ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

Owner of the Declaration	ARGE; European Federation of Associations of Lock and Builders Hardware Manufacturers
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
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Electromechanical hardware

ARGE; European Federation of Associations of Lock and Builders Hardware Manufacturers

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1. General Information

ARGE	Electromechanical hardware
Programme holder IBU - Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany	**Owner of the Declaration** ARGE; European Federation of Associations of Lock and Builders Hardware Manufacturers Offerstraße 12, 42551 Velbert Germany
Declaration number EPD-ARG-20160188-IBG1-EN	**Declared product / Declared unit** 1 kg of electromechanical hardware
This Declaration is based on the Product Category Rules: Building Hardware products, 07.2014 (PCR tested and approved by the SVR) **Issue date** 03.09.2021 **Valid to** 02.09.2022	**Scope:** This ARGE EPD covers electromechanical hardware security devices used to control or enable door opening by means of electrical impulse. The reference product used to calculate the impact this group of products has on the environment is an item of electromechanical hardware such as a lock, handle or push button device. It is composed of steel, stainless steel and electric/electronic components. The product assessed for this EPD has 2 different configurations (grid-connected and battery-powered) and serves as a reference to cover all products within this family. The product has been confirmed in accordance with ARGE and the market share as the most representative product of the family. The owner of the declaration shall be liable for the underlying information and evidence, but the ARGE programme holder (IBU) cannot be held responsible for manufacturer information, life cycle assessment data or evidence.
Prof. Dr.-Ing. Horst J. Bossenmayer (President of Institut Bauen und Umwelt e.V.)	**Verification** The CEN Norm /EN 15804/ serves as the core PCR Independent verification of the declaration according to /ISO 14025/ ☐ internally ☒ externally
Dr.-Ing. Burkhart Lehmannt (Managing Director IBU)	Dr. Frank Werner (Independent verifier appointed by SVR)

2. Product

2.1 Product description

This ARGE EPD covers electromechanical security devices designed to control or enable door opening and which are integrated into electronic control systems such as alarms, surveillance, remote access, fingerprint scanners etc.
There are 2 types of configurations:
- battery-powered
- grid-connected.

2.2 Application

These products are designed to be integrated into door assemblies of various materials and applications. They may be used for either interior or exterior doors, in accordance with manufacturer's instructions.

2.3 Technical Data

Ideally, products should comply with a suitable technical specification. /prEN 16867/ Mechatronic door furniture (still in draft form) is an example of such a specification and some products will comply with this.

2.4 Placing on the market / Application rules

Since prEN 16867 will not be a harmonized standard, it will not be subject to the terms of the CPR and compliance with the standard will be purely voluntary. National provisions however (e.g. Building Regulations) may still apply. In addition it should be noted that these types of product are subject to the terms of other EU Directives (e.g. EMC, RE & LV) for which compliance is mandatory.

2.5 Delivery status

The products are sold by unit. Deliveries of a single unit might be possible but will be an exception. Regular deliveries will cover a larger amount of devices as they are put on the market as "B2B" product and not for a final customer.

2.6 Base materials / Ancillary materials

Composition of product analysed for this EPD:
The values given in the table below are for the product analysed for this EPD :

Name	Value	Unit
Steel	71.93	%
Stainless steel	20.8	%
Zinc-based alloy	3.63	%
Motor	1.37	%
PCB	1.08	%
ABS	0.92	%
Acetal	0.26	%
Neodymium	0.0000159	%

The product does not contain substances cited on the REACH list of hazardous substances.
Steel is produced by combining iron with carbon as well as other elements depending on the desired characteristics. The subcomponents made of steel are formed by stamping.
Stainless steel is produced by combining iron with chromium as well as other elements depending on the desired characteristics. The subcomponents made of steel are formed by stamping.
Zinc-based alloy is an alloy of four separate metals: zinc, aluminium, magnesium and copper. Subcomponents of the device which are made from zinc-based alloy are diecast.
ABS is a thermoplastic polymer produced from propylene and ammonia. Subcomponents made of ABS are made by injection moulding.
Acetal, or polyoxymethylene, is produced via polymerisation of anhydrous formaldehyde. Subcomponents made of acetal are also formed by injection moulding.
Acrylic, used in resin form, is a thermoplastic derived from acrylic acid. Subcomponents made of acrylic are made by injection moulding.
Motor, PCB, electronic elements, including copper wiring, etched copper sheets on non-conductive substrates, resistors, transistors etc.
Neodymium alloy is a mix of pure neodymium, iron and boron used in high quality permanent magnets.
Battery (in case of battery-powered Electromechanical devices) : AA 1.5V Lithium

2.7 Manufacture
The production of an electromechanical hardware rnormally follows a 3 step procedure:
1. Prefabrication of the semi-finished products (usually by stamp punching or laser cutting) This step might include a surface treatment on factory site or by external manufacturers.
2. Preassembly of assembly modules (onsite factory)
3. Final assembly (onsite factory)

2.8 Environment and health during manufacturing
Regular measurements of air quality and noise levels are performed by ARGE member manufacturers. The results shall be within compulsory safety levels. In areas where employees are exposed to chemical products, prescribed safety clothes and technical safety devices shall be provided. Regular health checks are mandatory for employees of production sites.

2.9 Product processing/Installation
The installation of the product could vary depending on the type of door and the specific situation but products shall not require energy consumption for installation.

2.10 Packaging
The product assessed for this EPD is packaged in paper. The product is then packed by batch in a cardboard box and stacked on wooden pallets for transport to the customer.
Waste from product packaging is collected separately for waste disposal (including recycling).

2.11 Condition of use
Once installed, the products shall require no servicing during their expected service lives. There shall be no consumption of water linked to their use, and they shall not cause any emissions.

2.12 Environment and health during use
No environmental damage or health risks are to be expected during normal conditions of use.

2.13 Reference service life
The Reference Service Life is 7 years under normal working conditions. This corresponds to passing a mechanical endurance test of 10.000 cycles as specified in the /EN 14846/. The Reference Service Life is dependent on the actual frequency of use and environmental conditions. It is required that installation, as well as maintenance of the product, must be done in line with instructions provided by the manufacturer.

2.14 Extraordinary effects

Fire
Specific needs on fire resistance are addressed by individual manufacturers, no classes are defined as no EN or national standards are available.

Water
The declared product is intended to be used in buildings under normal conditions (indoor or outdoor). It shall not emit hazardous substances in the event of flooding.

Mechanical destruction
Mechanical destruction of the declared product shall not materially alter its composition or have any adverse effect on the environment.

2.15 Re-use phase
Removal of electromechanical hardware (for re-use or re-cycling) shall have no adverse effect on the environment.

2.16 Disposal
Electromechanical hardware components should be re-cycled wherever possible, providing that there is no adverse effect on the environment. The waste code in accordance with the /European Waste Code/ is 17 04 07.

2.17 Further information
Details of all types and variants to be shown on the manufacturers' websites listed on http://arge.org/members/members-directory.htm.

3. LCA: Calculation rules

3.1 Declared Unit

The declared unit for all products covered by ARGE EPD is 1 kg (of product). Since individual products will rarely weigh exactly 1 kg it is necessary to establish the exact weight of the product then use this as a correction factor to determine the true values for 1 kg of product in the tables (Section 5).

Correction factor

Name	Value	Unit
Declared unit mass	1	kg
Mass of declared product	0.63	kg
Correction factor	Divide by 0.63	

3.2 System boundary

This type of EPD covers “cradle to grave” requirements.
The analysis of the product life cycle includes the production and transport of the raw materials, manufacture of the product and the packaging materials, which are declared in modules A1-A3. Losses during production are considered as waste and are sent for recycling. No recycling processes are taken into account except transport and an electricity consumption for grinding the metals. When recycled metals are used as raw material, only their transformation process is taken into account and not the extraction of the raw material.
A4 module represents the transport of the finished product to the installation site.
There is no waste associated with the installation of the product. The A5 module therefore represents only the disposal of the product packaging.
B6 module represent the energy consumption of the product during use phase.
For the RSL considered, results of B4 stage consider the use of batteries (battery-powered configuration).
The End-of-Life (EoL) stages are also considered. The transportation to the EoL disposal site is taken into account in module C2. Module C4 covers the disposal of the device. Module C3 covers the recycling of the individual elements according to European averages, with the remaining waste divided between incineration and landfill. The same assumption as for waste to recycling in A3 is used here.
For end of life modules (C1 to C4) the system boundaries from the XP P01-064/CN standard have been followed, for more information appendices H.2 and H.6 of this standard describe the rules that have been chosen.
In practice, the end-of-life has been modelled as follows:
- When material is sent for recycling, generic transport and electric consumption of a shredder is taken into account (corresponding to the process “Grinding, metals”). Only then is the material considered to have attained the “end-of-waste” state.
- Each type of waste is modelled as transport to the treatment site over a distance of 30 km (source: /FD P01-015/). Parts sent for recycling include electricity consumption (grinding) and a flow (“Materials for recycling, unspecified”).
Four scenarios for the end-of-life of the products have been declared for this EPD:
1. 100% of the product going to landfill
2.100% of the product going to incineration
3. 100% of the product going to recycling
4. mixed scenario consisting of the previous three scenarios, values depending on the amount of waste going for recycling.
Module D has not been declared.

3.3 Estimates and assumptions

The LCA data of the declared product had been calculated by the production data from one ARGE member company. This company has been chosen by ARGE as being representative by means of its production processes and its market share. The product is chosen to be as representative as possible. In addition, data was used from another manufacturer to consider battery-powered devices in order to complete the LCA results.

3.4 Cut-off criteria

The cut -off criteria considered are 1% of renewable and non-renewable primary energy usage and 1% of the total mass of that unit process. The total neglected input flows per module shall be at a maximum of 5% of energy usage and mass.
For this study, all input and output flows have been considered at 100%, including raw materials as per the product composition provided by the manufacturer and packaging of raw materials as well as the final product. Energy and water consumption have also been considered at 100% according to the data provided. With the approach chosen, no significant environmental impacts are known to have been cut-off.

3.5 Background data

For life cycle modelling of the considered product, all relevant background datasets were taken from the ecoinvent 3.1 – Alloc Rec database. The life cycle analysis software used is SimaPro (V8.1), developed by PRé Consulting.

3.6 Data quality

The time factor and the life cycle inventory data used comes from:
Data collected specifically for this study on the ARGE manufacturer’s site. Data sets are based on 1-year averaged data (time period: 2013 for grid-connected product / 2015 for battery-powered product).
In the absence of collected data, generic data is obtained from the ecoinvent V3 database. This is updated regularly and is representative of current processes (the entire database having been updated in 2014).

3.7 Period under review

The data of the LCA is based on the annual production data of an ARGE member company from 2013.
Other values, e.g. for the processing of the base materials, are taken from the/ ecoinvent v3/.1 Alloc Rec where the dataset age varies for each dataset, see ecoinvent documentation for more information.

3.8 Allocation

The products covered by this EPD are produced in numerous sites. The product assessed for the calculation of this EPD is produced by one manufacturer on its own site. All data was provided by this manufacturer of the product per unit, and then

divided by the mass of the product to give a value per kg of product produced
In addition, a battery-powered device was considered to complete the evaluation. The data was provided by another manufacturer.
The assumptions relating to the EoL of the product are described in the section System Boundaries.

3.9 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to /EN 15804/ and the building context, respectively the product-specific characteristics of performance, are taken into account.

4. LCA: Scenarios and additional technical information

The following technical information is a basis for the declared modules or can be used for developing specific scenarios in the context of a building assessment for Modules Not Declared (MND).

Transport to the building site (A4)

Name	Value	Unit
Litres of fuel	0.0045	l/100km
Transport distance	3500	km
Capacity utilisation (including empty runs)	36	%

Installation into the building (A5)

Name	Value	Unit
Material loss	0.00949	kg

Replacement (B4) / Refurbishment (B5)

When electromechanical hardware devices are battery-powered, the batteries are assumed to be replaced every 2 years which leads to 3 replacements of a set of 2 batteries over an RSL of 7 years.

The transport of the battery is assumed to be done by truck (3.5 tons) over a distance of 30 km.

Name	Value	Unit
Litres of fuel	9	l/100km
Replacement of worn parts	0.089	kg

Reference service life

Name	Value	Unit
Reference service life (condition of use: see §2.13)	7	a

Operational energy use (B6) and Operational water use (B7)

The following scenario has been taken into account:
- 3 operative modes of the product: Active mode, Stand-by and off

- Time share in each mode (in %)

- Average power for each mode (in Watts)

The total energy consumption during the RSL has been calculated with the following formulas:

Energy consumption mode (Wh) = Average powermode (W)*Timemode (%)*RSL*365*24

Energy consumption of the product (Wh) = Energy consumptionactive + Energy consumptionstandby + Energy consumptionoff

It is assumed that, throughout its RSL (7 years), the product is active 1% of the time and is in standby or sleep mode during 99% of the time (data from companies).

The average power during the active time is 28.8 W (17 660.16 Wh) and during standby is 3.6 W (218 544.48 Wh). A European electricity mix has been taken into account for the energy consumption.

Name	Value	Unit
Electricity consumption	236.2	kWh

End of life (C1-C4)

Name	Value	Unit
Collected separately (Mixed scenario)	1	kg
Recycling (Mixed scenario)	0.241	kg
Energy recovery (Mixed scenario)	0.349	kg
Landfilling (Mixed scenario)	0.41	kg
Incineration (100% incineration scenario) Scenario 1	1	kg
Landfilling (Landfill scenario) Scenario 2	1	kg
Recycling (100% recycling scenario) Scenario 3	1	kg

It is assumed that a 16-32 ton truck is used to transport the product over the (up to) 30 km distance between the dismantling site and the next treatment site (source: FD P01-015).

Reuse, recovery and/or recycling potentials (D), relevant scenario information

As Module D has not been declared, materials destined for recycling have been accounted for in the indicator “Materials for recycling” however no benefit has been allocated.

Name	Value	Unit

5. LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MND	MND	MND	X	MND	X	MND	X	X	X	X	MND

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 kg of Electromechanical hardware

Parameter	Unit	A1-A3	A4	A5	B4	B6	C1	C2	C2/1	C2/2	C2/3	C3	C3/1	C3/2	C3/3	C4	C4/1	C4/2	C4/3
GWP	[kg CO_2-Eq.]	1.02E+1	5.89E-1	1.36E-2	5.32E-1	1.17E+2	0.00E+0	5.05E-3	5.05E-3	5.05E-3	5.05E-3	5.90E-3	0.00E+0	0.00E+0	8.66E-3	6.17E-2	5.23E-1	4.97E-1	0.00E+0
ODP	[kg CFC11-Eq.]	8.22E-7	1.08E-7	3.60E-10	4.62E-8	1.26E-5	0.00E+0	9.26E-10	9.26E-10	9.26E-10	9.26E-10	6.33E-10	0.00E+0	0.00E+0	9.30E-10	1.89E-9	4.02E-9	3.43E-9	0.00E+0
AP	[kg SO_2-Eq.]	6.37E-2	2.39E-3	1.41E-5	8.39E-3	4.87E-1	0.00E+0	2.05E-5	2.05E-5	2.05E-5	2.05E-5	2.45E-5	0.00E+0	0.00E+0	3.60E-5	1.68E-4	2.58E-4	1.24E-4	0.00E+0
EP	[kg $(PO_4)^{3-}$-Eq.]	2.23E-2	4.06E-4	6.29E-6	1.82E-3	5.47E-2	0.00E+0	3.48E-6	3.48E-6	3.48E-6	3.48E-6	2.75E-6	0.00E+0	0.00E+0	4.04E-6	4.37E-5	7.52E-5	5.94E-4	0.00E+0
POCP	[kg ethene-Eq.]	5.93E-3	2.68E-4	3.22E-6	5.45E-4	2.69E-2	0.00E+0	2.30E-6	2.30E-6	2.30E-6	2.30E-6	1.35E-6	0.00E+0	0.00E+0	1.98E-6	1.57E-5	1.60E-5	1.41E-4	0.00E+0
ADPE	[kg Sb-Eq.]	4.31E-3	1.89E-6	0.00E+0	3.82E-5	0.00E+0	0.00E+0	1.62E-8	1.67E-8	1.67E-8	1.67E-8	2.20E-9	0.00E+0	0.00E+0	3.53E-9	2.15E-7	4.69E-8	2.47E-8	0.00E+0
ADPF	[MJ]	1.46E+2	8.97E+0	3.31E-2	8.27E+0	1.80E+3	0.00E+0	7.69E-2	7.69E-2	7.69E-2	7.69E-2	9.05E-2	0.00E+0	0.00E+0	1.33E-1	2.84E-1	3.73E-1	2.80E-1	0.00E+0

Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources

RESULTS OF THE LCA - RESOURCE USE: 1 kg of Electromechanical hardware

Parameter	Unit	A1-A3	A4	A5	B4	B6	C1	C2	C2/1	C2/2	C2/3	C3	C3/1	C3/2	C3/3	C4	C4/1	C4/2	C4/3
PERE	[MJ]	1.61E+1	1.12E-1	2.06E-3	8.41E-1	2.33E+2	0.00E+0	9.61E-4	9.61E-4	9.61E-4	9.61E-4	1.17E-2	0.00E+0	0.00E+0	1.72E-2	9.80E-2	1.14E-2	2.11E-2	0.00E+0
PERM	[MJ]	2.21E+0	0.00E+0	-1.40E+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
PERT	[MJ]	1.84E+1	1.12E-1	-1.40E+0	8.41E-1	2.33E+2	0.00E+0	9.61E-4	9.61E-4	9.61E-4	9.61E-4	1.17E-2	0.00E+0	0.00E+0	1.72E-2	9.08E-2	1.14E-2	2.11E-2	0.00E+0
PENRE	[MJ]	1.71E+2	9.13E+0	3.95E-2	8.95E+0	2.64E+3	0.00E+0	7.82E-2	7.82E-2	7.82E-2	7.82E-2	1.33E-1	0.00E+0	0.00E+0	1.95E-1	3.23E-1	3.86E-1	3.53E-1	0.00E+0
PENRM	[MJ]	6.34E-1	0.00E+0	-4.98E-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	0.00E+0	0.00E+0	0.00E+0
PENRT	[MJ]	1.72E+2	9.13E+0	-1.03E-2	8.95E+0	2.64E+3	0.00E+0	7.82E-2	7.82E-2	7.82E-2	7.82E-2	1.33E-1	0.00E+0	0.00E+0	1.95E-1	3.23E-1	3.86E-1	3.53E-1	0.00E+0
SM	[kg]	5.31E-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	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]	9.36E-2	1.72E-3	2.77E-5	1.92E-2	8.86E-1	0.00E+0	1.48E-5	1.48E-5	1.48E-5	1.48E-5	4.45E-5	0.00E+0	0.00E+0	6.54E-5	4.12E-4	1.17E-3	3.42E-4	0.00E+0

Caption	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 = Use of net fresh water

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 kg of Electromechanical hardware

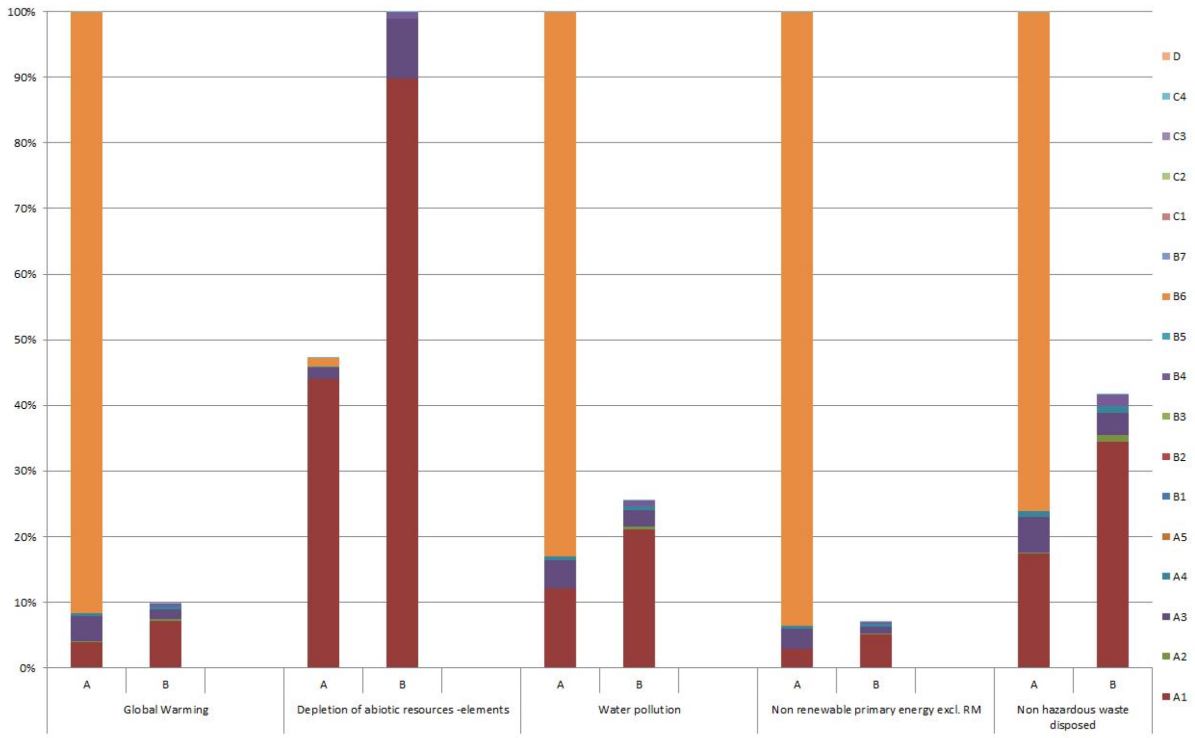
Parameter	Unit	A1-A3	A4	A5	B4	B6	C1	C2	C2/1	C2/2	C2/3	C3	C3/1	C3/2	C3/3	C4	C4/1	C4/2	C4/3
HWD	[kg]	1.83E+0	5.64E-3	3.13E-4	7.33E-2	8.32E+0	0.00E+0	4.83E-5	4.83E-5	4.83E-5	4.83E-5	4.18E-4	0.00E+0	0.00E+0	6.14E-4	1.11E-2	2.66E-1	1.24E-3	0.00E+0
NHWD	[kg]	1.13E+1	4.68E-1	2.54E-2	9.13E-1	3.75E+1	0.00E+0	4.01E-3	4.01E-3	4.01E-3	4.01E-3	1.88E-3	0.00E+0	0.00E+0	2.77E-3	7.22E-2	1.45E-2	1.00E+0	0.00E+0
RWD	[kg]	5.67E-4	6.13E-5	2.23E-7	2.19E-5	1.43E-2	0.00E+0	5.25E-7	5.25E-7	5.25E-7	5.25E-7	7.17E-7	0.00E+0	0.00E+0	1.05E-6	1.21E-6	1.35E-6	2.65E-6	0.00E+0
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]	1.93E-1	0.00E+0	9.94E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.80E-1	0.00E+0	0.00E+0	1.00E+0	0.00E+0	0.00E+0	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	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EEE	[MJ]	0.00E+0	0.00E+0	3.28E-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	5.36E-2	1.39E+0	0.00E+0	0.00E+0
EET	[MJ]	0.00E+0	0.00E+0	6.82E-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	1.10E-1	2.85E+0	0.00E+0	0.00E+0

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy

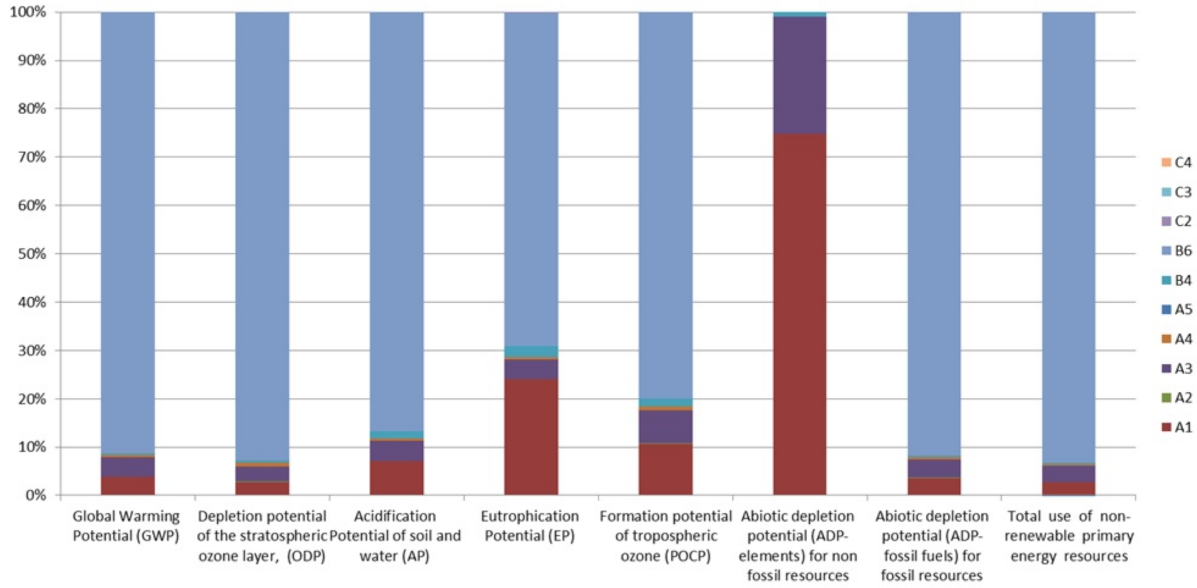
Other end of life scenarios have been calculated in order to build specific end of life scenario at the building level:
- scenario 1: the product is considered to be 100% incinerated
- scenario 2: the product is considered to be 100% landfilled
- scenario 3: the product is considered to be 100% recycled

6. LCA: Interpretation

The results concerning grid-connected configuration products are the most impactful (due to the electricity consumption during use), except for the indicator ADP, comparing to battery-powered configuration products. The difference between the impacts of the two configurations on this indicator is significant and comes from the quantity of PCB used.
Thus, to consider the worst case, the results given declares results of the grid-connected product on all indicators except ADP and results of the battery-powered product on ADP.
Moreover, the battery-powered product is the only one to have impacts on the B4 step; its results are added to the final impacts of the configuration. The end of life of batteries is also more impacting than the other material; therefore the C4 step of the battery-powered product is declared for the EPD.



The majority of the impacts for this group of products are due to the consummation of energy during the use phase, except for the depletion of abiotic non-fossil resources ; the impact for which stems mostly from A1 – Extraction and supply of raw materials (PCB and metals).
The results are conservative as complying with the scenario described just above.



7. Requisite evidence

No testing results are required by the PCR part B.

8. References

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epa - European Waste Catalogue and Hazardous Waste List - 01-2002.

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General principles
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