epd-norway
Global Program Operator

Environmental Product Declaration

In accordance with ISO14025:2006 and EN15804:2012+A2:2019

SOLARWATT Panel vision M 5.0, SOLARWATT Panel vision L 5.0

Panel vision M 5.0 black

Panel vision L 5.0 black

Panel vision M 5.0 style

Panel vision L 5.0 style

Panel vision M 5.0 pure

Panel vision L 5.0 pure

SOLARWATT®

Owner of the declaration:
Solarwatt GmbH

Product name:

SOLARWATT Panel vision M 5.0,
SOLARWATT Panel vision L 5.0

Declared unit:
1m^2 of manufactured photovoltaic module

Product category /PCR:
NPCR 029 2022 Part B for PV modules 1.2

Program holder and publisher:
The Norwegian EPD foundation

Declaration number:
NEPD-7924-7102-EN

Registration number:
NEPD-7924-7102-EN

Issue date: 24/10/2024

Valid to: 24/10/2029

The Norwegian
EPD Foundation

#06227 | Rev 0 | 11.11.2024

General information

Product:
Panel vision M 5.0 series,
Panel vision L 5.0 series

Program operator:
The Norwegian EPD Foundation
Post Box 5250 Majorstuen, 0303 Oslo, Norway

Tlf: +47 23 08 80 00
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Declaration number:
NEPD-7924-7102-EN

This declaration is based on Product Category Rules:
NPCR 029 2022 Part B for PV modules 1.2

Statement of liability:
The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer, life cycle assessment data and evidence.

Declared unit:
1 m^2 of manufactured photovoltaic module, with processes at construction and end-of-life stage.

Functional unit:
1 Wp of manufactured photovoltaic module, from cradle-to-grave, with activities needed for a study period for a defined reference service life of 30 years (≥80% of the labelled power output).

Verification:
Independent verification of the declaration and data, according to ISO14025:2010

internal ☐ external ☑

Sign

Kristine Bjordal

Kristine Bjordal
Independent verifier approved by EPD Norway

Owner of the declaration:
Solarwatt GmbH
e-mail: info@solarwatt.com &
pm_panels@solarwatt.com
Contact person : Gregor Kuschmann
Phone number : +49-151-58722296

Manufacturer:
The product is manufactured on behalf of Solarwatt GmbH
e-mail: info@solarwatt.com

Place of production:
China

Management system:
ISO 14001, ISO 9001, IEC 62941, OHSAS 18001:2007, ISO 45001

Organisation no:
DE 154882861

Issue date:
24/10/2024

Valid to:
24/10/2029

Year of study:
2024

Comparability:
EPD of construction products may not be able to compare if they do not comply with EN 15804 and are seen in a building context.

The EPD has been worked out by:
Yazid Charkani - Kapstan

Approved

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Product

Product description:

Photovoltaic modules are meant to be installed on roof or stand alone power plants. All the modules included in this EPD are Biglass Bi-facial. Including Topcon pv cells technology.

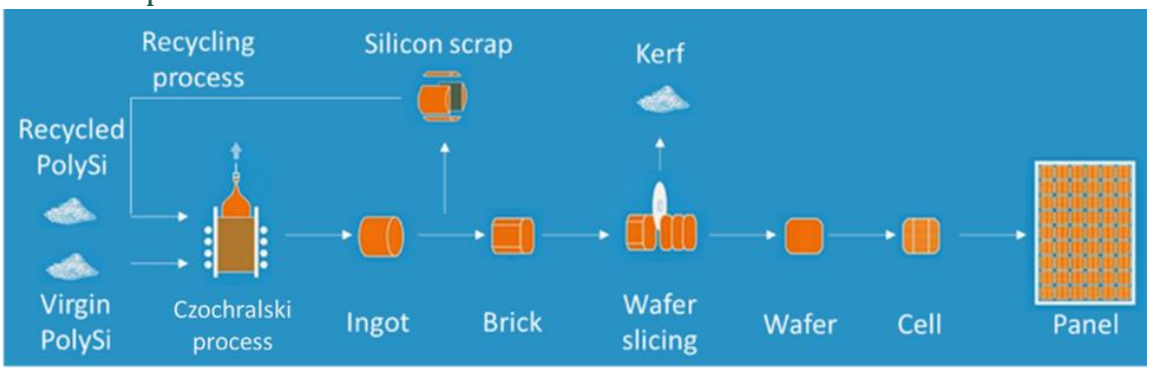
This EPD represents multiples modules with small variations over the size, the number of cells, power… (see table of module characteristics in "Product scope"). The results are calculated based on the maximum inventory amongst the modules. The variation between each module results is lower than 10 %.

This EPD is valid for the following module types:

- SOLARWATT Panel vision M 5.0 pure / style / black
- SOLARWATT Panel vision L 5.0 pure / style / black

		Panel vision M 5.0 pure Panel vision M 5.0 style	Panel vision M 5.0 black	Panel vision L 5.0 pure Panel vision L 5.0 style Panel vision L 5.0 black
Height	m	1.762	1.762	1.95
Width	m	1.134	1.134	1.134
Area	m²	2.00	2.00	2.21
Wafer size	mm	182*186.7 /182*187.5	182*186.7 /182*187.5	182*186.7 /182*187.5
Power	Wp	455	450	500
Bifacial	Y/N	Yes	Yes	Yes
Lifetime	Year	30	30	30
Yearly degradation	%	0.4	0.4	0.4

Production process:



Step 1 - PolySi: The raw material used to produce the cells is a high purity silicon called "Solar grade silicon" or "PolySi".

Step 2 - Ingot: The PolySi is transformed into a monocrystalline ingot by heating up the silicon with a process called "Czochralski process".

Step 3 - Wafer slicing: the ingot is then cut into bricks and sliced into wafers by diamond wire slicing.

Step 4 - Solar cell: the wafer is transformed into a cell through chemical treatments and wiring.

Step 5 - Solar panel: Solar cells are interconnected to form a complete solar module. This process involves soldering the cells together and encapsulating them between a front sheet (usually made of glass), EVA and a back sheet (here made of polymer). Aluminium frame is used for reinforcement. A junction box is included for electrical connection.

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Product specification:

	Materials	KG / FU	KG / DU	%
Production materials	Cells	**4.08E-03**	**9.22E-01**	6.6%
	Glass	**4.39E-02**	**9.93E+00**	71.4%
	Aluminium	**4.61E-03**	**1.04E+00**	7.5%
	EVA	**1.98E-03**	**4.47E-01**	3.2%
	Copper	**3.09E-04**	**6.97E-02**	0.5%
	EPE	**3.96E-03**	**8.95E-01**	6.4%
	Tin	**2.82E-05**	**6.38E-03**	0.0%
	Junction box	**3.59E-04**	**8.11E-02**	0.6%
	Sealant	**6.01E-04**	**1.36E-01**	1.0%
Packaging materials	Pallet	**1.39E-03**	**3.14E-01**	2.3%
	Cardboard	**2.89E-04**	**6.52E-02**	0.5%
	HDPE	**1.94E-06**	**4.38E-04**	>0.1%
	LDPE	**1.26E-07**	**2.84E-05**	>0.1%
	Label	**1.29E-08**	**2.92E-06**	>0.1%

Technical data:

IEC 61215 / 61730, IEC 61701, IEC 61215, IEC 62782, IEC 62716, ISO 11925-2, IEC 62938, IEC 62804, AS 40404.2

Market:

World

Reference service life, product:

30 years

LCA: Calculation rules

Declared unit:

1m² of manufactured photovoltaic module

Cut-off criteria:

No known flows has been excluded from the study.

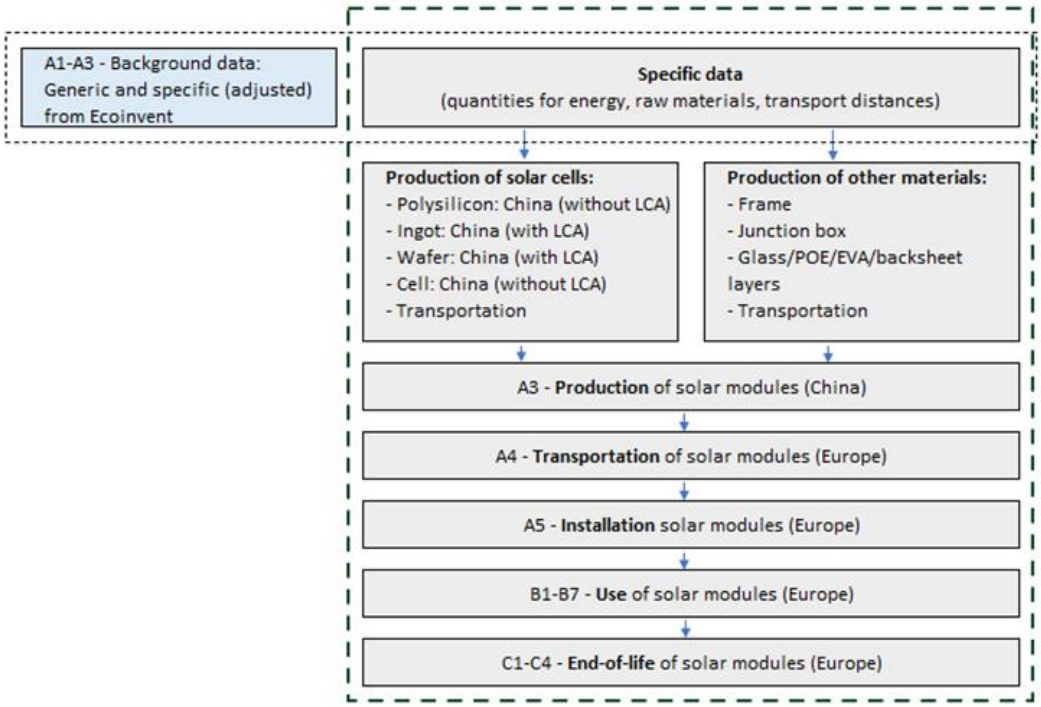
Allocation:

The allocation is made in accordance with the provisions of ISO 14025. The allocation method in accordance with ISO 14040 is process subdivision for electricity inputs. The products are distinguished as separated system processes. The electricity ratio inputs are allocated to products based on process characteristics (lamination duration/throughput).

Data quality:

Specific data comes from actual consumption of the module assembly factory (January 2023 – February 2024). This data has been collected by the manufacturer and checked by the LCA practitioner. Generic data is from Ecoinvent v3.8 and Simapro v9.4. Characterization factors from EN15804:2012 + A2: 2019. Generic data <10 years old. Ecoinvent system model used: cut-off.

System boundary:



EPD Type:

Cradle to grave and module D.

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD. All data is provided per functional unit.

Transport from production place to assembly/user (A4)

The transport step A4 covers the transport from the factory in China to the installation site in Europe by sea and road. The delivery port used for calculations in Europe is Fos-sur mer in France. There is no installation site specifically identified. Therefore, Oslo has been considered for the calculations.

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance (km)	Fuel/Energy consumption	Value (tkm)
Truck	26%	16-32 metric ton lorry, EURO5	3 022	Diesel (4.44E-2 l/tkm)	1.69E-01
Boat	70%	Container ship	15 794	Heavy fuel (2.63E-3 l/tkm)	8.83E-01

Fuel consumption is taken from ecoinvent 3.8.

Assembly (A5)

The modules are installed by hand. The screwdriver electricity consumption is neglected. As in PCR part B, the fasteners (screws) and other additional materials are not included in the LCA. The only impact is the packaging waste given in the table below:

Item	Unit	Value
Wooden pallet	kg	1.39E-03
Cardboard	kg	2.89E-04
HDPE	kg	1.94E-06
Plastic	kg	1.26E-07
Packaging label	kg	1.29E-08

Use (B1)

Photovoltaic modules harness solar energy throughout their entire lifecycle via the photovoltaic effect. The amount of electricity they produce is directly influenced by solar irradiance. The electricity production is calculated as below:

$$Energyyear\ i = Isun \times PR \times Effpanel \times S1kWp \times Dpanel$$

Where :

- I_{sun} is the sun irradiation received by the module in kWh. m^{-2}.$year^{-1}$. The electricity production is calculated with a default $\boldsymbol{I_{sun}}$ = 1300 kWh. m^{-2}.$year^{-1}$. For a site with a different irradiation, the electricity production can be extraploated based on the irradiation difference.
- PR, or Performance ratio, is the ratio between the energy produced by the panel and the final energy at the output of the photovoltaic system in order to take into account the various losses (cables, inverter, etc.). The energy produced is calculated by default with a PR of 0.75.
- Eff_{panel} , or panel efficiency, is the ratio between the energy produced and the solar radiation received.

- S_{1kWp} is the surface area to get 1 kWp.
- D_{panel} corresponds to the degradation of the panel in year i. This degradation is 1% the first year and then 0.4% $D_{panel} = 0.99 \times (1 - 0.40\%)^{i-1}$

As a result, the following chart illustrates the exported electricity energy (EEE):

Solar irradiance for electricity production	Unit	Value
1000 kWh/m²/year	kWh (30 years)	4 996
1100 kWh/m²/year	kWh (30 years)	5 496
1200 kWh/m²/year	kWh (30 years)	5 996
1400 kWh/m²/year	kWh (30 years)	6 495
1500 kWh/m²/year	kWh (30 years)	6 995
1700 kWh/m²/year	kWh (30 years)	7 494

In the results, a solar irradiance of 1500 kWh/m^2/year is used for the EEE calculations.

Use (B2-B7)

The modules are considered as self-cleaning materials. No maintenance, repair, replacement or refurbishment is required during the module lifetime.

End of Life (C1, C3, C4)

The modules are considered as removed by hand. Waste scenarios follow PCR part B standards for C3 and C4.

Waste process	Unit	Value
Recycling	Kg	1.77E+01
Incineration and energy recovery	Kg	6.83E+00

Transport to waste processing (C2)

It has been assumed that the modules are collected by truck and sent for recycling. 50 km is co nsidered from the site to the recycling factory as proposed in PCR part B.

Type	Type of vehicle	Distance (km)	Fuel/Energy consumption	Value (tkm)
Truck	16-32 metric ton lorry, EURO5	50	Diesel (4.44E-2 l/tkm)	5.42E-03

Benefits and loads beyond the system boundaries (D)

Benefits and loads have been based on glass and aluminum frame recycling only.

Item	Unit	Value
Glass	Kg	9.92E+00
Aluminium	Kg	1.04E+00

LCA: Results

The LCA results show the environmental impacts and resource input and output flows calculated according to ISO 14025 and EN 15804 +A2. The results are shown per functional unit, which for this declaration is 1Wp, The LCA results have been calculated using the LCA software SimaPro 9.4.0.2.

System boundaries (X=included, MND= module not declared, MNR=module not relevant)

Product stage			Assembly stage		Use stage							End of life stage				Benefits & loads beyond system boundary
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Classification of disclaimers to the declaration of core and additional environmental impact indicators

ILCD classification	Indicator	Disclaimer
ILCD type / level 1	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
ILCD type / level 2	Acidification potential, Accumulated Exceedance (AP)	None
	Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine)	None
	Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	None
	Formation potential of tropospheric ozone (POCP)	None
	Potential Human exposure efficiency relative to U235 (IRP)	1
ILCD type / level 3	Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	2
	Abiotic depletion potential for fossil resources (ADP-fossil)	2
	Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	2
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2
	Potential Comparative Toxic Unit for humans (HTP-c)	2
	Potential Comparative Toxic Unit for humans (HTP-nc)	2
	Potential Soil quality index (SQP)	2

Disclaimer 1 – 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.

Disclaimer 2 – The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator

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Results presented per functional unit

Core environmental impact indicators

Indicator	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	4.89E-01	3.67E-02	4.40E-03	0.00E+00	0.00E+00	4.94E-04	1.62E-02	0.00E+00	-9.70E-02
GWP-fossil	kg CO2 eq.	4.88E-01	3.66E-02	4.17E-03	0.00E+00	0.00E+00	4.94E-04	1.62E-02	0.00E+00	-9.63E-02
GWP-biogenic	kg CO2 eq.	1.03E-03	1.34E-05	2.23E-04	0.00E+00	0.00E+00	1.97E-07	6.21E-06	0.00E+00	-4.77E-04
GWP-LULUC	kg CO2 eq.	2.59E-04	1.73E-05	1.37E-06	0.00E+00	0.00E+00	1.77E-07	1.26E-06	0.00E+00	-2.81E-04
ODP	kg CFC11 eq.	6.46E-08	8.14E-09	4.91E-10	0.00E+00	0.00E+00	1.18E-10	1.48E-10	0.00E+00	-3.11E-09
AP	mol H^+ eq.	3.25E-03	3.86E-04	6.75E-06	0.00E+00	0.00E+00	2.06E-06	2.89E-05	0.00E+00	-6.51E-04
EP-freshwater	kg P eq.	2.86E-05	2.37E-07	8.96E-08	0.00E+00	0.00E+00	3.38E-09	7.73E-08	0.00E+00	-2.99E-06
EP-marine	kg N eq.	6.83E-04	1.01E-04	1.75E-06	0.00E+00	0.00E+00	6.22E-07	4.90E-06	0.00E+00	-9.93E-05
EP-terrestial	mol N eq.	6.59E-03	1.12E-03	1.55E-05	0.00E+00	0.00E+00	6.87E-06	5.40E-05	0.00E+00	-1.11E-03
POCP	kg NMVOC eq.	2.56E-03	3.07E-04	4.31E-06	0.00E+00	0.00E+00	2.21E-06	1.39E-05	0.00E+00	-3.23E-04
ADP-M&M	kg Sb eq.	3.90E-05	1.10E-07	8.58E-09	0.00E+00	0.00E+00	1.13E-09	4.70E-07	0.00E+00	3.09E-08
ADP-fossil	MJ	4.92E+00	5.32E-01	2.04E-02	0.00E+00	0.00E+00	7.70E-03	1.60E-02	0.00E+00	-9.35E-01
WDP	m^3	1.84E-01	1.44E-03	5.53E-04	0.00E+00	0.00E+00	2.57E-05	2.39E-03	0.00E+00	-8.83E-03

GWP-total: *Global Warming Potential;* ***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; See "additional Norwegian requirements" for indicator given as PO4 eq.* ***EP-marine:*** *Eutrophication potential, fraction of nutrients reaching freshwater end compartment;* ***EP-terrestrial:*** *Eutrophication potential, Accumulated Exceedance;* ***POCP****: Formation potential of tropospheric ozone;* ***ADP-M&M****: Abiotic depletion potential for non-fossil resources (minerals and metals);* ***ADP-fossil:*** *Abiotic depletion potential for fossil resources;* ***WDP:*** *Water deprivation potential, deprivation weighted water consumption*

Reading example: 9,0 E-03 = 9,0*10-3 = 0,009

Additional environmental impact indicators

Indicator	Unit	A1-A3	A4	A5	B1	C1	C2	C3	C4	D
PM	disease incidence	3.81E-08	2.21E-09	6.37E-11	0.00E+00	0.00E+00	4.44E-11	1.19E-10	0.00E+00	-7.57E-09
IRP	kBq U-235 eq	7.72E-03	2.28E-03	8.57E-05	0.00E+00	0.00E+00	3.34E-05	7.05E-05	0.00E+00	-1.02E-03
ETP-fw	CTUe	2.10E+01	4.05E-01	8.25E-02	0.00E+00	0.00E+00	6.01E-03	1.85E-01	0.00E+00	-2.64E+00
HTP-c	CTUh	3.63E-10	1.58E-11	2.60E-12	0.00E+00	0.00E+00	1.66E-13	8.46E-12	0.00E+00	-1.21E-10
HTP-nc	CTUh	2.71E-08	3.92E-10	3.12E-11	0.00E+00	0.00E+00	6.58E-12	4.68E-10	0.00E+00	-2.18E-09
SQP	Dimensionless	3.70E+00	4.33E-01	6.77E-03	0.00E+00	0.00E+00	1.36E-02	2.22E-02	0.00E+00	-5.10E-01

PM: *Particulate matter emissions;* ***IRP:*** *Ionizing radiation, human health;* ***ETP-fw:*** *Ecotoxicity (freshwater);* ***ETP-c:*** *Human toxicity, cancer effects;* ***HTP-nc:*** *Human toxicity, non-cancer effects;* ***SQP:*** *Land use related impacts / soil quality*

[1] 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.

[2] The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator

Resource use

Indicator	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
RPEE	MJ	7.90E-01	6.49E-03	8.11E-04	0.00E+00	0.00E+00	9.79E-05	1.05E-02	0.00E+00	-9.82E-02
RPEM	MJ	3.15E-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
TPE	MJ	8.21E-01	6.49E-03	8.11E-04	0.00E+00	0.00E+00	9.79E-05	1.05E-02	0.00E+00	-9.82E-02
NRPE	MJ	4.92E+00	5.32E-01	2.04E-02	0.00E+00	0.00E+00	7.69E-03	1.59E-02	0.00E+00	-9.37E-01
NRPM	MJ	6.69E-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
TRPE	MJ	4.99E+00	5.32E-01	2.04E-02	0.00E+00	0.00E+00	7.69E-03	1.59E-02	0.00E+00	-9.37E-01
SM	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
RSF	MJ	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
NRSF	MJ	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
W	m3	4.48E-03	4.73E-05	1.37E-05	0.00E+00	0.00E+00	8.29E-07	1.09E-04	0.00E+00	-1.55E-04

RPEE *Renewable primary energy resources used as energy carrier;* ***RPEM*** *Renewable primary energy resources used as raw materials;* ***TPE*** *Total use of renewable primary energy resources;* ***NRPE*** *Nonrenewable primary energy resources used as energy carrier;* ***NRPM*** *Nonrenewable primary energy resources used as materials;* ***TRPE*** *Total use of non-renewable primary energy resources;* ***SM*** *Use of secondary materials;* ***RSF*** *Use of renewable secondary fuels;* ***NRSF*** *Use of non-renewable secondary fuels;* ***W*** *Use of net fresh water.*

End of life – Waste

Indicator	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HW	kg	3.91E-02	4.36E-04	6.81E-04	0.00E+00	0.00E+00	5.33E-06	8.14E-03	0.00E+00	-1.55E-02
NHW	kg	5.43E-01	2.52E-02	2.53E-03	0.00E+00	0.00E+00	7.59E-04	6.67E-03	0.00E+00	-7.43E-02
RW	kg	7.82E-06	3.59E-06	1.20E-07	0.00E+00	0.00E+00	5.21E-08	6.48E-08	0.00E+00	-1.19E-06

HW *Hazardous waste disposed;* ***NHW*** *Non-hazardous waste disposed;* ***RW*** *Radioactive waste disposed.*

End of life – output flow

Indicator	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
CR	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
MR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.70E-02	0.00E+00	0.00E+00
MER	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
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.44E-01	0.00E+00	0.00E+00
ETE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.48E-01	0.00E+00	0.00E+00
Exported energy - gas and process	MJ	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

CR *Components for reuse;* ***MR*** *Materials for recycling;* ***MER*** *Materials for energy recovery;* ***EEE*** *Exported electric energy;* ***ETE*** *Exported thermal energy.*

Information describing the biogenic carbon content at the factory gate

Biogenic carbon content	Unit	Value
Biogenic carbon content in product	kg C	0.00E+00
Biogenic carbon content in the accompanying packaging	kg C	8.39E-04

Additional requirements

Electricity modelling in manufacturing phase

The electricity input of manufacturing phase is sourced from both national mix grid and renewable energy from roof pv plant. The renewable energy use is tracked through a green electricity contract.

Model dataset	A3 (kWh/m²)	Share %	Unit	Value
Electricity, medium voltage {CN}| market group for | Cut-off, U	3.54E+00	97%	kgCO2-eq / kWh	1.024
Electricity, low voltage {CN-JS}| electricity production, photovoltaic, 3kWp slanted-roof installation, single-Si, panel, mounted | Cut-off, U	1.19E-01	3%	kgCO2-eq / kWh	85

A market-based approach is not applicable due to the absence of a Guarantee of Origin system.

Electricity modelling in upstream stages

The Solar-grade polysi purification is the the most energy-consuming upstream stage in the pv supply chain, the electricity model of this stage has been geographically adapted to match the factory location :

Model dataset	Unit	Value
Electricity, high voltage {CN-SC} production mix| Cut-off, U	kgCO2-eq / kWh	0.25

Additional environmental impact indicators required in NPCR Part A for construction products (per functional unit)

In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator GWP-IOBC is required as it declares climate impacts calculated according to the principle of instantaneous oxidation. GWP-IOBC is also referred to as GWP-GHG in context to Swedish public procurement legislation. GWP-BC is also presented for information.

Indicator	Unit (per FU)	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
EP-freshwater*	kg PO4 eq.	7.90E-01	5.47E-03	8.11E-04	0.00E+00	0.00E+00	9.79E-05	1.05E-02	0.00E+00	-9.82E-02
GWP-IOBC	kg CO2 eq.	6.98E-08	5.06E-04	2.90E-05	5.36E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-4.58E-05
GWP-BC	kg CO2 eq.	2.68E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP	kg CO2 eq.	4.63E-01	5.06E-04	2.90E-05	5.36E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-4.58E-05

EP-freshwater* *Eutrophication potential, fraction of nutrients reaching freshwater end compartment. Declared as PO4 eq.* ***GWP-IOBC*** *Global warming potential calculated according to the principle of instantanious oxidation.* ***GWP-BC*** *Global warming potential from net uptake and emissions of biogenic carbon from the materials in each module.* ***GWP Global*** *warming potential.*

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Additional environmental impact indicators required in NPCR Part A for construction products (per declared unit)

In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator GWP-IOBC is required as it declares climate impacts calculated according to the principle of instantaneous oxidation. GWP-IOBC is also referred to as GWP-GHG in context to Swedish public procurement legislation. GWP-BC is also presented for information.

Indicator	Unit (per DU)	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
EP-freshwater*	kg PO4 eq.	1.79E+02	1.24E+00	1.83E-01	0.00E+00	0.00E+00	2.21E-02	2.38E+00	0.00E+00	-2.22E+01
GWP-IOBC	kg CO2 eq.	1.58E-05	1.14E-01	6.56E-03	1.21E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.04E-02
GWP-BC	kg CO2 eq.	6.06E-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
GWP	kg CO2 eq.	1.05E+02	1.14E-01	6.56E-03	1.21E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.04E-02

EP-freshwater* *Eutrophication potential, fraction of nutrients reaching freshwater end compartment. Declared as PO4 eq.* ***GWP-IOBC*** *Global warming potential calculated according to the principle of instantaneous oxidation.* ***GWP-BC*** *Global warming potential from net uptake and emissions of biogenic carbon from the materials in each module.* ***GWP Global*** *warming potential.*

Hazardous substances

The declaration is based upon reference to threshold values provided to EPD verifiers. Documentation available upon request to EPD owner.

The product contains substances given by the REACH Candidate list that are less than 0,1 % by weight.

Indoor environment

No tests have been carried out on the product concerning indoor climate

Carbon footprint

Carbon footprint has been carried out for the product.

Bibliography

ISO 14025:2010	Environmental labels and declarations - Type III environmental declarations - Principles and procedures
ISO 14044:2006	Environmental management - Life cycle assessment - Requirements and guidelines
EN 15804:2012+A2:2019	Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products
ISO 21930:2007	Sustainability in building construction - Environmental declaration of building products
LCA report	EPD report modules V1.0
NPCR	Part A “Construction products and services” version 2.0 Part B “for photovoltaic modules used in the building and construction industry, including production of cell, wafer, ingot block, solar grade silicon, solar substrates, solar superstrates and other solar grade semiconductor materials” version 1.2
Simapro	Version 9.4.0.2
Ecoinvent	Version 3.8

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