Statement of Verification

BREG EN EPD No.: 000575 Issue 01

This is to verify that the

Environmental Product Declaration

provided by:

measurable. energy HQ

BRE Global Verified EPD

is in accordance with the requirements of:

EN 15804:2012+A2:2019

and

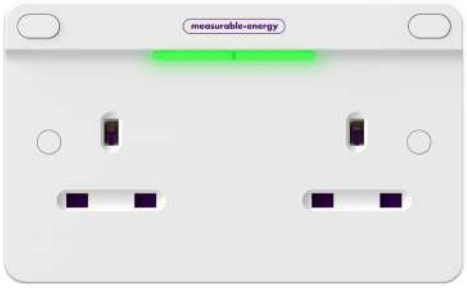
BRE Global Scheme Document SD207

This declaration is for:

1 Unit of measurable. energy power socket with the weight of 0.268 kg

Company Address

measurable. energy HQ,
8th floor,
Fountain House,
2 Queens Walk,
Reading



measurable·energy

Signed for BRE Global Ltd	Emma Baker Operator	03 May 2024 Date of this Issue
03 May 2024 Date of First Issue		02 May 2029 Expiry Date

BRE Global Verified EPD

This Statement of Verification is issued subject to terms and conditions (for details visit www.greenbooklive.com/terms.

To check the validity of this statement of verification please, visit www.greenbooklive.com/check or contact us.

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ECO PLATFORM EPD VERIFIED

Environmental Product Declaration

EPD Number: 000575

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE 2023 Product Category Rules (PN 514 Rev 3.1) for Type III environmental product declaration of construction products to EN 15804:2012+A2:2019.
Commissioner of LCA study	**LCA consultant/Tool**
measurable. energy HQ, 8th floor, Fountain House, 2 Queens Walk, Reading	LCA Consultant: Bala Subramanian LCA Tool: BRE LINA A2
Declared/Functional Unit	**Applicability/Coverage**
1 Unit of measurable. energy power socket with the weight of 0.268 kg	Other (please specify). Product specific
EPD Type	**Background database**
Cradle to Gate with options	Ecoinvent 3.8

Demonstration of Verification
CEN standard EN 15804 serves as the core PCR [a]
Independent verification of the declaration and data according to EN ISO 14025:2010 ☐Internal ☒ External
(Where appropriate [b])Third party verifier: Francis Yu
a: Product category rules b: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)

Comparability
Environmental product declarations from different programmes may not be comparable if not compliant with EN 15804:2012+A2:2019. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See Clause 5.3 of EN 15804:2012+A2:2019 for further guidance

Information modules covered

Product			Construction		Use stage							End-of-life					Benefits and loads beyond the system boundary
					Related to the building fabric					Related to the building							
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		D
Raw materials supply	Transport	Manufacturing	Transport to site	Construction – Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal		Reuse, Recovery and/or Recycling potential
☑	☑	☑	☐	☐	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑		☑

Note: Ticks indicate the Information Modules declared.

Manufacturing site(s)

measurable. energy HQ,
8th floor,
Fountain House,
2 Queens Walk,
Reading

Construction Product:

Product Description

measurable. energy Power Sockets use ML and AI to automatically identify and eliminate wasted energy from all the appliances plugged in. The sockets enable users to see how much electricity they're consuming, what emissions they're generating and automatically reduce their bills and carbon emissions. The system works by:

Automatically recognising the appliances that are plugged in:
As soon as an appliance is plugged into one of our plug sockets, it automatically identifies what this is based on its unique energy signature. We can detect laptops, lamps, phone chargers, heaters, fridges, kettles, microwaves and more.

Understand what appliances are doing:
Different appliances use different amounts of power depending on their energy states. Once they're plugged in, we can track when devices are being used, when they're in standby and when they're switched off.

Eliminating wasted energy by automatically turning off sockets:
When our machine-learning technology identifies that an appliance is wasting energy, the socket is automatically turned off, turning back on before people return the next day or after the weekend. Reports can be downloaded 24/7 to see total energy and emissions as well as the energy, emissions and costs saved by turning sockets off.

Technical Information

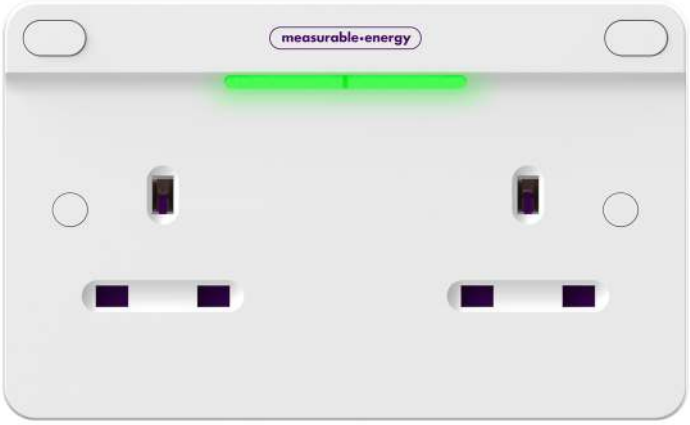
measurable. energy type G plug sockets can be wall fitted with a regular 25 mm back box, installed in floor boxes and smaller back boxes using our adapter plate, or mounted onto desks using our 4-gang extension lead.

Property	Value, Unit
Amp rating	13 A
Power voltage supply	100-250 V AC
Power consumption	<0.5 W
Operating temperature	-10°C to +40°C
Operating humidity	0-95% RH, no condensation
Number of earth terminal	2
Number of gangs	2
Dimensions	150 x 92 x 29.3 mm [19.5 mm into a mounting box]
Minimum back box depth	25 mm deep
Switched/unswitched	Switched - single pole
Screwed/screwless	Screwed
Wi-Fi support	2.4 GHz
Wi-Fi seurity	WPA2/WPA3 PSK
Colour	White
Certifications	BS1363, UKCA and CE
Guarantee	10-year guarantee for manufacturing faults and defects

m.e Power Sockets conform to the following standards:

Standard	Value, Unit
2014/30/EU Electromagnetic compatibility (EMC)	
EN 301 489-1 V2.2.3	Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements
EN 61000-6-3:2007+A1:2011	Generic standards — Emission standard for residential, commercial, and light-industrial environments
EN 301 489-17 V3.2.2	Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU
2014/35/EU Low Voltage (LVD)	
BS 1363-2:2016+A1:2018	13 A plugs, socket-outlets, adaptors and connection units. Specification for 13 A switched and unswitched socket-outlets
EN 60669-1:2018	Switches for household and similar fixed electric- al installations — Part 1: General requirements
EN 60669-2-1:2004/A12:2010	Switches for household and similar fixed electric- al installations — Part 2-1: Particular requirements — Electronic switches
2011/65/EU Restriction of the use of certain hazardous substances (RoHS)	
EN 50581:2012	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Standard	Value, Unit
2014/53/EU Radio Emissions Directive (RED)	
EN 300 328 V2.1.1	Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU
IASME IoT Cyber Assurance Level 1	



Main Product Contents

Material/Chemical Input	%
Polypropylene	5-10
Glass-filled polycarbonate	20-25
Low alloy steel	30-35
PCB	20-25
Copper-Co-Be alloy	5-10
Others	0-5

Manufacturing Process

measurable. energy hardware products are manufactured used standard methods of mass-production for plastics, metallurgy, electrical components, and circuit boards. This document will detail the process of manufacturing each of these elements and their assembly to form an m.e power socket.
measurable. energy do not manufacture any electrical components, the manufacture and supply of which is handled by the components' respective manufacturer.

Plastics Manufacturing
The plastic components and enclosure of the m.e power socket are manufactured by means of injection moulding. m.e own master tools for each plastic component, sub-contractors liquify the appropriate raw plastic material, inject this into the closed mould under pressure, cool the part and open the mould to release the part. The part then goes through some basic post-processing such as removing any flashing from the mould or removing the sprue.

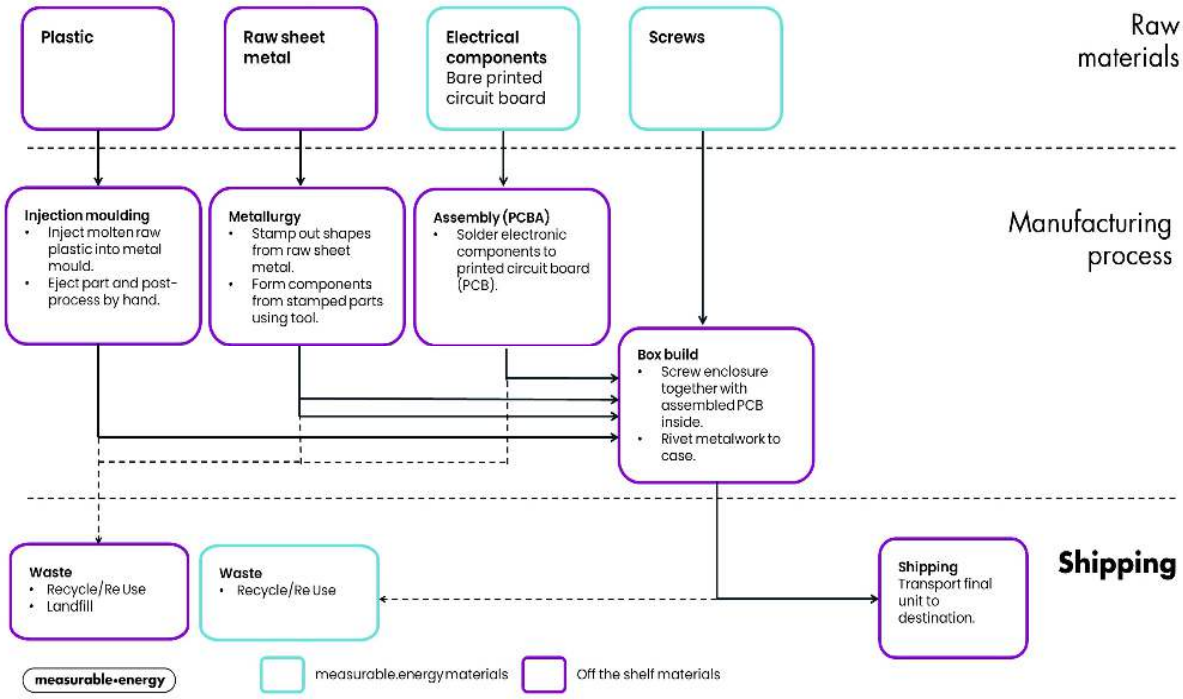
Metallurgy
measurable. energy metal components fall into 2 categories: custom and off-the-shelf. Off-the shelf components include springs, screws, rivets and screw terminals; these are purchased already-made from suppliers and are not manufactured by m.e directly.
Custom metalwork is manufactured by means of sheet metal punching and folding, sub-contractors use m.e master tools to punch out the raw shape of m.e components from raw sheet metal (either beryllium copper or galvanised steel, depending on the part). The raw punched part is then bent into it's final shape using a form tool.

Circuit Board
measurable. energy printed circuit boards (PCBs) are produced by a 3rd part contractor using industry standard copper-subtraction means. In short, this process dissolves the unwanted copper from a board made of FR-4 material that is clad on both sides by copper. The process images the desired circuit onto the copper using a corrosion-resistant material, the board is then submerged in a corrosive substance until all the exposed copper is removed, a layer of UV-hardened solder-mask is then applied.

Circuit Board Assembly (PCBA)
The printed circuit board is then assembled with the appropriate electronic and metal components according to the schematic. This is a two-stage process, surface mount and through hole. For surface mount, a lead-free solder paste is first applied to the board where solder is desired by means of a stencil. The boards then enter a pick-and -place machine, this machine uses a computer-controlled gantry to place all the surface-mount components in their correct locations on top of the pre-applied solder paste, which holds the components in place by means of surface tension. The boards are then passed through a reflow oven, which heats the boards in such a manner that the solder paste melts, binding the components to the exposed copper of the circuit board with a mechanical connection that is also conductive. The through-hole components how "legs" that fit into holes in the PCB. These are placed into their respective holes by hand. The boards then pass through a wave solder machine. This machine maintains a pool of molten lead-free solder and passes this liquid solder over an edge in such a way that it creates a standing wave of flowing liquid solder. The underside of the boards is passed through this wave, surface tension of the copper holds the solder to it, electrically and mechanically fixing the through -hole components in place. The PCB is now assembled and electrically sound.

Box Build (Final Assembly)
The box build phase of manufacture is the final stage. The plastic enclosure is assembled by hand, the sub-components of the rear assembly and front assembly are place into their respective positions, they are not held by adhesive or other means. The circuit board is then placed into the rear assembly by hand. The front enclosure is then placed by hand on the circuit board. The enclosures are then screwed together, the force of these screws holds the assembly together including the components that were assembled inside "loose", they are now hold in place by mechanical force. The front and rear are then riveted together. The power socket is now complete.

Process flow diagram



Use Stage:

The m.e socket uses a small amount of operational energy to run the automatic functions of the socket, the sockets itself an energy-saving measure turn off automatically to save energy overnight, at weekends and during hybrid working patterns. This operational energy is dwarfed by the savings the socket delivers. During the operational energy use it consumes 0.0005 kWh.

End of Life

Deconstruction: Power socket is made of materials like Polypropylene, polycarbonate, copper, low alloy steel, and other components. At the end of life, power sockets will be manually removed from the building sites, and they will be sent to the pre-processing unit. End-of-life (EoL) phase splits into two components: Disposal and EoL potential, they both represent the influence of expected end-of-life recovery rate on the benefit that can be obtained in subsequent life cycles. In the disposal phase, the recovered waste components will be transported to the waste processing unit thereby the socket waste will be processed. In addition, the power socket will be removed manually from the building sites at their EoL, and no power tools is used hence no impacts from C1.

Transport: 50km by road has been modelled for module C2 as a typical distance from the demolition site to the recycling plant. However, end-users of the EPD can use this information to calculate the impacts of a bespoke transport distance for module C2 if required.

Waste processing: Based on the datasheets of the materials and the options available, the power socket has a very positive end of life potential, given that most of the components can be recycled and some of the components like Polycarbonate and silicon are unrecoverable, so they will be ended in landfilling. Therefore, it is assumed as 64% of the material is recovered and 36% is assumed as unrecoverable and they will be sent to landfilling.

The energy used for the processing the waste socket is not included in module C3, it is assumed to be very small and are effectively negligible.

Life Cycle Assessment Calculation Rules

Declared / Functional unit description.

1 Unit of measurable. energy power socket with the weight of 0.268 kg

System boundary

This is a cradle-to-gate with options LCA, reporting all production life cycle stages of modules A1 to A3, Use stage modules (B1-B7), end of life stages C1-C4, and D in accordance with EN 15804:2012+A2:2019 and BRE 2021 Product Category Rules (PN 514 Rev 3.1) and also this EPD follows additional requirements for construction products considered as electronic or electric equipment.

Data sources, quality and allocation

The quantity used in the data collection for this EPD is the total quantity of measurable. energy power socket manufactured during the data collection period (01/10/22-31/04/23). No other products are manufactured to power socket; therefore, no allocation of electricity and water consumption and discharge are required. Further, the manufacturer has confirmed that no water was used for the production/manufacturing process however the water used for the commercial purpose has been included in this analysis. The original data collection form has been used while doing an LCA analysis and there was a no uplift in the given data.

Secondary data has been obtained for all other upstream and downstream processes that are beyond the control of the manufacturer (i.e., raw material production) from the ecoinvent 3.8 database. All ecoinvent datasets are complete within the context used and conform to the system boundary and the criteria for the exclusion of inputs and outputs, according to the requirements specified in EN15804 A2.

ISO14044 guidance. **Quality Level**	**Geographical representativeness**	**Technical representativeness**	**Time representativeness**
Very Good	Data from area under study.	Data from processes and products under study. Same state of technology applied as defined in goal and scope (i.e., identical technology).	n/a
Very Good	n/a	n/a	There is approximately 1-2 years between the Ecoinvent LCI reference year, and the time period for which the LCA was undertaken.

Specific European datasets have been selected from the ecoinvent LCI for this LCA. Manufacturer uses the national grid electricity for production, so therefore the national grid electricity dataset has been used for the LCA modelling (Ecoinvent 3.8). The GWP carbon footprint for using 1 kWh of electricity, GB kwh is 0.239 in kgCO2e/kWh. The quality level of time representativeness is also Very Good as the background LCI datasets are based on ecoinvent v3.8 which was compiled in 2021. Therefore, there is less than 5 years between the ecoinvent LCI reference year and the time period for which the LCA was undertaken.

Cut-off criteria

All raw materials and energy input to the manufacturing process have been included, except for direct emissions to air, water, and soil, which are not measured.

LCA Results

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts									
			GWP-total	GWP-fossil	GWP-biogenic	GWP-luluc	ODP	AP	EP-freshwater
			kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CFC11 eq	mol H^+ eq	kg $(PO_4)^{3-}$ eq
Product stage	Raw material supply	A1	1.77E+01	1.75E+01	8.89E-02	3.07E-02	1.63E-06	1.40E-01	2.65E-02
	Transport	A2	2.54E-02	2.54E-02	2.16E-05	9.97E-06	5.87E-09	1.03E-04	1.63E-06
	Manufacturing	A3	1.11E-01	1.10E-01	1.58E-05	1.53E-04	8.66E-09	3.17E-04	2.74E-05
	Total (Consumption grid)	A1-3	1.78E+01	1.77E+01	8.90E-02	3.09E-02	1.65E-06	1.40E-01	2.65E-02
Use stage	Use	B1	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Maintenance	B2	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Repair	B3	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Replacement	B4	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Refurbishment	B5	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Operational energy use	B6	1.19E-04	1.18E-04	1.07E-06	1.24E-07	9.00E-12	2.62E-07	1.62E-08
	Operational water use	B7	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
64% - Recycling and 36% - Landfill									
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	2.23E-03	2.23E-03	1.90E-06	8.75E-07	5.15E-10	9.04E-06	1.43E-07
	Waste processing	C3	2.16E-01	2.16E-01	2.60E-04	4.87E-05	2.60E-08	3.66E-04	5.97E-05
	Disposal	C4	2.36E-01	2.35E-01	2.89E-04	5.39E-05	2.79E-08	3.53E-04	6.65E-05
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-3.40E-01	-3.39E-01	-7.97E-04	-3.58E-04	-1.31E-08	-1.24E-02	-9.88E-04

GWP-total = Global warming potential, total;
GWP-fossil = Global warming potential, fossil;
GWP-biogenic = Global warming potential, biogenic;
GWP-luluc = Global warming potential, land use and land use change;

ODP = Depletion potential of the stratospheric ozone layer;
AP = Acidification potential, accumulated exceedance; and
EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts									
			EP-marine	EP-terrestrial	POCP	ADP-mineral &metals	ADP-fossil	WDP	PM
			kg N eq	mol N eq	kg NMVOC eq	kg Sb eq	MJ, net calorific value	m^3 world eq deprived	disease incidence
Product stage	Raw material supply	A1	2.53E-02	2.74E-01	7.11E-02	7.74E-03	2.27E+02	7.73E+00	9.29E-07
	Transport	A2	3.10E-05	3.39E-04	1.04E-04	8.83E-08	3.84E-01	1.73E-03	2.19E-09
	Manufacturing	A3	2.44E-04	9.97E-04	2.35E-04	6.94E-07	2.70E+00	4.76E-02	3.11E-09
	Total (Consumption grid)	A1-3	2.56E-02	2.76E-01	7.15E-02	7.74E-03	2.31E+02	7.78E+00	9.34E-07
Use stage	Use	B1	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Maintenance	B2	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Repair	B3	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Replacement	B4	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Refurbishment	B5	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Operational energy use	B6	7.86E-08	8.74E-07	2.14E-07	7.35E-10	3.14E-03	7.19E-06	1.82E-12
	Operational water use	B7	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
64% - Recycling and 36% - Landfill									
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	2.72E-06	2.98E-05	9.11E-06	7.74E-09	3.37E-02	1.52E-04	1.92E-10
	Waste processing	C3	9.11E-05	9.21E-04	2.52E-04	4.23E-07	1.06E+00	3.10E-02	4.32E-09
	Disposal	C4	7.69E-05	7.57E-04	2.07E-04	4.70E-07	1.11E+00	3.45E-02	3.32E-09
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-7.07E-04	-9.37E-03	-3.04E-03	-2.84E-04	-6.53E+00	-2.77E-01	-3.55E-08

EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment;
EP-terrestrial = Eutrophication potential, accumulated exceedance;
POCP = Formation potential of tropospheric ozone;
ADP-mineral&metals = Abiotic depletion potential for non-fossil resources;
ADP-fossil = Depletion potential of the stratospheric ozone layer;
WDP = Water (user) deprivation potential, deprivation-weighted water consumption; and
PM = Particulate matter.

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts							
			IRP	ETP-fw	HTP-c	HTP-nc	SQP
			kBq U^{235} eq	CTUe	CTUh	CTUh	dimensionless
Product stage	Raw material supply	A1	2.23E+00	1.82E+03	2.20E-08	9.08E-07	8.75E+01
	Transport	A2	1.97E-03	2.99E-01	9.70E-12	3.14E-10	2.64E-01
	Manufacturing	A3	8.32E-02	4.36E+00	7.93E-11	1.75E-09	1.36E+00
	Total (Consumption grid)	A1-3	2.32E+00	1.83E+03	2.21E-08	9.10E-07	8.92E+01
Use stage	Use	B1	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Maintenance	B2	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Repair	B3	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Replacement	B4	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Refurbishment	B5	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Operational energy use	B6	1.04E-04	1.36E-03	3.84E-14	9.05E-13	1.17E-03
	Operational water use	B7	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
64% - Recycling and 36% - Landfill							
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	1.73E-04	2.63E-02	8.51E-13	2.76E-11	2.31E-02
	Waste processing	C3	6.78E-03	4.13E+00	1.33E-10	1.56E-09	2.20E-01
	Disposal	C4	7.24E-03	4.57E+00	1.47E-10	1.71E-09	2.37E-01
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-3.13E-02	-9.62E+01	-2.68E-09	-1.58E-07	-4.05E+00

IRP = Potential human exposure efficiency relative to U235;
ETP-fw = Potential comparative toxic unit for ecosystems;
HTP-c = Potential comparative toxic unit for humans;
HTP-nc = Potential comparative toxic unit for humans; and
SQP = Potential soil quality index.

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing resource use, primary energy								
			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	2.61E+01	0.00E+00	2.61E+01	2.25E+02	1.77E+00	2.27E+02
	Transport	A2	5.41E-03	0.00E+00	5.41E-03	3.77E-01	0.00E+00	3.77E-01
	Manufacturing	A3	4.40E-01	2.57E-01	6.97E-01	2.95E+00	4.59E-01	3.41E+00
	Total (Consumption grid)	A1-3	2.66E+01	2.57E-01	2.68E+01	2.29E+02	2.23E+00	2.31E+02
Use stage	Use	B1	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Maintenance	B2	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Repair	B3	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Replacement	B4	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Refurbishment	B5	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Operational energy use	B6	7.53E-04	0.00E+00	7.53E-04	4.14E-03	0.00E+00	4.14E-03
	Operational water use	B7	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
64% - Recycling and 36% - Landfill								
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	4.74E-04	0.00E+00	4.74E-04	3.31E-02	0.00E+00	3.31E-02
	Waste processing	C3	4.20E-02	0.00E+00	4.20E-02	-4.35E-01	1.48E+00	1.04E+00
	Disposal	C4	4.65E-02	0.00E+00	4.65E-02	-5.58E-01	1.65E+00	1.09E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-6.17E-01	0.00E+00	-6.17E-01	-4.14E+00	-2.34E+00	-6.47E+00

PERE = Use of renewable primary energy excluding renewable primary energy 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 resource

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing resource use, secondary materials and fuels, use of water						
			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m^3
Product stage	Raw material supply	A1	2.04E-02	0.00E+00	0.00E+00	1.93E-01
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	4.28E-05
	Manufacturing	A3	4.49E-04	2.12E-06	0.00E+00	1.52E-03
	Total (Consumption grid)	A1-3	2.08E-02	2.12E-06	0.00E+00	1.95E-01
Use stage	Use	B1	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Maintenance	B2	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Repair	B3	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Replacement	B4	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Refurbishment	B5	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Operational energy use	B6	3.53E-07	2.73E-09	0.00E+00	6.87E-07
	Operational water use	B7	0.00e+0	0.00e+0	0.00e+0	0.00e+0
64% - Recycling and 36% - Landfill						
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	3.75E-06
	Waste processing	C3	2.76E-04	0.00E+00	0.00E+00	7.45E-04
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	8.28E-04
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-7.27E-03	0.00E+00	0.00E+00	-6.73E-03

SM = Use of secondary material;
RSF = Use of renewable secondary fuels;
NRSF = Use of non-renewable secondary fuels;
FW = Net use of fresh water

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Other environmental information describing waste categories					
			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	1.65E+00	4.21E+01	6.81E-04
	Transport	A2	4.23E-04	7.51E-03	2.60E-06
	Manufacturing	A3	4.72E-03	8.83E-02	2.17E-05
	Total (Consumption grid)	A1-3	1.65E+00	4.22E+01	7.05E-04
Use stage	Use	B1	0.00e+0	0.00e+0	0.00e+0
	Maintenance	B2	0.00e+0	0.00e+0	0.00e+0
	Repair	B3	0.00e+0	0.00e+0	0.00e+0
	Replacement	B4	0.00e+0	0.00e+0	0.00e+0
	Refurbishment	B5	0.00e+0	0.00e+0	0.00e+0
	Operational energy use	B6	4.22E-06	7.28E-05	2.68E-08
	Operational water use	B7	0.00e+0	0.00e+0	0.00e+0
64% - Recycling and 36% - Landfill					
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	3.71E-05	6.59E-04	2.28E-07
	Waste processing	C3	1.24E-01	6.09E-02	6.30E-06
	Disposal	C4	1.38E-01	6.74E-02	6.52E-06
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-6.64E-02	-3.61E+00	-1.08E-05

HWD = Hazardous waste disposed.
NHWD = Non-hazardous waste disposed.
RWD = Radioactive waste disposed

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Other environmental information describing output flows – at end of life								
			CRU	MFR	MER	EE	Biogenic carbon (product)	Biogenic carbon (packaging)
			kg	kg	kg	MJ per energy carrier	kg C	kg C
Product stage	Raw material supply	A1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Manufacturing	A3	0.00E+00	2.86E-02	1.60E-08	1.69E-03	0.00E+00	1.37E-03
	Total (Consumption grid)	A1-3	0.00E+00	2.86E-02	1.60E-08	1.69E-03	0.00E+00	1.37E-03
Use stage	Use	B1	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Maintenance	B2	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Repair	B3	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Replacement	B4	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Refurbishment	B5	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
	Operational energy use	B6	0.00E+00	4.74E-08	2.02E-11	2.18E-06	0.00e+0	0.00e+0
	Operational water use	B7	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0	0.00e+0
64% - Recycling and 36% - Landfill								
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Waste processing	C3	0.00E+00	1.71E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CRU = Components for reuse.
MFR = Materials for recycling
MER = Materials for energy recovery.
EE = Exported Energy

Scenarios and additional technical information

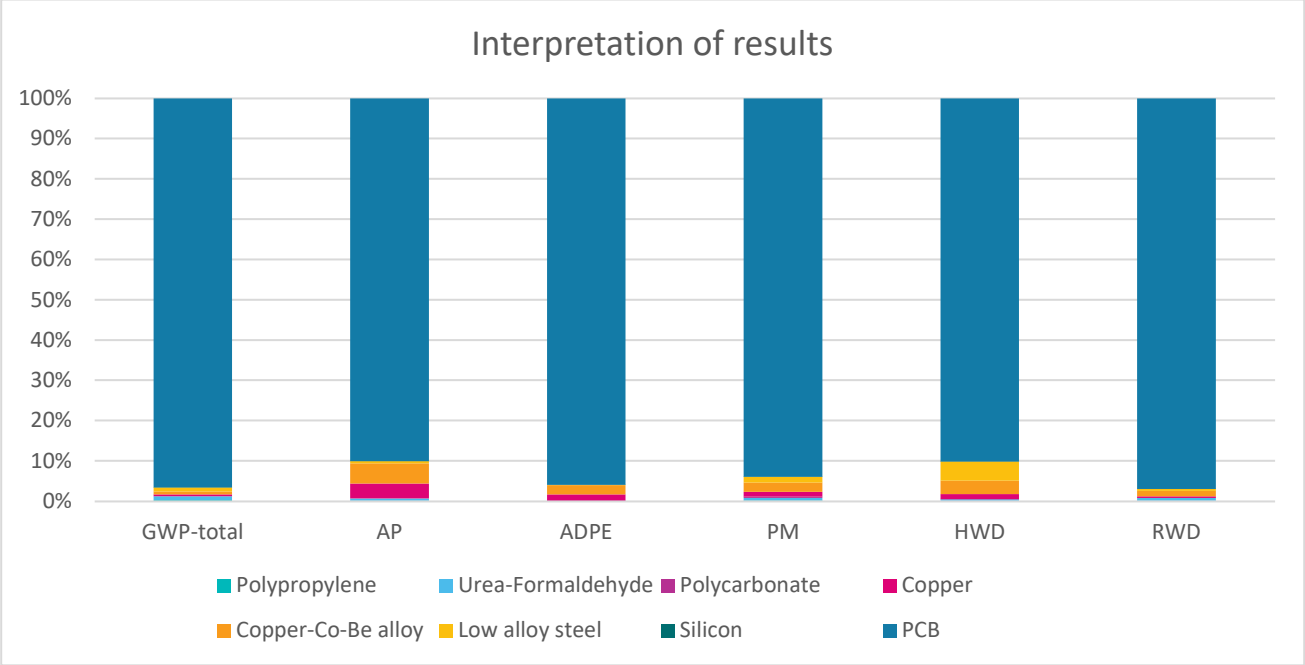
Scenarios and additional technical information			
Scenario	Parameter	Units	Results
Use stage B1 to B5 and B7	Sockets generally provide power to building occupants as needed and automatically turn off when not in use. Therefore, they typically do not require any maintenance or replacement unless there are power fluctuations. Hence, no impacts from B1, B2, B3, B4, and B5. Also, there is no operational water use during the service life of the product so no impacts from B7.		
B6 – Operational energy use	The m.e socket uses a small amount of operational energy to run the automatic functions of the socket, the sockets itself an energy-saving measure turn off automatically to save energy overnight, at weekends and during hybrid working patterns. This operational energy is dwarfed by the savings the socket delivers. During the operational energy use it consumes 0.0005 kWh		
Service life	10-year guarantee for manufacturing faults and defects		
C1 – Deconstruction	At the end of life, power sockets will be manually removed from the building sites, and they will be sent to the pre-processing unit. End-of-life (EoL) phase splits into two components: Disposal and EoL potential, they both represent the influence of expected end-of-life recovery rate on the benefit that can be obtained in subsequent life cycles. Hence, the power socket will be removed manually from the building sites therefore no impacts from C1.		
C2 – Transportation	50km by road has been modelled for module C2 as a typical distance from the demolition site to the recycling plant. However, end-users of the EPD can use this information to calculate the impacts of a bespoke transport distance for module C2 if required.		
	Deconstruction unit to pre-processing unit	km	50
	Type of transport - Road transport	Lorry	16-32 ton
C3 – Preprocessing	Based on the datasheets of the materials and the options available, the power socket has a very positive end of life potential, given that most of the components can be recycled and some of the components like Polycarbonate and silicon are unrecoverable, so they will be ended in landfilling. Therefore, it is assumed as 64% of the material is recovered and 36% is assumed as unrecoverable and they will be sent to landfilling (Qaban, A., McCann, F. and Jin, R. (2022)). The energy used for the processing the waste socket is not included in module C3, it is assumed to be very small and are effectively negligible.		
	Copper waste - recycling	kg	0.009
	Copper alloy waste - recycling	kg	0.023
	Steel waste - recycling	kg	0.084
	PCB waste - recycling	kg	0.055
C4 – Disposal	The recovered power socket is sent to recycling while a small portion is assumed to be unrecoverable, and they will be ended in landfilling.		
	Plastic mixed waste	kg	0.0972

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
Module D	Once sockets have reached the end of their lifetime (10 years minimum) they will be recycled through the electrical recycling scheme. In which, 64% of the socket materials will be recycled at the pre-processing unit and the remaining 36% is assumed as landfilling (Qaban, A., McCann, F. and Jin, R. (2022)). The calculation assumes that there is no yield-loss during the recycling process. Recycling 64% - 0.17152 kg/unit. In 0.17152 kg, low alloyed steel constitutes 0.084 kg. To calculate the benefits of recycling steel in Module D, the pre-existing recycled content will be excluded. This means that the 0.033 kg arising from the original input of scrap steel should be avoided, and the benefits have been calculated for virgin steel, which amounts to 0.051 kg. The waste from copper and copper alloy constitutes 0.006 kg and 0.015 kg, respectively. In the dataset used to calculate the recycling benefits, the pre-existing recycled content is 34.6%. This recycled content should be excluded from the calculation of benefits. Therefore, the pre-existing content has been removed, and the benefits have been calculated for virgin copper.		
	Copper waste - Recycling	kg	0.0060
	Copper alloy waste - Recycling	kg	0.0149
	Steel waste - Recycling	kg	0.0507
	PCB waste - Recycling	kg	0.0550

Interpretation of results

The bulk of the environmental impacts and primary energy demand are attributed to the upstream manufacturing process of the measurable. energy power socket, covered by information modules A1-A3 of EN15804+A2.

It is composed of Urea-Formaldehyde at 25.07%, Low alloy steel at 31.28%, PCB at 20.52%, and other materials accounting for 23.13%. It is noteworthy that PCB, constituting 20.52% of the composition, is primarily accountable for higher impacts, with low alloyed steel following suit.



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