

ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

ELCHEM PRO installation ready self-regulating cable

Pistesarjat Oy



EPD HUB, HUB-6549

Published on 01.06.2026, last updated on 01.06.2026, valid until 01.06.2031

Life Cycle Assessment study has been performed in accordance with the requirements of EN 15804, EPD Hub PCR version 1.2 (24 Mar 2025) and JRC characterization factors EF 3.1.

Created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Pistesarjat Oy
Address	Kylänportti 2, 02940 Espoo, Finland
Contact details	myynti@pistesarjat.fi
Website	www.pistesarjat.fi

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804:2012+A2:2019/AC:2021 and ISO 14025
PCR	EPD Hub Core PCR Version 1.2, 24 Mar 2025
Sector	Construction product
Category of EPD	Third party verified EPD
Parent EPD number	-
Scope of the EPD	Cradle to gate with options, A4-B7, and modules C1-C4 and D
EPD author	Carolina Lassheikki, Pistesarjat Oy
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☑ External verification
EPD verifier	Elena Antuña-Bernardo as an authorized verifier for EPD Hub

This EPD is intended for business-to-business and/or business-to-consumer communication. The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

PRODUCT

Product name	ELCHEM PRO installation ready self-regulating cable
Additional labels	-
Product reference	-
Place(s) of raw material origin	Finland, Poland, Germany, USA and China
Place of production	Kylänportti 2, Espoo, Finland
Place(s) of installation and use	Finland
Period for data	01.11.2023–31.10.2024
Averaging in EPD	Multiple products
Variation in GWP-fossil for A1-A3 (%)	5
GTIN (Global Trade Item Number)	-
NOBB (Norwegian Building Product Database)	(coming soon)
A1-A3 Specific data (%)	96,7

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 m
Declared unit mass	0,13 kg
Mass of packaging	0,015 kg
GWP-fossil, A1-A3 ($kgCO_2e$)	0,63
GWP-total, A1-A3 ($kgCO_2e$)	0,61
Secondary material, inputs (%)	12,9
Total energy use, A1-A3 (kWh)	2,5
Net freshwater use, A1-A3 (m^3)	0,01

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Pistesarjat is a Finnish company primarily known for high-quality solutions in defrosting, electric heating and industrial heating. The company's expertise also covers fire-resistant systems, IT solutions and cabling for electric vehicle charging stations.

With own production and warehouse facilities, Pistesarjat offers cost-effective and swift manufacturing of customized installation-ready cables, while applying continuous product development and precise quality control. Quick deliveries, excellent product knowledge, and customer focus are at the core of the company's aim to provide efficient safety.

PRODUCT DESCRIPTION

ELCHEM PRO is a high-quality self-regulating cable aimed for use in gutters and downpipes, to provide frost protection and de-icing for rainwater systems. The cable is UV-resistant and halogen free (HFFR).

As a self-regulating heating cable, ELCHEM PRO automatically adjusts its heat output based on ambient temperature, providing efficient and safe thermal control. It is, however, always advisable to utilize an external control unit as well, to prolong the cable's service life. The robust ELCHEM PRO has protective copper braiding beneath the UV-resistant outer sheath, providing durability and a long service life. Both the heating cable and the power supply cable are halogen free, causing low emission of smoke and corrosive gases in case of fire.

The ELCHEM PRO is delivered as a pre-assembled installation ready product consisting of a heating cable and a power supply cable, which are connected at our production facilities in Espoo, Finland. The product is made to order, allowing the customer to specify length of both heating cable and power supply cable. Further information can be found at: www.pistesarjat.fi

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	20	Asia, EU
Minerals	0	-
Fossil materials	80	EU, Asia, USA
Bio-based materials	0	-

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	0,005

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 m
Mass per declared unit	0,13 kg
Functional unit	1 m of installed self-regulating cables (20 W/m) for de-icing, from cradle-to-grave, with activities for the reference service life of 21 years.
Reference service life	21 years

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Installation stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
Raw materials	Transport	Manufacturing	Transport	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Not declared = ND.

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

A market-based approach is used in modelling the electricity mix utilized in the factory.

A1 Raw material extraction

The ELCHEM PRO heating cable is assembled from ready-made components. The two main materials (99% of product mass) are a heating cable and a power supply cable, both of which have a third-party verified EPD. Other components have been included through proxy data with generic data points utilizing either exact or similar material and manufacturing technology.

A2 Transport to manufacturing site

Components for ELCHEM PRO are sourced from Finland, Poland, Germany, USA and China. Transportation of raw materials to the manufacturing site is based on primary data, applying transport distances and modes (road and sea) as reported by suppliers. Geographical representativeness has been considered by utilizing global and Europe specific data points, depending on transport route. All road transportation is assumed to be carried out by EURO6 lorries, 16–32 metric ton (World/Europe), meanwhile container ship (World/Europe) is applied for sea transport.

A3 Manufacturing

Assembly happens at the manufacturer's production facility in Espoo, Finland. The production facility is powered fully on an electricity mix of renewable energy sources, including hydroelectric power, biomass, solar energy, wind power, and geothermal energy.

As ELCHEM PRO is made to order, its production begins by cutting desired lengths of heating cable and power supply cable, which are connected by stripping some of the sheath and joining conductors with butt splices. The connection is then protected with PVC tape, heat shrink tubing and self-amalgamating silicone tape, upon which the end of the heating cable is sealed.

Lastly, the product is packaged in a corrugated cardboard box sealed with plastic packaging tape for shipping to the customer.

Data for transportation of packaging materials to the manufacturing site has been collected and modelled with same principles as stated in the A2 description. No ancillary materials are used in the manufacturing process.

Losses resulting from production amount to approx. 1 g of material for each made connection. The production losses are collected as municipal waste and transported by truck (30 km) to Vantaan Energia's waste treatment facility, where the waste is incinerated with energy recovery. Manufacturing waste information is based on the manufacturer's production practices and treatment reports by the waste service provider.

The use of green energy in manufacturing is demonstrated through a Guarantee of Origin, and its use is ensured throughout the validity period of this EPD.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

A4 Transport to installation site

For calculating impact of transport to installation site, a weighted average has been applied. The used distance to the customer is 255 km, which is based on reported transportation distances and destinations in the annual summary from the manufacturer's logistics providers. The assumed mode of transport is EURO6 lorry, 16–32 metric ton.

A5 Installation

The product is assumed to be installed by hand, and installation on site generates no waste except packaging.

There is no standard installation method that would be universally representative for de-icing cables installed in rainwater system. This LCA includes Klipsi® magnetic brackets as installation resource, installed with a 2 m spacing between brackets.

Packaging material end-of-life is based on conservative scenarios, utilizing One Click LCA's EOL construction groups. The EOL construction groups are material specific, considering research and geographically relevant national reports for proposed recycling degrees and treatment averages. Transport to the treatment facility by truck (50–100 km) is included in the scenarios. Waste fractions and their treatment are detailed in the ‘Scenario documentation’ section.

PRODUCT USE AND MAINTENANCE (B1-B7)

B1 Use

It is highly recommended to utilize an external thermostat or control unit with temperature and moisture sensors even for self-regulating heating cables. An adequate control system does not only prolong the lifetime of heating cables remarkably, but it also increases energy efficiency and system functionality.

B2 Maintenance

Once installed, the heating cables for de-icing and snow melting require no direct maintenance. It is, however, advisable to conduct yearly maintenance of the rainwater system itself annually to secure water flow. Accumulated organic material may impact heating efficiency and lifetime of the de-icing system.

B3–B4 Repair and replacement

ELCHEM PRO does not include components viable for repairs or replacements.

B5 Refurbishment

If installed and operated according to instructions, the de-icing cable has a reference service of 21 years. No refurbishment activities are expected within the RSL.

B6–B7 Operational energy and water use

The operational energy consumption has been calculated with the assumptions that there is a yearly average of 138 frost days (temp. <0 °C) in Southern Finland (Finnish Meteorological Institute). The system is assumed to operate 4 hours daily during the frost days. Consumed energy and electricity data are detailed in 'Scenario Documentation'.

ELCHEM PRO does not consume water in use.

PRODUCT END OF LIFE (C1-C4, D)

C1–C2 Deconstruction and transport

At their end of life, cables and magnetic fasteners are dismantled from the building structure by hand, by simply detaching the magnetic brackets, which allows the product to be uninstalled.

Finnish law on waste handling at construction sites along with EEE waste directives mandate separate collection of the declared product. Further, heating cables in gutters and downpipes can easily be uninstalled, and both the cable itself and its installation accessory include metals which are considered valuable materials for recycling. Therefore, the calculation applies the assumption that all cables and installation brackets are collected separately for waste treatment and recycling. Transport to waste treatment assumes a distance of 100 km with EURO6 lorry, 16–32 metric ton as vehicle.

C3–C4, D Waste processing, disposal, benefits and loads

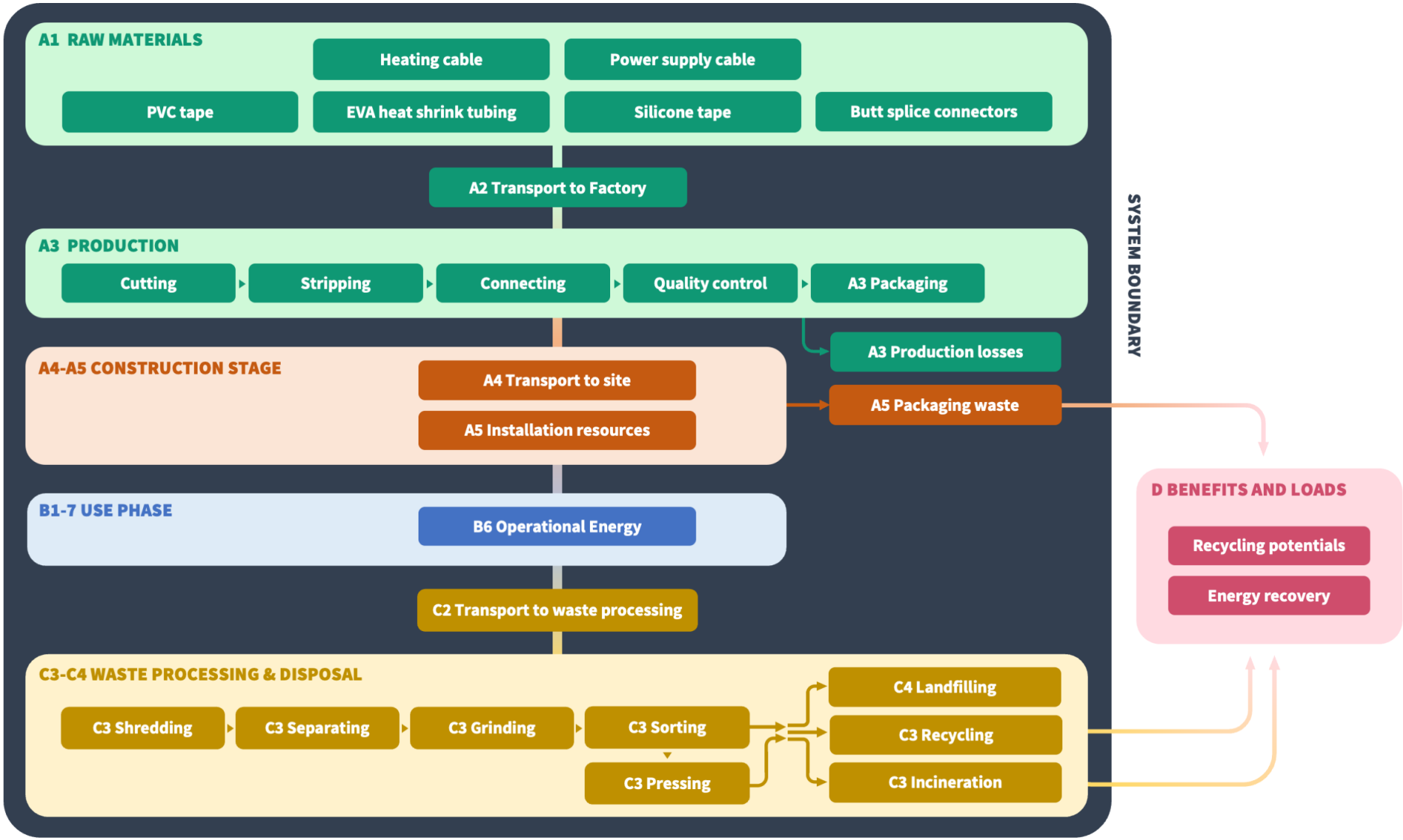
The cables are assumed to be treated with shredding, current separation, and grinding to separate the materials into plastic (79,7 %) and metals (20,3 %). End-of-life scenarios for these materials are based on One Click LCA's EOL construction groups. The EOL construction groups are material specific, considering research and geographically relevant national reports for proposed recycling degrees and treatment averages. Transport to further treatment facilities by truck (50–250 km) is included in the scenarios.

All plastics (incl. sheaths, tapes and heat shrinks) are consolidated and assumed to be treated as HDPE, with waste treatment divided into landfilling 27 %, incineration 49 %, and recycling 24 %. Out of the cable's copper content 60 % is recycled, while 40 % of the material is landfilled. Out of all material, a 0,8 % share has been consolidated to non-ferrous metals.

For the magnetic brackets, the assumed treatment is to separate the plastic from the magnets, applying the same technology as in the cable treatment. The waste scenario for the neodymium magnet is based on that of steel and ferrous metals: 80 % of the material is recycled, while 20 % is landfilled. The plastic is paralleled to polypropylene (PP), and therefore 40 % is incinerated, 20 % is recycled, and 40 % is landfilled.

Waste treatment in Finland is organized so that non-hazardous waste which cannot be recycled is generally incinerated with energy recovery: nationally approximately 50 % of all waste is treated with this method, while less than 1 % of waste is burned without energy recovery. Likewise, landfilling amounts to less than 1 % of waste treatment (Tilastokeskus, 2020–2024). This LCA assumes percentages for landfilling that are higher than national statistics, meaning that the benefits and loads can be considered very conservative.

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded.

Excluded processes are limited to early production stage processes and technologies (A1 stage) that have not been detailed by suppliers or where suitable data has not been available. Such processes and materials are, e.g., the adhesive lining of the PVC tape and the tinning of the copper butt splice connectors.

VALIDATION OF DATA

Data collection for production, transport, and packaging was conducted using time and site-specific information, as defined in the general information section on page 2. Upstream process calculations rely on generic data as defined in the Bibliography section. Manufacturer-provided specific and generic data were used for the product's manufacturing stage. The analysis was performed in One Click LCA EPD Generator, with the 'Cut-Off, EN 15804+A2' allocation method, and characterization factors according to EN 15804:2012+A2:2019/AC:2021 and JRC EF 3.1.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

Data type	Allocation
Raw materials and waste	No allocation
Packaging material	No allocation
Ancillary materials	Not applicable
Manufacturing energy	Allocated by revenue

For the plastic material of magnetic brackets, datapoint Nylon part (PA 6.6), 1070 kg/m3, EN15804+A2, ÖKOBAUDAT 2023 is used to represent PA 6.6 Grilon AZ3 (polyamide). For this material's end of life scenarios, applied assumptions are based on PP (polypropylene).

For the cable's end of life, all plastics (incl. sheaths, tapes and heat shrinks) are consolidated and assumed to be treated as HDPE.

PRODUCT & MANUFACTURING SITES GROUPING

Type of grouping	Multiple products
Grouping method	Based on a representative product
Variation in GWP-fossil for A1-A3, %	5

Averaging is based on one product, but since the product is made to measure, its share of materials varies slightly. The product is made with the same composition at a single manufacturing site.

The components of the product are 1) heating cable, 2) power supply cable, 3) butt splices, 4) heat shrinks, 5) PVC tape, and 6) silicone tape. As the product is made to measure, the length of the heating cable can vary between 2–50 meters. The power supply cable length can vary accordingly.

This declaration departs from an average product, based on the mode configuration from sales data, i.e. most occurring order. The average product consists of 19 m heating cable and 5 m power supply cable.

Since the power supply cable has a larger mass per meter and a slightly higher GWP value, the averaging calculation applies a maximum scenario where the declared unit is calculated with the highest possible percentual share of the power supply cable (2 m heating cable, 50 m power supply cable). The minimum scenario is achieved vice versa, by having the highest possible share of heating cable (50 m heating cable, 2 m power supply cable).

The average modelling resulted in a 0 % difference for GWP fossil between the average product and the minimum averaging scenario. For the maximum scenario, the GWP fossil was +5 % compared to the average product.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator for EPD Hub V3 and EPD Process Certification v3.2.5. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044.

The EPD Generator uses Ecoinvent v3.10.1/3.11/3.12 and One Click LCA databases as sources of environmental data. Allocation used in Ecoinvent 3.10.1/3.11/3.12 environmental data sources follow the methodology ‘allocation, Cut-off, EN 15804+A2‘.

ISO 14025:2010. Environmental labels and declarations - Type III environmental declarations - Principles and procedures. International Organization for Standardization.

ISO 14044:2006. Environmental management - Life cycle assessment - Requirements and guidelines. International Organization for Standardization.

EN 15804:2012+A2:2019. Environmental product declaration - Core rules for the product category of construction products. European Committee for Standardization.

ISO 21930:2017. Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products. International Organization for Standardization.

EN 50693:2019. Product category rules for life cycle assessments of electronic and electrical products and systems. European Committee for Standardization.

Council of European Energy Regulators (2020). 2nd CEER Report on Power Losses. Reference C19-EQS-101-03

Finnish Meteorological Institute, Temperature statistics 1991–2020. Available on https://www.ilmatieteenlaitos.fi/1991-2020-lampotilatilastot

Tilastokeskus, Finnish waste statistics. Available on https://stat.fi/fi/tilasto/jate

ENVIRONMENTAL IMPACT DATA

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	5,86E-01	2,46E-02	-1,39E-03	6,09E-01	7,02E-03	2,89E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,20E+05	0,00E+00	0,00E+00	5,87E-03	2,97E-01	3,54E-03	-2,03E-01
GWP – fossil	kg CO_2e	5,89E-01	2,46E-02	2,03E-02	6,34E-01	7,02E-03	2,67E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,20E+05	0,00E+00	0,00E+00	5,86E-03	2,97E-01	3,54E-03	-2,03E-01
GWP – biogenic	kg CO_2e	-3,63E-03	4,55E-06	-2,24E-02	-2,60E-02	1,41E-06	2,20E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,72E+01	0,00E+00	0,00E+00	1,25E-06	1,98E-04	-1,86E-06	0,00E+00
GWP – LULUC	kg CO_2e	3,84E-04	8,91E-06	6,29E-04	1,02E-03	2,52E-06	4,63E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,44E+00	0,00E+00	0,00E+00	2,37E-06	5,21E-05	2,60E-07	-2,62E-04
Ozone depletion pot.	kg $CFC\text{-}_{11}e$	4,84E-06	4,88E-10	7,49E-10	4,84E-06	1,40E-10	1,04E-10	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,75E-03	0,00E+00	0,00E+00	9,97E-11	4,83E-10	1,08E-11	-4,26E-09
Acidification potential	mol H^+e	8,91E-03	6,18E-05	1,33E-04	9,10E-03	1,46E-05	1,54E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,47E+02	0,00E+00	0,00E+00	1,62E-05	1,83E-04	2,90E-06	-3,01E-03
EP-freshwater[2)]	kg Pe	5,01E-04	1,64E-06	1,07E-05	5,13E-04	4,73E-07	1,42E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,87E+01	0,00E+00	0,00E+00	4,27E-07	1,30E-05	4,36E-08	-1,82E-03
EP-marine	kg Ne	7,20E-04	1,49E-05	5,03E-05	7,86E-04	3,51E-06	1,83E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,40E+01	0,00E+00	0,00E+00	4,79E-06	5,28E-05	7,87E-06	-8,02E-04
EP-terrestrial	mol Ne	8,93E-03	1,62E-04	4,58E-04	9,55E-03	3,78E-05	1,98E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,65E+02	0,00E+00	0,00E+00	5,20E-05	5,05E-04	1,19E-05	-1,14E-02
POCP ("smog")[3)]	kg NMVOCe	2,66E-03	9,23E-05	1,07E-04	2,86E-03	2,43E-05	5,95E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,74E+02	0,00E+00	0,00E+00	2,46E-05	1,47E-04	4,97E-06	-2,52E-03
ADP-minerals & metals[4)]	kg Sbe	7,11E-05	8,10E-08	2,66E-07	7,15E-05	2,34E-08	5,78E-07	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,25E-02	0,00E+00	0,00E+00	1,85E-08	1,59E-07	8,71E-10	-3,46E-05
ADP-fossil resources	MJ	7,74E+00	3,46E-01	2,92E-01	8,37E+00	9,87E-02	3,13E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,49E+06	0,00E+00	0,00E+00	8,32E-02	4,02E-01	9,26E-03	-3,79E+00
Water use[5)]	m^3e depr.	5,51E+00	1,71E-03	1,41E-02	5,52E+00	4,91E-04	3,82E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,45E+06	0,00E+00	0,00E+00	4,06E-04	9,44E-02	4,16E-05	-6,78E-02

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	1,15E-08	1,80E-09	1,38E-09	1,47E-08	5,17E-10	1,25E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,03E-03	0,00E+00	0,00E+00	4,85E-10	1,67E-09	6,60E-11	-2,39E-08
Ionizing radiation[6)]	kBq U235e	2,86E-02	4,42E-04	1,83E-03	3,08E-02	1,27E-04	2,64E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,10E+05	0,00E+00	0,00E+00	8,76E-05	3,10E-03	8,49E-06	-2,95E-02
Ecotoxicity (freshwater)	CTUe	3,82E+01	4,57E-02	6,99E-01	3,90E+01	1,31E-02	1,89E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,81E+05	0,00E+00	0,00E+00	1,18E-02	4,50E+00	1,09E-02	-2,13E+01
Human toxicity, cancer	CTUh	7,82E-10	4,15E-12	9,89E-12	7,96E-10	1,18E-12	3,84E-10	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,00E-06	0,00E+00	0,00E+00	9,82E-13	3,12E-11	1,89E-13	-6,72E-11
Human tox. non-cancer	CTUh	5,64E-08	2,17E-10	3,58E-10	5,70E-08	6,25E-11	4,35E-10	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,22E-04	0,00E+00	0,00E+00	5,28E-11	7,93E-10	3,37E-11	-2,87E-09
SQP[7)]	-	1,13E+00	2,06E-01	1,67E+00	3,01E+00	5,97E-02	1,96E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,61E+04	0,00E+00	0,00E+00	6,00E-02	1,38E-01	2,08E-02	-2,45E+00

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator; 7) SQP = Land use related impacts/soil quality.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8)]	MJ	7,62E-01	6,00E-03	6,67E-01	1,44E+00	1,73E-03	-1,03E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,15E+05	0,00E+00	0,00E+00	1,29E-03	4,55E-02	1,33E-04	-7,48E-01
Renew. PER as material	MJ	3,51E-03	0,00E+00	1,89E-01	1,92E-01	0,00E+00	-1,89E-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	-2,39E-03	-1,07E-03	0,00E+00
Total use of renew. PER	MJ	7,65E-01	6,00E-03	8,56E-01	1,63E+00	1,73E-03	-2,92E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,15E+05	0,00E+00	0,00E+00	1,29E-03	4,31E-02	-9,41E-04	-7,48E-01
Non-re. PER as energy	MJ	6,90E+00	3,46E-01	2,83E-01	7,53E+00	9,87E-02	2,80E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,20E+06	0,00E+00	0,00E+00	8,32E-02	-2,70E+00	-1,13E+00	-3,79E+00
Non-re. PER as material	MJ	8,50E-01	0,00E+00	-2,40E-03	8,47E-01	0,00E+00	5,44E-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	-6,24E-01	-2,77E-01	1,07E+00
Total use of non-re. PER	MJ	7,75E+00	3,46E-01	2,80E-01	8,37E+00	9,87E-02	2,86E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,20E+06	0,00E+00	0,00E+00	8,32E-02	-3,33E+00	-1,40E+00	-2,71E+00
Secondary materials	kg	1,68E-02	1,60E-04	1,46E-02	3,16E-02	4,58E-05	8,54E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,24E-03	0,00E+00	0,00E+00	3,74E-05	1,95E-04	3,19E-06	4,38E-02
Renew. secondary fuels	MJ	1,13E-02	2,01E-06	1,36E-03	1,26E-02	5,80E-07	2,40E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,80E-07	0,00E+00	0,00E+00	4,74E-07	1,19E-05	6,07E-08	-1,35E-05
Non-ren. secondary fuels	MJ	1,85E-02	0,00E+00	0,00E+00	1,85E-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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	9,90E-03	4,68E-05	3,20E-04	1,03E-02	1,35E-05	1,27E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,60E+03	0,00E+00	0,00E+00	1,15E-05	2,11E-03	-1,05E-04	-2,88E-03

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	2,17E-02	5,02E-04	1,59E-03	2,38E-02	1,44E-04	5,52E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,10E-01	0,00E+00	0,00E+00	1,32E-04	2,37E-02	1,51E-05	-2,87E-02
Non-hazardous waste	kg	6,84E-02	1,05E-02	3,77E-02	1,17E-01	3,03E-03	1,20E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,84E+03	0,00E+00	0,00E+00	2,61E-03	2,06E-01	1,45E-01	-5,27E-01
Radioactive waste	kg	2,03E-05	1,10E-07	9,13E-07	2,13E-05	3,16E-08	1,10E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,14E+01	0,00E+00	0,00E+00	2,16E-08	7,62E-07	2,08E-09	-7,49E-06

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	7,82E-08	7,82E-08	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
Materials for recycling	kg	1,64E-02	0,00E+00	1,46E-02	3,10E-02	0,00E+00	1,22E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,14E-08	0,00E+00	0,00E+00	0,00E+00	5,20E-02	0,00E+00	0,00E+00
Materials for energy rec	kg	2,11E-03	0,00E+00	1,35E-03	3,46E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,16E-16	0,00E+00	0,00E+00	0,00E+00	5,19E-02	2,19E-04	0,00E+00
Exported energy	MJ	2,27E-02	0,00E+00	4,07E-04	2,31E-02	0,00E+00	8,10E-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	8,31E-01	0,00E+00	0,00E+00
Exported energy – Electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,30E-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	3,50E-01	0,00E+00	0,00E+00
Exported energy – Heat	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,80E-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	4,81E-01	0,00E+00	0,00E+00

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO_2e	5,85E-01	2,45E-02	1,96E-02	6,29E-01	6,97E-03	2,30E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,20E+05	0,00E+00	0,00E+00	5,83E-03	2,97E-01	3,39E-03	-2,00E-01
Ozone depletion Pot.	kg $CFC_{-11}e$	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Acidification	kg SO_2e	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Eutrophication	kg PO_4^3e	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
POCP (“smog”)	kg C_2H_4e	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ADP-elements	kg Sbe	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ADP-fossil	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

ADDITIONAL INDICATOR – GWP-GHG

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG[9)]	kg CO_2e	5,89E-01	2,46E-02	2,10E-02	6,35E-01	7,02E-03	2,67E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,20E+05	0,00E+00	0,00E+00	5,86E-03	2,97E-01	3,54E-03	-2,03E-01

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. In addition, the characterisation factors for the flows – CH4 fossil, CH4 biogenic and Dinitrogen monoxide – were updated. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterisation factor for biogenic CO2 is set to zero

SCENARIO DOCUMENTATION

DATA SOURCES

Manufacturing energy scenario documentation

1. Electricity production, wind, 1-3MW turbine, onshore, Finland, Ecoinvent, 0.0195 kgCO2e/kWh
2. Electricity production, deep geothermal, World, Ecoinvent, 0.0718 kgCO2e/kWh
3. Electricity production, photovoltaic, 3kWp slanted-roof installation, single-Si, panel, mounted, Finland, Ecoinvent, 0.12 kgCO2e/kWh
4. Electricity production, hydro, run-of-river, Finland, Ecoinvent, 0.0044 kgCO2e/kWh
5. Electricity production, wood, future, World, Ecoinvent, 0.0445 kgCO2e/kWh

Transport scenario documentation - A4 (Transport resources)

1. Transport, freight, lorry 16-32 metric ton, EURO6, 255.0 km

Transport to the building site (A4) - Scenario documentation

Scenario parameter	Value
Capacity utilization (including empty return) %	50
Bulk density of transported products	1,45E+02
Volume capacity utilization factor	1

Installation at the building site (A5) - Scenario documentation

Scenario parameter	Value
Energy: type and consumption (MJ or kWh)	-
Water use (m^3)	-
Ancillary materials: type and mass (kg)	Magnetic polyamide bracket Klipsi® (à 31 g) for cable installations, installed with 2 m spacing between brackets.
Waste materials: type and mass (kg)	Cardboard box 0.01458 kg Plastic tape 0.00042 kg
Waste materials: output routes	Cardboard box 0.0121 kg recycling (83 %), 0.0012 kg incineration (8 %), 0.0013 kg landfilled (9 %) Plastic tape 0.00017 kg recycling (40%), 0.00015 kg incineration (37 %), 0.000096 kg landfilled (23 %)
Direct emissions (kg)	-

Use stages scenario documentation - B2 Maintenance

Scenario information	Value
Maintenance process description	-
Maintenance cycle (per RSL)	-
Energy use (kWh/cycle)	-
Water use (m3 or litres/cycle)	-
Ancillary materials (kg/cycle)	-
Waste materials (kg/cycle)	-

Use stages scenario documentation - B3 Repair

Scenario information	Value
Repair & Inspection process description	-
Repair cycle (per RSL)	-
Energy use (kWh/cycle)	-
Water use (m3 or litres/cycle)	-
Ancillary materials (kg/cycle)	-
Waste materials (kg/cycle)	-

Use stages scenario documentation - B4 Replacement

Scenario information	Value
Replacement cycle (per RSL)	-
Activity type, Energy use (kWh)	-
Exchange of worn parts, mass (kg)	-

Use stages scenario documentation - B5 Refurbishment

Scenario information	Value
Refurbishment process, cycle (per RSL)	-
Energy use (kWh/cycle)	-
Ancillary materials (kg/cycle)	-
Waste materials (kg/cycle)	-

Use stages scenario documentation - B6-B7 Use of energy and use of water

Scenario information	Value
Type of energy, consumption (kWh)	Electricity, Finland, residual mix, 2024, One Click LCA, 0.55 kg CO2e / kWh Operation 4 h /day @ 20 w/m, 138 operational days/year * RSL 21 years = 220 379 kWh The operational energy consumption has been calculated with the assumptions that there is a yearly average of 138 frost days (temp. <0 °C) in Southern Finland based on statistics from the Finnish Meteorological Institute. The system is assumed to operate 4 hours daily during the frost days.
Freshwater consumption (m3)	-
Performance characteristics, e.g., power rating, efficiency, capacity	Use of energy has been calculated by assuming that the de-icing cable operates at full power. However, it is highly recommended to utilize an external thermostat or control unit with temperature and moisture sensors even for self-regulating heating cables. An adequate control system does not only prolong the lifetime of heating cables remarkably, but it also increases energy efficiency and system functionality.

End of life (C1-C4) - Scenario documentation

Scenario information	Value
Collection process: collected separately (kg)	0.14576 kg (100 %) collected separately.
Collection process: Mixed waste (kg)	-
Recovery: re-use (kg)	0
Recovery: recycling (kg)	0,05
Recovery: energy recovery (kg)	0,05
Disposal (kg)	0
Scenario assumptions e.g. transportation (mode, km) & other	Waste treatment transport 100 km with EURO6 lorry, 16–32 metric ton.

THIRD-PARTY VERIFICATION STATEMENT

EPD Hub declares that this EPD is verified in accordance with ISO 14025 by an independent, third-party verifier. The project report on the Life Cycle Assessment and the report(s) on features of environmental relevance are filed at EPD Hub. EPD Hub PCR and ECO Platform verification checklist are used.

EPD Hub is not able to identify any unjustified deviations from the PCR and EN 15804+A2 in the Environmental Product Declaration and its project report.

EPD Hub maintains its independence as a third-party body; it was not involved in the execution of the LCA or in the development of the declaration and has no conflicts of interest regarding this verification.

The company-specific data and upstream and downstream data have been examined as regards plausibility and consistency. The publisher is responsible for ensuring the factual integrity and legal compliance of this declaration.

The software used in creation of this LCA and EPD is verified by EPD Hub to conform to the procedural and methodological requirements outlined in ISO 14025:2010, ISO 14040/14044, EN 15804+A2, and EPD Hub Core Product Category Rules and General Program Instructions.

Verified tools

Tool verifier: Magaly Gonzalez Vazquez
Tool verification validity: 27 March 2025 - 26 March 2028

Elena Antuña-Bernardo as an authorized verifier for EPD Hub Limited
01.06.2026

