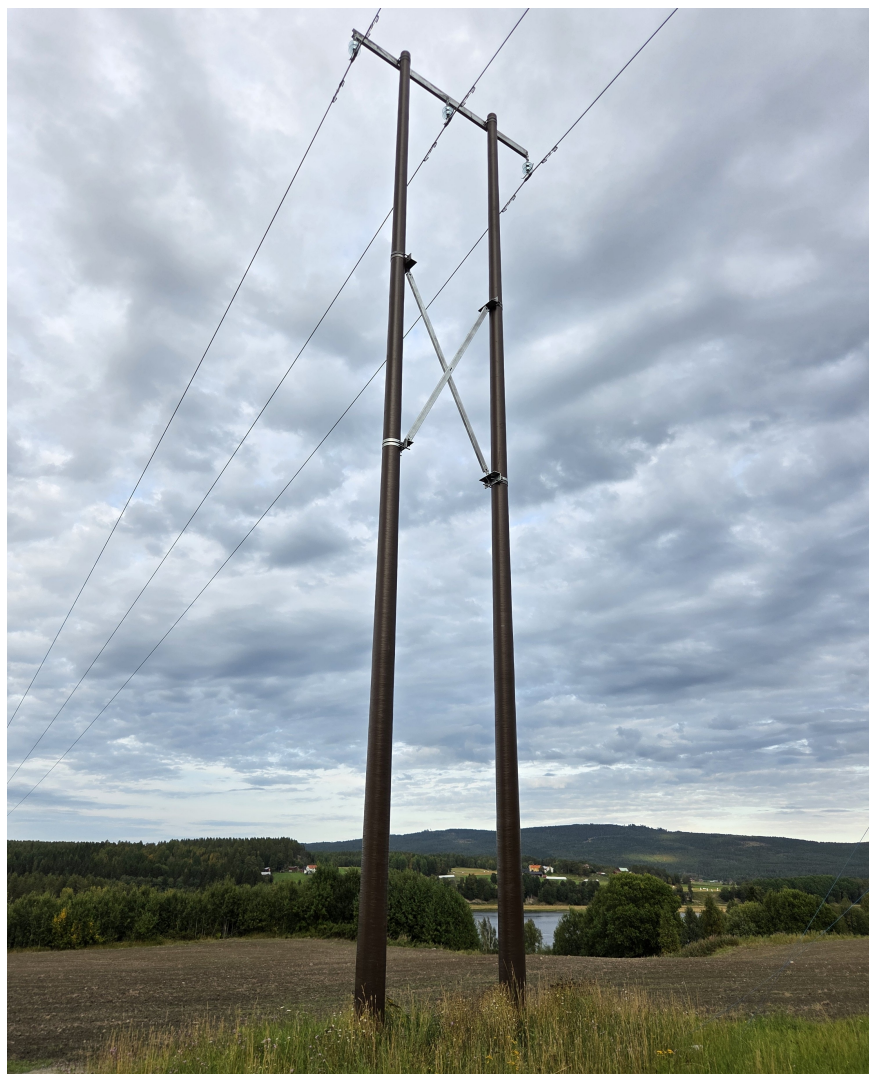


Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

WOPAS Power Line Poles (Ø260–330 mm)



Owner of the declaration:

WOPAS AS

Product:

WOPAS Power Line Poles (Ø260–330 mm)

Declared unit:

1 m³

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR

NPCR 015:2021 Part B for wood and wood-based products for use in construction

Program operator:

EPD-Global

Declaration number:

NEPD-15973-20421

Issue date:

12.06.2026

Valid to:

12.06.2031

EPD software:

LCAno EPD generator ID: 1593778

General information

Product

WOPAS Power Line Poles (Ø260–330 mm)

Program operator:

EPD-Global
Post Box 5250 Majorstuen, 0303 Oslo, Norway
Phone: +47 977 22 020
web: www.epd-global.com

Declaration number:

NEPD-15973-20421

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR
NPCR 015:2021 Part B for wood and wood-based products for use in construction

Statement of liability:

The owner of the declaration shall be liable for the underlying information and evidence. EPD-Global shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Declared unit:

1 m³ WOPAS Power Line Poles (Ø260–330 mm)

Declared unit with option:

A1-A3, A4, A5, C1, C2, C3, C4, D

Functional unit:

General information on verification of EPD from EPD tools:

Independent verification of data, other environmental information and the declaration according to ISO 14025:2010, § 8.1.3 and § 8.1.4. Verification of each EPD is made according to EPD-Global's guidelines for verification and approval requiring that tools are i) integrated into the company's environmental management system, ii) the procedures for use of the EPD tool are approved by EPD-Global, and iii) the process is reviewed annually by an independent third party verifier. See Appendix G of EPD-Global's General Programme Instructions for further information on EPD tools

Verification of EPD tool:

Independent third party verification of the EPD tool, background data and test-EPD in accordance with EPD-Global's procedures and guidelines for verification and approval of EPD tools.

Third party verifier:

Alexander Borg, Asplan Viak AS

(no signature required)

Owner of the declaration:

WOPAS AS
Contact person:
Phone: +47 32 09 12 44
e-mail: wopas@wopas.net

Manufacturer:

WOPAS AS

Place of production:

WOPAS AS
Kleivi Næringspark
43570 ÅL, Norway

Management system:

Organisation no:

917935505

Issue date:

12.06.2026

Valid to:

12.06.2031

Year of study:

2025

Comparability:

EPDs of construction products may not be comparable if they do not comply with EN 15804 and are not viewed in a building context.

Development and verification of EPD:

The declaration is created using EPD tool lca.tools ver EPD2022.03, developed by LCA.no. The EPD tool is integrated in the company's management system, and has been approved by EPD-Global.

Developer of EPD: Erik Möörk

Reviewer of company-specific input data and EPD: Jennie Ohlson

Approved:



Håkon Hauan, CEO EPD-Global

Product

Product description:

WOPAS Power Line Poles are conical composite poles developed for demanding infrastructure applications and overhead electricity networks ranging from 0.4 kV to 170 kV. The poles combine a solid wood core with an extruded polyethylene (PE) coating, providing reliable mechanical performance and long-term protection in Nordic environments. The product range is suitable for both onshore and coastal applications, including overhead power line infrastructure.

This EPD is based on a representative power line pole with an average diameter of Ø290 mm and covers conical WOPAS Power Line Poles with average diameters between Ø260 - 330 mm. The covered products consist of the same materials and are manufactured using the same production processes. Variations within the product range are limited to the relative proportions of wood and polyethylene (PE) resulting from differences in pole diameter. In accordance with the applicable PCR requirements, products included within this EPD have environmental impacts that remain within $\pm 10\%$ of the representative product.

More information: www.wopas.net

Product specification

Conical solid wood core encapsulated with a 9 mm polyethylene (PE) coating.

Declared unit: 1 m³ excluding end caps.

Materials	kg	%
Plastic - Polyethylene	2.89	0.5204
Plastic - Polyethylene (HDPE)	35.60	6.41
Polyethylene (HDPE) recycled	76.98	13.86
Wood	439.86	79.21
Total	555.33	100.00

Technical data:

WOPAS Power Line Poles are available in various dimensions and lengths to meet customer requirements. The poles consist of a solid wood core encapsulated with a polyethylene (PE) coating and are manufactured in accordance with relevant customer and market specifications.

Market:

Main market is Nordics

Reference service life, product

80 years

Reference service life, building or construction works

Not relevant

LCA: Calculation rules

Declared unit:

1 m³ WOPAS Power Line Poles (Ø260–330 mm)

Cut-off criteria:

All major raw materials and all the essential energy is included. The production processes for raw materials and energy flows with very small amounts (less than 1%) are not included. These cut-off criteria do not apply for hazardous materials and substances.

Allocation:

The allocation is made in accordance with the provisions of EN 15804. In forestry, economic allocation between sawn timber and solid wood is used. At sawmills, energy, water, waste, materials and internal transport are divided into sub-processes and then allocated according to income between the main and secondary products. Environmental impact and resource consumption for the primary production of recycled materials is allocated to the original product system.

Data quality:

Specific data for the product composition are provided by the manufacturer. The data represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on EPDs according to EN 15804 and different LCA databases. The data quality of the raw materials in A1 is presented in the table below.

Materials	Source	Data quality	Year
Plastic - Polyethylene	Modified ecoinvent 3.10.1	Database	2023
Plastic - Polyethylene (HDPE)	ecoinvent 3.10.1	Database	2023
Polyethylene (HDPE) recycled	ecoinvent 3.10.1	Database	2023
Wood	ecoinvent 3.10.1	Database	2023

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

Product stage			Construction installation stage		Use stage								End of life stage				Beyond the system boundaries
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	MND	MND	MND	MND	MND	MND	MND		X	X	X	X	X

System boundary:

A1–A3: Extraction and supply of raw materials, including transport to the manufacturing site in Norway. Manufacturing processes comprise turning, drying and extrusion.

A4: Transport to the customer.

C1–D: See scenarios description



Additional technical information:

Regenerated polyethylene (PE) is supplied internally from the parent company, Hallingplast AS, whose production facility is co-located with WOPAS' manufacturing site. As a result, no external transport is included for this raw material.

LCA: Scenarios and additional technical information

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

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

A4: Assumed transport to customer in Nordics of 300 km (Standard value)

A5: At the construction site, 4 minutes of work with front loader is assumed (Erlandsson 2015) and an average lift with a crane (Lundström 2016).

Energy use is calculated based on declared product weight. No material losses are assumed at construction site.

C1-C4: Standard assumptions from PCR - incineration of materials at end of life

C2: It was assumed that waste was transported for 85 km using a lorry as the recommended default scenario for Norway by the EPD generator documentation.

B1-B7: No maintenance, repair or replacement is assumed during the service life of the product.

D: Substitution credits for thermal energy and electricity based on incineration.

Transport from production place to user (A4)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, over 32 tonnes, EURO 6 (km) - Europe	55.0 %	300.00	0.023	l/tkm	6.90
Assembly (A5)	Unit	Value			
Electricity, Norway (kWh)	kWh	0.0323			
Diesel, burned (MJ)	MJ	1.16			
De-construction demolition (C1)	Unit	Value			
End-of-life treatments of polyethylene (PE) 0% recycled content (kg)	kg	115.47			
Transport to waste processing (C2)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, over 32 tonnes, EURO 6 (km) - Europe	55.0 %	85.00	0.023	l/tkm	1.96
Waste processing (C3)	Unit	Value			
Treatment of waste wood, untreated, municipal incineration FAE (kg)	kg	439.86			
Waste treatment per kg Polyethylene (PE), incineration with fly ash extraction (kg)	kg	115.47			
Benefits and loads beyond the system boundaries (D)	Unit	Value			
Substitution of electricity (MJ)	MJ	0.0155			
Substitution of thermal energy, district heating (MJ)	MJ	0.04066			
Substitution of electricity, in Norway (MJ)	MJ	223.92			
Substitution of thermal energy, district heating, in Norway (MJ)	MJ	3387.64			

LCA: Results

The LCA results are presented below for the declared unit defined on page 2 of the EPD document.

Environmental impact										
Indicator		Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
	GWP-total	kg CO ₂ -eq	-4.89E+02	1.72E+01	1.07E-01	0.00E+00	4.89E+00	1.07E+03	0	-2.04E+01
	GWP-fossil	kg CO ₂ -eq	2.16E+02	1.72E+01	1.07E-01	0.00E+00	4.88E+00	3.63E+02	0	-1.97E+01
	GWP-biogenic	kg CO ₂ -eq	-7.06E+02	1.12E-02	3.75E-05	0.00E+00	3.17E-03	7.11E+02	0	-3.40E-02
	GWP-luluc	kg CO ₂ -eq	8.85E-01	6.71E-03	1.20E-05	0.00E+00	1.90E-03	1.60E-03	0	-6.77E-01
	ODP	kg CFC11 -eq	1.40E-05	3.33E-07	2.30E-08	0.00E+00	9.44E-08	1.32E-07	0	-1.43E+00
	AP	mol H+ -eq	1.14E+00	4.07E-02	1.12E-03	0.00E+00	1.15E-02	1.11E-01	0	-1.71E-01
	EP-FreshWater	kg P -eq	7.01E-02	1.20E-03	1.20E-06	0.00E+00	3.41E-04	2.43E-03	0	-3.21E-03
	EP-Marine	kg N -eq	2.95E-01	1.07E-02	4.91E-04	0.00E+00	3.02E-03	5.85E-02	0	-5.34E-02
	EP-Terrestrial	mol N -eq	3.10E+00	1.15E-01	5.39E-03	0.00E+00	3.27E-02	5.81E-01	0	-5.77E-01
	POCP	kg NMVOC -eq	1.45E+00	7.07E-02	1.48E-03	0.00E+00	2.00E-02	1.44E-01	0	-1.60E-01
	ADP-minerals&metals ¹	kg Sb-eq	3.84E-03	4.93E-05	2.86E-07	0.00E+00	1.40E-05	1.88E-05	0	-3.23E-04
	ADP-fossil ¹	MJ	4.84E+03	2.59E+02	1.47E+00	0.00E+00	7.33E+01	7.29E+01	0	-2.79E+02
	WDP ¹	m ³	1.14E+03	1.32E+00	3.51E-01	0.00E+00	3.75E-01	2.27E+01	0	-8.51E+01

GWP-total = Global Warming Potential total; GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

"Reading example: 9.0 E-03 = 9.0*10⁻³ = 0.009"

1. 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

Remarks to environmental impacts

Not relevant

Additional environmental impact indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
 PM	Disease incidence	3.53E-05	1.67E-06	2.95E-08	0.00E+00	4.72E-07	9.00E-07	0	-9.84E-06
 IRP ²	kgBq U235 -eq	3.26E+01	3.12E-01	6.56E-03	0.00E+00	8.84E-02	1.45E-01	0	-2.00E+00
 ETP-fw ¹	CTUe	1.19E+03	3.05E+01	8.15E-01	0.00E+00	8.64E+00	1.13E+02	0	-1.47E+03
 HTP-c ¹	CTUh	9.54E-08	0.00E+00	3.30E-11	0.00E+00	0.00E+00	1.62E-08	0	-2.73E-08
 HTP-nc ¹	CTUh	3.70E-06	1.67E-07	8.34E-10	0.00E+00	4.72E-08	1.04E-06	0	-1.55E-06
 SQP ¹	dimensionless	7.70E+04	2.60E+02	1.91E-01	0.00E+00	7.38E+01	1.81E+01	0	-1.88E+03

PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Potential Soil Quality Index (dimensionless)

"Reading example: 9.0 E-03 = 9.0*10⁻³ = 0.009"

1. 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
2. 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.

Resource use										
Indicator		Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
	PERE	MJ	1.03E+04	4.21E+00	1.42E-01	0.00E+00	1.19E+00	2.53E+00	0	-1.73E+03
	PERM	MJ	5.89E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-5.89E+03	0	0.00E+00
	PERT	MJ	1.62E+04	4.21E+00	1.42E-01	0.00E+00	1.19E+00	-5.88E+03	0	-1.73E+03
	PENRE	MJ	3.51E+03	2.59E+02	1.47E+00	0.00E+00	7.33E+01	7.29E+01	0	-2.79E+02
	PENRM	MJ	4.88E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-4.13E+03	0	0.00E+00
	PENRT	MJ	8.39E+03	2.59E+02	1.47E+00	0.00E+00	7.33E+01	-4.06E+03	0	-2.79E+02
	SM	kg	7.76E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0.00E+00
	RSF	MJ	3.04E-01	1.41E-03	1.95E-04	0.00E+00	4.00E-04	4.50E-04	0	-1.00E-01
	NRSF	MJ	1.00E+00	0.00E+00	2.86E-03	0.00E+00	0.00E+00	0.00E+00	0	-1.02E+02
	FW	m ³	1.54E+01	3.82E-02	1.02E-03	0.00E+00	1.08E-02	1.55E-01	0	-1.98E+00

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non renewable primary energy resources used as raw materials; PENRT = Total use of non renewable primary energy resources; SM = Use of secondary materials; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water

"Reading example: 9.0 E-03 = 9.0*10⁻³ = 0.009"

End of life - Waste										
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D	
 HWD	kg	9.04E+00	3.74E-01	1.40E-04	0.00E+00	1.06E-01	0.00E+00	0	-1.87E-01	
 NHWD	kg	1.28E+03	7.49E+00	5.87E-03	0.00E+00	2.12E+00	5.55E+02	0	-1.31E+01	
 RWD	kg	1.23E+00	7.71E-05	1.02E-05	0.00E+00	2.19E-05	0.00E+00	0	-1.42E-03	

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed

"Reading example: 9.0 E-03 = 9.0*10⁻³ = 0.009"

End of life - Output flow										
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D	
 CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0.00E+00	
 MFR	kg	4.07E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0.00E+00	
 MER	kg	1.46E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.15E+02	0	0.00E+00	
 EEE	MJ	2.53E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.63E-02	0	0.00E+00	
 EET	MJ	5.56E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.76E-02	0	0.00E+00	

CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported energy electrical; EET = Exported energy thermal

"Reading example: 9.0 E-03 = 9.0*10⁻³ = 0.009"

Biogenic Carbon Content		
Indicator	Unit	At the factory gate
Biogenic carbon content in product	kg C	1.94E+02
Biogenic carbon content in accompanying packaging	kg C	0.00E+00

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO₂

Additional requirements

Greenhouse gas emissions from the use of electricity in the manufacturing phase

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).

Electricity mix	Source	Amount	Unit
Electricity, Norway (kWh)	ecoinvent 3.10.1	24.60	g CO ₂ -eq/kWh

Dangerous substances

Not declared.

Indoor environment

Not relevant

Additional Environmental Information

Additional environmental impact indicators required in NPCR Part A for construction products									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWPIOBC	kg CO ₂ -eq	2.19E+02	1.72E+01	1.07E-01	0.00E+00	4.89E+00	3.63E+02	0	-2.01E+01

GWPIOBC: Global warming potential calculated according to the principle of instantaneous oxidation. 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.

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