E+4	2.19E+5	1.16E+6	6.70E+4	3.85E+4	0.00E+0	3.12E+3	0.00E+0	0.00E+0	0.00E+0	3.22E+4	0.00E+0	5.45E+2	1.34E+3	1.36E+4	5.19E+2	-2.11E+5
PENRM	MJ	1.95E+4	0.00E+0	3.30E+3	2.28E+4	0.00E+0	6.87E+2	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	0.00E+0	-2.71E+3
PENRT	MJ	9.21E+5	4.25E+4	2.22E+5	1.19E+6	6.70E+4	3.92E+4	0.00E+0	3.12E+3	0.00E+0	0.00E+0	0.00E+0	3.22E+4	0.00E+0	5.45E+2	1.34E+3	1.36E+4	5.19E+2	-2.13E+5
SM	Kg	5.57E+3	0.00E+0	2.23E+2	5.79E+3	0.00E+0	1.74E+2	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	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	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	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	m^3	7.22E+2	6.13E+0	1.11E+2	8.38E+2	1.01E+1	2.68E+1	0.00E+0	2.07E+0	0.00E+0	0.00E+0	0.00E+0	2.49E+1	0.00E+0	5.05E-2	3.23E-1	7.68E+0	4.61E-1	-1.56E+2

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

OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	Kg	3.88E+1	2.68E-1	5.89E+0	4.50E+1	4.22E-1	2.46E+0	0.00E+0	3.79E+0	0.00E+0	0.00E+0	0.00E+0	5.44E-2	0.00E+0	2.04E-2	8.52E-3	3.81E+1	2.03E-3	4.35E+1
NHWD	Kg	2.13E+4	2.11E+3	1.04E+3	2.44E+4	4.22E+3	3.08E+3	0.00E+0	1.81E+2	0.00E+0	0.00E+0	0.00E+0	6.73E+1	0.00E+0	1.45E+0	8.83E+1	8.21E+2	1.38E+3	-4.56E+3
RWD	Kg	1.39E+0	1.68E-2	2.03E+0	3.45E+0	2.25E-2	1.07E-1	0.00E+0	7.23E-3	0.00E+0	0.00E+0	0.00E+0	1.67E-1	0.00E+0	8.97E-5	3.06E-4	2.69E-2	4.37E-4	-6.98E-2

HWD=Hazardous waste disposed | **NHWD**=Non-hazardous waste disposed | **RWD**=Radioactive waste disposed

5 Results

ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	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	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	3.60E+2	3.60E+2	0.00E+0	2.84E+2	0.00E+0	1.51E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	8.92E+3	0.00E+0	9.21E+1
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	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	3.33E+1	3.33E+1	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	0.00E+0	0.00E+0	0.00E+0	3.44E+3
EEE	MJ	0.00E+0	0.00E+0	1.94E+1	1.94E+1	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	0.00E+0	0.00E+0	0.00E+0	2.00E+3

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

5 Results

5.3 INFORMATION ON BIOGENIC CARBON CONTENT PER PIECE

BIOGENIC CARBON CONTENT

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

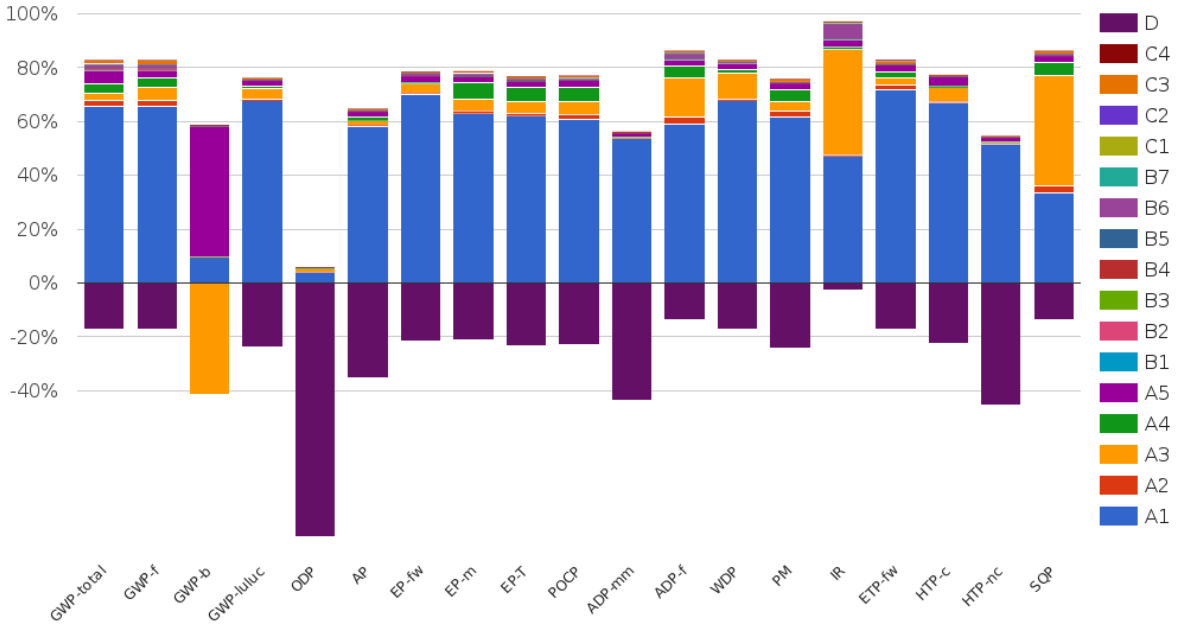
Biogenic carbon content	Amount	Unit
Biogenic carbon content in the product	5.414	kg C
Biogenic carbon content in accompanying packaging	509.6	kg C

UPTAKE OF BIOGENIC CARBON DIOXIDE

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

Uptake Biogenic Carbon dioxide	Amount	Unit
product	19.85	kg CO2 (biogenic)
Packaging	1869	kg CO2 (biogenic)

6 Interpretation of results



- Module A1 is the dominant contributor across all impact categories, accounting for approximately 60% of the total impacts. This is primarily attributed to the extraction and processing of raw materials.
- Module A3 also shows notable contributions, particularly in IR - Potential Human exposure efficiency relative to U235 (IRP), SQP (Soil Quality Potential), due to impacts associated with manufacturing processes, due to the gas emissions.

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 14044:2006

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

EN 15804+A2
EN 15804:2012+A2:2019/AC:2021, Sustainability of Buildings - Environmental Product Declarations - Framework Development Rules by Product Category

EN 50693
Product category rules for life cycle assessments of electronic and electrical products and systems

EPDItaly007
Core Product Category Rules based on EN 50693 for electrical and electronic products Rev. 3.1 (2024-11-12)

Kiwa-EE GPI R.2.0
Kiwa-Ecobility Experts, General Programme Instructions “Product Level”, SOP EE 1203_R. 2.0 (27.02.2025)

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Kiwa-Ecobility Experts, General Programme Instructions “Product Level” – Annex B1 Environmental Information Programme according to EN 15804 / ISO 21930, SOP EE 1203_R. 2.0 (27.02.2025)

Ecoinvent
ecoinvent Version 3.9.1 (December 2022)

R<THINK characterization method
ecoinvent 3.9.1: EN 15804+A1 indicators (CML-IA Baseline v3.09), EN 15804+A2 indicators (EF 3.1)

IEC 62271-320
IEC 62271-320 High-voltage switchgear and controlgear – Part 320: Type tests for high-voltage switchgear and controlgear

PEFCRs
Product Environmental Footprint Category Rules (PEFCRs)for Products in building, 2019

7 References

IEC/TR 62635

Guidelines for end-of-life information provided by manufacturers and recyclers and for recyclability rate calculation of electrical and electronic equipment.

8 Contact information

Publisher	Operator	Owner of declaration
Kiwa-Ecobility Experts Wattstraße 11-13 13355 Berlin, DE	**Kiwa-Ecobility Experts** Wattstraße 11-13 13355 Berlin, DE	**Grid Solutions** 167 QUAI de la bataille de stalingrad 92130 Issy-les-Moulineaux , FR
E-mail: DE.Ecobility.Experts@kiwa.com	**E-mail:** DE.Ecobility.Experts@kiwa.com	**E-mail:** Solene.Michaud@gevernova.com
Website: https://www.kiwa.com/de/en/themes/ecobility-experts/ecobility-experts-epd-program/	**Website:** https://www.kiwa.com/de/en/themes/ecobility-experts/ecobility-experts-epd-program/	**Website:** www.gevernova.com/grid-solutions

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