Environmental
Product
Declaration
In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Solartag T-ROOF roof tiles
from
Solartag ApS

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-09093
Publication date:	2023-09-29
Valid until:	2028-09-29

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

General information

Programme information

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

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): PCR 2019:14 Construction products Version 1.2.5; 2022-11-01 c-PCR-016 Photovoltaic modules and parts thereof (adopted from EPD Norway 2022-03-31)
PCR review was conducted by: PCR 2019:14: The Technical Committee of the International EPD® System. A full list of members available on www.environdec.com. The review panel may be contacted via info@environdec.com Chair of the PCR review: Claudia A. Peña, DDERE Research & Technology c-PCR-016 Technical Committee of EPD International acting as PCR Review Panel for the adoption process Chair of the PCR review: Claudia A. Peña, DDERE Research & Technology
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by accredited certification body Third-party verification: Viktor Hakkarainen, *Bureau Veritas certification Sverige AB* is an approved certification body accountable for the third-party verification The certification body is accredited by: SWEDAC, Accreditation number: 1236
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

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

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g.

identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

EPD Owner	SOLARTAG **Solartag Aps** **https://solartag.eu/** **Address: Industrikrogen 4 1.t.h, 2635 Ishøj, Denmark** **Contact:** **Mikkel Karlsson** **COO** **mk@solartag.eu**
LCA author	BUREAU VERITAS **Bureau Veritas HSE DK** https://www.bureauveritas.dk/da **Address: Oldenborggade 25, 7000 Fredericia, Denmark** **Author:** **Julie M. V. Larsen**
Programme Operator	EPD® THE INTERNATIONAL EPD® SYSTEM **info@environdec.com**

Company Information

Description of the organisation: Solartag ApS was founded by carpenter and inventor Thomas Pedersen. Thomas was concerned with creating a strong and more sustainable roofing material with respect for Danish building traditions. The result was Solartag, which also includes a patented bracket solution that ensures quick, safe and, not least, screwless assembly. Solartag also sells standard solar systems through solcelleanlæg.dk, so the company offers both an integrated and a roof-mounted solar solution. The company started small in St. Heddinge, but grew rapidly. At the start of 2021, Jens Romundstad joined, who has previously been, among other things, Sales Director at fakta A/S and HR Director at CoopDanmark A/S. Jens took over as Managing Director in late summer 2021 and bought into Solartag, so that the company, which now had its domicile in Ishøj, was owned by Thomas and

Jens. At the beginning of 2022, Solartag separated its assembly department, so that today Solartag exclusively uses independent, external contractors in strong partnerships for the assembly tasks, both Solartag and solar cell systems. Solartag therefore focuses today primarily on sales and consultancy, as a supplier of strong solar cell solutions, through a strong organisation.

Product-related or management system-related certifications: N/A
Name and location of production site: Production takes place in Lithuania at Metsolar, Žirmūnų st. 139, LT-09120, Vilnius, Lithuania.

Product information
Product name: Solartag T-ROOF™
Reference Service Life: 25 years, as per c-PCR-016
Product description: Solartag is an aestatic satin matte T-roof, with invisible, integrated cells. Solartag is comprised of 6 components, which in unison offers full adaptation to all breakthrough roof challenges. A mobile app lets you monitor your solar effect. The matt surface minimizes glare and is best compared to a slate roof. With 11.4 kg per ^{m2}, Solartag is a lightweight ventilated roof, that can be assembled on an existing laths, with a firm roof sheating and underlay. Solartag requires little professional assistance, making it an easy task for many DIY houseowners.
Geographical scope: A1-A3 is modelled with an EU geographical validity. An energy output calculation has been made. This is an example in a Danish (DK) geographical validity, with an RSL of 25 years. This is a calculation example only valid for the specific location in Denmark. Module C is valid for the geographical region of EU.

Calculation for lifetime energy output

The energy production of the active module is determined based on the value of the factors below. These are all depended in the module type.

	Value	Unit
Solar irradiation (S_rad)	950	kWh/kWp/year
Area of module (A)	0.5046	m^2
Module yield (y)	0.141	kWp/m^2
Performance ratio (PR)	0.93	Unitless
Degradation rate (deg)	0.7	%
Reference Service life (RSL)	25	Years

For the first year of operation, the energy production is calculated thusly:

$$E_1 = S_{rad} * A * y * PR * (1 - deg)$$

For the whole RSL the calculation is carried out with the below formular:

$$E_{RSL} = E_1 * \left(1 + \sum_{n=1}^{RSL-} (1 - deg)^n\right)$$

For the RSL of 25 years for the location used in this example, the total production will be 1,433.2 kWh for 1 module. If a different location is used, the total production will be different.

LCA information

Functional unit / declared unit:

Functional unit: 1 Wp of manufactured photovoltaic module, from cradle-to-grave, with activities needed for a study period for a RSL of 25 years.

Declared unit: 1 m^2 of manufactured photovoltaic module, from cradle-to-grave, with activities needed for a study period for a RSL of 25 years.

Allocation Procedure: The allocation is based on the share of the turnover at the production site, which for Solartag ApS is equal to 38%. The products which are made for Solartag ApS are homogeneous in nature since they consists only of T-ROOF modules.

Reference service life:

25 years

Time representativeness:

Data used are collected in 2023 and valid for the years of 2022.

Database(s) and LCA software used:

Software: SimaPro 9.5

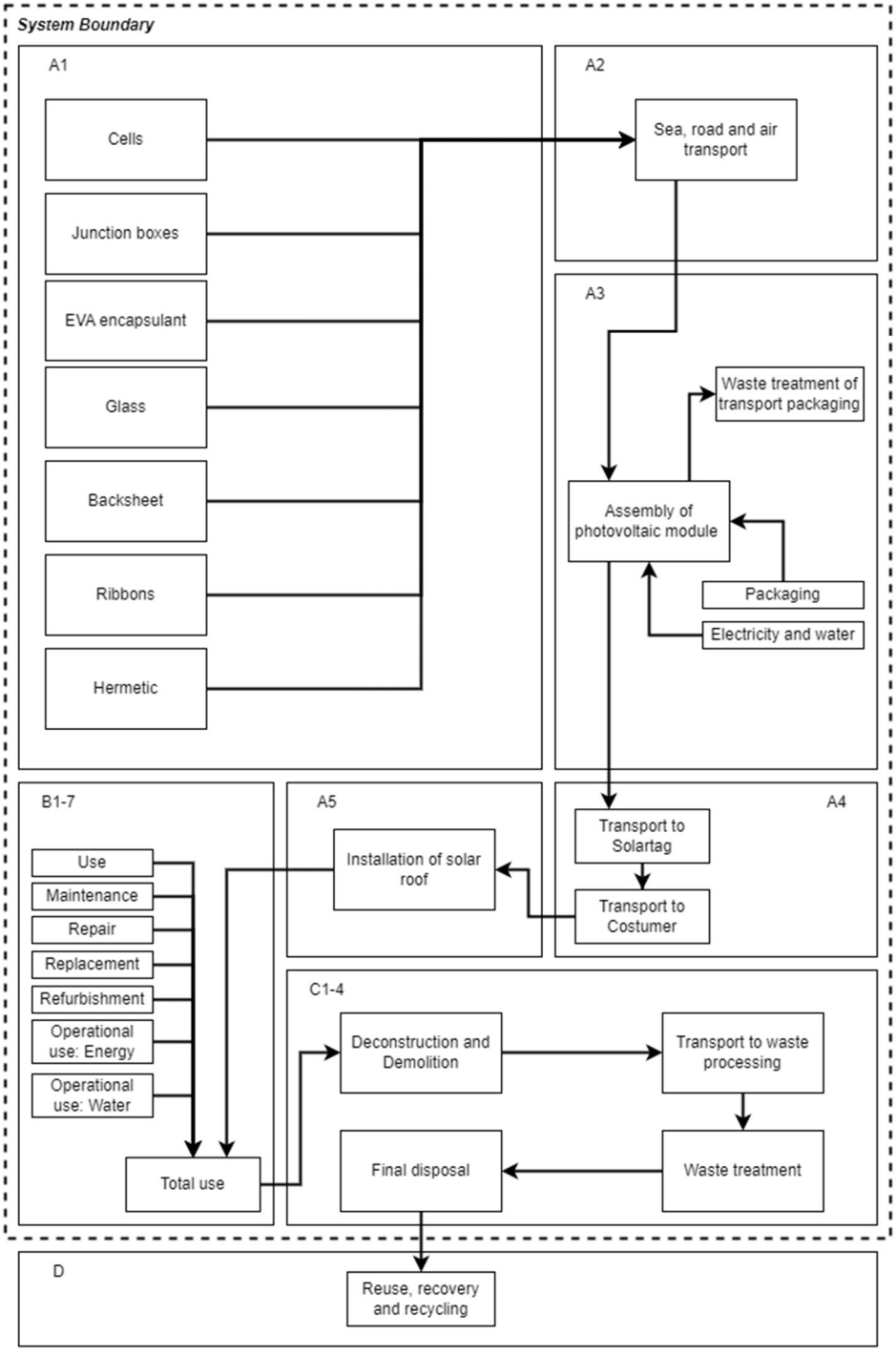
Database: EcoInvent 3.9.1

Description of system boundaries:

c) Cradle to grave and module D (A + B + C + D).

Alle lifecycle stages are considered in this EPD.

System diagram:



More information:

Manufacturing Process: The module is manufactured in Lithuania. Here the components are combined in each module, with raw material sourced from global suppliers. Cells are connected in series with the tab ribbon connector in rows of 7 cells, soldered with the stringing machine. The glass

is then cleaned, and residue is removed. EVA encapsulant is cut to fit the size of glass surface and bottom layer of encapsulant is laid on the glass. Two cell strings are positioned on the glass according to a drawing. The strings are interconnected with the bus ribbon and soldered onto the tab ribbon connectors. Terminals are then soldered on each of the poles. Interlayer is added to complete the cell array. Second EVA encapsulant sheet is positioned on top of the cell array. The backsheet is positioned on top of the second encapsulant layer and terminals are drawn through second encapsulant layer and the backsheet. The finished product is then enclosed via vacuum lamination. On the back of the laminate a junction box is positioned above the terminals on the backsheet. Before the junction box is placed on the backsheet silicone is applied for permanent adhesion. Module terminals are fastened in corresponding junction box terminals. The connection is sealed with silicone potting material. Lastly, the finished module is flash tested and packed for shipment.

As per section 6.2.3 in the PCR, the following is not included in the scope since these are expected to be included at the building level assessment:

- Materials for the mounting system of the module
- Microinverters
- Wiring
- Switches
- One or many solar inverters
- Battery bank
- Battery charger
- Other electrical components and systems necessary to connect the photovoltaic module to the electrical grid.
- Personnel activities and transport of personnel
- Fasteners (screws) and other additional materials

Assumptions:

- Vehicles to waste is Euro 5
- Production waste is assumed to be 1% and waste as a result of testing is assumed to be 3%

Cut-off:

The general rules for cut-off of inputs and outputs follow the requirements in EN 15804, 6.3.6, where the total of neglected input flows per module shall be a maximum of 5 % of energy usage and mass and 1 % of energy usage and mass for unit processes. For renewable and non-renewable the cut-off criterion is 1%. The LCA study are based on known specific data for packaging materials and 100% product prescription. However generic data from the Ecoinvent 3.8 database are used for raw material.

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Geography	GLO	GLO	LU	EU	DK	DK	DK	DK	DK	DK	DK	DK	EU	EU	EU	EU	EU
Specific data used	13.3%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%					-	-	-	-	-	-	-	-	-	-	-	-

(X = Included in LCA, GLO = Source from multiple countries inside and outside Europe)

Scenarios after Module A3: All modules after A3 are based on probable scenarios, except A4, which is based on actual customer transportation in the reference year. Modules B1-B7 are all based on knowledge of how the Solartag T-ROOF operates and test data. Module C1-C4 is based in default modelling as described in c-PCR-014.

Rates for module D: Rates applied to materials calculated for module D.

	Recycling	Incineration	Landfill	Losses during recycling
Silicon	90%	5%	6%	5%
Junction Box	42%	0%	58%	70%
EVA encapsulant	29%	32%	39%	22%
Glass	88%	5%	7%	5%
Backsheet	29%	32%	39%	22%
Copper	95%	0%	5%	5%

Content information

Below is the weight per 1 module. The weights for functional unit and declared unit is obtained by either dividing the weight with the total Wp of a module or the area of a module.

- Weight of a module: 5.75 kg
- Area of a module: 0.5046 m^2
- Total Wp of a module: 71 Wp

Product components	Weight per unit, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Glass	4.77E+00	-	-
EVA encapsulant	4.04E-01	-	-
Backsheet (PET)	1.85E-01	-	-
Junction Box	1.70E-01	-	-
Cells (Mono-silicon)	1.26E-01	-	-
Copper	6.30E-02	-	-
Hermetic (Silicon)	3.00E-02	-	-
TOTAL	5.75E+00	-	-
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/kg**
Cardboard	1.32E-01	2.30%	1.57E-02
Packing film	6.90E-03	0.12%	-
Wooden pallet	3.35E-01	5.84%	3.99E-02
Plastic Strap	3.00E-03	0.05%	-
TOTAL	4.77E-01	8.30%	5.56E-02

Product components	Weight per FU, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Glass	6.72E-02	-	-
EVA encapsulant	5.69E-03	-	-
Backsheet	2.61E-03	-	-

Junction Boxes	2.39E-03	-	-
Cells	1.77E-03	-	-
Copper	8.87E-04	-	-
Hermetic	4.23E-04	-	-
TOTAL	8.10E-02	-	-
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/kg**
Cardboard	9.72E-05	2.30%	9.30E-04
Packing film	1.86E-03	0.12%	-
Wooden pallet	4.72E-03	5.84%	2.36E-03
Plastic Strap	4.23E-05	0.05%	-
TOTAL	6.72E-03	8.30%	3.29E-03

Product components	**Weight per DU, kg**	**Post-consumer material, weight-%**	**Biogenic material, weight-% and kg C/kg**
Glass	9.45E+00	-	-
EVA encapsulant	8.01E-01	-	-
Backsheet	3.67E-01	-	-
Junction Boxes	3.37E-01	-	-
Cells	2.50E-01	-	-
Copper	1.25E-01	-	-
Hermetic	5.95E-02	-	-
TOTAL	1.14E+01	-	-
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/kg**
Cardboard	1.37E-02	2.30%	1.31E-01
Packing film	2.62E-01	0.12%	-
Wooden pallet	6.65E-01	5.84%	3.32E-01

Plastic Strap	5.95E-03	0.05%	-
TOTAL	9.46E-01	8.30%	4.63E-01

Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% per functional (kg/Wp)
Lead	231-100-4	7439-92-1	0.07%

Results of the environmental performance indicators – Functional Unit (1 Wp)

Mandatory impact category indicators according to EN 15804 – Functional Unit (1 Wp)

Results per functional or declared unit										
Indicator	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP- total	kg CO_2 eq.	5.88E-01	1.04E-02	3.79E-03	0.0E+00	0.0E+00	3.63E-04	1.08E-02	1.46E-03	-7.65E-02
GWP-fossil	kg CO_2 eq.	5.64E-01	1.04E-02	3.73E-04	0.0E+00	0.0E+00	3.63E-04	1.07E-02	2.12E-04	-7.91E-02
GWP-biogenic	kg CO_2 eq.	2.39E-02	1.06E-05	3.42E-03	0.0E+00	0.0E+00	3.85E-07	1.17E-04	1.25E-03	2.62E-03
GWP- luluc	kg CO_2 eq.	7.07E-04	4.74E-06	3.83E-07	0.0E+00	0.0E+00	1.36E-07	1.27E-06	1.29E-07	-7.92E-05
ODP	kg CFC 11 eq.	5.74E-08	2.48E-09	2.69E-11	0.0E+00	0.0E+00	9.04E-11	1.55E-10	3.16E-11	-7.84E-09
AP	mol H^+ eq.	3.44E-03	4.35E-05	1.33E-06	0.0E+00	0.0E+00	1.16E-06	6.88E-06	1.04E-06	-6.22E-04
EP-freshwater	kg P eq.	3.55E-05	8.08E-08	3.85E-09	0.0E+00	0.0E+00	2.59E-09	3.14E-08	8.96E-09	-1.73E-06
EP-marine	kg N eq.	6.61E-04	9.31E-06	8.51E-07	0.0E+00	0.0E+00	2.54E-07	2.29E-06	2.03E-06	-8.88E-05
EP-terrestrial	mol N eq.	7.70E-03	1.04E-04	5.24E-06	0.0E+00	0.0E+00	2.83E-06	2.44E-05	3.61E-06	-1.10E-03
POCP	kg NMVOC eq.	2.09E-03	3.66E-05	1.71E-06	0.0E+00	0.0E+00	1.11E-06	7.00E-06	1.33E-06	-2.76E-04
ADP-minerals&metals*	kg Sb eq.	3.22E-05	3.51E-08	9.23E-10	0.0E+00	0.0E+00	8.68E-10	8.66E-09	4.61E-10	-8.48E-07
ADP-fossil*	MJ	7.78E+00	1.64E-01	2.43E-03	0.0E+00	0.0E+00	5.90E-03	1.79E-02	2.55E-03	-9.58E-01
WDP*	m^3	3.57E-01	5.76E-04	8.92E-06	0.0E+00	0.0E+00	2.04E-05	3.92E-04	1.03E-04	-1.92E-02
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; 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; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption									

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

** Disclaimer: 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.

Additional mandatory and voluntary impact category indicators – Functional Unit (1 Wp)

Results per functional or declared unit										
Indicator	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP-GHG	kg CO_2 eq.	5.65E-01	1.04E-02	3.74E-04	0.0E+00	0.0E+00	3.63E-04	1.07E-02	2.13E-04	-7.92E-02
PM	disease inc.	3.16E-08	1.01E-09	2.14E-11	0.0E+00	0.0E+00	4.20E-11	1.11E-10	1.77E-11	-7.80E-09
IRP**	kBq U235 eq	2.73E-02	7.11E-04	9.82E-06	0.0E+00	0.0E+00	2.56E-05	7.02E-05	9.87E-06	-2.61E-03
ETP-fw*	CTUe	2.34E+01	1.31E-01	4.66E-03	0.0E+00	0.0E+00	4.61E-03	3.17E-02	9.54E-03	-1.81E+00
HTP-c*	CTUh	3.13E-10	4.30E-12	2.43E-13	0.0E+00	0.0E+00	1.26E-13	1.92E-12	1.40E-13	-2.68E-11
HTP-nc*	CTUh	9.84E-09	1.33E-10	7.55E-12	0.0E+00	0.0E+00	4.86E-12	4.26E-11	4.61E-12	-2.51E-10
SQP*	-	2.53E+00	1.55E-01	1.76E-03	0.0E+00	0.0E+00	6.75E-03	2.03E-02	5.74E-03	-7.35E-01
Additional voluntary indicators e.g. the voluntary indicators from EN 15804 or the global indicators according to ISO 21930:2017										

Resource use indicators

Results per functional or declared unit										
Indicator	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	MJ	9.90E-01	2.40E-03	1.01E-04	0.0E+00	0.0E+00	7.51E-05	6.27E-03	5.76E-05	-1.20E-01
PERM	MJ	1.14E-01	0.00E+00	1.05E-01	0.0E+00	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	1.10E+00	2.40E-03	1.05E-01	0.0E+00	0.0E+00	7.51E-05	6.27E-03	5.76E-05	-1.20E-01
PENRE	MJ	8.01E+00	1.74E-01	-3.11E-03	0.0E+00	0.0E+00	6.27E-03	1.91E-02	2.71E-03	-1.03E+00
PENRM	MJ	3.09E-01	0.00E+00	5.70E-03	0.0E+00	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	8.32E+00	1.74E-01	2.58E-03	0.0E+00	0.0E+00	6.27E-03	1.91E-02	2.71E-03	-1.03E+00
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.0E+00	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.0E+00	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.0E+00	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	3.60E-01	5.74E-04	9.28E-06	0.0E+00	0.0E+00	2.03E-05	3.98E-04	1.03E-04	-1.95E-02
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water									

Waste indicators

Results per functional or declared unit										
Indicator	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Hazardous waste disposed	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-hazardous waste disposed	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Radioactive waste disposed	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Output flow indicators

Results per functional or declared unit										
Indicator	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	2.08E-03	0.00E+00	2.85E-03	0.00E+00	0.00E+00	0.00E+00	6.54E-02	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ	2.22E-03	0.00E+00	2.41E-03	0.00E+00	0.00E+00	0.00E+00	4.40E-03	0.00E+00	0.00E+00
Exported energy, thermal	MJ	2.13E-02	0.00E+00	2.32E-02	0.00E+00	0.00E+00	0.00E+00	4.22E-02	0.00E+00	0.00E+00

Results of the environmental performance indicators – Declared Unit (1 m^2)

Mandatory impact category indicators according to EN 15804 – Declared Unit (1 m^2)

Results per functional or declared unit										
Indicator	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP- total	kg CO_2 eq.	7.54E+01	9.32E-01	5.34E-01	0.00E+00	0.00E+00	5.11E-02	1.52E+00	2.05E-01	-1.20E+01
GWP-fossil	kg CO_2 eq.	7.19E+01	9.30E-01	5.25E-02	0.00E+00	0.00E+00	5.10E-02	1.50E+00	2.99E-02	-1.23E+01
GWP-biogenic	kg CO_2 eq.	3.36E+00	9.58E-04	4.81E-01	0.00E+00	0.00E+00	5.42E-05	1.65E-02	1.75E-01	3.37E-01
GWP- luluc	kg CO_2 eq.	9.78E-02	4.52E-04	5.40E-05	0.00E+00	0.00E+00	1.91E-05	1.78E-04	1.82E-05	-1.35E-02
ODP	kg CFC 11 eq.	6.33E-06	2.18E-07	3.78E-09	0.00E+00	0.00E+00	1.27E-08	2.19E-08	4.45E-09	-1.18E-06
AP	mol H^+ eq.	4.50E-01	3.64E-03	1.87E-04	0.00E+00	0.00E+00	1.63E-04	9.67E-04	1.46E-04	-9.35E-02
EP-freshwater	kg P eq.	4.96E-03	7.66E-06	5.42E-07	0.00E+00	0.00E+00	3.64E-07	4.42E-06	1.26E-06	-3.51E-04
EP-marine	kg N eq.	8.22E-02	7.60E-04	1.20E-04	0.00E+00	0.00E+00	3.58E-05	3.22E-04	2.85E-04	-1.33E-02
EP-terrestrial	mol N eq.	9.64E-01	8.48E-03	7.37E-04	0.00E+00	0.00E+00	3.98E-04	3.43E-03	5.08E-04	-1.64E-01
POCP	kg NMVOC eq.	2.60E-01	3.03E-03	2.41E-04	0.00E+00	0.00E+00	1.57E-04	9.85E-04	1.87E-04	-4.14E-02
ADP-minerals&metals*	kg Sb eq.	4.52E-03	3.69E-06	1.30E-07	0.00E+00	0.00E+00	1.22E-07	1.22E-06	6.49E-08	-1.29E-04
ADP-fossil*	MJ	9.84E+02	1.45E+01	3.42E-01	0.00E+00	0.00E+00	8.30E-01	2.52E+00	3.59E-01	-1.60E+02
WDP*	m^3	5.00E+01	5.19E-02	1.26E-03	0.00E+00	0.00E+00	2.87E-03	5.52E-02	1.45E-02	-2.95E+00
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; 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; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption									

Additional mandatory and voluntary impact category indicators – Declared Unit (1 m^2)

Results per functional or declared unit										
Indicator	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP-GHG	kg CO_2 eq.	7.20E+01	9.31E-01	5.26E-02	0.0E+00	0.0E+00	5.10E-02	1.50E+00	2.99E-02	-1.24E+01
PM	disease inc.	4.00E-06	8.24E-08	3.01E-09	0.0E+00	0.0E+00	5.91E-09	1.56E-08	2.49E-09	-1.11E-06
IRP**	kBq U235 eq	3.36E+00	6.30E-02	1.38E-03	0.0E+00	0.0E+00	3.60E-03	9.87E-03	1.39E-03	-5.61E-01
ETP-fw*	CTUe	3.21E+03	1.18E+01	6.55E-01	0.0E+00	0.0E+00	6.49E-01	4.46E+00	1.34E+00	-2.68E+02
HTP-c*	CTUh	1.64E-08	1.88E-10	1.20E-11	0.0E+00	0.0E+00	8.32E-12	9.17E-11	4.74E-12	-1.92E-09
HTP-nc*	CTUh	4.45E-08	5.26E-10	1.52E-10	0.0E+00	0.0E+00	2.73E-11	1.45E-10	2.10E-10	-4.09E-09
SQP*	-	2.83E+02	1.24E+01	2.47E-01	0.0E+00	0.0E+00	9.49E-01	2.86E+00	8.08E-01	-1.07E+02
Additional voluntary indicators e.g. the voluntary indicators from EN 15804 or the global indicators according to ISO 21930:2017										

Resource use indicators

Results per functional or declared unit										
Indicator	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	MJ	1.38E+02	2.31E-01	1.41E-02	0.0E+00	0.0E+00	1.06E-02	8.82E-01	8.11E-03	-2.14E+01
PERM	MJ	1.61E+01	0.00E+00	1.48E+01	0.0E+00	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	1.54E+02	2.31E-01	1.48E+01	0.0E+00	0.0E+00	1.06E-02	8.82E-01	8.11E-03	-2.14E+01
PENRE	MJ	1.01E+03	1.54E+01	-4.38E-01	0.0E+00	0.0E+00	8.82E-01	2.68E+00	3.81E-01	-1.72E+02
PENRM	MJ	4.34E+01	0.00E+00	8.02E-01	0.0E+00	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.05E+03	1.54E+01	3.64E-01	0.0E+00	0.0E+00	8.82E-01	2.68E+00	3.81E-01	-1.72E+02
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.0E+00	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.0E+00	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.0E+00	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	5.05E+01	5.18E-02	1.31E-03	0.0E+00	0.0E+00	2.85E-03	5.59E-02	1.46E-02	-3.00E+00
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

Waste indicators

Results per functional or declared unit										
Indicator	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Hazardous waste disposed	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Non-hazardous waste disposed	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Radioactive waste disposed	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Output flow indicators

Results per functional or declared unit										
Indicator	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	2.93E-01	0.00E+00	4.01E-01	0.00E+00	0.00E+00	0.00E+00	9.20E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ	3.12E-01	0.00E+00	3.40E-01	0.00E+00	0.00E+00	0.00E+00	9.91E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	9.91E+00	0.00E+00	3.26E+00	0.00E+00	0.00E+00	0.00E+00	9.91E+00	0.00E+00	0.00E+00

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