



## ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

Nor48  
Vindunor A/S



### EPD HUB, HUB-3636

Published on 13.07.2025, last updated on 13.07.2025, valid until 12.07.2030

Life Cycle Assessment study has been performed in accordance with the requirements of EN 15804, EPD Hub PCR version 1.1 (5 Dec 2023) and JRC characterization factors EF 3.1.



Created with One Click LCA

VINDUÑOR  
NORØYSK NÆRVER, DANSK KVALITET, NØRDISK ÆSTETIK.

# GENERAL INFORMATION

## MANUFACTURER

Manufacturer	Vindunor A/S
Address	Ålborgvej 86, 9800, Hjørring, DK
Contact details	info@vindunor.dk
Website	www.vindunor.dk

## EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804:2012+A2:2019/AC:2021 and ISO 14025
PCR	EPD Hub Core PCR Version 1.1, 5 Dec 2023
Sector	Construction product
Category of EPD	Third party verified EPD
Parent EPD number	-
Scope of the EPD	Cradle to gate with options, A5, and modules C1-C4, D
EPD author	Anders Kjærgaard Jensen, Vindunor A/S
EPD verification	Independent verification of this EPD and data, according to ISO 14025: <input type="checkbox"/> Internal verification <input checked="" type="checkbox"/> External verification
EPD verifier	Sarah Curpen, as an authorized verifier acting for EPD Hub Limited.

This EPD is intended for business-to-business and/or business-to-consumer communication. The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

## PRODUCT

Product name	Nor48
Product reference	Wood/Aluminum Window
Place(s) of raw material origin	Denmark and Estonia
Place of production	9800, Hjørring, Denmark
Place(s) of installation and use	Denmark
Period for data	Calendar year 2023 (01.01.2023-12.31.2023)
Averaging in EPD	No grouping
Variation in GWP-fossil for A1-A3 (%)	0%
A1-A3 Specific data (%)	69,1

## ENVIRONMENTAL DATA SUMMARY

<b>Declared unit</b>	1 m2 triple-glazed window in a slim double-glazed frame.
<b>Declared unit mass</b>	38,675 kg
<b>GWP-fossil, A1-A3 (kgCO<sub>2</sub>e)</b>	5,52E+01
<b>GWP-total, A1-A3 (kgCO<sub>2</sub>e)</b>	2,87E+01
<b>Secondary material, inputs (%)</b>	7,13
<b>Secondary material, outputs (%)</b>	12,8
<b>Total energy use, A1-A3 (kWh)</b>	358
<b>Net freshwater use, A1-A3 (m<sup>3</sup>)</b>	1,68

# PRODUCT AND MANUFACTURER

## ABOUT THE MANUFACTURER

Vindunor A/S specializes in the production of windows and doors made from wood and wood/aluminum, including models such as Nor1, Nor48, and Nor360. The production is 100% order-based, meaning that every element is custom-made according to specific measurements and requirements. The company emphasizes Danish quality, Nordic aesthetics, and collaboration with Danish suppliers whenever possible.

## PRODUCT DESCRIPTION

A triple-glazed window in a slim double-glazed frame.

Further information can be found at:  
[www.vindunor.dk](http://www.vindunor.dk)

## PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	7%	Europe
Minerals	61%	Europe
Fossil materials	3%	Europe
Bio-based materials	29%	Europe

## BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	6,38
Biogenic carbon content in packaging, kg C	2,44

## FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 m2 triple-glazed window in a slim double-glazed frame.
Mass per declared unit	38,675 kg
Functional unit	1 m2 of of triple glazed wood/aluminum window.
Reference service life	-

## SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

# PRODUCT LIFE-CYCLE

## SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Assembly stage		Use stage								End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D			
x	x	x	MND	x	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x			
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling	

Modules not declared = MND. Modules not relevant = MNR

### MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

A market-based approach is used in modelling the electricity mix utilized in the factory.

A1 – Extraction and production of raw materials

A2 – Transport to manufacturing

A3 – Material manufacturing

The product stage includes the procurement of all raw materials, products, and energy, transport to the production site, packaging, and waste processing up to the end-of-waste state or final disposal. LCA results are declared in aggregated form for the product stage, meaning that sub-modules A1, A2, and A3 are declared as a single module A1-A3.

Production of the windows takes place at Vindunor A/S in Hjørring. The production includes cutting profiles to length, drilling holes, gluing, painting, assembling the finished windows, as well as packaging.

The product is manufactured using electricity with Guarantees of Origin (GO) from solar panels in the production process. Electricity used in the remaining life cycle stages is modeled using the national average electricity mix corresponding to the relevant geography. Background system: Upstream and downstream processes are modeled with the electricity sources on which the datasets used are based. This will most often be based on a national average electricity mix.

### TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

The installation scenario evaluated reflects the most typical method: manual installation using an electric screwdriver, without the assistance of mechanical lifting equipment. No additional materials are needed during this process, and it does not result in any product-related waste. This stage (A5) also accounts for the environmental impact associated with packaging waste generated during installation. It is assumed that the packaging waste undergoes initial processing.

## PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not cover the use phase.

Air, soil, and water impacts during the use phase have not been studied.

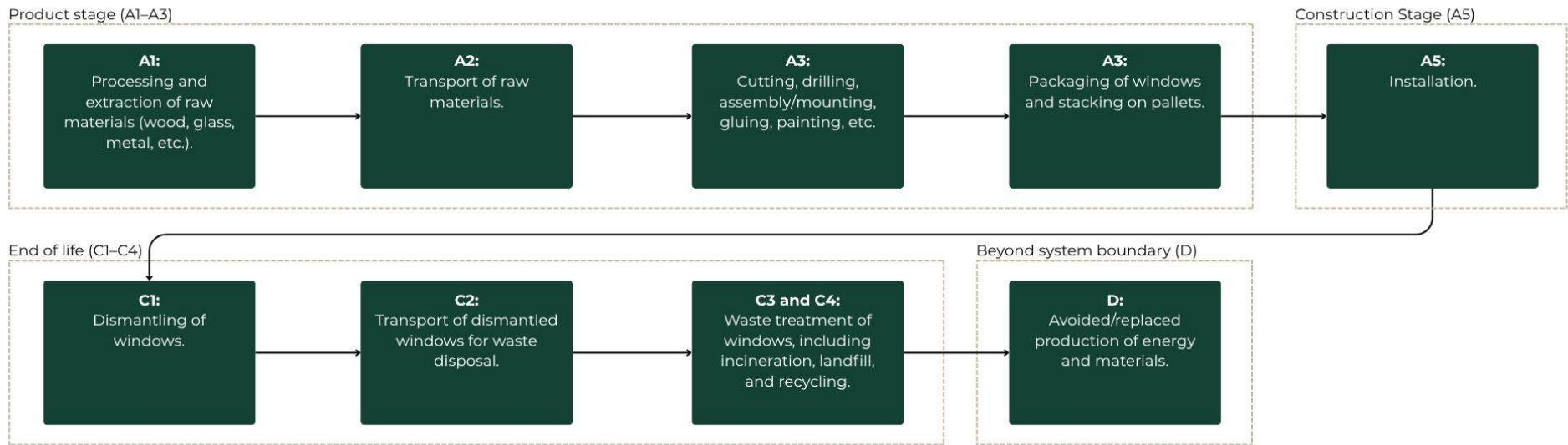
## PRODUCT END OF LIFE (C1-C4, D)

When the buildings are demolished, the window will be dismantled. This process is assumed to be carried out using standard tools, such as an electric drill.

scenarios in EN 17213:2020, Annex B.3. Waste sorting of the material fractions after window dismantling is included, as well as transport distances to waste treatment facilities.

For the recycling process, an efficiency of up to 90% is assumed, and avoided materials are only accounted for when replacing primary materials. For the incineration process, energy recovery is included for the combustion of materials, displacing the average Danish electricity mix and heat.

# MANUFACTURING PROCESS



# LIFE-CYCLE ASSESSMENT

## CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded.

## VALIDATION OF DATA

Data collection for production, transport, and packaging was conducted using time and site-specific information, as defined in the general information section on page 1 and 2. Upstream process calculations rely on generic data as defined in the Bibliography section. Manufacturer-provided specific and generic data were used for the product's manufacturing stage. The analysis was performed in One Click LCA EPD Generator, with the 'Cut-Off, EN 15804+A2' allocation method, and characterization factors according to EN 15804:2012+A2:2019/AC:2021 and JRC EF 3.1.

## ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

Data type	Allocation
Raw materials	No allocation
Packaging material	Allocated by mass or volume
Ancillary materials	Allocated by mass or volume
Manufacturing energy and waste	Allocated by mass or volume

## PRODUCT & MANUFACTURING SITES GROUPING

Type of grouping	No grouping
Grouping method	Not applicable
Variation in GWP-fossil for A1-A3, %	0%

This EPD is product and factory specific.

## LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.10.1 and One Click LCA databases as sources of environmental data. Allocation used in Ecoinvent 3.10.1 environmental data sources follow the methodology 'allocation, Cut-off, EN 15804+A2'.

# ENVIRONMENTAL IMPACT DATA

## CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total <sup>1)</sup>	kg CO <sub>2</sub> e	2,38E+01	2,23E+00	2,72E+00	2,87E+01	MND	1,09E+01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,63E-01	2,18E+01	1,39E+00	-2,42E+00
GWP – fossil	kg CO <sub>2</sub> e	4,68E+01	2,23E+00	6,11E+00	5,52E+01	MND	3,93E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,63E-01	1,38E+00	1,39E+00	-4,03E+00
GWP – biogenic	kg CO <sub>2</sub> e	-2,32E+01	9,99E-05	-3,40E+00	-2,66E+01	MND	1,05E+01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,32E-05	2,04E+01	-1,64E-03	1,61E+00
GWP – LULUC	kg CO <sub>2</sub> e	1,09E-01	8,69E-04	1,20E-02	1,22E-01	MND	2,05E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,07E-04	1,26E-04	3,43E-04	1,71E-03
Ozone depletion pot.	kg CFC <sub>11</sub> e	2,07E-06	4,64E-08	2,86E-07	2,41E-06	MND	2,25E-09	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,85E-09	3,31E-09	1,73E-08	-2,64E-07
Acidification potential	mol H <sup>+</sup> e	2,97E-01	5,27E-03	3,94E-02	3,42E-01	MND	7,77E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,57E-03	2,60E-03	2,90E-03	-5,27E-02
EP-freshwater <sup>2)</sup>	kg Pe	1,30E-03	1,56E-04	2,41E-03	3,87E-03	MND	3,62E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,60E-05	1,16E-04	3,56E-04	-2,95E-03
EP-marine	kg Ne	5,57E-02	1,39E-03	8,45E-03	6,56E-02	MND	8,07E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	5,17E-04	1,26E-03	9,43E-04	-1,28E-02
EP-terrestrial	mol Ne	6,68E-01	1,50E-02	9,11E-02	7,74E-01	MND	3,17E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	5,63E-03	1,20E-02	9,78E-03	-1,61E-01
POCP (“smog”) <sup>3)</sup>	kg NMVOCe	1,70E-01	9,16E-03	3,28E-02	2,12E-01	MND	1,03E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,32E-03	3,09E-03	3,63E-03	-3,48E-02
ADP-minerals & metals <sup>4)</sup>	kg Sbe	2,33E-03	6,38E-06	1,70E-04	2,50E-03	MND	4,20E-07	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,29E-06	2,56E-06	3,89E-06	-6,08E-05
ADP-fossil resources	MJ	7,38E+02	3,35E+01	9,04E+01	8,62E+02	MND	1,94E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,72E+00	2,64E+00	1,07E+01	-4,78E+01
Water use <sup>5)</sup>	m <sup>3</sup> e depr.	2,68E+03	1,71E-01	6,46E+00	2,69E+03	MND	5,70E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,32E-02	4,61E-01	9,73E-02	-4,09E+00

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO<sub>4</sub>e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

### ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	1,11E-06	2,17E-07	5,78E-07	1,91E-06	MND	1,34E-08	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,63E-08	2,94E-08	5,21E-08	-6,84E-08
Ionizing radiation <sup>6)</sup>	kBq U235e	6,77E+01	4,03E-02	4,99E-01	6,83E+01	MND	5,24E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	5,86E-03	1,06E-02	3,28E-02	-2,26E+00
Ecotoxicity (freshwater)	CTUe	9,43E+02	3,95E+00	6,80E+01	1,01E+03	MND	7,27E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	9,49E-01	3,98E+00	3,46E+01	-6,27E+01
Human toxicity, cancer	CTUh	4,92E-08	3,71E-10	8,70E-09	5,83E-08	MND	7,72E-11	MND	MND	MND	MND	MND	MND	MND	0,00E+00	7,64E-11	4,78E-10	1,37E-09	3,51E-09
Human tox. non-cancer	CTUh	2,34E-06	2,16E-08	1,58E-07	2,52E-06	MND	3,98E-09	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,35E-09	2,79E-08	5,25E-09	9,30E-08
SQP <sup>7)</sup>	-	1,64E+02	3,37E+01	1,05E+03	1,25E+03	MND	1,86E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,76E+00	2,87E+00	1,33E+01	7,96E+01

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. 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; 7) SQP = Land use related impacts/soil quality.

### USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy <sup>8)</sup>	MJ	2,69E+02	5,44E-01	2,05E+02	4,74E+02	MND	-5,53E+01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	9,21E-02	-1,92E+02	3,94E-01	2,09E+01
Renew. PER as material	MJ	1,24E+02	0,00E+00	6,07E+01	1,85E+02	MND	-7,68E+01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	-1,08E+02	0,00E+00	1,15E+01
Total use of renew. PER	MJ	3,92E+02	5,44E-01	2,65E+02	6,58E+02	MND	-1,32E+02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	9,21E-02	-3,00E+02	3,94E-01	3,24E+01
Non-re. PER as energy	MJ	7,02E+02	3,35E+01	7,99E+01	8,16E+02	MND	-6,56E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,72E+00	-1,48E+01	1,59E+00	-4,78E+01
Non-re. PER as material	MJ	1,64E+01	0,00E+00	1,01E+01	2,65E+01	MND	-5,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	-2,03E+01	-1,24E+00	7,32E+00
Total use of non-re. PER	MJ	7,19E+02	3,35E+01	9,01E+01	8,42E+02	MND	-1,16E+01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,72E+00	-3,51E+01	3,45E-01	-4,05E+01
Secondary materials	kg	2,76E+00	1,45E-02	9,70E-02	2,87E+00	MND	1,56E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,86E-03	4,84E-03	3,60E-03	1,44E+01
Renew. secondary fuels	MJ	1,28E-01	1,83E-04	6,37E-03	1,35E-01	MND	1,56E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,63E-05	7,35E-05	6,42E-05	1,44E-01
Non-ren. secondary fuels	MJ	2,89E-01	0,00E+00	0,00E+00	2,89E-01	MND	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m <sup>3</sup>	1,52E+00	4,94E-03	1,57E-01	1,68E+00	MND	-4,87E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	9,93E-04	2,79E-03	-7,70E-02	-1,25E-01

8) PER = Primary energy resources.

## END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	1,56E-01	4,85E-02	6,13E-01	8,17E-01	MND	1,45E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,14E-02	9,84E-02	2,05E-01	-2,83E-01
Non-hazardous waste	kg	1,10E+01	9,70E-01	1,67E+01	2,87E+01	MND	8,72E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,10E-01	1,39E+01	1,07E+02	-2,39E+00
Radioactive waste	kg	1,06E-02	9,96E-06	2,25E-04	1,09E-02	MND	1,31E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,43E-06	2,70E-06	8,68E-06	-5,86E-04

## END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	1,71E-01	0,00E+00	1,79E-01	3,50E-01	MND	1,31E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	4,95E+00	0,00E+00	0,00E+00
Materials for energy rec	kg	6,79E-03	0,00E+00	1,70E+00	1,71E+00	MND	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	5,44E-02	0,00E+00	2,96E-06	5,44E-02	MND	7,25E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	3,05E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	2,78E+01	0,00E+00	0,00E+00
Exported energy – Heat	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	4,19E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	3,83E+01	0,00E+00	0,00E+00

## ENVIRONMENTAL IMPACTS – GWP-GHG

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG <sup>9)</sup>	kg CO <sub>2</sub> e	4,69E+01	2,23E+00	6,12E+00	5,53E+01	MND	3,93E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,63E-01	1,38E+00	1,39E+00	-4,03E+00

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product as defined by IPCC AR 5 (IPCC 2013). In addition, the characterisation factors for the flows - CH<sub>4</sub> fossil, CH<sub>4</sub> biogenic and Dinitrogen monoxide - were updated in line with the guidance of IES PCR 1.2.5 Annex 1. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterization factor for biogenic CO<sub>2</sub> is set to zero.

## THIRD-PARTY VERIFICATION STATEMENT

EPD Hub declares that this EPD is verified in accordance with ISO 14025 by an independent, third-party verifier. The project report on the Life Cycle Assessment and the report(s) on features of environmental relevance are filed at EPD Hub. EPD Hub PCR and ECO Platform verification checklist are used.

EPD Hub is not able to identify any unjustified deviations from the PCR and EN 15802+A2 in the Environmental Product Declaration and its project report.

EPD Hub maintains its independence as a third-party body; it was not involved in the execution of the LCA or in the development of the declaration and has no conflicts of interest regarding this verification.

The company-specific data and upstream and downstream data have been examined as regards plausibility and consistency. The publisher is responsible for ensuring the factual integrity and legal compliance of this declaration.

The software used in creation of this LCA and EPD is verified by EPD Hub to conform to the procedural and methodological requirements outlined in ISO 14025:2010, ISO 14040/14044, EN 15804+A2, and EPD Hub Core Product Category Rules and General Program Instructions.

### [Verified tools](#)

Tool verifier: Magaly Gonzalez Vazquez

Tool verification validity: 27 March 2025 - 26 March 2028

Sarah Curpen, as an authorized verifier acting for EPD Hub Limited  
13.07.2025

