DAH Solar Co., Ltd.

ENVIRONMENTAL PRODUCT DECLARATION

DAH PV bifacial module

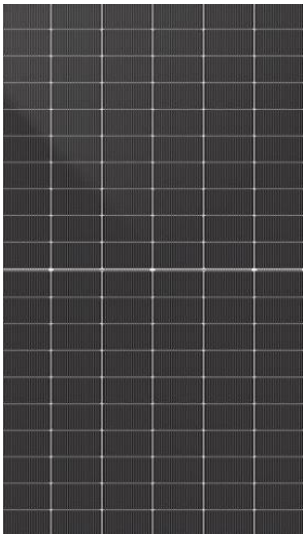
DHA Solar Co., Ltd. No. 1, Yaoyuan Road, Luyang District, Hefei City, Anhui, China

in compliance with ISO 14025 and EN15804

Program Operator	The Norwegian EPD Foundation
Publisher	EPDItaly

Declaration Number	NEPD-7614-6996-EN
Registration Number	MR-EPDITALY0102

Issue Date	20/ 09/ 2024
Valid to	20/ 09 / 2029



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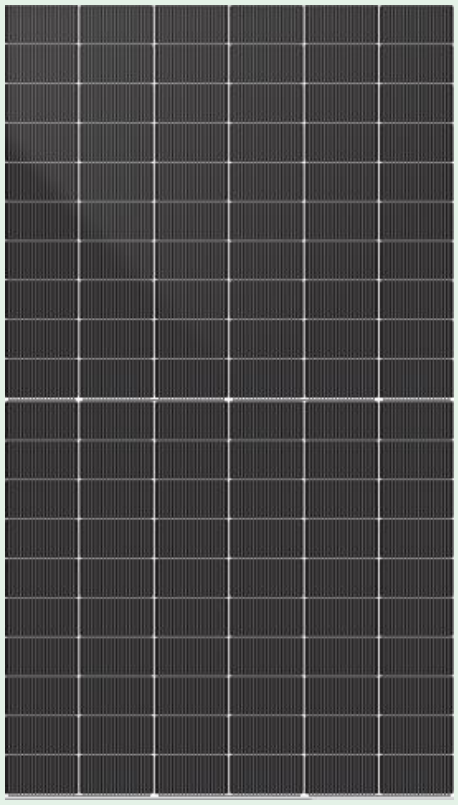
Global Program Operator

ECO PLATFORM EPD VERIFIED

Environmental Product Declaration

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

DAH PV bifacial module



DAH Solar

The Norwegian
EPD Foundation

Owner of the declaration:
DAH Solar Co., Ltd.

Product name:
PV bifacial module

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

Product category /PCR:
NPCR PART A: Construction products and services Version 2.0 & NPCR PART A: Construction products and services Version 2.0 and NPCR 029 Part B Version: 1.2

Program holder and publisher:
The Norwegian EPD foundation

Declaration number:
NEPD-7614-6996-EN

Registration number:
NEPD-7614-6996-EN

Issue date: 20.09.2024

Valid to: 20.09.2029

General information

Product:
Mono-crystalline, doule glass, solar photovoltaic modules
This is an EPD which represents the average of 4 similar products from DAH Solar Co., Ltd. (DAH).

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-7614-6996-EN

This declaration is based on Product Category Rules:
NPCR PART A: Construction products and services Version 2.0, valid to 2026-03-24 and NPCR 029:2022 Part B for photovoltaic modules 1.2, valid to 2025-06-11

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:
Not applicable.

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

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

internal ☐ external √

Rui Wang
Independent verifier approved by EPD Norway

Owner of the declaration:
DAH Solar Co., Ltd.
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Manufacturer:
DAH Solar Co., Ltd.
No. 1, Yaoyuan Road, Luyang District, Hefei City, Anhui, China
Phone: +86-18655051861
e-mail: KevinJiang@dahsolar.com

Place of production:
China

Management system:
ISO 14001, ISO 9001

Organisation no:
91340100686890473Q

Issue date:
20.09.2024

Valid to:
20.09.2029

Year of study:
Jul 2023 to Jun 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:
Helen Ji

Approved

Manager of EPD Norway

Product

Product description:

EPD for multiple products: This is an EPD which represents the average of 4 similar products from DAH Solar Co., Ltd. (DAH). The environmental performance of the products included vary less than+/- 10%.

DAH PV bifacial module is high performance monocrystalline TOPCon module. The power output range is 475-630Wp. Maximum Efficiency is 23.32%.

Product specification:

The products can be identified by its name.

Four types of modules are included, which are R18/R20–N72-doubel glass, R18/R20 -N66-doubel glass, R18/R20 -N60-doubel glass and R18/R20-N54-doubel glass.

Module	R18/R20–N72-doubel glass	R18/R20 -N66-doubel glass	R18/R20 -N60-doubel glass	R18/R20-N54-doubel glass
Type	DHN-72R18/DG-xxxW DHN-72R18/DG(BW)-xxxW DHN-72R18/DG(BB)-xxxW DHN-72R18/DG/FS-xxxW DHN-72R18/DG/FS(BW)-xxxW DHN-72R18/DG/FS(BB)-xxxW DHN-72R20/DG-xxxW DHN-72R20/DG(BW)-xxxW DHN-72R20/DG(BB)-xxxW DHN-72R20/DG/FS-xxxW DHN-72R20/DG/FS(BW)-xxxW DHN-72R20/DG/FS(BB)-xxxW	DHN-66R18/DG-xxxW DHN-66R18/DG(BW)-xxxW DHN-66R18/DG(BB)-xxxW DHN-66R18/DG/FS-xxxW DHN-66R18/DG/FS(BW)-xxxW DHN-66R18/DG/FS(BB)-xxxW DHN-66R20/DG-xxxW DHN-66R20/DG(BW)-xxxW DHN-66R20/DG(BB)-xxxW DHN-66R20/DG/FS-xxxW DHN-66R20/DG/FS(BW)-xxxW DHN-66R20/DG/FS(BB)-xxxW	DHN-60R18/DG-xxxW DHN-60R18/DG(BW)-xxxW DHN-60R18/DG(BB)-xxxW DHN-60R18/DG/FS-xxxW DHN-60R18/DG/FS(BW)-xxxW DHN-60R18/DG/FS(BB)-xxxW DHN-60R20/DG-xxxW DHN-60R20/DG(BW)-xxxW DHN-60R20/DG(BB)-xxxW DHN-60R20/DG/FS-xxxW DHN-60R20/DG/FS(BW)-xxxW DHN-60R20/DG/FS(BB)-xxxW	DHN-54R18/DG-xxxW DHN-54R18/DG(BW)-xxxW DHN-54R18/DG(BB)-xxxW DHN-54R18/DG/FS-xxxW DHN-54R18/DG/FS(BW)-xxxW DHN-54R18/DG/FS(BB)-xxxW DHN-54R20/DG-xxxW DHN-54R20/DG(BW)-xxxW DHN-54R20/DG(BB)-xxxW DHN-54R20/DG/FS-xxxW DHN-54R20/DG/FS(BW)-xxxW DHN-54R20/DG/FS(BB)-xxxW
Rated output (Wp)	600-630	550-575	500-530	450-475
Height(m)	2.382	2.190	1.994	1.800
Width(m)	1.134	1.134	1.134	1.134
Area(m2)	2.701	2.483	2.261	2.041
Bifacial	Yes	Yes	Yes	Yes
Lifetime	25	25	25	25
Yearly degradation	0.7%	0.7%	0.7%	0.7%
No. of cells (pcs)	72.0	66.0	60.0	54.0
Total mass of 1 photovoltaic panel related to the FU/DU, excluding packaging	32.99	32.61	28.52	25.76
Total mass of 1 photovoltaic panel related to the FU/DU, including packaging	34.10	33.72	29.64	26.88
Converting factor to convert results related to the FU to 1 m2 photovoltaic module	233.25	231.53	234.41	232.73
Type of technology	Mono-Si	Mono-Si	Mono-Si	Mono-Si

Content declaration:

Materials[1]	Value kg/FU	%
Cell	1.21E-03	2.23%
Glass	4.20E-02	77.50%
EVA	2.74E-03	5.06%
POE	2.21E-03	4.08%
Aluminium frame	4.92E-03	9.07%
Sealant and Pottant	5.17E-04	0.95%
Junction box	1.79E-04	0.33%
Ribon string	3.18E-04	0.59%
Ribon interconnection	8.27E-05	0.15%
Packaging	**Value**	**%**
Wooden pallet	1.46E-03	0.01%
Cardboard box	5.26E-04	0.00183%
Packaging corner	3.82E-06	0.00001%
L-shaped corner protector	2.82E-05	0.00010%
Wrap	6.03E-06	0.00002%
Band	2.01E-07	0.000001%
Packaging label	2.01E-07	0.000001%

Technical data:

The modules are tested according to the following norms: IEC 61215 and IEC 61730.

Market:

World

Reference service life, product:

25 years. It is a standard reference service life of 25 years for ⩾80% of the labelled power output according to the PCR.

Reference service life, building:

N/A

Additional technical information

N/A

[1] The average mass composition in the table is obtained based on the average calculation of the BoM (bill of materials) of the four types of modules.

LCA: Calculation rules

Functional unit:

1 Wp of manufactured photovoltaic module, from cradle to-grave and module D.

Cut-off criteria:

For the processes within the system boundary, all available energy and material flow data have been included in the model. No cut-off has been applied in this study.

Allocation:

In this study, onsite energy such as electricity and diesel consumption, auxiliary consumption, emissions and waste at DAH plant is allocated according to the ratio between the total weight of produced reference products and the weight of all produced products of the plant in Jul 2023 to Jun 2024.

Data quality:

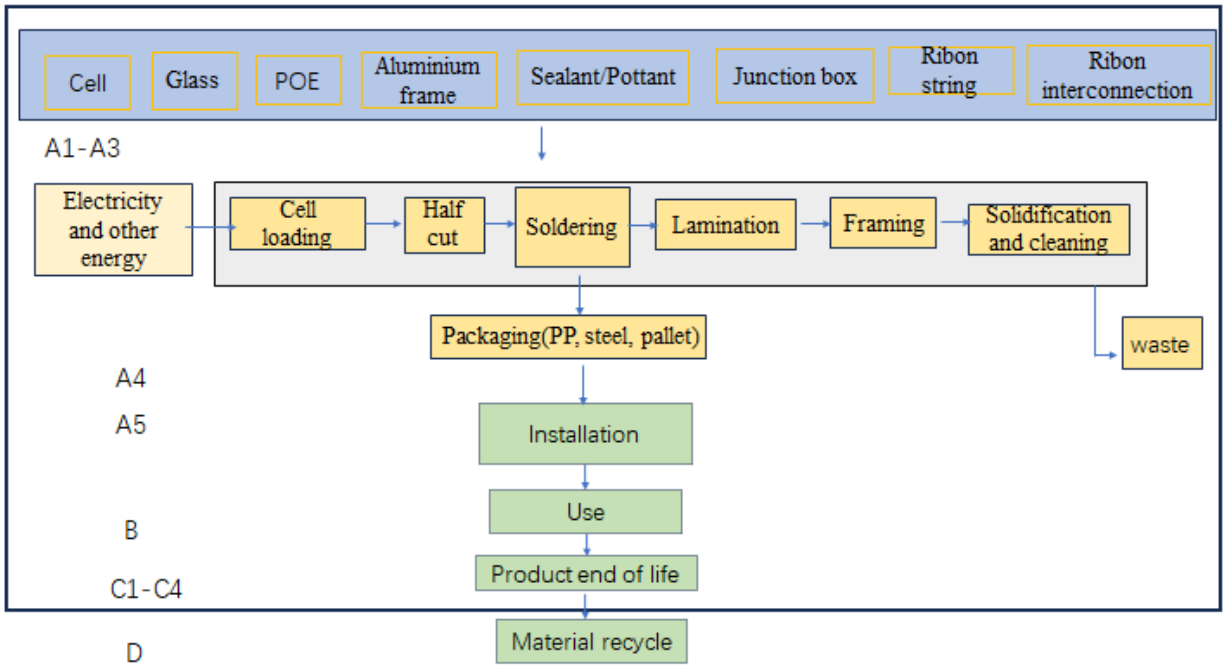
Primary data (such as materials or energy flows that enter and leave the production system) is from DAH manufacturing facilities from Jul 2023 to Jun 2024. Generic data related to the life cycle impacts of the material or energy flows that enter and leave the production system is sourced from Ecoinvent 3.9.1. The data quality is assessed through the ISO 14044 standard and EN 15804, the data quality level results of the study shows good level.

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

System boundary:

This LCA of DAH PV module is a cradle-to-grave study with the consideration of the load and benefits in module D.


Cell
Glass
POE
Aluminium frame
Sealant/Pottant
Junction box
Ribon string
Ribon interconnection
A1-A3
Electricity and other energy
Cell loading
Half cut
Soldering
Lamination
Framing
Solidification and cleaning
waste
Packaging(PP, steel, pallet)
A4
A5
Installation
B
Use
C1-C4
Product end of life
D
Material recycle

LCA: Scenarios and additional technical information

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

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
Truck	53.3%	500	Diesel	tkm	0.026
Ship	50%	10000	Heavy fuel	tkm	0.52

The reference product is produced in China and distributed around the world. The product is assumed to be sold in International market.

Assembly (A5)

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

Packaging	Unit	Value
Wood pallet	Kg	2.92E-04
Cardboard box	Kg	5.26E-04
Packaging corner	Kg	3.82E-06
L-shaped corner protector	Kg	2.82E-05
Wrap	Kg	6.03E-06
Band	Kg	2.01E-07
Packaging lable	Kg	2.01E-07

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	m3	9.05E-01
Electricity consumption	kWh	4.98E-05

It is assumed that the product needs to be cleaned once per year. For each cleaning, water consumption is 20 kg, the electricity needed to pump the water is 0.0011 kWh.

Replacement (B4)/Refurbishment (B5)

No replacement or refurbishment is required during the lifttime.

Operational energy (B6) and water consumption (B7)

The products do not require any energy or water consumption.:

To calculate the elecricity production, following method should be used. 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:

Electricity production in the first year of operation:

(1) E1 = Srad * A * y * PR * (1- deg)

Electricity production second year of operation:

(2) E2 = E1 * (1 - deg)

Electricity production n year of operation:

*(3) En = E1 * (1 - deg)$^{n-1}$*

Energy production over reference service life of module, assuming linear annual degradation:

(4)$E_{RSL} = E_1 \times (1 + \sum_{n=1}^{RSL-1}(1 - deg)^n$

RSL = Reference service life for energy-producing unit, from functional unit (FU), stated in the EPD

n = year of operation

The data used to calculate electricity production is show below:

Electricity production parameter	Unit	Value
Srad	kWh/kWp/year	1541
A	m2	2.372
y	kWp/m2	0.233
PR	-	Site sepcific
deg	-	Site sepcific

End of Life (C1, C3, C4)

	Unit	Value
Recycling	kg	4.69E-02
Energy recovery	kg	2.21E-03
To landfill	kg	3.45E-03

Assumptions are made for C1, C3 and C4 stage. Deconstruction/Deinstallation is zero as the product would be manually deconstructed. For C3, 90% products are recycled, 6% are landfilled and 4% are incinerated.

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	53.3%	50	Diesel	tkm	0.0026

According to the PCR, distance for this stage is 50km.

Benefits and loads beyond the system boundaries (D)

Benefits and loads have been based on glass, copper and aluminium frame recycling only.

Benefits and loads beyond the system boundaries (D)	Unit	Value
Substitution of electricity	MJ	2.58E-02
Substitution of thermal energy, district heating	MJ	1.45E-02
Substitution of primary material, glass	kg	3.61E-02
Substitution of primary material, aluminium	kg	8.74E-03

For PV waste panels, it is assumed that 90% would be recycled including 69.3% glass and 16.8% aluminium.

LCA: Results

The LCA results show the environmental impacts and resource input and output flows calculated according to EN 15804:2012+A2. The results are shown per functional unit (1Wp). The LCA results have been calculated using the LCA software SimaPro 9.5.

The EPD represents the average of the 4 similar products (module 1, module 2, module 3 and module 4) from DAH Solar Co., Ltd. (DAH). The LCI of the four modules are done separately. The impact of the four modules are calculated respectively, and then average result of the four modules are used for this EPD. The difference between the minimum value and the maximum value for every environmental indicators is calculated. All the environmental indicators have less than 10% difference, which means that the results can represent all the four modules and can be used in the same EPD.

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 (per funtional unit Wp)

Indicator	Unit	A1-A3	A4	A5	B2	C1	C2	C3	C4	D
GWP - total	kg CO2 eq	3.03E-01	8.04E-03	1.52E-03	7.92E-04	0.00E+00	6.50E-04	1.50E-02	1.73E-04	-2.90E-01
GWP - fossil	kg CO2 eq	3.05E-01	8.03E-03	2.68E-04	7.89E-04	0.00E+00	6.50E-04	1.15E-02	1.73E-04	-2.88E-01
GWP - biogenic	kg CO2 eq	-2.28E-03	1.87E-06	1.26E-03	1.83E-06	0.00E+00	1.88E-07	3.53E-03	7.57E-08	-1.41E-03
GWP - luluc	kg CO2 eq	2.95E-01	5.23E-04	5.43E-06	1.23E-07	1.27E-06	0.00E+00	3.26E-07	5.96E-06	1.05E-07
ODP	kg CFC11 eq	3.67E-09	1.23E-10	3.01E-12	1.22E-10	0.00E+00	9.42E-12	5.61E-10	5.02E-12	-4.94E-09
AP	molc H+ eq	2.07E-03	1.67E-04	8.93E-07	4.23E-06	0.00E+00	2.24E-06	1.50E-04	1.31E-06	-1.51E-03
EP- freshwater	kg P eq	1.09E-04	3.99E-07	4.52E-08	3.46E-07	0.00E+00	5.22E-08	2.15E-06	1.44E-08	-1.60E-04
EP -marine	kg N eq	3.78E-04	4.27E-05	3.83E-06	8.53E-07	0.00E+00	7.21E-07	5.50E-05	5.01E-07	-3.09E-04
EP - terrestrial	molc N eq	4.14E-03	4.70E-04	2.84E-06	8.61E-06	0.00E+00	7.64E-06	6.21E-04	5.37E-06	-3.23E-03
POCP	kg NMVOC eq	1.19E-03	1.32E-04	1.47E-06	2.81E-06	0.00E+00	2.95E-06	1.55E-04	1.87E-06	-9.59E-04
ADP-M&M[2]	kg Sb-Eq	2.18E-05	1.25E-08	6.21E-10	3.82E-09	0.00E+00	2.04E-09	1.58E-07	2.41E-10	-2.34E-05
ADP-fossil[2]	MJ	3.47E+00	1.05E-01	2.87E-03	1.01E-02	0.00E+00	8.97E-03	5.76E-02	4.32E-03	-3.62E+00
WDP[2]	m^3	8.57E-02	3.49E-04	3.36E-05	3.67E-02	0.00E+00	3.75E-05	5.18E-03	1.91E-04	-3.39E-01

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*

Additional environmental impact indicators (per funtional unit Wp)

Indicator	Unit	A1-A3	A4	A5	B2	C1	C2	C3	C4	D
PM	Disease incidence	2.42E-08	4.31E-10	1.55E-11	5.00E-11	0.00E+00	4.51E-11	6.11E-09	2.86E-11	-1.43E-08
IRP[1]	kBq U235 eq.	1.37E-02	6.78E-05	4.47E-06	9.90E-05	0.00E+00	7.76E-06	3.29E-04	2.73E-06	-3.06E-02
ETP-fw[2]	CTUe	1.26E+00	3.92E-02	5.97E-03	2.41E-03	0.00E+00	3.76E-03	8.66E-02	1.51E-03	-7.35E-01
HTP-c[2]	CTUh	2.12E-10	3.47E-12	1.31E-13	2.08E-12	0.00E+00	2.69E-13	8.51E-11	7.38E-14	-1.39E-10
HTP-nc[2]	CTUh	5.57E-09	4.78E-11	4.49E-12	2.92E-11	0.00E+00	6.15E-12	3.83E-10	9.23E-13	-4.08E-09
SQP[2]	Dimensionless	9.65E-01	4.52E-02	2.34E-03	2.76E-03	0.00E+00	4.62E-03	2.57E-02	8.57E-03	-8.68E-01

PM: *Particulate matter emissions;* ***IRP:*** *Ionising 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*

Resource use (per funtional unit Wp)

Parameter	Unit	A1-A3	A4	A5	B2	C1	C2	C3	C4	D
RPEE	MJ	3.34E-01	9.64E-04	2.14E-02	1.27E-03	0.00E+00	1.21E-04	5.24E-03	3.65E-05	-8.66E-01
RPEM	MJ	2.13E-02	0.00E+00	-2.13E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TPE	MJ	3.55E-01	9.64E-04	6.22E-05	1.27E-03	0.00E+00	1.21E-04	5.24E-03	3.65E-05	-8.66E-01
NRPE	MJ	3.47E+00	1.05E-01	2.87E-03	1.01E-02	0.00E+00	8.97E-03	5.76E-02	4.41E-03	-3.62E+00
NRPM	MJ	9.39E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-9.39E-05	0.00E+00
TRPE	MJ	3.47E+00	1.05E-01	2.87E-03	1.01E-02	0.00E+00	8.97E-03	5.76E-02	4.32E-03	-3.62E+00
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	m^3	3.00E-03	1.15E-05	9.25E-07	8.84E-04	0.00E+00	1.20E-06	1.30E-04	4.58E-06	-1.34E-02

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 (per funtional unit Wp)

Parameter	Unit	A1-A3	A4	A5	B2	C1	C2	C3	C4	D
HW	kg	3.46E-04	1.95E-06	1.61E-06	6.44E-07	0.00E+00	2.09E-07	3.11E-06	5.31E-08	-4.08E-04
NHW	kg	3.91E-02	3.64E-03	2.14E-03	1.17E-04	0.00E+00	3.66E-04	1.11E-03	2.85E-02	-3.34E-02
RW	kg	3.38E-06	1.58E-08	1.08E-09	2.46E-08	0.00E+00	1.84E-09	8.32E-08	6.38E-10	-7.61E-06

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

End of life – output flow (per funtional unit Wp)

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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.89E-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	2.21E-03	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	2.68E-02	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	1.51E-02	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
Biogenic carbon content in the accompanying packaging	kg C	9.57E-04

Additional requirements

Location based electricity mix from the use of electricity in manufacturing

National production mix from import, medium voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing prosess (foreground/core) per functional unit.

National electricity grid	Data source	GWP_{total} [kg CO2 -eq/kWh]
Electricity, medium voltage {CN}| market group for electricity, medium voltage | Cut-off, U	Ecoinvent 3.9.1	0.946
Electricity, low voltage {CN-AH}| electricity production, photovoltaic, 570kWp open ground installation, multi-Si | Cut-off, S	Ecoinvent 3.9.1	0.000522

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	3.07E-01	8.04E-03	1.52E-03	7.92E-04	0.00E+00	6.50E-04	1.15E-02	1.73E-04	-2.90E-01

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

Hazardous substances

The declaration is based upon reference to threshold values and/or test results and/or material safety data sheets provided to EPD verifiers. Documentation available upon request to EPD owner.

- [X] The product contains no substances given by the REACH Candidate list.
- [ ] The product contains substances given by the REACH Candidate list that are less than 0,1 % by weight.
- [ ] The product contains dangerous substances, more then 0,1% by weight, given by the REACH Candidate List, see table.
- [ ] The product contains no substances given by the REACH Candidate list.
- [ ] The product is classified as hazardous waste, see table.

Name	CAS no.	Amount
NA	NA	NA

Indoor environment

The product meets the requirements for low emissions.

N/A

Carbon footprint (A1-C4)

While a carbon footprint analysis has not been conducted for the product separately, the results section does include an evaluation of Global Warming Potential (GWP) with such an analysis. The GWP total results presented in this EPD document represents the carbon footprint of the product studied:

The carbon footprint (per Wp) for the product included in the study is 3.21E-1kg CO2 eq./Wp.

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
NPCR Part A:	Construction products and services. Ver. 2.0. April 2021
PCR NPCR 029 version 1.2	PCR – 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
LCA report	LCA Report of DAH PV module version 2.0. September 2024

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