

Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 50693:2019 for:

DIGITAL AND ASTRONOMICAL TIME SWITCHES

DATA LOG | ASTRO UNO | DATA LOG BT | ASTRO UNO BT |
DATA LOG 2 | ASTRO NOVA CITY | DATA LOG 2 BT | ASTRO
NOVA CITY BT

from

ORBIS TECNOLOGÍA ELÉCTRICA S.A.



Programme:	The International EPD System, www.environdec.com
Programme operator:	EPD International AB
Type of EPD:	EPD of multiple products from a company
EPD registration number:	EPD-IES-0029336:001
Version date:	2026-03-17
Validity date:	2031-03-17

An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com EPD of multiple products, based on a representative product.



GENERAL INFORMATION

Programme Information	
Programme:	The International EPD System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	support@environdec.com

Product Category Rules (PCR)
Product Category Rules (PCR): <i>ELECTRONIC AND ELECTRIC EQUIPMENT, AND ELECTRONIC COMPONENTS (NON-CONSTRUCTION), 2024:06, version 1.0.1. UN CPC code 48269</i>
PCR review was conducted by: <i>PCR Committee: Diaan Gab-Allah, United Environmental Consultants, diaa.gaballah@gmail.com</i> <i>PCR Moderators: World Resources Forum, Wallbox, Minviro, Ramboll, PMI, CIC Energigune, Take Care International, Huawei, Midea, support@environdec.com</i>

Third-party Verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:
<input checked="" type="checkbox"/> Individual EPD verification without a pre-verified LCA/EPD tool Third-party verifier: <i>Stephen Forson, ViridisPride Ltd, s.forson@viridispride.com</i> Approved by: International EPD System
Procedure for follow-up of data during EPD validity involves third party verifier: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison.

For further information about comparability, see ISO 14025.

INFORMATION ABOUT EPD OWNER

Owner of the EPD: ORBIS TECNOLOGÍA ELÉCTRICA, S.A.

Address: Calle Lérida, 61 - 28020 Madrid (Spain)

Contact: Jose Manuel Rodriguez, Josem.rodriguez@orbis.es

Address and contact information of the LCA practitioner commissioned by the EPD owner:

NOVONET CONSULTORES Y AUDITORES, S.L.

Calle Orense, 10 Plta. 12 - 28020 Madrid (Spain)

Javier Sierra Fernández

jsierra@novonet.es

Description of the organisation:

ORBIS TECNOLOGÍA ELÉCTRICA, S.A. is a Spanish manufacturer specialized in the design, production and commercialization of electrical equipment for control, measurement, regulation and energy management. Since its foundation in 1950, the company has developed its activities with a strong focus on quality, safety, energy efficiency and environmental responsibility.

With more than 70 years of experience, ORBIS has consolidated its position as an international manufacturer of electrical material, operating four production centers located in Spain and other countries within the European Union. From these facilities, the company supplies its products to more than 60 countries worldwide, supported by a strong international outlook and in-house commercial presence in several European markets.

The ORBIS product portfolio comprises more than 300 product references, offering a broad multi-speciality range covering electrical installation, energy measurement and management, renewable energy applications, climate control, home and building automation, public lighting and street lighting management, industrial applications and electric mobility. Over the course of its activity, the company has manufactured tens of millions of products installed across a wide variety of professional and industrial contexts.

ORBIS develops its products using its own technologies and brands, applying strict control processes throughout design, component selection and manufacturing stages. This approach enables the company to ensure high levels of performance, reliability and customer satisfaction. All products comply with applicable European and international safety and quality requirements, as demonstrated by CE marking and, where applicable, additional voluntary certifications.

Environmental responsibility and efficient use of resources are central to the company's corporate strategy. Under the guiding concept of "smart energy", ORBIS promotes solutions that contribute to energy savings and responsible resource management, supporting sustainable development and the reduction of environmental impacts over the life cycle of its products. Product design and manufacturing are carried out using processes and materials selected to minimize environmental burdens, within a framework of long-term relationships with customers, suppliers and partners.

Product-related or management system-related certifications:

The company operates a quality management system certified in accordance with ISO 9001:2015 (registration n. ER-0207/1994), covering the design, production, marketing and after-sales service of its electrical and electronic products.

The products manufactured and placed on the market by the company comply with applicable European product legislation and bear the CE marking, demonstrating conformity with relevant safety, health and environmental protection requirements.

In addition, selected product families are certified by independent third-party certification bodies (such as VDE, BEAB and AENOR), confirming compliance with applicable European and international standards related to quality and electrical safety.

PRODUCT INFORMATION

Product name: Digital and astronomical time switches

Product identification:

Electronic time switches and control devices for low-voltage electrical installations, designed for fixed installation on DIN rails, in accordance with applicable European standards for electrical and electronic equipment.

Visual representation of the product:



UN CPC code: 48269

Product description:

This EPD is a multi-product Environmental Product Declaration covering a family of electronic devices for the control, scheduling and monitoring of electrical circuits in low-voltage installations. The products are designed for fixed installation on DIN rails and are used in residential, tertiary and industrial electrical systems.

The EPD covers the following eight products manufactured and marketed by ORBIS DATA LOG, ASTRO UNO, DATA LOG BT, ASTRO UNO BT, DATA LOG 2, ASTRO NOVA CITY, DATA LOG 2 BT, ASTRONOVA CITY BT.

All products included in this EPD share a common design concept and construction, consisting of an electronic control unit housed in a plastic enclosure and integrating printed circuit boards, electronic components, terminals and auxiliary elements. The products operate by controlling electrical loads according to predefined time schedules or, for astronomical models, according to calculated sunrise and sunset times. This enables automated switching of electrical circuits and supports efficient operation of lighting and other electrical systems.

Differences between the products relate mainly to their functional configuration, communication capabilities and internal component layout. Some models incorporate wireless communication functionality via Bluetooth, while others operate exclusively as wired devices. These differences result in variations in material composition, mass and environmental performance within the declared product group.

In accordance with the PCR *Electronic and electric equipment, and electronic components (non-construction), version 1.0.1*, this Environmental Product Declaration is a multi-product EPD based on the results of a representative product, as permitted under Section 4.9.1 of the PCR.

The EPD covers a homogeneous family of products manufactured by ORBIS, which share the same main function, comply with the same applicable product standards, and are manufactured using similar materials and production technologies.

For the purpose of representing the environmental performance of the full product group, three products were analysed:

- **ASTRO UNO BT**, identified as the product with the lowest environmental impacts.
- **DATA LOG 2**, identified as the product with the highest environmental impacts.
- **ASTRO NOVA CITY**, selected as the representative product based on the highest sales volume during the reference year.

The technical specifications of the representative product are detailed below:

TECHNICAL CHARACTERISTIC	ASTRO NOVA CITY (representative)
Power supply	230 ± 10 % V AC
Nominal frequency	50 / 60 Hz
Switching capacity	16(10) A / 250 V AC
Degree of protection	IP20 according to EN 60529
Wireless communication type	Not applicable
Antenna	Not applicable
Reception sensitivity	Not applicable
Syncing range (outdoor)	Not applicable
Method of mounting control	On DIN rail
Number of modules	2
Wire cross section	4 mm ²
Operating temperature	-10 °C to +45 °C
Limit temperature of operation	-30 °C to +50 °C
Stand-by consumption	1.3 W (16 VA)

TECHNICAL CHARACTERISTIC	ASTRO NOVA CITY (representative)
Power reserve	4 years (Replaceable Li/MnO ₂ battery CR2032, 3V 220 mAh)
Net weight	143 g

The declared environmental results are based on the representative product. The comparison between the minimum-, maximum- and representative-impact products shows that the differences in the analysed environmental impact indicators remain below 10% across the life cycle.

In accordance with the PCR requirements, this limited variation confirms that the products can be considered a homogeneous product family and that the use of a representative product is appropriate. Therefore, the declared results are considered representative of all products covered by this EPD, within the defined system boundaries, assumptions and modelling choices.

The assessed products are manufactured through a process comprising the injection moulding of plastic housing components, assembly of electronic components and printed circuit boards, functional testing, and final packaging. Injection moulding of polycarbonate parts is carried out at the Alcobendas plant (Spain), while final assembly, testing and packaging are performed at the Madrid plant (Spain).

A declared product lifespan of 10 years is assumed for all products covered by this EPD under normal operating conditions and intended use. The products include a replaceable lithium backup battery (CR2032), with a typical service life of approximately four years. Replacement of this battery during the product lifespan is recommended by the manufacturer but is not mandatory for basic operation.

Name and location of production site(s):

Production is carried out in Spain at the following sites:

- Alcobendas (Madrid region), Spain – injection moulding and forming of polycarbonate parts
- Madrid, Spain – final assembly, testing and packaging of the electronic devices

More information about the products can be found at <https://www.orbis.es>

CONTENT DECLARATION

Content declaration of representative product:

The declared unit is one (1) electronic device ASTRO NOVA CITY (astronomical time switch), as placed on the market, excluding distribution packaging.

The mass (weight) of one unit of the representative product, per declared unit: 0.143 kg.

Information about the content of the product in the form of a list of materials and substances, and their mass:

Product content	Mass, kg (per declared unit of representative product)	Post-consumer recycled material, mass-% of product	Biogenic material, mass-% of product	Biogenic material, kg C (per declared unit of representative product)
COMMON COMPONENTS				
Structural plastic base and rail mounting elements (PC and SS)	1.950E-02	0%	0%	0
Ventilation covers and auxiliary plastic parts (PP)	2.970E-03	0%	0%	0
Battery holder (PC) and insulation elements (PP)	1.180E-03	0%	0%	0
Lithium button cell battery (CR2032)	2.900E-03	0%	0%	0
Labels (paper)	1.500E-05	0%	0%	6.341E-06
DISPLAY MODULE				
Display printed circuit board (PCB)	6.517E-03	0%	0%	0
Display and backlight system	7.930E-03	0%	0%	0
Supercapacitor	1.459E-03	0%	0%	0
Flat cable	9.034E-04	0%	0%	0
Pushbuttons (body and heads) (PC)	6.413E-04	0%	0%	0
Display support (PC) and battery holder (PP)	2.925E-03	0%	0%	0
POWER SUPPLY AND CONTROL CIRCUIT ASSEMBLY				
Power supply PCB	9.200E-03	0%	0%	0
Passive electronic components (capacitors, resistors, inductors, varistors)	1.610E-02	0%	0%	0
Electromechanical components (relay)	2.360E-02	0%	0%	0
Connectors and terminals	2.290E-02	0%	0%	0
Fasteners (screws)	5.600E-03	0%	0%	0
UPPER HOUSING				

Product content	Mass, kg (per declared unit of representative product)	Post-consumer recycled material, mass-% of product	Biogenic material, mass-% of product	Biogenic material, kg C (per declared unit of representative product)
Upper housing (PC)	1.840E-02	0%	0%	0
TOTAL	1.427E-01	0%	0%	6.341E-06

The mass and the content of distribution and/or consumer packaging:

The products are distributed as finished devices packed in cardboard packaging, including a paper instruction manual. Packaging is structured on three levels:

- Primary packaging: Individual cardboard box per product and paper instruction manual.
- Secondary packaging: Cardboard boxes containing multiple individual product boxes.
- Tertiary packaging: Wooden pallets (two pallet formats depending on national or international distribution) and polypropylene (PP) plastic strapping used to secure boxes to pallets

The mass of distribution packaging has been calculated per declared unit, taking into account the actual national and international distribution shares for each product during the reference year (2024). A weighted-average “product with packaging” has been modelled accordingly.

Packaging materials	Mass, kg (per declared unit of representative product)	Mass-% (versus the representative product)	Biogenic material, kg C (per declared unit of representative product)
Instruction manual (paper)	1.470E-02	10.30%	6.215E-03
Individual product cardboard box	9.400E-03	6.59%	3.889E-03
Secondary cardboard box	4.800E-03	3.36%	1.986E-03
Wooden pallet	9.212E-03	6.45%	3.476E-03
Plastic strapping (PP)	1.024E-05	0.01%	0
TOTAL	3.812E-02	26.71%	1.557E-02

1 kg biogenic carbon in the product/packaging is equivalent to the uptake of 44/12 kg of CO₂.

*The packaging is only presented for the representative product.

The gross mass of materials declared in the content declaration (product + packaging) covers 100% of the declared unit and its associated packaging.

Information on the environmental and hazardous/toxic properties of a substances contained in the product:

The products covered by this EPD do not contain substances included in the Candidate List of Substances of Very High Concern (SVHC) in accordance with Regulation (EC) No 1907/2006 (REACH), in concentrations above 0.1% by weight of the product or any of its components. No other substances classified as hazardous or toxic and requiring mandatory declaration under applicable European regulations have been identified in the products.

LCA INFORMATION

Declared unit:

The declared unit of this Environmental Product Declaration is one (1) electronic control device, as placed on the market, including the product itself and excluding its associated distribution packaging.

All environmental performance results presented in this EPD are expressed per declared unit.

Conversion factor to mass:

The weight of one unit of the representative product is 0.143 kg (ASTRO NOVA CITY).

The products covered in this EPD have a weight of 0.134 kg (DATA LOG, ASTRO UNO, DATA LOG BT, ASTRO UNO BT) or 0.143 kg (models DATA LOG 2, ASTRO NOVA CITY, DATA LOG 2 BT, ASTRONOVA CITY BT)

Reference service life and its relationship with the technical/actual lifespan:

A reference service life (RSL) of 10 years is declared for the assessed products. This value corresponds to the technical lifespan declared by the manufacturer for the electronic devices under normal operating conditions and intended use.

The products include a replaceable lithium button cell battery (CR2032) used as a power reserve. The manufacturer recommends replacement of this battery approximately every 4 years. This replacement does not affect the declared service life of the device and is considered part of normal maintenance during use.

Time representativeness:

Primary data used for the life cycle inventory correspond to the reference year 2024, covering the period from 1 January 2024 to 31 December 2024.

Secondary data are based on the most recent and relevant datasets available in the selected databases at the time of the study.

Geographical scope:

The geographical scope of the EPD is defined per life cycle stage as follows:

	MANUFACTURING			DISTRIBUTION	INSTALLATION	USE							END-OF-LIFE			
	Raw material supply	Transport	Manufacturing	Distribution	Installation	Use	Maintenance	Repair	Reuse	Refurbishment	Operational energy use	Operational water use	De-installation	Transport	Waste processing	Final disposal
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
Declared module	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

	MANUFACTURING			DISTRIBUTION	INSTALLATION	USE							END-OF-LIFE				
	Raw material supply	Transport	Manufacturing	Distribution	Installation	Use	Maintenance	Repair	Reuse	Refurbishment	Operational energy use	Operational water use	De-installation	Transport	Waste processing	Final disposal	
Geography	GLO	GLO	ES	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO
Variation – products (GWP-GHG results)	-1.58/+0.00%*			-	-	-	-	-	-	-	-	-	-	-	-	-	-

*0% variation for the maximum product due to identical BOM with the representative product.

Database(s) and LCA software used:

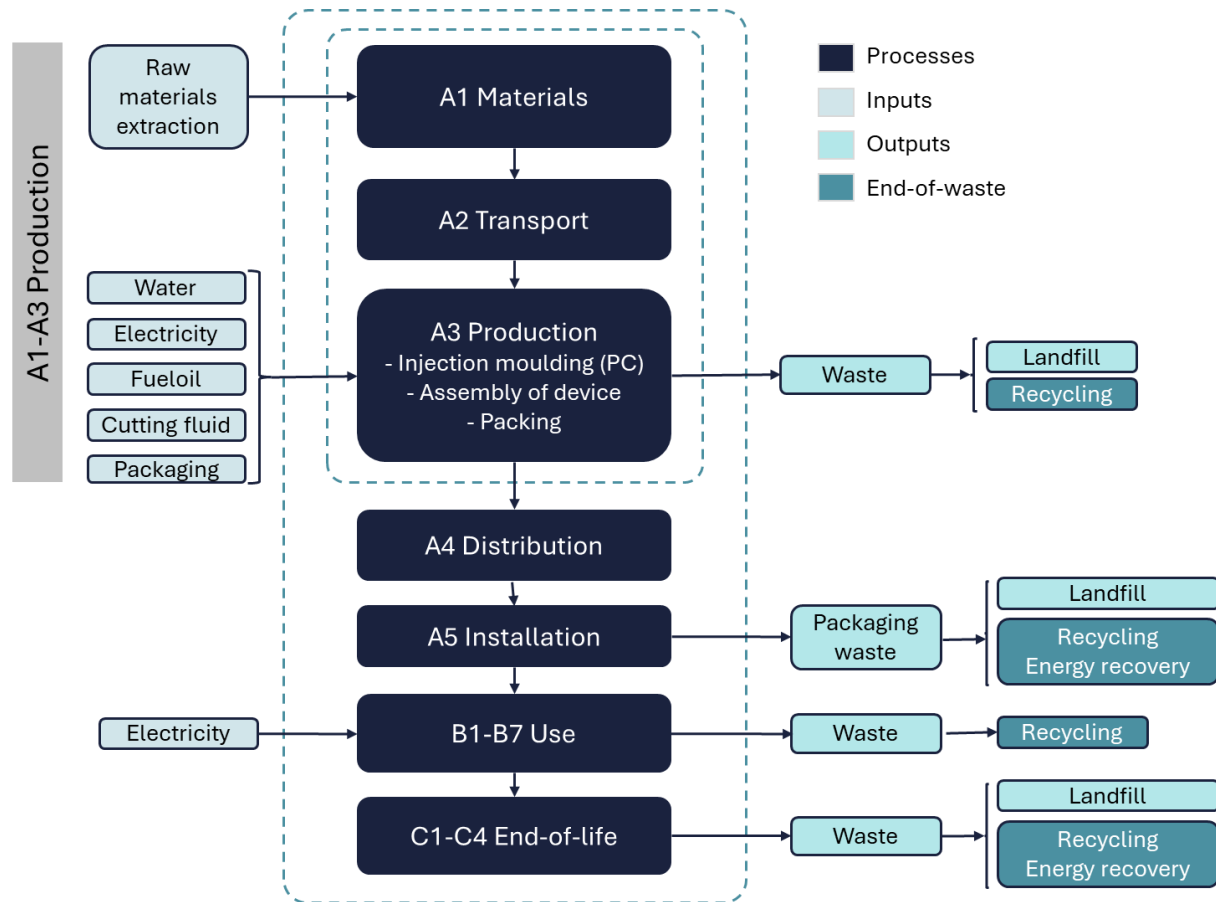
- Life Cycle Inventory database: Ecoinvent v3.11.
- LCA software: SimaPro v10.2.0.2.
- Impact assessment method: EF 3.1, aligned with EN 15804+A2 reference package, where applicable.

Description of system boundaries:

The system boundary of this EPD is defined as **cradle-to-grave**, covering the following life cycle stages:

- Manufacturing stage: Modules A1–A3.
- Distribution stage: Module A4.
- Installation stage: Module A5.
- Use stage: Modules B1–B7.
- De-installation stage: Module C1.
- End-of-life stage: Modules C2–C4.

Process flow diagram:



A1–A3 Production stage

The production stage includes all processes from raw material extraction to the finished product at the factory gate.

A1 Raw material supply

This module includes the extraction and processing of all raw materials, components and subassemblies required for the manufacture of the declared products, such as plastics, metals, electronic components, printed circuit boards and batteries. Upstream processes are modelled using selected generic datasets from the LCI database. Packaging of raw materials at supplier level is excluded in accordance with the PCR.

A2 Transport to manufacturing sites

Module A2 covers the transport of raw materials, components and subassemblies from suppliers to the manufacturing and assembly sites of ORBIS.

Transport distances and modes are based on supplier-specific information and modelled using appropriate road and air transport datasets.

A3 Manufacturing and assembly

Manufacturing and assembly are carried out in two production plants. Injection moulding of polycarbonate parts takes place at the Alcobendas plant, while final assembly, testing and packaging of the electronic devices are performed at the Madrid plant. Internal transport of moulded parts between both sites is included as part of the manufacturing system.

Module A3 includes electricity and fuel oil consumption, water use, cutting fluids, generation and treatment of manufacturing waste, and the production and transport of distribution packaging. Annual consumptions for both plants for the reference year 2024 have been aggregated and allocated per declared unit based on total production volumes. An average manufacturing scrap rate of 2.66% has been considered and included in this module.

The electricity mix considered has an associated emission factor of 0.275 kg CO₂-eq/kWh. Additional details can be found in the Additional Environmental Information section of this EPD.

A4 Distribution stage

This module includes the transport of the packaged products from the manufacturing sites to customers or installation locations. Distribution has been modelled using real sales data for 2024, differentiated by national and international markets. For each declared product, weighted average transport distances, transport modes (road, air and sea) and transport work (kg·km per declared unit) have been calculated. Road transport is assumed to be carried out by EURO 6 heavy-duty trucks, while international distribution may additionally involve air freight and maritime transport, depending on the destination.

Scenario information	ASTRO NOVA CITY (representative)
National distribution	
Transport mode: road (Truck, 16-32 metric ton, diesel, EURO 6)	
Weighted average distance (km)	393.46
Transport work (kg·km / declared unit)	23.84
International distribution	
Transport mode: road (Truck, 16-32 metric ton, diesel, EURO 6)	
Weighted average distance (km)	2413.49
Transport work (kg·km / declared unit)	276.60
Transport mode: air (Aircraft, dedicated freight, long haul)	
Weighted average distance (km)	412.26
Transport work (kg·km / declared unit)	46.75
Transport mode: sea (Container ship, heavy fuel oil)	
Weighted average distance (km)	99.01
Transport work (kg·km / declared unit)	11.23

A5 Installation stage

Installation of the products is carried out manually and does not require auxiliary materials, energy or water. All packaging materials are assumed to become waste at the installation site. Packaging waste is transported 80 km by truck (16–32 t, EURO 6) to a waste management facility and treated according to PCR requirements, international statistics for paper, cardboard and wood, and UNE-EN 50693 scenarios for plastic strapping.

B Use stage (Modules B1–B7)

B1 Use

The product does not generate direct emissions to air, water or soil during normal use and does not require consumables.

B2 Maintenance

No maintenance operations are required during the reference service life.

B3 Repair

No repair activities are considered. In case of malfunction, the product is assumed to be replaced.

B4 Reuse

Reuse scenarios are not considered. The product is assumed to remain installed at the same location throughout its service life.

B5 Refurbishment

The device includes a backup battery that must be replaced every four years to maintain functionality. Based on a reference service life of 10 years, 2.5 battery replacements are considered. This module includes manufacturing of replacement batteries, transport to and from the place of use, and end-of-life treatment of spent batteries according to typical recycling routes.

B6 Operational energy use

During the use phase, the declared product requires a continuous electricity supply for normal operation. The average operational power demand has been set at 1.3 W, based on the manufacturer's technical specifications. Assuming continuous operation over the declared reference service life of 10 years, the total electricity consumption amounts to 113.88 kWh per declared unit.

The total electricity consumption during use has been calculated following the equation provided in Section 4.7.5.2 of PCR 2024:06 for equipment intended to maintain a continuous connection to the mains power:

$$TEC = [(P_{on} \times T_{on}) + (P_{off} \times T_{off}) + (P_{standby} \times T_{standby}) + (P_{net\ standby} \times T_{net\ standby}) + (P_{other} \times T_{other})] \times RSL$$

For the declared product, the manufacturer's technical specifications indicate a continuous power demand during normal operation. Therefore, a single operating mode has been considered:

- $P_{on} = 1.3\text{ W}$
- $T_{on} = 24\text{ h/day}$
- $P_{off} = P_{standby} = P_{net\ standby} = P_{other} = 0\text{ W}$
- $RSL = 10\text{ years}$

Annual electricity consumption:

$$TEC_{year} = (1.3/1000) \cdot 24 \cdot 365 = 11.388\text{ kWh/year}$$

Total electricity consumption over the reference service life:

$$TEC_{RSL} = 11.388 \cdot 10 = 113.88\text{ kWh per declared unit}$$

Given the international distribution and use of the products, electricity consumption during use has been modelled using a global electricity mix, an emission factor of 0.666 kg CO₂-eq/kWh for the GWP-GHG indicator. The associated upstream electricity generation processes are included in the LCA model.

No other forms of energy are required during operation, and no direct emissions to air, water or soil occur during the use phase.

B7 Operational water use

The product does not consume water during operation.

C End-of-life stage (Modules C1–C4)

The end-of-life stage follows a generic European scenario for electrical and electronic equipment based on EN 50693.

C1 De-installation

De-installation from the point of use is assumed to be manual, with no energy or water consumption.

C2 Transport

The discarded product is transported 80 km by truck (16–32 t, EURO 6) to an authorised waste treatment facility.

C3 Waste processing

End-of-life processing includes manual dismantling followed by mechanical shredding. After pre-treatment, material fractions are routed to recycling, energy recovery or landfill according to the default allocation values in EN 50693 (Table G.4). In the absence of detailed information, printed circuit boards and electronic components are conservatively assumed to be 100% landfilled.

C4 Final disposal

All non-recovered fractions are disposed of in sanitary landfill, including PCBs, electronic components and the landfill shares of metals and plastics.

Source of data and share of primary data:

Process	Source type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Share of primary data, of GWP-GHG results for A1					0.00%
A1- Raw materials (plastics, metals, electronic components, printed circuit boards, batteries and auxiliary materials)	Database	Ecoinvent v3.11	2024	Secondary data	89.10%
Share of primary data, of GWP-GHG results for A2					9.07%
A2-Transport of components and materials to manufacturing plants (road, sea and air transport)	Database	Company data. Ecoinvent v3.11	2024	Primary data	9.07%

Process	Source type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Share of primary data, of GWP-GHG results for A3					1.31%
A3- Electricity (residual mix)	Collected data	Company data. Ecoinvent v3.11	2024	Primary data	0.10%
A3- Thermal energy consumption (fuel oil)	Collected data	Company data. Ecoinvent v3.11	2024	Primary data	1.02%
A3- Tap water consumption	Collected data	Company data. Ecoinvent v3.11	2024	Secondary data	0.00%
A3- Factory waste (landfill + incineration+ recycling)	Collected data	Company data. Ecoinvent v3.11	2025	Secondary data	0.03%
A3- Transport of factory waste to waste management facilities	Collected data	Company data. Ecoinvent v3.11	2025	Primary data	0.19%
A3- Packaging materials (instructions, pallet, cardboard, plastic strapping)	Database	Ecoinvent v3.11	2024	Secondary data	0.88%
Total share of primary data, of GWP-GHG results for A1-A3					10.38%

The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data, to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories.

Data quality:

Data quality has been assessed using the semi-quantitative evaluation criteria from the Product Environmental Footprint (PEF) method described in Table 3.2 of the EN 15804 standard and Annex C in the EN 15941 standard. The assessment has covered the geographical (GeR), technical (TeR), and temporal (TiR) representativeness, as well as precision (P) and completeness (C) of the data, in line with the requirements in section 4.7 of the PCR 2024:06.

The scale of values used is from 1 to 5, where 1 is the lowest score and 5 is the highest, resulting in an average score in GeR of 3.69; in TeR of 4.63, in TiR of 4.88, in P of 4.00, and in C of 4.50. The total data quality rating is 4.34, which indicates that the overall data quality is good.

Cut-off rules

The cut-off rules applied in this study follow the requirements set out in Section 4.5 of the PCR Electronic and electric equipment, and electronic components (non-construction) (version 2024:06), as well as the General Programme Instructions (GPI) v5.0.1.

All available life cycle inventory (LCI) data have been used wherever possible. The application of cut-off rules has been avoided and has not been used to omit relevant inputs or outputs to influence the results of the assessment.

In accordance with the PCR, a cut-off threshold of 5% over the entire product life cycle has been applied. This means that any inputs or outputs that are known or expected to contribute more than 5% to the results of any environmental performance indicator have been included in the LCA model. Inputs and

outputs that are explicitly outside the system boundary, as defined by the PCR, the GPI or other normative reference standards cited therein, are not subject to this cut-off rule.

Where complete data coverage could not be achieved for minor flows, conservative assumptions, plausibility considerations and expert judgement were applied. Where relevant, proxy data and extrapolations were used to ensure a high level of completeness of the inventory. The application of these assumptions has been documented in this LCA study in a transparent and verifiable manner.

In line with the PCR requirements, components and materials for which the cut-off rule does not apply (such as batteries, printed circuit board assemblies, electronic displays and other critical electronic materials) have been fully included in the LCA model, regardless of their mass contribution.

Overall, the applied cut-off approach ensures that the life cycle inventory is sufficiently complete and representative, and that any exclusions do not affect the reliability of the results or the conclusions of the EPD.

Allocations rules

The polluter-pays principle and the modularity principle have been applied throughout the study. Allocation has been avoided wherever possible by directly linking inputs and outputs to the declared products.

Where allocation could not be avoided, the following hierarchy has been applied, in line with ISO 14044 and the PCR:

- Subdivision of processes was considered first, where technically feasible.
- When subdivision was not possible, allocation based on physical relationships (e.g. number of units produced) was applied.
- Economic allocation has not been used, as it was not considered representative for the processes involved.

ORBIS manufactures a large portfolio of electronic products within the same production facilities. Therefore, certain manufacturing data (e.g. electricity consumption, fuel oil consumption, water use, cutting fluids and general waste generation) are collected at plant level and are not available per individual product reference.

For these shared processes, allocation has been performed based on physical relationships, using the number of finished units manufactured during the reference year as the allocation key. This approach is considered appropriate, as:

- The declared products are manufactured using comparable assembly processes and equipment.
- Energy and resource consumption scale proportionally with production output.
- All products are electronic devices with similar manufacturing complexity.

Total annual consumptions and waste generation from both production sites have been aggregated for the reference year 2024 and allocated per declared unit based on the total number of units manufactured (573,949 units).

Packaging materials used for product distribution have been allocated directly per declared unit, based on the specific packaging configuration and distribution scenario (national and international markets). No allocation between products was required for packaging.

For inventory data obtained from background LCA databases (e.g. Ecoinvent v3.11), the allocation rules applied within those datasets follow the modelling principles defined by the database provider and are considered compliant with ISO 14044 and the PCR.

No co-products are generated in the manufacturing system of the declared products. Therefore, no co-product allocation was required.

ENVIRONMENTAL PERFORMANCE

The results shown below are those obtained in the study of the representative product: one electronic device ASTRO NOVA CITY (astronomical time switch), according to the Environmental Footprint 3.1 (EF) impact assessment method developed by the European Commission.

The environmental performance results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks. The results of the end-of-life stage should be considered when using the results of the production stage.

Core impact category indicators

PARAMETER	UNIT	MANUFACTURING	DISTRIBUTION	INSTALLATION	USE							DE-INSTALLATION	END-OF-LIFE			TOTAL	
					Raw Materials, Transport & Manufacturing	Transport	Installation	Use	Maintenance	Repair	Reuse		Refurbishment	Operational energy use	Operational water use		De-installation
		A1 - A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		
Global warming potential (GWP)	Fossil	kg CO ₂ eq.	9.08E+00	8.14E-02	1.32E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.06E-01	7.55E+01	0.00E+00	0.00E+00	1.71E-03	7.64E-02	2.79E-03	8.47E+01
	Biogenic	kg CO ₂ eq.	-4.19E-02	2.81E-06	6.35E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.50E-04	1.24E-01	0.00E+00	0.00E+00	5.39E-08	1.17E-05	2.75E-05	1.47E-01
	Land use and land transformation	kg CO ₂ eq.	1.60E-02	1.90E-06	5.21E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.19E-04	1.62E-01	0.00E+00	0.00E+00	2.71E-08	1.35E-05	1.53E-07	1.79E-01
	TOTAL	kg CO ₂ eq.	9.06E+00	8.14E-02	6.49E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.07E-01	7.58E+01	0.00E+00	0.00E+00	1.71E-03	7.64E-02	2.81E-03	8.51E+01
Ozone layer depletion (ODP)	kg CFC11 eq.	3.57E-07	1.57E-09	2.53E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.59E-09	4.37E-07	0.00E+00	0.00E+00	3.89E-11	5.40E-11	2.39E-11	7.96E-07	
Acidification potential (AP)	mol H ⁺ eq.	9.57E-02	2.07E-04	5.44E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.23E-03	3.68E-01	0.00E+00	0.00E+00	2.12E-06	4.74E-05	8.65E-06	4.65E-01	
Eutrophication potential (EP)	Aquatic freshwater	kg P eq.	1.59E-03	5.41E-08	8.01E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.36E-06	4.01E-03	0.00E+00	0.00E+00	1.06E-09	3.45E-07	2.06E-08	5.60E-03
	Aquatic marine	kg N eq.	1.34E-02	7.42E-05	2.22E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.32E-04	6.69E-02	0.00E+00	0.00E+00	4.78E-07	1.46E-05	5.09E-06	8.05E-02
	Aquatic terrestrial	mol N eq.	1.54E-01	8.11E-04	2.31E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.50E-03	7.37E-01	0.00E+00	0.00E+00	5.21E-06	1.51E-04	2.59E-05	8.93E-01
Photochemical oxidant creation potential (POCP)	kg NMVOC eq.	5.05E-02	3.26E-04	7.65E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.67E-04	2.19E-01	0.00E+00	0.00E+00	4.17E-06	4.02E-05	9.55E-06	2.70E-01	
Abiotic depletion potential (ADP)*	Metals and minerals	kg Sb eq.	3.36E-03	2.14E-09	1.52E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.10E-05	2.24E-06	0.00E+00	0.00E+00	4.46E-11	8.16E-10	1.67E-10	3.37E-03
	Fossil resources	MJ, net calorific value	6.41E+01	7.60E-03	1.24E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.80E-01	6.92E+02	0.00E+00	0.00E+00	1.51E-04	5.92E-02	9.59E-04	7.57E+02
Water deprivation potential (WDP)*		m ³ world eq. deprived	2.12E+00	5.25E-04	-5.71E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.76E-02	9.93E+00	0.00E+00	0.00E+00	7.44E-06	1.89E-03	-8.86E-03	1.21E+01

* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Additional mandatory impact indicator

PARAMETER	UNIT	MANUFACTURING	DISTRIBUTION	INSTALLATION	USE							DE-INSTALLATION	END-OF-LIFE			TOTAL
		Raw Materials, Transporting & Manufacturing	Transport	Installation	Use	Maintenance	Repair	Reuse	Refurbishment	Operational energy use	Operational water use	De-installation	Transport	Waste processing	Disposal	
		A1 - A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	
GWP-GHG	kg CO2 eq.	9.12E+00	8.14E-02	1.66E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.07E-01	7.58E+01	0.00E+00	0.00E+00	1.71E-03	7.64E-02	2.79E-03	8.51E+01

Resource use indicators

PARAMETER	UNIT	MANUFACTURING	DISTRIBUTION	INSTALLATION	USE							DE-INSTALLATION	END-OF-LIFE			TOTAL	
		Raw Materials, Transporting & Manufacturing	Transport	Installation	Use	Maintenance	Repair	Reuse	Refurbishment	Operational energy use	Operational water use	De-installation	Transport	Waste processing	Disposal		
		A1 - A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	1.70E+01	2.35E-03	2.07E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.46E-01	1.57E+02	0.00E+00	0.00E+00	5.68E-05	1.12E-02	3.19E-04	1.75E+02
	Used as raw materials	MJ, net calorific value	5.66E-01	0.00E+00	-2.07E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.59E-01
	TOTAL	MJ, net calorific value	1.76E+01	2.35E-03	3.11E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.46E-01	1.57E+02	0.00E+00	0.00E+00	5.68E-05	1.12E-02	3.19E-04	1.75E+02
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	6.57E+01	7.89E-03	1.50E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.17E-01	7.24E+02	0.00E+00	0.00E+00	1.56E-04	6.20E-02	6.74E-01	7.92E+02
	Used as raw materials	MJ, net calorific value	1.35E+00	0.00E+00	-2.01E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-6.73E-01	0.00E+00
	TOTAL	MJ, net calorific value	6.71E+01	7.89E-03	1.29E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.17E-01	7.24E+02	0.00E+00	0.00E+00	1.56E-04	6.20E-02	9.95E-04	7.92E+02
Secondary material	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Renewable secondary fuels	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Non-renewable secondary fuels	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Net use of fresh water	m3	7.52E-02	2.49E-05	-9.48E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.95E-04	4.49E-01	0.00E+00	0.00E+00	4.41E-07	7.33E-05	-1.91E-04	5.25E-01	

Waste indicators

PARAMETER	UNIT	MANU	DISTRI	INSTA	USE							DE-	END-OF-LIFE			TOTAL		
		FACTU	BUTIO	LLATI	Raw Materials, Transport & Manufacturing	Transport	Installation	Use	Maintenance	Repair	Reuse	Refurbishment	Operational energy use	Operational water use	De-installation		Transport	Waste processing
		A1 - A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4			
Hazardous waste disposed	kg	9.70E-04	7.26E-06	1.13E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.81E-05	2.60E-03	0.00E+00	0.00E+00	1.51E-07	3.14E-07	1.12E-07	3.60E-03		
Non-hazardous waste disposed	kg	1.24E-01	3.34E-05	1.74E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.07E-03	4.73E-01	0.00E+00	0.00E+00	7.53E-07	5.81E-04	1.02E-01	7.25E-01		
Radioactive waste disposed	kg	2.32E-04	5.50E-08	6.84E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.56E-06	2.66E-03	0.00E+00	0.00E+00	1.37E-09	2.22E-07	5.89E-09	2.89E-03		

Output flow indicators

PARAMETER	UNIT	MANU	DISTRI	INSTA	USE							DE-	END-OF-LIFE			TOTAL		
		FACTU	BUTIO	LLATI	Raw Materials, Transport & Manufacturing	Transport	Installation	Use	Maintenance	Repair	Reuse	Refurbishment	Operational energy use	Operational water use	De-installation		Transport	Waste processing
		A1 - A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4			
Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	2.36E-02	0.00E+00	2.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.81E-02	0.00E+00	6.17E-02		
Materials for energy recovery	kg	0.00E+00	0.00E+00	2.68E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.27E-02	0.00E+00	2.54E-02		
Exported energy, electricity	MJ per energy carrier	0.00E+00	0.00E+00	4.66E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.02E-01	0.00E+00	1.06E-01		
Exported energy, thermal	MJ per energy carrier	0.00E+00	0.00E+00	9.36E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.97E-01	0.00E+00	2.06E-01		

ADDITIONAL ENVIRONMENTAL INFORMATION

Electric mix used:

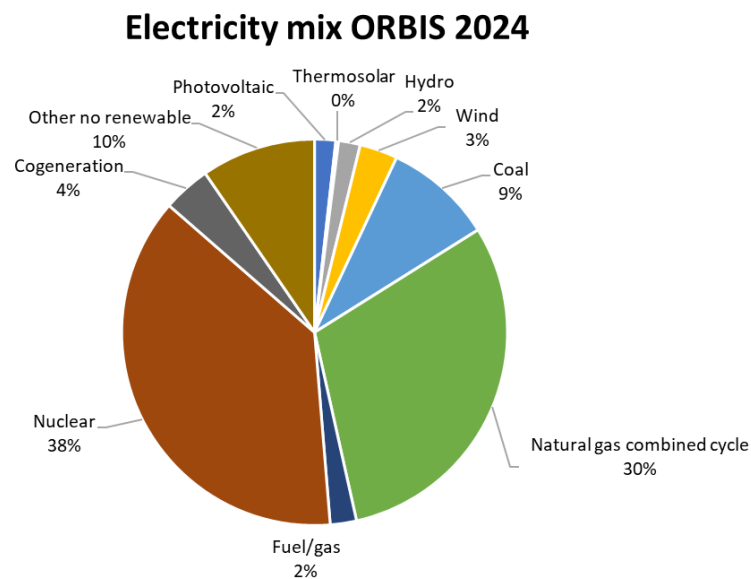
Electricity consumption associated with the manufacturing and assembly of the declared products (module A3) has been modelled using the electricity mix supplied by the energy provider to ORBIS (IBERDROLA CLIENTES S.A.U.) which corresponds to the Spanish residual electricity mix for the reference year 2024.

In line with the PCR *Electronic and electric equipment (non-construction)* and the GPI v5.0.1, the residual mix has been applied to ensure that renewable attributes already allocated through Guarantees of Origin are not double-counted.

A dedicated electricity process was developed to represent the supplier's electricity mix, based on national residual mix data. The resulting mix, whose energy source distribution is shown in the figure below, has an associated emission factor of 0.275 kg CO₂-eq/kWh.

Electricity datasets from Ecoinvent v3.11 (high-, medium- and low-voltage electricity) were used as a background and adjusted to reflect the supplier-specific energy source composition.

This electricity mix has been consistently applied to the aggregated electricity consumption of both production sites (Alcobendas and Madrid), using primary electricity consumption data for the year 2024. The two facilities have the same energy supplier.



VERSION HISTORY

Original Version of the EPD, 2026-03-17

ABBREVIATIONS

Abbreviation	Definition
General Abbreviations	
EN	European Norm (Standard)
EPD	Environmental Product Declaration
EF	Environmental Footprint
GPI	General Programme Instructions
ISO	International Organization for Standardization
LCA	Life Cycle Assessment
PCR	Product Category Rules
c-PCR	Complementary Product Category Rules
CEN	European Committee for Standardization
CPC	Central product classification
GHS	Globally harmonized system of classification and labelling of chemicals
Environmental Impact Indicators (EN 15804)	
GHG	Greenhouse gas
GWP	Global Warming Potential (kg CO ₂ eq.)
GWP-fossil	Global Warming Potential from fossil sources (kg CO ₂ eq.)
GWP-biogenic	Global Warming Potential from biogenic sources (kg CO ₂ eq.)
GWP-luluc	Global Warming Potential from land use and land use change (kg CO ₂ eq.)
GWP-total	Total Global Warming Potential (kg CO ₂ eq.)
GWP-GHG	Global Warming Potential for greenhouse gases (kg CO ₂ eq.)
ODP	Ozone Depletion Potential (kg CFC-11 eq.)
AP	Acidification Potential (mol H ⁺ eq.)
EP	Eutrophication Potential
EP-freshwater	Freshwater eutrophication potential (kg P eq.)
EP-marine	Marine eutrophication potential (kg N eq.)
EP-terrestrial	Terrestrial eutrophication potential (mol N eq.)
POCP	Photochemical Ozone Creation Potential (kg NMVOC eq.)
ADP	Abiotic Depletion Potential
ADP-minerals&metals	Abiotic depletion potential for non-fossil resources (kg Sb eq.)
ADP-fossil	Abiotic depletion potential for fossil resources (MJ)
WDP	Water Deprivation Potential (m ³)
Resource Use Indicators	
PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials (MJ)
PERM	Use of renewable primary energy resources used as raw materials (MJ)
PERT	Total use of renewable primary energy resources (MJ)
PENRE	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (MJ)
PENRM	Use of non-renewable primary energy resources used as raw materials (MJ)
PENRT	Total use of non-renewable primary energy resources (MJ)
SM	Use of secondary material (kg)
RSF	Use of renewable secondary fuels (MJ)
NRSF	Use of non-renewable secondary fuels (MJ)
FW	Use of net fresh water (m ³)
Waste Indicators	
HW	Hazardous Waste (disposed) (kg)
NHW	Non-Hazardous Waste (disposed) (kg)
RW	Radioactive Waste (disposed) (kg)
Output Flow Indicators	
CFR	Components for Reuse (kg)
MR	Material for Recycling (kg)
MER	Materials for Energy Recovery (kg)
EEE	Exported Energy. Electricity (MJ)
EET	Exported Energy. Thermal (MJ)

Abbreviation	Definition
Lifecycle Stages / Modules	
A1	Raw material supply
A2	Transport
A3	Manufacturing
A4	Transport to site
A5	Construction/Installation
B1	Use
B2	Maintenance
B3	Repair
B4	Replacement
B5	Refurbishment
B6	Operational energy use
B7	Operational water use
C1	Deconstruction/Demolition
C2	Transport to waste processing
C3	Waste processing
C4	Disposal
D	Reuse-Recovery-Recycling potential
Other Relevant Terms	
SVHC	Substances of Very High Concern
MJ	Megajoule
kg	Kilogram
m ³	Cubic Meter
NMVOG	Non-Methane Volatile Organic Compounds
Sb eq.	Antimony Equivalents
P eq.	Phosphorus Equivalents
N eq.	Nitrogen Equivalents
CFC-11 eq.	Chlorofluorocarbon-11 Equivalents
CO ₂ eq.	Carbon Dioxide Equivalents
kg C	Kilograms of Carbon
kg CO ₂ eq.	Kilograms of Carbon Dioxide Equivalent

REFERENCES

- a) General Programme Instruction of the International EPD® System. Version 5.0.1
- b) ISO 14025:2010 Environmental labels and declarations - Type III Environmental Declarations -Principles and procedures.
- c) ISO 14040:2006 Environmental management - Life Cycle Assessment-Principles and framework
- d) ISO 14044:2006 Environmental management - Life Cycle Assessment-Requirements and guidelines.
- e) PCR Electronic and electric equipment, and electronic components (non-construction), 2024:06, version 1.0.1
- f) EN 50693:2019. Product category rules for life cycle assessments of electronic and electrical products and systems.
- g) LCA software SimaPro v10.2.0.2.
- h) Ecoinvent v3.11 database.
- i) Orbis. Digital time switches
- j) LCA report ORBIS v4.

