

**Jinko Solar Co.,Ltd.**



## **ENVIRONMENTAL PRODUCT DECLARATION**

**Mono-crystalline Photovoltaic module**

**China**

**in compliance with ISO 14025 and EN15804**

Program Operator	The Norwegian EPD Foundation
Publisher	EPDIItaly

Declaration Number	NEPD-11344-11291
Registration Number	MR-EPDITALY0116

Issue Date	11 / 06 / 2025
Valid to	11 / 06 / 2030



Registered under the mutual recognition between EPDIItaly and The Norwegian EPD Foundation.

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# Environmental Product Declaration

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

## Photovoltaic modules



**Jinko** *Solar*

The Norwegian  
EPD Foundation

**Owner of the declaration:**  
Jinko Solar Co., Ltd.

**Product name:**  
Mono-crystalline Photovoltaic module

**Declared unit:**  
1 Wp of manufactured photovoltaic module,  
with processes at construction and end-of-life  
stage

**Product category /PCR:**  
[NPCR PART A: Construction products and  
services Version 2.0 & NPCR 029 Part B 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]

**Program holder and publisher:**  
The Norwegian EPD foundation

**Declaration number:**  
NEPD-11344-11291

**Registration number:**  
NEPD-11344-11291

**Issue date:** 11.06.2025

**Valid to:** 11.06.2030

# General information

## Product:

JKMxxxN-66HL4M-BDV (power rating: 625-650Wp)

## Program operator:

The Norwegian EPD Foundation  
Post Box 5250 Majorstuen, 0303 Oslo, Norway  
Tlf: +47 23 08 80 00  
e-mail: post@epd-norge.no

## Declaration number:

NEPD-11344-11291

## This declaration is based on Product Category Rules:

NPCR PART A: Construction products and services Version 2.0, 2021-03-24

NPCR 029 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, 2022-03-31

## 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 evidences.

## Declared unit:

1 Wp of manufactured photovoltaic module, with processes at construction and end-of-life stage

## Declared unit with option:

Not applicable

## 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 ( $\geq 80\%$  of the labelled power output).

## Verification:

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

internal  external

Sign



[ Michael ZHU Jiang]  
Independent verifier approved by EPD Norway

## Owner of the declaration:

Jinko Solar Co., Ltd.  
Contact person: Sophia Sun  
e-mail: simin.sun@jinkosolar.com

## Manufacturer:

Shangrao Jinko Photovoltaic Manufacturing Co., Ltd.  
Contact person: Sophia Sun  
e-mail: simin.sun@jinkosolar.com

## Place of production:

Room2-1, Office Building1-1, South of Development Road, West of Jinko Redouble Increasing Area, Shangrao Economic Development Zone, 334100, Jiangxi, P. R. China

## Management system:

ISO 14001, ISO 45001, ISO 9001,  
IEC 61215, IEC 61730, IEC61701, IEC62716, IEC60068,  
IEC62804

## Organisation no:

91361100794799028G

## Issue date:

11.06.2025

## Valid to:

11.06.2030

## Year of study:

2025

## 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:

Sophia Sun

Approved



Manager of EPD Norway

# Product

## Product description:

This LCA considers the module manufactured by the Jinko Solar, namely JKMxxxN-66HL4M-BDV. The module included in this EPD are double glass and the solar cells are produced with TOPCON process. Solar cells are assembled with the EVA, glass, frame and electrical connections to produce the finished solar module in the production factory in Shangrao in China.

## Product Specification:

The details of materials mass are presented below.

PV Components	Materials	Unit	Value	%
Photovoltaic cell	Silicon	kg	6.87E-01	2.09%
Front glass	Glass	kg	1.34E+01	40.84%
Back glass	Glass	kg	1.34E+01	40.84%
Frame	Aluminium alloy	kg	2.44E+00	7.42%
Solder strip	Pb, Tin	kg	2.33E-01	0.71%
Bus bar	Pb, Tin	kg	3.72E-02	0.11%
Silica gel	Silicone	kg	3.00E-01	0.91%
Junction box	Bronze, XLPE, Tin	kg	1.10E-01	0.33%
POE film	POE	kg	9.89E-01	3.01%
EVA film	EVA	kg	1.10E+00	3.35%
LRF film	PET, EVA	kg	9.89E-02	0.30%
Nameplate	PET	kg	5.03E-04	0.00%
Barcode	Paper	kg	1.01E-04	0.00%
Potting adhesive	Silicon rubbe	kg	2.70E-02	0.08%

## Technical data:

Parameters	JKMxxxN-66HL4M-BDV	
	Value / pcs	Value / FU
Power rating range(W)	625-650	
Power output (Wp)	650	1
Module Area(m <sup>2</sup> )	2.70	0.0042
Dimension of the module(mm)	2382*1134*30	
Weight (kg)	32.4	0.050
Weight including packaging(kg)	33.28	0.051
First year degradation (%)	1%	1%

Degradation(%)	0.40%	0.40%
Number of cells	132	0.203
Type of technology	Mono-crystalline silicon	
Conversion factor including the frame(W/m <sup>2</sup> )	233	0.358

**Market:**

World

**Reference service life, product:**

The reference service life is 25 years (>80% of the labelled power output) according to the PCR since no third-party report is available.

**Additional technical info**

None

**LCA: Calculation rules**

**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 ( $\geq 80\%$  of the labelled power output).

**Cut-off criteria:**

No specific materials have been cut-off in this specific LCA. All materials provided by the manufacturer are properly modelled.

**Allocation:**

Since the module are produced from the same production line. Therefore, a multi-output allocation strategy is applied for the A3 phase to the specific PV modules. Incoming energy and water and waste production in-house is allocated equally among all products through yield allocation.

The allocation strategy for the EoL process per PCR follows the same strategy listed in the EN15804. Thus, the “cut-off” strategy is applied. This scenario allocates the entire environmental impacts of waste treatment procedures (from deconstruction to the waste processing) to the producer. The recycled materials, on the other hand, are burden-free. An important note is that when materials have reached a so-called “end-of-waste” state, the coverage of the waste processing is thus terminated. Any inputs/flows related to refine gross recycled materials for actual applications are beyond the product system boundary and is accounted in Module D.

**Data quality:**

According to NPCR Part A Construction Products and Services v2.0 and NPCR 029 Part B v1.2, the data quality is assessed through the ISO 14044 standard and EN 15804.

Quality requirement	Specific requirement	Data quality	Level
Time-related coverage (age of data and the minimum length of time over which data should be collected)	Existing LCI data were, at most, 10 years old.	<10 years	<b>Good</b>
	Newly collected LCI data were current or up to 3 years old	2024-03 to 2025-02 production	<b>Good</b>

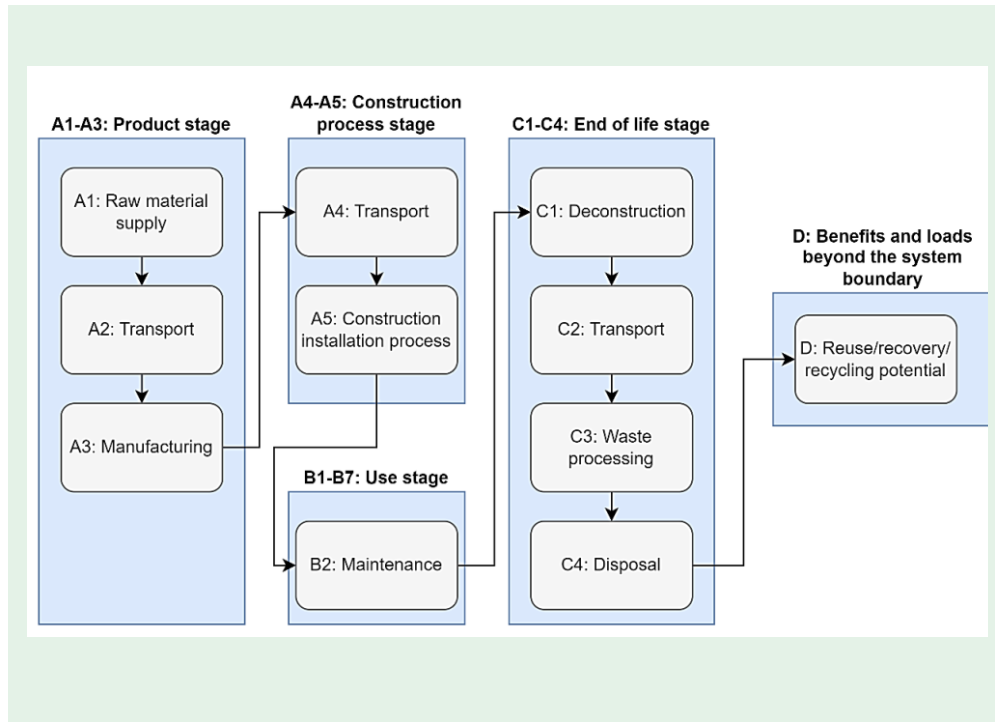
Geographical coverage (the geographical area from which data for unit processes should be collected to satisfy the goal of the study):	Upstream: Unit process for raw material should be collected for respective geographic region	All raw material data were based on the respective geographic region	<b>Good</b>
	Core: unit process for production should represent the real site	Production data is collected and provided by Jinko Solar	<b>Good</b>
	Downstream: end-of-life disposal should represent the region of disposal	Parameter from IEC standards and generic data from the database was used for scenario development	<b>Good</b>
Completeness	95% percentage of flow is measured or estimated	All of the unit processes within the scope of the life cycle were included, with less than a 5% cut-off	<b>Good</b>
Representativeness	Qualitative assessment of the degree to which the data set reflects the true population of interest, i.e. geographical coverage, period and technology coverage	See geographical coverage, period, and technology coverage requirement above. These requirements are met.	<b>Good</b>
Consistency	Qualitative assessment of Whether the study methodology is applied uniformly to the various components of the analysis	the study methodology is applied uniformly to the different parts of the analysis	<b>Good</b>
Reproducibility	Qualitative assessment of the extent to which information about the methodology and data values would allow an independent practitioner to reproduce the results reported in the study	Yes	<b>Good</b>
Sources of the data	The foreground data should be from the primary producer	Yes	<b>Good</b>
Uncertainty of the information	Data, models, and assumptions should be verified	All the primary data and assumptions were confirmed with Jinko Solar, and models were built following ISO 14040/44 and PCR requirements	<b>Good</b>

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

Product stage			Installation stage		Use stage							End of life stage				Benefits & loads beyond system boundary
Raw materials	Transport	Manufacturing	Transport	Installation	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	MNR	X	MNR	MNR	MNR	MNR	MNR	X	X	X	X	X

### System boundary:

The study is a cradle to grave analysis from the extraction of raw materials up to the decommission of the product, including raw materials acquisition, transportation, manufacturing, delivery, installation, maintenance and waste disposal for end-of-life, benefits and loads after end-of-life.



## LCA: Scenarios and additional technical information

The following information describes the scenarios in the different modules of the EPD.

### Manufacturing (A3)

The data of cell manufacturing is based on the information provided by Jinko Solar from their own cell production plant in Shangrao. And the data of PV module assembly provided by Jinko Solar from their own production base in Shangrao plant.

### Transport from production place to assembly/user (A4)

Transport from production place to assembly/user (A4)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy consumption	Unit	Value
China: Truck, EURO5, 16- 32 metric ton	36.7%	571	Diesel	kg/km	0.037
Container ship	50%	20715	Heavy oil	kg/km	0.0025
Europe: Truck, EURO5, 16- 32 metric ton	36.7%	800	Diesel	kg/km	0.037

The distribution scenario(A4) is based on the information provided by the suppliers. The product is firstly transported to the Shanghai Port at a distance of 571km by lorry. Then, the product is transported from Shanghai Port to Rostock Port by 20715 km through the container ship. After then, the product is unloaded to the storage site by a distance of 300km. The distance between the storage site to the final consumers is assumed to be 500km as well per PCR B.

### Installation (A5)

	Unit	Value
Water consumption	m <sup>3</sup>	0
Electricity consumption	kWh	0.04108
Diesel	MJ	8.7499
Material loss	Kg	0
Output materials for waste treatment	Kg	0.09

The electricity consumption and diesel consumption during installation stage is scaled up based on the data from Ecoinvent database value (36.03 kWh/570kWp and 7673 MJ/570kWp respectively) according to the power rating of PV modules. The PV power rating for the module is 650 Wp. The packaging materials of the PV modules include wood pallet, paper and plastics. Wood pallet is assumed to be directly reused. Packaging paper is assumed to be recycled and plastics are assumed to be incinerated. The transport distance for the packaging materials to the recycling site is assumed to be 50km according to the PCR. Other materials including the mounting system, cables, inverters are not considered based on the requirements listed in the PCR B.

### Use (B1)

There are no material or energy inputs, nor emissions during the use phase (B1) of the PV module.

## Maintenance (B2)/Repair (B3)

	Unit	Value
Water consumption	m <sup>3</sup>	0.61
Electricity consumption	kWh	0

Only maintenance (B2) for PV panels is cleaning. It is assumed to be cleaned once per month with an application rate of 0.76L water per m<sup>2</sup> PV panel according to the reference [13].

## Replacement (B4)/Refurbishment (B5)

It is assumed that the PV module itself does not require replacement and refurbishment during its RSL.

## Operational energy (B6) and water consumption (B7)

According the NPCR 029 Part B v1.2, PV module does not require operational energy nor water.

## End of Life (C1, C3, C4)

	Unit	Value
Hazardous waste disposed	kg	0
Collected as mixed construction waste	kg	0
Reuse	kg	0
Recycling	kg	22.06
Energy recovery	kg	0
To landfill	kg	3.69
To incineration	kg	2.21

De-construction (C1) of the PV plant during the disposal stage is assumed mainly consuming electricity, and the electricity consumption is assumed the same as the construction stage (A5), 50km transportation distance from plant site to waste treatment site (C2) is assumed according to the PCR B. For the C3, phase, since there is lack of existing data of recycling rate for PV module, this study refers to legal requirements issued by Waste Electrical and Electronic Equipment (WEEE). In 2012/19/EU-Article 11 & ANNEX V, the required collection rate for waste PV module is 85%. Therefore, 15% of waste PV module end up with waste disposal through landfill. A specific electricity 5.56E-2 kWh/kg and diesel 3.24E-2 MJ/kg diesel consumption is referenced to disassemble and sort the collected PV modules. The final disposal scenario for C4 is based on the following table.

PV components	Materials	Recycling	Landfill	Incineration
PV cells	Silicon	80%	20%	0%
	Silver bar line	90%	10%	0%
Solar glass	Glass	85%	15%	0%
PET	PET	0%	0%	100%
Aluminium Frame	Aluminium alloy	94%	6%	0%
	Copper	63%	37%	0%
Cu strip and busbar	Pb	93%	7%	0%
	Tin	90%	10%	0%
	Bronze	63%	37%	0%
Junction box	Plastics	0%	0%	100%
Chemicals	Adhesive	0%	0%	100%
EVA	EVA	0%	0%	100%

## Transport to waste processing (C2)

Transport from production place to assembly/user (C2)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy consumption	Unit	Value
Truck	36.7%	50	Diesel	kg/km	0.037

Waste transportation distance from the de-installation plant to the waste treatment facilities is assumed to be 50 km according to the NPCR 029 Part B v1.2.

## Benefits and loads beyond the system boundaries (D)

Benefits and loads beyond the system boundaries (D)	Unit	Value
Avoided Products		
Silicon, metallurgical grade {RoW}  market for silicon, metallurgical grade   Cut-off, U	kg	4.67E-01
Silver {GLO}  market for silver   Cut-off, U	kg	5.01E-03
Glass cullet, for Saint-Gobain ISOVER SA {GLO}  glass cullet, for Saint-Gobain ISOVER SA, Recycled Content cut-off   Cut-off, U	kg	1.94E+01
Aluminium, primary, ingot {CN}  aluminium production, primary, ingot   Cut-off, U	kg	1.95E+00
Lead concentrate {GLO}  market for lead concentrate   Cut-off, U	kg	8.54E-02
Tin concentrate {GLO}  market for tin concentrate   Cut-off, U	kg	1.24E-01
Bronze {GLO}  market for bronze   Cut-off, U	kg	2.12E-02
Electricity, medium voltage {DE}  market group for electricity, medium voltage   Cut-off, U	MJ	1.12E+01
Heat, central or small-scale, other than natural gas {RoW }  market for heat, central or small-scale, other than natural gas   Cut-off, U	MJ	2.17E+01

## LCA: Results

The LCA results show the environmental impacts and resource input and output flows calculated according to ISO 14025 and EN 15804 +A2.

### Core environmental impact indicators

Indicator	Unit	A1-A3	A4	A5	B2	C1	C2	C3	C4	D
GWP - total	kg CO2 eq	3.42E-01	2.43E-02	1.66E-03	1.18E-03	1.37E-03	4.80E-04	1.42E-03	1.04E-02	-9.09E-02
GWP - fossil	kg CO2 eq	3.42E-01	2.43E-02	1.54E-03	1.17E-03	1.37E-03	4.79E-04	1.31E-03	1.04E-02	-9.05E-02
GWP - biogenic	kg CO2 eq	-1.30E-04	2.32E-06	1.21E-04	1.92E-06	3.34E-06	1.62E-07	1.14E-04	2.13E-06	-3.79E-04
GWP - luluc	kg CO2 eq	5.29E-04	1.53E-05	2.06E-07	1.55E-06	1.99E-07	2.47E-07	1.88E-06	6.76E-08	-3.23E-05
ODP	kg CFC11 eq	8.08E-09	3.65E-10	2.19E-11	2.28E-10	2.15E-11	7.17E-12	1.42E-11	8.04E-12	-7.15E-10
AP	molc H+ eq	2.02E-03	3.69E-04	1.25E-05	6.20E-06	1.24E-05	1.70E-06	4.24E-06	3.00E-06	-6.05E-04
EP- freshwater	kg P eq	1.37E-04	1.45E-06	8.50E-08	4.24E-07	8.36E-08	3.89E-08	1.60E-06	6.22E-08	-3.64E-05
EP-freshwater	kg PO <sub>4</sub> eq	4.20E-04	4.45E-06	2.60E-07	1.30E-06	2.56E-07	1.19E-07	4.90E-06	1.90E-07	-1.11E-04
EP -marine	kg N eq	3.87E-04	9.59E-05	5.87E-06	1.26E-06	5.76E-06	5.57E-07	1.59E-06	1.91E-06	-1.08E-04
EP - terrestrial	molc N eq	4.17E-03	1.05E-03	6.29E-05	1.29E-05	6.25E-05	5.91E-06	1.44E-05	1.54E-05	-1.17E-03
POCP	kg NMVOC eq	1.22E-03	3.04E-04	1.86E-05	4.15E-06	1.85E-05	2.28E-06	4.27E-06	3.95E-06	-3.53E-04
ADP-M&M <sup>2</sup>	kg Sb eq	1.47E-05	5.35E-08	5.63E-10	5.34E-09	5.16E-10	1.53E-09	2.04E-09	4.11E-10	-9.12E-06
ADP-fossil <sup>2</sup>	MJ	4.10E+00	3.22E-01	1.81E-02	1.41E-02	1.79E-02	6.74E-03	2.01E-02	2.79E-03	-8.41E-01
WDP <sup>2</sup>	m <sup>3</sup>	3.34E-01	1.14E-03	4.05E-05	3.87E-02	3.88E-05	2.98E-05	1.23E-04	9.73E-05	-7.80E-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<sup>-3</sup> = 0,009

## Additional environmental impact indicators

Indicator	Unit	A1-A3	A4	A5	B2	C1	C2	C3	C4	D
PM	Disease incidence	2.17E-08	1.39E-09	3.47E-10	7.88E-11	3.46E-10	3.81E-11	5.90E-11	1.93E-11	-7.75E-09
IRP <sup>1</sup>	kBq U235 eq.	2.29E-02	2.25E-04	1.57E-05	1.03E-04	1.54E-05	5.74E-06	2.65E-04	5.04E-06	-2.23E-03
ETP-fw <sup>2</sup>	CTUe	1.85E+00	1.71E-01	9.02E-03	5.14E-03	8.45E-03	3.76E-03	5.19E-03	7.93E-02	-6.30E-01
HTP-c <sup>2</sup>	CTUh	1.56E-10	1.08E-11	4.36E-13	2.77E-12	4.15E-13	2.17E-13	3.23E-13	7.95E-13	-9.60E-11
HTP-nc <sup>2</sup>	CTUh	4.24E-09	1.74E-10	3.70E-12	3.91E-11	3.04E-12	4.84E-12	8.06E-12	1.38E-10	-1.84E-09
SQP <sup>2</sup>	Dimensionless	1.27E+00	1.23E-01	1.38E-03	2.92E-03	1.24E-03	4.02E-03	6.78E-03	3.65E-03	-2.83E-01

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

<sup>1</sup> 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.

<sup>2</sup> 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

Parameter	Unit	A1-A3	A4	A5	B2	C1	C2	C3	C4	D
RPEE	MJ	4.24E-01	3.36E-03	1.94E-04	1.34E-03	1.89E-04	8.59E-05	3.36E-03	7.97E-05	-6.74E-02
RPEM	MJ	2.98E-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
TPE	MJ	7.23E-01	3.36E-03	1.94E-04	1.34E-03	1.89E-04	8.59E-05	3.36E-03	7.97E-05	-6.74E-02
NRPE	MJ	4.00E+00	3.22E-01	1.81E-02	1.41E-02	1.79E-02	6.74E-03	2.01E-02	2.79E-03	-8.41E-01
NRPM	MJ	1.01E-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
TRPE	MJ	4.10E+00	3.22E-01	1.81E-02	1.41E-02	1.79E-02	6.74E-03	2.01E-02	2.79E-03	-8.41E-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
FW	m <sup>3</sup>	1.13E-02	3.71E-05	1.77E-06	9.02E-04	1.56E-06	9.40E-07	9.01E-06	6.90E-06	-2.37E-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; **FW** Use of net fresh water.

## End of life – Waste

Parameter	Unit	A1-A3	A4	A5	B2	C1	C2	C3	C4	D
HW	kg	2.53E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHW	kg	1.39E-06	0.00E+00	6.34E-05	0.00E+00	0.00E+00	0.00E+00	7.48E-03	5.69E-03	0.00E+00
RW	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

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

## End of life – output flow

Parameter	Unit	A1-A3	A4	A5	B2	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	1.39E-06	0.00E+00	3.43E-04	0.00E+00	0.00E+00	0.00E+00	4.37E-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	3.21E-06	0.00E+00	2.41E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.53E-02	0.00E+00
ETE	MJ	4.32E-05	0.00E+00	4.73E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.95E-02	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
Biogenic carbon content in the accompanying packaging	kg C	5.72E-04

## Additional requirements

### Location based electricity mix from the use of electricity in manufacturing

National production mix from import, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process (A3). The average grid loss for the Jiangxi province is 4% according to the Chinese Energy Year book . The coal power generation accounts for 81.71%, the hydro accounts for 5.39%, the wind accounts for 7.60% and the photovoltaic accounts for 5.30%. The details of the electricity mix are shown in Figure 2 below.

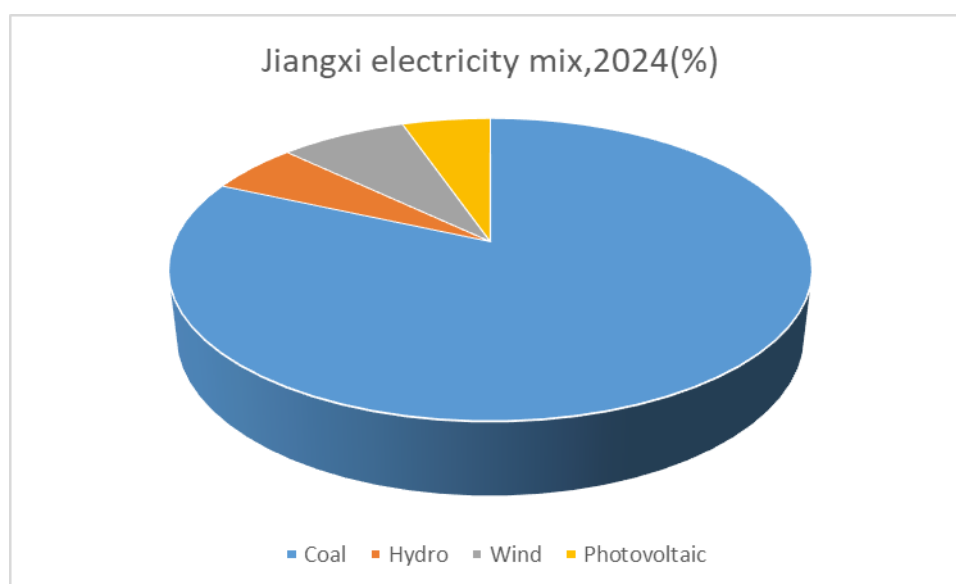


Figure 2 the electricity production mix for Jiangxi province at 2024

National electricity grid, medium voltage, in Jiangxi Province	Data source	core [kWh]	GWP <sub>total</sub> [kg CO <sub>2</sub> -eq/kWh]	SUM [kg CO <sub>2</sub> -eq]
<i>Electricity production at medium voltage</i>	Chinese Energy Year book	0.0114	1.05	0.012

## Guarantees of origin from the use of electricity in the manufacturing phase

None

### Additional environmental impact indicators required for construction products

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.

Parameter	Unit	A1-A3	A4	A5	B2	C1	C2	C3	C4	D
GWP-IOBC	kg	3.42E-01	2.43E-02	1.54E-03	1.17E-03	1.37E-03	4.80E-04	1.31E-03	1.04E-02	-9.05E-02

**GWP-IOBC** Global warming potential calculated according to the principle of instantaneous oxidation.

### Hazardous substances

The PV modules does not contain any Substances of Very High Concern (SVHC) and other REACH listed substances according to the REACH Authorisation List  
<https://echa.europa.eu/authorisation-list>

### -Indoor environment

Not relevant for PV modules since it is installed in outdoor environment.

### Carbon footprint

None

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