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

1 m LED strip on plastic reel

Registration number:	EPD-Kiwa-EE-216609-EN
Issue date:	12-09-2025
Valid until:	12-09-2030
Declaration owner:	GIS Norge AS and PRO MAGASINET AS
Publisher:	Kiwa-Ecobility Experts
Programme operator:	Kiwa-Ecobility Experts
Status:	verified

1 General information

1.1 PRODUCT

1 m LED strip on plastic reel

1.2 REGISTRATION NUMBER

EPD-Kiwa-EE-216609-EN

1.3 VALIDITY

Issue date: 12-09-2025

Valid until: 12-09-2030

1.4 PROGRAMME OPERATOR

Kiwa-Ecobility Experts
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DE

Raoul Mancke

(Head of programme operations, Kiwa-Ecobility Experts)

Dr. Ronny Stadie

(Verification body, Kiwa-Ecobility Experts)

1.5 OWNER OF THE DECLARATION

Declaration owner: GIS Norge AS and PRO MAGASINET AS

Address: Trykkeriveien 3, 1653 Sellebakk, Norway

E-mail: dantj@lasere.no

Website: WWW.LASERE.NO

Production location: China

Address production location: No.1,Longguang Road,Jianghai District, 529000 Jiangmen City, Guangdong, China

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

Patrick Wortner, PeoplePlanetProfit GmbH & Co. KG.

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 Programme Instructions “Product Level" SOP EE 1203_R. 3.0

Kiwa-Ecobility Experts, General Programme Instructions “Product Level” – Annex B1 Environmental Information Programme according to EN 15804 / ISO 21930, SOP EE 1203_R. 3.0

EPD Italy 007 - Core Product Category Rules based on EN 50693 for electrical and electronic products Rev. 3.1 (2024-11-12)

IBU PCR Part B for luminaires, lamps, and components for luminaires

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: RETHINK characterization method (see references for more details)

LCA database profiles: ecoinvent (for version see references)

Version database: v3.19 (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 '1 m LED strip on plastic reel' with the calculation identifier ReTHiNK-116609.

2 Product

2.1 PRODUCT DESCRIPTION

This EPD has been jointly prepared by GIS Norge AS and Pro Magasinet AS. Both companies share responsibility for the EPD and the associated product data. The declaration covers products distributed under the brands EXTREME and PROF. Pro Magasinet AS acts as the importer, while GIS Norge AS is the distributor in Norway.

The product operates with a constant voltage input of 230 VAC / 50 Hz. It offers four colour temperature options: 3000 K, 4000 K, 5000 K, and 6000 K. The colour consistency is ensured with an SDCM of ≤ 6. Designed for durability, it features an IP65 waterproof rating and a screw connection, along with an anti-UV PVC casing for added protection.

It provides a wide 120° beam angle and consumes 8.5 watts per meter, delivering a luminous efficacy of 105 lumens per watt. The colour rendering index (CRI) is ≥ 82, ensuring accurate and vibrant light quality.

The storage temperature range is from -20°C to +60°C, and the operating temperature range is from -10°C to +40°C. It is available in reel lengths of 5 m, 10 m, 15 m, 25 m, or 50 m, and can be fixed using nylon cable ties or mounting clips.

The constituent materials of 1m LED strip are given in the table below.

Components	Weight (kg)	Percentage (%)
LED	0.00056	0.37
Resistor	0.000152	0.10
PCB	0.0072	4.70
Wire	0.0072	4.70
Main body	0.138	90.13
Total	**0.153112**	**100**

The constituent materials of 1m LED strip packaging are given in the table below.

Materials	Weight (kg)
Packaging Paper	0.016
Sealed Bag	0.000004
Reel	0.03
Total	**0.046004**

According to the manufacture, the product complies with the following standards: EN 60598-1, EN 60598-2-21, EN 55015:2019, EN 61000-3-2, EN 61000-3-3, EN 61547, EN 2019/2020, and 2011/65/EU.

2.2 APPLICATION (INTENDED USE OF THE PRODUCT)

This product is well-suited for use on construction sites. It can be used for elevator shaft maintenance lighting, providing reliable illumination in confined vertical spaces. It is also ideal for highlighting the contours of building exteriors and for various decorative applications. Additionally, it can be used in public facilities and for road warning lighting, enhancing visibility and safety in public areas.

2.3 REFERENCE SERVICE LIFE

RSL PRODUCT

According to the original manufacturer, Shenzhen Sparta Optoelectronics Co., Ltd, the LED strip has an estimated service life of 20,000 hours (approximately 2 years of continuous 24/7 use). This value, reported in the product catalogue, is based on the manufacturer's internal testing and evaluation procedures.

USED RSL (YR) IN THIS LCA CALCULATION:

2

2.4 TECHNICAL DATA

Electrical characteristics are given in table below.

AC 220-240 V; 50/60Hz; class II, IP 65; ta: 45 °C

2 Product

Voltage (V AC)	WATTS (W/m)	lumen (LM/m)	CCT (K)	CRI (Ra)	IP
230V	8.5	1000	6000	82	65

2.5 SUBSTANCES OF VERY HIGH CONCERN

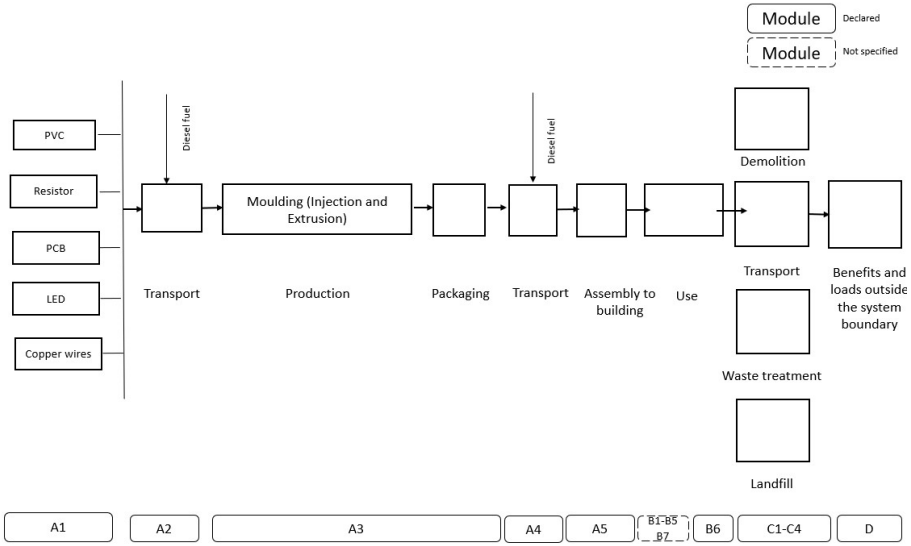
According to manufacture, no substance present in the product with a concentration exceeding 0.1% of the total weight is included on the "List of Substances of Very High Concern" (SVHC) for authorization under REACH legislation.

2.6 DESCRIPTION PRODUCTION PROCESS

The components are sourced from suppliers in China. The manufacturing process at Sparta Optoelectronics begins with Surface Mount Technology (SMT), followed by soldering the parallel wires. In parallel, half-casing extrusion molding is carried out.

The components are then assembled through parallel connection. This is followed by a second extrusion molding, and then injection molding of screws.

The finished product is packaged for delivery. The products are subsequently transported to PRO MAGASINET AS in Norway, which acts as the importer, and then distributed in Norway by GIS NORGE AS, the distributor.



2.7 CONSTRUCTION DESCRIPTION

Installation is declared only to account for the environmental impacts associated with the end-of-life of packaging.

3 Calculation rules

3.1 DECLARED UNIT

1 m LED stripe on plastic reel

Functional unit: 1000 lm × 35,000 h lumen-hours with conversion factor (≈1.96)

Reference unit: meter (m^1)

3.2 CONVERSION FACTORS

Description	Value	Unit
Reference unit	1	m^1
Weight per reference unit	0.153	kg
Conversion factor to 1 kg	6.531167	m^1

3.3 SCOPE OF DECLARATION AND SYSTEM BOUNDARIES

This is a Cradle to gate with options, modules C1-C4 and module D 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	ND	ND	ND	ND	ND	X	ND	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 1 m ED strip, a product of GIS Norge AS and PRO MAGASINET AS. The results of this EPD are representative for Scandinavian market.

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.

3 Calculation rules

The packaging waste of raw materials is excluded based on the cut-off criteria, as the quantities are not quantifiable. The potential impact is expected to be negligible compared to the overall system.

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.

Module A4 (Transport) is calculated based on the assumption that the product from Sparta Optoelectronics (China) is transported over a total distance of 25,844 km by sea and 242 km by truck to the GIS warehouse in Sellebakk, Norway. The transportation is assumed to involve a combination of road and sea freight, using the following datasets:

The A5 (Installation) is declared to account for the environmental impacts associated with the end-of-life of packaging.

Use stage (B6)

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.

Modules B1–B5 and B7 are considered not relevant for this product, as the LED stripe is a sealed, non-serviceable component with no direct emissions, maintenance, repair, or water use during its use phase. Operational energy use (B6) is the only relevant use-stage module and is declared based on typical energy consumption for 20000 hours use.

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.

No electricity is consumed during the demolition process, as the removal of the LED stripe is performed entirely manually.

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

Allocations were avoided as far as possible. No by-products or co-products are produced during the manufacture of the analysed product. 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.

3.7 DATA COLLECTION & REFERENCE PERIOD

All primary data were collected by manufacture of product for the reference year of 2024 covering the period from January to December 2024.

3.8 ESTIMATES AND ASSUMPTIONS

- For some components such as the LED, PCB, and packaging paper, multiple suppliers are involved. In this calculation, the average transport distance from these suppliers has been used to represent a realistic and balanced estimate for transport-related impacts.
- According to the manufacturer, the production waste for the LED strip is approximately 2% of the total material input.
- 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.

3 Calculation rules

- Module A4 (Transport) is calculated based on the assumption that the product from Sparta Optoelectronics (China) is transported over a total distance of 25,844 km by sea and 242 km by truck to the GIS warehouse in Sellebakk, Norway. The transportation is assumed to involve a combination of road and sea freight, using the following datasets:

Transport, freight, lorry, unspecified {RER} | market for transport, freight, lorry, unspecified | Cut-off, U	242 km
Transport, freight, sea, container ship {GLO} | market for transport, freight, sea, container ship | Cut-off, U	25,844 km

- For the purposes of this LCA and EPD, A4 covers transport from the factory in China to the warehouse in Norway. Further transport to customers is not included, as it depends on individual delivery locations and transport modes.
- Modules B1–B5 and B7 are considered not relevant for this product, as the LED stripe is a sealed, non-serviceable component with no direct emissions, maintenance, repair, or water use during its use phase. Operational energy use (B6) is the only relevant use-stage module and is declared based on typical energy consumption for 20000 hours use.
- Module B6 – Operational energy use
  The operational energy use of the LED strip is calculated according to the methodology provided in IBU PCR Part B for luminaires, lamps, and components for luminaires. The energy consumption model follows the application scenarios developed in EN 15193:2007. To calculate the electricity use of the LED strip, the following scenario parameters have been applied:

Active power of the LED strip (Pa)	8.5 W/m
Passive power of the LED strip (Pp)	0 W
Daylight time usage (tD)	2 250 h
Standard year time (ty)	8 760 h
Occupancy dependency factor (FO)	1
Daylight dependency factor (FD)	0.9
Non-daylight time usage (tN)	250 h
Constant illuminance factor (FCP)	1
Non-daylight dimming factor (FN)	1
Declared lifetime	20000 h

- The A5 (Installation) is declared to account for the environmental impacts associated with the end-of-life of packaging.
- In Module C1, no electricity is consumed during the demolition process, as the removal of the LED stripe is performed entirely manually.
- Copper and steel in the product are assumed to contain a fraction of secondary material, based on generic ecoinvent datasets.

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 2024, 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 manufacture.

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 medium.

3.10 POWER MIX

Electricity consumption is based on the Chinese average grid mix for 2024 using the dataset “Electricity, medium voltage {CN} | electricity, medium voltage.” This mix has a total Global Warming Potential (GWP) of approximately 0.94 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	Module A4
Fuel type and consumption of vehicle	not available
Distance	26086 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

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	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	0.046	kg

4.3 OPERATIONAL ENERGY USE (B6)

Description	Service cycle (yr)	Number of cycles (n)	Amount per cycle	Total Amount	Unit
Energy use	2	1.00	38.68	38.68	kWh

4 Scenarios and additional technical information

4.4 DE-CONSTRUCTION, DEMOLITION (C1)

No inputs are needed for the product at the de-construction / demolition phase

4.5 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]
Electronic waste	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
(ei3.9.1) copper (i.a. sheets, pipes (EU)	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
(ei3.9.1) PVC, pipes (EU)	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
(ei3.9.1) Metals, mixed (via residue) (EU)	(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

4.6 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.

4 Scenarios and additional technical information

Waste Scenario	Region	Not removed (stays in work) [%]	Landfill [%]	Incineration [%]	Recycling [%]	Re-use [%]
Electronic waste	EU	0	5	35	60	0
(ei3.9.1) copper (i.a. sheets, pipes (EU)	EU	0	5	0	95	0
(ei3.9.1) PVC, pipes (EU)	EU	0	10	20	70	0
(ei3.9.1) Metals, mixed (via residue) (EU)	EU	0	5	5	90	0

Waste Scenario	Not removed (stays in work) [kg]	Landfill [kg]	Incineration [kg]	Recycling [kg]	Re-use [kg]
Electronic waste	0.000	0.000	0.003	0.004	0.000
(ei3.9.1) copper (i.a. sheets, pipes (EU)	0.000	0.000	0.000	0.007	0.000
(ei3.9.1) PVC, pipes (EU)	0.000	0.014	0.028	0.097	0.000
(ei3.9.1) Metals, mixed (via residue) (EU)	0.000	0.000	0.000	0.001	0.000
Total	**0.000**	**0.015**	**0.030**	**0.108**	**0.000**

4.7 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]
Electronic waste	0.004	0.000
(ei3.9.1) copper (i.a. sheets, pipes (EU)	0.006	0.000
(ei3.9.1) PVC, pipes (EU)	0.097	0.594
(ei3.9.1) Metals, mixed (via residue) (EU)	0.001	0.000
Total	**0.107**	**0.594**

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 METER

CORE ENVIRONMENTAL IMPACT INDICATORS EN 15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq.	1.36E+0	8.89E-4	1.89E-1	1.55E+0	5.95E-2	1.51E-1	1.33E+0	0.00E+0	1.70E-3	1.07E-1	1.06E-3	-2.16E-1
GWP-f	kg CO_2 eq.	1.35E+0	8.86E-4	2.14E-1	1.56E+0	5.94E-2	1.24E-1	1.30E+0	0.00E+0	1.69E-3	1.07E-1	1.06E-3	-2.15E-1
GWP-b	kg CO_2 eq.	3.91E-3	2.88E-7	-2.55E-2	-2.16E-2	1.27E-5	2.64E-2	2.09E-2	0.00E+0	5.51E-7	7.68E-5	1.00E-6	-4.63E-4
GWP-luluc	kg CO_2 eq.	2.21E-3	3.16E-6	1.85E-4	2.40E-3	6.58E-5	8.60E-5	8.72E-3	0.00E+0	6.03E-6	5.63E-5	1.27E-7	-1.63E-4
ODP	kg CFC 11 eq.	1.72E-7	1.58E-11	3.18E-9	1.75E-7	9.18E-10	7.58E-9	3.82E-8	0.00E+0	3.01E-11	9.85E-9	4.03E-12	-7.45E-8
AP	mol H+ eq.	1.25E-2	4.24E-6	1.14E-3	1.37E-2	1.59E-3	5.09E-4	1.39E-2	0.00E+0	8.10E-6	2.04E-4	1.25E-6	-4.84E-3
EP-fw	kg P eq.	1.28E-4	8.81E-9	8.38E-6	1.36E-4	2.78E-7	4.38E-6	8.88E-5	0.00E+0	1.68E-8	1.58E-6	2.58E-9	-1.41E-5
EP-m	kg N eq.	1.54E-3	1.61E-6	2.43E-4	1.78E-3	4.02E-4	7.98E-5	1.30E-3	0.00E+0	3.08E-6	5.19E-5	8.28E-7	-2.35E-4
EP-T	mol N eq.	1.87E-2	1.72E-5	2.69E-3	2.14E-2	4.44E-3	9.30E-4	1.69E-2	0.00E+0	3.28E-5	5.67E-4	4.90E-6	-3.08E-3
POCP	kg NMVOC eq.	6.30E-3	5.87E-6	8.22E-4	7.12E-3	1.21E-3	2.98E-4	4.98E-3	0.00E+0	1.12E-5	1.93E-4	1.91E-6	-1.12E-3
ADP-mm	kg Sb-eq.	1.96E-4	2.77E-9	2.44E-5	2.20E-4	7.29E-8	6.72E-6	1.46E-4	0.00E+0	5.30E-9	2.84E-7	3.60E-10	-5.29E-5
ADP-f	MJ	2.07E+1	1.27E-2	3.85E+0	2.45E+1	7.43E-1	8.54E-1	2.53E+1	0.00E+0	2.42E-2	5.91E-1	3.72E-3	-4.69E+0
WDP	m3 world eq.	2.28E-1	6.93E-5	1.85E-2	2.46E-1	2.00E-3	1.17E-2	1.12E+0	0.00E+0	1.32E-4	2.02E-2	1.53E-4	-2.87E-1

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) depreciation potential, deprivation-weighted water consumption (WDP)

5 Results

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN 15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
PM	disease incidence	7.62E-8	8.74E-11	1.35E-8	8.98E-8	2.23E-9	3.32E-9	8.83E-8	0.00E+0	1.67E-10	3.00E-9	2.63E-11	-1.16E-8
IR	kBq U235 eq.	4.87E-2	4.95E-6	3.79E-3	5.25E-2	1.73E-4	1.82E-3	5.10E-1	0.00E+0	9.45E-6	1.29E-3	2.09E-6	-7.68E-3
ETP-fw	CTUe	1.98E+1	9.36E-3	1.20E+0	2.10E+1	3.92E-1	1.61E+0	2.08E+1	0.00E+0	1.79E-2	4.19E+0	5.59E-2	-3.52E+0
HTP-c	CTUh	1.74E-9	4.69E-13	7.84E-11	1.82E-9	2.64E-11	7.30E-11	3.37E-9	0.00E+0	8.96E-13	5.88E-11	1.12E-13	-8.13E-10
HTP-nc	CTUh	9.68E-8	1.02E-11	2.54E-9	9.94E-8	2.67E-10	3.24E-9	1.54E-7	0.00E+0	1.95E-11	8.60E-10	3.32E-12	-6.87E-8
SQP	Pt	6.77E+0	1.00E-2	3.48E+0	1.03E+1	1.28E-1	3.55E-1	1.20E+1	0.00E+0	1.91E-2	3.29E-1	8.44E-3	-2.57E+0

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

5 Results

ILCD classification	Indicator	Disclaimer
	Potential Soil quality index (SQP)	2

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

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

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

PARAMETERS DESCRIBING RESOURCE USE

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
PERE	MJ	1.89E+0	1.79E-4	5.18E-1	2.41E+0	5.98E-3	8.06E-2	1.56E+2	0.00E+0	3.43E-4	4.61E-2	7.19E-5	-4.67E-1
PERM	MJ	0.00E+0	0.00E+0	2.21E-1	2.21E-1	0.00E+0	6.64E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	MJ	1.89E+0	1.79E-4	7.40E-1	2.63E+0	5.98E-3	8.73E-2	1.56E+2	0.00E+0	3.43E-4	4.61E-2	7.19E-5	-4.67E-1
PENRE	MJ	1.77E+1	1.27E-2	2.83E+0	2.05E+1	7.43E-1	7.34E-1	2.53E+1	0.00E+0	2.43E-2	5.91E-1	3.72E-3	-3.21E+0
PENRM	MJ	2.97E+0	0.00E+0	1.02E+0	3.99E+0	0.00E+0	1.20E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-1.48E+0
PENRT	MJ	2.07E+1	1.27E-2	3.85E+0	2.45E+1	7.43E-1	8.54E-1	2.53E+1	0.00E+0	2.43E-2	5.91E-1	3.72E-3	-4.69E+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	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
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
FW	m^3	6.74E-3	3.07E-6	5.54E-4	7.29E-3	7.62E-5	3.46E-4	1.10E+0	0.00E+0	5.86E-6	5.60E-4	3.84E-6	-3.13E-3

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

5 Results

OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
HWD	Kg	7.31E-5	8.09E-8	5.38E-6	7.85E-5	3.83E-6	2.87E-6	4.97E-5	0.00E+0	1.55E-7	2.01E-6	1.84E-8	-1.05E-5
NHWD	Kg	1.52E-1	8.38E-4	2.43E-2	1.77E-1	8.38E-3	4.34E-2	1.10E+0	0.00E+0	1.60E-3	4.94E-2	1.46E-2	-3.32E-2
RWD	Kg	3.14E-5	2.90E-9	2.74E-6	3.42E-5	9.36E-8	1.19E-6	2.34E-4	0.00E+0	5.55E-9	9.22E-7	1.26E-9	-5.89E-6

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

ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B6	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
MFR	Kg	0.00E+0	0.00E+0	2.89E-3	2.89E-3	0.00E+0	1.71E-2	0.00E+0	0.00E+0	0.00E+0	1.04E-1	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	0.00E+0	0.00E+0
EET	MJ	0.00E+0	0.00E+0	3.79E-3	3.79E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.75E-1
EEE	MJ	0.00E+0	0.00E+0	2.20E-3	2.20E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.76E-1

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 METER

BIOGENIC CARBON CONTENT

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

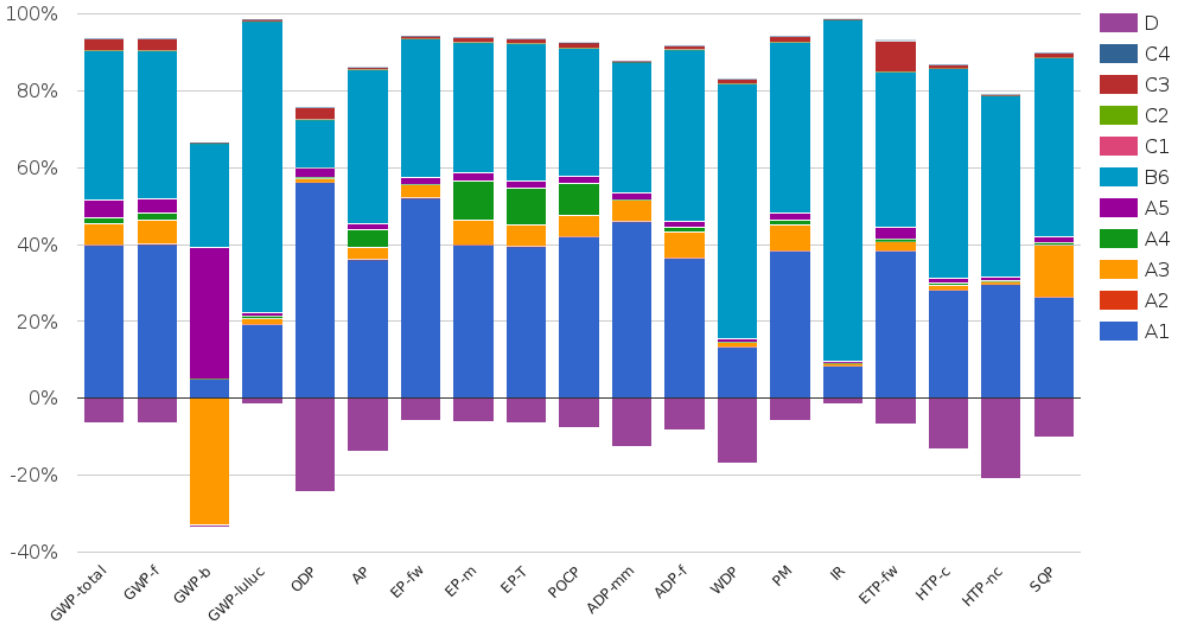
Biogenic carbon content	Amount	Unit
Biogenic carbon content in the product	0	kg C
Biogenic carbon content in accompanying packaging	0.007127	kg C

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
Packaging	0.02613	kg CO2 (biogenic)

6 Interpretation of results



The contribution analysis illustrates how different life cycle modules (A1–A5, C1–C4, B6, and D) contribute to the overall environmental impacts across multiple indicators. The results show that A1–A3 (raw material supply, transport, and manufacturing) together dominate most impact categories. Module A4 (transport to site) and A5 (construction/installation) contribute moderately to some categories, while C1–C3 (end-of-life processes) and B6 (use stage) generally have limited influence. Module D (benefits beyond system boundary) provides negative contributions, reflecting potential avoided burdens through recycling or energy recovery.

7 References

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ISO 14044
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ISO 14025
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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)

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Ecoinvent
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R<THINK characterization method
EN 15804+A2 indicators (EF 3.1)

PCR

IBU PCR Part B for luminaires, lamps, and components for luminaires

NIST, 2024

The U.S. Plastics Recycling Economy: Current State, Challenges, and Opportunities. NIST Advanced Manufacturing Series No. AMS 100-64. https://doi.org/10.6028/NIST.AMS.100-64

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