

Environmental Product Declaration

In accordance with ISO 14025 and EN 15804 +A2



LOBAS[®] SOLAR

The Norwegian
EPD Foundation

Owner of the declaration:
Lonevåg Beslagfabrikk AS

Program holder and publisher:
The Norwegian EPD foundation

Declaration number:
NEPD-3666-2605-EN

Registration Number:
NEPD-3666-2605-EN

Issue date: 11.08.2022
Valid to: 11.08.2027

Product name

Mounting system for photovoltaic systems – flat roofs. Lobas Solar.

Manufacturer

Lonevåg Beslagfabrikk AS

General information

Product:

Mounting system for photovoltaic systems – flat roofs

Program Operator:

The Norwegian EPD Foundation
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Declaration Number:

NEPD-3666-2605-EN

This declaration is based on Product Category

Rules:

EN15804:2012 + A2:2019
 NPCR Part A (v.2.0, 2021) Construction products and services
 NPCR 013:2021 Part B for Steel and aluminium construction products

Statements:

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 m² of mounting system for photovoltaic systems – flat roofs

Declared unit with option:

Cradle-to-gate with options

Functional unit:

Not applicable

Verification:

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

internal external



Fredrik M. Johnsen, Stiftinga Vestlandsforskning
 Independent verifier approved by EPD Norway

Owner of the declaration:

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 Hovdavegen 18, 5282 Lonevåg
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Place of production:

Lonevåg, Osterøy, Norway

Management system:

-

Organisation no:

828 824 112

Issue date:

11.08.2022

Valid to:

11.08.2027

Year of study:

2021/2022

Comparability:

EPDs from other programmes than The Norwegian EPD foundation may not be comparable.

The EPD has been worked out by:

Andrea Arntzen Nistad



Approved (Manager of EPD Norway)

Product

Product description:

The product analysed is a mounting system for photovoltaic systems applicable for flat roofs in nordic countries. The system is adapted to the specific project location.

Product specification:

The system consists of baseplates in steel, a connector in steel and aluminum and profiles in aluminum. Lonevåg Beslagfabrikk produces baseplates and connectors. Hydro Extrusion Norway AS at Magnor produces the aluminum profiles.

Dimensions, specifications and material use will vary depending on the specific wind and snow loads at the building location. Tromsø, the Norwegian location with the highest material demand to present an upper bound for environmental impacts. Hence, the EPD represent a conservative estimate for the environmental impacts.

The product composition per m² for a system in Tromsø is showed in the table below and is used for analysis.

Materials	KG	%
Aluminium	5,65	83,5
Steel	1,11	16,4
Rubber	0,01	0,1
Sum product	6,77	100
Packaging, wood	0,27	
Packaging, paper	0,012	
Packaging, steel	4,34e-7	
Sum including packaging	7,04	

Technical data:

The loads are calculated by SINTEF according to NS-EN 1991-1-3:2003+A1:2015+NA:2018 (snow loads) and NS-EN 1991-1-4:2005+NA:2009 (wind actions).

Wind loads -1,39 kN/m²

Snow loads 7,06 kN/m²

For flat buildings roofs with parapet

Market:

Nordic countries

Reference service life, product:

Not relevant for declared unit

Reference service life, building:
60 years

LCA: Calculation rules

Declared unit:

1 m² of mounting system for photovoltaic systems – flat roofs

The EPD is a specific EPD.

Data quality:

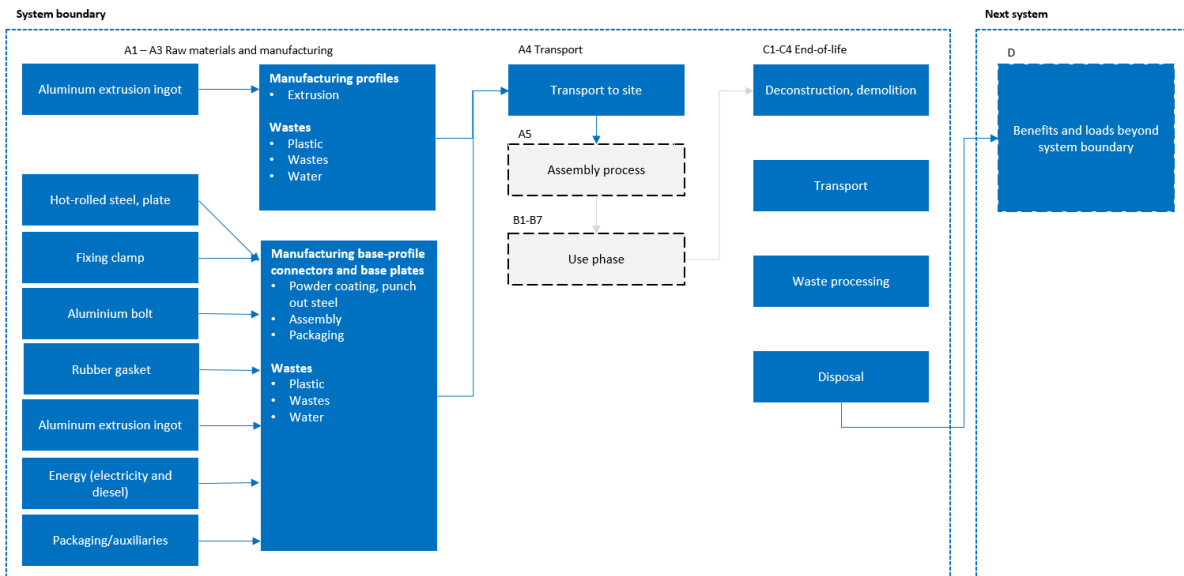
Components are mainly produced by Lonevåg Beslagfabrikk AS and Hydro Extrusion Norway AS (Magnor). Lonevåg Beslagfabrikk AS brings the product to the market, and Hydro is regarded as a sub-supplier (A1). Hence, data collection is done mainly for Lonevåg Beslagfabrikk AS. Specific data are used for all processes, based on production year 2020. Data are collected during the fall of 2021. Hydro's production of aluminium extrusion ingots are covered by supplier EPD, with data collected for the extrusion process for profile production.

Background data on raw materials, transport and electricity production are from ecoinvent v. 3.7.1, allocation cut-off by classification. Generic processes are adjusted to be representative for the suppliers and processes covered. Market processes are mainly used. Calculations are carried out using SimaPro 9.2.0.2. No data is older than 5 years.

General requirements and guidelines concerning the use of generic and specific data and the quality of those are as described in EN 15804: 2012+A2:2019, clause 6.3.6 and 6.3.7., including ISO14044:2006, 4.2.3.6. The data is representative according to temporal, geographical and technological requirements.

Allocation:

Allocation in accordance with principles described in EN 15804:2012 + A2:2019. Energy, water and waste at Lonevåg Beslagfabrikk AS are mass allocated. Energy and waste handling of material scrap of aluminum extrusion at Hydro Magnor (Hydro Extrusion Norway AS) are also allocated by mass.



System boundary:

Modules declared according to NPCR 013 Part B. Declared modules A1-A3, A4, C1-C4 and D.

The figure above shows declared modules in blue and excluded modules in grey.

Cut-off criteria:

All major raw materials and all the essential energy is included. The production process for raw materials and energy flows that are included with very small amounts (<1% energy, mass, impact) are not included. This cut-off rule does not apply for hazardous materials and substances.

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)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance KM	Fuel/Energy consumption	value (l/t)
Truck	82	Lorry, 24 t	300	0,017 L/tkm	5,22

Scenario for distance to building site is calculated based on default scenario from NPCR 013:2021 Part B and is confirmed as a likely scenario by the manufacturer.

End of Life (C1, C3, C4)

	Unit	Value
Hazardous waste disposed	Kg	
Collected as mixed construction waste	Kg	0,01
Reuse	Kg	

Recycling	Kg	1,00
Energy recovery	Kg	
To landfill	Kg	0,10

Aluminium end-of-life are modeled using NEPD-1839-768.

Transport to waste processing (C2)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance KM	Fuel/Energy consumption	value (l/t)
Truck, waste collection	50	Lorry	19	0,4 l/tkm	7,4
Truck, waste reciving facility to central and final sorting	26	Lorry	278	0,04 l/tkm	12,2

To provide a plausible scenario for transportation to waste processing, a study of Norwegian waste treatment was used as proxy data (Raadal et al., 2009).

Benefits and loads beyond the system boundaries (D)

	Unit	Value
Net new steel scrap	Kg	0,87
Net new aluminium scrap	Kg	As per NEPD-1839-768, 0,75

Additional technical information

LCA: Results

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

Product stage	Assembly stage	Use stage	End of life stage	Benefits & loads beoynd 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	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

Core environmental impact indicators

Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	4,20E+01	2,05E-01	1,45E-01	1,21E-01	1,41E+00	6,95E-03	-2,71E+01
GWP-fossil	kg CO2 eq.	4,18E+01	2,04E-01	1,45E-01	1,21E-01	1,41E+00	3,19E-03	-2,71E+01
GWP-biogenic	kg CO2 eq.	1,94E-01	4,42E-04	1,25E-04	1,61E-04	0,00E+00	3,76E-03	-9,51E-04
GWP-LULUC	kg CO2 eq.	4,81E-03	6,93E-05	1,45E-05	2,24E-05	0,00E+00	6,08E-07	2,12E-04
ODP	kg CFC11 eq.	3,48E-06	5,08E-08	3,10E-08	2,55E-08	1,11E-07	2,57E-10	-1,57E-06
AP	mol H ⁺ eq.	2,69E-01	6,27E-04	1,50E-03	4,75E-04	3,98E-03	7,01E-06	-1,66E-01
EP-freshwater	kg P eq.	1,84E-02	1,32E-06	4,80E-07	4,03E-07	0,00E+00	8,67E-09	-3,00E-07
EP-marine	kg N eq.	4,94E-03	1,36E-04	6,66E-04	9,59E-05	0,00E+00	2,56E-06	-3,93E-04
EP-terrestrial	mol N eq.	1,25E-01	1,51E-03	7,30E-03	1,09E-03	9,10E-04	2,77E-05	-1,24E-02
POCP	kg NMVOC eq.	3,47E-02	5,90E-04	2,01E-03	3,89E-04	1,73E-04	7,78E-06	-1,58E-02
ADP-M&M	kg Sb eq.	3,33E+02	4,38E-07	7,45E-08	6,78E-01	7,57E+00	1,80E-09	-2,45E+02
ADP-fossil	MJ	3,86E+02	3,29E+00	1,99E+00	1,78E+00	7,57E+00	1,80E-02	-2,58E+02
WDP	m ³	2,09E+00	9,90E-03	2,83E-03	2,67E-03	8,42E-03	1,07E-03	-3,97E-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

Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
PM	Disease incidence	ND	ND	ND	ND	ND	ND	ND
IRP	kBq U235 eq.	ND	ND	ND	ND	ND	ND	ND

ETP-fw	CTUe	ND	ND	ND	ND	ND	ND	ND
HTP-c	CTUh	ND	ND	ND	ND	ND	ND	ND
HTP-nc	CTUh	ND	ND	ND	ND	ND	ND	ND
SQP	Dimensionless	ND	ND	ND	ND	ND	ND	ND

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

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

ILCD classification	Indicator	Disclaimer
ILCD type / level 1 ILCD type / level 2	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
	Acidification potential, Accumulated Exceedance (AP)	None
	Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater)	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
<p>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.</p> <p>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</p>		

Resource use

Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
RPEE	MJ	3,38E+02	3,81E-02	1,12E-02	1,95E-02	9,77E-01	1,93E-04	-1,21E+02
RPEM	MJ	5,30E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

TPE	MJ	3,44E+02	3,81E-02	1,12E-02	1,95E-02	9,77E-01	1,93E-04	-1,21E+02
NRPE	MJ	4,83E+02	3,29E+00	1,99E+00	1,80E+00	8,70E+00	1,80E-02	-3,14E+02
NRPM	MJ	4,20E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
TRPE	MJ	4,83E+02	3,29E+00	1,99E+00	1,80E+00	8,70E+00	1,80E-02	-3,14E+02
SM	kg	6,17E-01	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
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
W	m ³	2,59E-01	3,53E-04	1,13E-04	1,28E-04	0,00E+00	2,33E-05	-6,47E-03

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 Non renewable primary energy resources used as energy carrier; NRPM Non renewable 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

Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
HW	KG	9,38E+00	1,71E-04	5,79E-05	4,99E-05	3,49E-02	1,10E-03	2,59E-02
NHW	KG	2,08E+01	2,76E-01	2,65E-03	7,79E-02	6,61E+00	3,37E-01	-1,31E+01
RW	KG	2,43E-03	2,23E-05	1,37E-05	1,22E-05	2,74E-05	1,12E-07	-1,19E-03

HW Hazardous waste disposed; NHW Non hazardous waste disposed; RW Radioactive waste disposed

End of life – output flow

Parameter	Unit	A1-A3	A4	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
MR	kg	1,04E+00	0,00E+00	0,00E+00	5,42E+00	6,27E+00	0,00E+00	5,27E+00
MER	kg	9,31E-03	0,00E+00	0,00E+00	0,00E+00	1,53E-01	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	0,00E+00
ETE	MJ	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

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

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	0,12

Additional Norwegian requirements

Greenhouse gas emission from the use of electricity in the manufacturing phase 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 process (A3).

National electricity grid	Unit	Value
Electricity, medium voltage {NO} market for Cut-off, S	kg CO2 -eq/kWh	0,25

Additional environmental impact indicators required in NPCR Part A for construction products

In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator for GWP has been sub-divided into the following:

GWP-IOBC Climate impacts calculated according to the principle of instantaneous oxidation
 GWP-BC Climate impacts from the net uptake and emission of biogenic carbon from each module.

In addition, EP-freshwater shall also declared as PO4 eq.

Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
EP-freshwater*	kg PO4 eq.	2,36E-03	6,79E-05	2,35E-04	3,97E-05	0,00E+00	1,10E-06	-1,32E-04
GWP-IOBC	kg CO2 eq.	4,19E+01	2,04E-01	1,44E-01	1,21E-01	1,41E+00	2,91E-04	-2,60E+01
GWP-BC	kg CO2 eq.	4,33E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWP	kg CO2 eq.	4,23E+01	2,04E-01	1,44E-01	1,21E-01	1,41E+00	2,91E-04	-2,60E+01

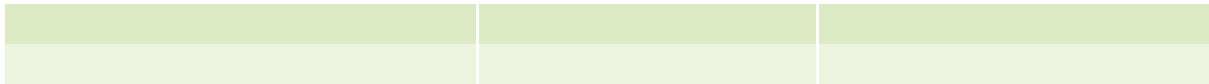
EP-freshwater* Eutrophication potential, fraction of nutrients reaching freshwater end compartment. Declared as PO4 eq. **GWP-IOBC** Global warming potential calculated according to the principle of instantaneous oxidation. **GWP-BC** Global warming potential from net uptake and emissions of biogenic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

Hazardous substances

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

- The product contains no substances given by the REACH Candidate list or the Norwegian priority list.
- The product contains substances given by the REACH Candidate list or the Norwegian priority list that are less than 0,1 % by weight.
- The product contain dangerous substances, more then 0,1% by weight, given by the REACH Candidate List or the Norwegian Priority list, see table.
- The product contains no substances given by the REACH Candidate list or the Norwegian priority list. The product is classified as hazardous waste (Avfallsforskiten, Annex III), see table.

Name	CAS no.	Amount
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Indoor environment

Not relevant for this product category.


Carbon footprint

Carbon footprint has not been worked 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
EPD-NORGE 2021	NPCR Part A:2021 Construction products and services. Reg 24.03.2021
EPD-NORGE 2021	NPCR 013:2021 Part B for Steel and aluminium construction products. Reg 06.10.2021
Raadal, H. L., Modahl, I. S., & Lyng, K. A. (2009).	Climate account for waste management. Phase I and II: Glass packaging, Metal Packaging, Paper, Cardboard, Plastic Packaging, Wet Organic Waste, Tree Waste and Refuse Waste from Households
Nistad Arntzen. A 2022	LCA report mounting system for photovoltaic systems, Lobas Solar.

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EPD for the best environmental decision



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