

# ENVIRONMENTAL PRODUCT DECLARATION

## IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

African mahogany solid wood cladding from certified forests in the Congo Basin  
Keflico A/S, Denmark



**EPD HUB, HUB-2360**

Publishing date 29 November 2024, last updated on 29 November 2024, valid until 29 November 2029.

## GENERAL INFORMATION

### MANUFACTURER

Manufacturer	Keflico A/S, Denmark
Address	Juelstrupparken 24, 9530 Støvring, Denmark
Contact details	info@keflico.com
Website	https://keflico.com/

### EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804+A2:2019 und ISO 14025
PCR	EPD Hub Core PCR Version 1.1, 5 Dec 2023 EN 16485 Round and sawn timber
Sector	Construction product
Category of EPD	Third party verified EPD
Parent EPD number	-
Scope of the EPD	Cradle to gate with options, A4-A5, and modules C1-C4, D
EPD author	Sabine Kristensen, Artelia Denmark
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	Magaly González Vázquez, as an authorized verifier acting for EPD Hub Limited

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	African mahogany solid wood cladding from certified forests in the Congo Basin
Additional labels	FSC Certificate Code: NC-COC-012337, NC-CW-012337. FSC License Code: FSC-C019698. PEFC Certificate Code: PBN-PEFC-COC-000046. PEFC License Code: PEFC/09-31-041
Product reference	-
Place of production	Støvring, Denmark
Period for data	01.01.2023 – 31.12.2023
Averaging in EPD	No averaging
Variation in GWP-fossil for A1-A3	-

### ENVIRONMENTAL DATA SUMMARY

<b>Declared unit</b>	1 m <sup>3</sup> mahogany cladding
<b>Declared unit mass</b>	680 kg at 12% moisture content
<b>GWP-fossil, A1-A3 (kgCO<sub>2</sub>e)</b>	6,58E+02
<b>GWP-total, A1-A3 (kgCO<sub>2</sub>e)</b>	-3,93E+02*
<b>Secondary material, inputs (%)</b>	0.5
<b>Secondary material, outputs (%)</b>	92.5
<b>Total energy use, A1-A3 (kWh)</b>	2320
<b>Net freshwater use, A1-A3 (m<sup>3</sup>)</b>	1.97

\*It is important to note that the GWP-total, A1-A3 (kgCO<sub>2</sub>e) is only negative due to the inherent properties of the product as biogenic. The uptake is released as emissions in C3/C4.

## PRODUCT AND MANUFACTURER

### ABOUT THE MANUFACTURER

Keflico A/S is a Danish timber trader and supplier, active since 1953. We're a prominent player in the Danish market for hardwood and wood-based panels and boards. We've built a tight collaboration with our clients in the Danish wood industry and builders' merchants through classic virtues such as timely delivery, good service, and a diversified product catalogue.

The electricity consumption at Keflico is partly covered by solar panels with production at Keflico, and partly covered by Guarantees of Origin from Jysk Energi.

### PRODUCT DESCRIPTION

Tropical planed hardwood boards which main function is to be used for exterior applications, primarily cladding boards for exterior walls. The boards are 20x40 mm and have a density of 680 kg/m<sup>3</sup> at 12% moisture content. The boards are very durable and have a long service life. They are naturally dense and hard and are therefore better able to withstand humidity and wood boring insect attacks, without additional treatment, than untreated European wood. The product is manufactured from 100% FSC certified mahogany.

Further information can be found at <https://keflico.com/>.

### PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	0	-
Minerals	0	-
Fossil materials	0	-
Bio-based materials	100%	The Congo Basin, Central Africa

### BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	303.6
Biogenic carbon content in packaging, kg C	-

### FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 m <sup>3</sup> mahogany cladding
Mass per declared unit	680 kg at 12% moisture content
Functional unit	-
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	X	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.

The wood is sourced from certified forests in the Congo Basin. In Congo the wood is sawn, kiln dried, and moulded at the manufacturing site before shipment to Denmark as timber cladding. The LCI data for module A1 is a private dataset, which was provided by the International Tropical Timber Technical Association (ATIBT). The dataset covers the processing until packed and ready for transport to port, including loss. The amount of packaging is assumed to be 1.7 kg. In Cameroon, the wood is assumed transported to the port of Douala, with a distance of 634 km. For shipment to Aarhus the distance is 11.000 km. The wood is not further treated in at Keflico in Denmark, only stored. The energy consumption at Keflico is included, which is based on certified electricity from wind and solar power, and district heating. The packaging material plastic film/strap and metal strap for transport is handled at Keflico and sent to recycling. The assumptions regarding average transport distance to waste treatment facilities in Denmark is based on (Bassi, Christensen, & Damgaard, 2017):

- 230 km for plastic
- 70 km for metal

Potential packaging material added at Keflico is excluded.

### TRANSPORT AND INSTALLATION (A4-A5)

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

A4 - The packaged timber cladding received at the port of Aarhus in Denmark is transported by road to Keflico's warehouse, or directly to the installation site. The average downstream distance in Denmark is 200 km by road.

A5 - The electricity consumed by electric tools used during the installation was considered. The consumption of electricity is assumed 0.06 kWh/kg for the installation. No loss occurs.

### PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not cover the use stage.

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

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

The End-of-Life stage covers the demolition (C1), transport (C2), waste processing (C3) and final disposal (C4).

It is important to note that the End-of-Life scenario outlined in this EPD can only be accomplished, if the product is not treated during its use. Furthermore, it is assumed that the wood is collected as separate construction waste with a collection rate of 100%.

C1 - The deconstruction/demolition of the cladding is assumed to be done manually and has no related energy consumption.

C2 - The average distance to the waste treatment facilities in Denmark is based on (Bassi, Christensen, & Damgaard, 2017):

45 km for incineration

365 km for recycling

70 km for final disposal

C3 - Based on Statistics Denmark for waste treatment of wood from construction waste.

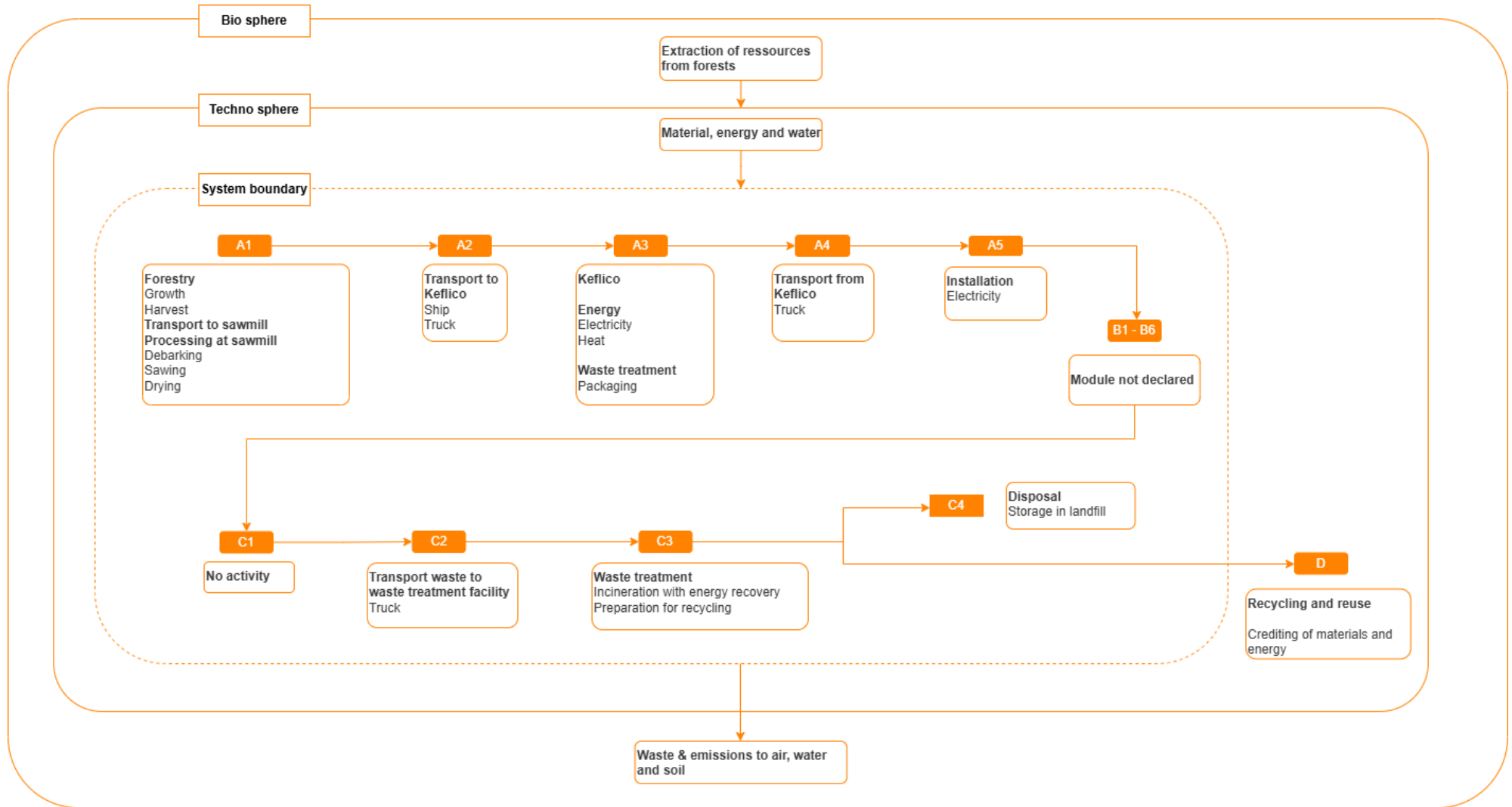
According to the statistics 75% of untreated wood is recycled and 23% is incinerated with energy recovery.

It is assumed that the efficiency of the recovery of electricity is 16% and recovery of thermal energy is 22%.

C4 - Based on Statistics Denmark for waste treatment of wood from construction waste 2% end up in landfill.

D - The benefits of recycling and incineration with energy recovery is covered in this EPD. The incineration with energy recovery results in heat and electricity. The recycled wood substitutes the production of new wood, in this case it is assumed that the recycled wood will substitute the production of wood chips.

# 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.

### 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	Allocation according to EN16485
Packaging material	Not applicable
Ancillary materials	Not applicable
Manufacturing energy and waste	Allocated by mass or volume

### AVERAGES AND VARIABILITY

Type of average	No averaging
Averaging method	Not applicable
Variation in GWP-fossil for A1-A3	-

This EPD is product and factory specific and does not contain average calculations.

### 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 v3.8, Plastics Europe, Federal LCA Commons and One Click LCA databases as sources of environmental data.

# ENVIRONMENTAL IMPACT DATA

## CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

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	-5,16E+02	1,11E+02	1,18E+01	-3,93E+02	2,26E+01	1,19E+01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,23E+01	1,04E+03	2,11E+01	-8,47E+02
GWP – fossil	kg CO <sub>2</sub> e	5,35E+02	1,11E+02	1,18E+01	6,58E+02	2,26E+01	1,18E+01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,23E+01	5,64E+00	1,11E-01	-1,27E+01
GWP – biogenic	kg CO <sub>2</sub> e	-1,05E+03	0,00E+00	0,00E+00	-1,05E+03	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	1,03E+03	2,10E+01	-8,34E+02
GWP – LULUC	kg CO <sub>2</sub> e	5,24E-01	6,66E-02	9,40E-03	6,00E-01	8,87E-03	2,40E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,27E-02	1,00E-02	2,87E-05	-2,14E-01
Ozone depletion	kg CFC-11e	9,50E-05	2,31E-05	1,54E-06	1,20E-04	5,23E-06	3,36E-07	MND	MND	MND	MND	MND	MND	MND	0,00E+00	7,47E-06	3,79E-07	4,22E-08	-3,23E-06
Acidification potential	mol H <sup>+</sup> e	7,58E+00	2,50E+00	4,48E-02	1,01E+01	9,18E-02	4,86E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,31E-01	7,09E-02	9,92E-04	-2,81E-01
EP-freshwater	kg Pe	4,32E-02	5,81E-04	3,11E-04	4,41E-02	1,59E-04	1,01E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,27E-04	4,57E-04	1,43E-06	-1,79E-03
EP-marine	kg Ne	3,44E+00	6,33E-01	7,43E-03	4,08E+00	2,74E-02	9,18E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,91E-02	2,59E-02	7,69E-04	-8,41E-02
EP-terrestrial	mol Ne	3,76E+01	7,03E+00	7,85E-02	4,47E+01	3,02E-01	1,20E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,31E-01	2,96E-01	4,09E-03	-1,32E+00
POCP (“smog”) <sup>3)</sup>	kg NMVOC	1,47E+01	1,85E+00	2,62E-02	1,66E+01	9,25E-02	2,76E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,32E-01	7,81E-02	1,49E-03	-2,79E-01
ADP-minerals &	kg Sbe	0,00E+00	1,92E-04	5,02E-04	6,95E-04	8,01E-05	1,59E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,14E-04	1,80E-05	3,98E-07	-4,69E-05
ADP-fossil resources	MJ	0,00E+00	1,49E+03	1,77E+02	1,67E+03	3,36E+02	1,68E+02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,79E+02	1,02E+02	2,99E+00	-1,74E+02
Water use <sup>5)</sup>	m <sup>3</sup> e depr.	8,50E+01	5,34E+00	4,43E+00	9,48E+01	1,55E+00	8,92E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,21E+00	5,51E+00	2,78E-02	-8,34E+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 PO4e; 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

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	1,65E-04	6,94E-06	3,53E-07	1,72E-04	1,95E-06	3,00E-07	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,78E-06	4,74E-07	2,20E-08	-3,97E-06
Ionizing radiation <sup>6)</sup>	kBq U235e	2,98E+01	6,99E+00	4,77E-01	3,73E+01	1,76E+00	2,91E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,51E+00	2,38E+00	1,86E-02	-1,70E+00
Ecotoxicity (freshwater)	CTUe	1,64E+04	1,10E+03	2,72E+02	1,78E+04	2,78E+02	3,04E+02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,97E+02	8,67E+01	2,50E+00	-2,53E+03
Human toxicity, cancer	CTUh	2,93E-05	5,57E-08	9,17E-09	2,94E-05	8,62E-09	7,56E-09	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,23E-08	4,90E-08	8,79E-11	-3,67E-08
Human tox. non-cancer	CTUh	1,62E-04	9,00E-07	3,25E-07	1,63E-04	2,83E-07	2,30E-07	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,04E-07	1,88E-07	2,84E-09	-1,16E-06
SQP <sup>7)</sup>	-	1,57E+06	8,22E+02	2,69E+01	1,57E+06	2,35E+02	2,04E+02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,35E+02	1,79E+01	7,93E+00	-1,14E+04

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	8,09E+01	1,29E+01	2,69E+02	3,63E+02	4,81E+00	1,43E+02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,87E+00	1,58E+01	1,36E-01	-3,92E+03
Renew. PER as material	MJ	1,05E+04	0,00E+00	0,00E+00	1,05E+04	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	-1,02E+04	-2,09E+02	-5,53E+03
Total use of renew. PER	MJ	1,05E+04	1,29E+01	2,69E+02	1,08E+04	4,81E+00	1,43E+02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,87E+00	-1,02E+04	-2,09E+02	-9,45E+03
Non-re. PER as energy	MJ	6,32E+03	1,49E+03	1,77E+02	7,99E+03	3,36E+02	1,68E+02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,79E+02	1,02E+02	2,99E+00	-1,74E+02
Non-re. PER as material	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	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
Total use of non-re. PER	MJ	6,32E+03	1,49E+03	1,77E+02	7,99E+03	3,36E+02	1,68E+02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,79E+02	1,02E+02	2,99E+00	-1,74E+02
Secondary materials	kg	3,41E+00	5,74E-01	1,15E-01	4,10E+00	1,12E-01	4,51E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,61E-01	8,17E-02	1,14E-03	-1,52E-01
Renew. secondary fuels	MJ	2,35E-02	2,79E-03	2,32E-03	2,86E-02	1,24E-03	3,31E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,77E-03	1,15E-04	5,21E-05	-1,82E-03
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	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>	1,73E+00	1,35E-01	1,09E-01	1,97E+00	4,22E-02	4,39E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,03E-02	1,49E-01	3,89E-03	-9,29E-02

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	1,46E+01	2,01E+00	6,92E-01	1,73E+01	3,77E-01	1,33E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	5,38E-01	3,59E-01	0,00E+00	-5,69E-01
Non-hazardous waste	kg	7,68E+02	2,30E+01	1,25E+01	8,03E+02	6,69E+00	4,36E+01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	9,54E+00	1,76E+02	1,36E+01	-8,81E+00
Radioactive waste	kg	4,24E-02	1,04E-02	2,20E-04	5,30E-02	2,31E-03	7,34E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,30E-03	6,28E-04	0,00E+00	-1,22E-03

### 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	0,00E+00	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	2,57E-01	0,00E+00	1,67E+00	1,92E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	5,10E+02	0,00E+00	0,00E+00
Materials for energy rec	kg	1,14E+03	0,00E+00	0,00E+00	1,14E+03	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	1,56E+02	0,00E+00	0,00E+00
Exported energy	MJ	2,20E+01	0,00E+00	0,00E+00	2,20E+01	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	8,31E+02	0,00E+00	0,00E+00

## VERIFICATION STATEMENT

### VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with reference standard, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The digital background data for this EPD

Why does verification transparency matter? Read more online

This EPD has been generated by One Click LCA EPD generator, which has been verified and approved by the EPD Hub.

### THIRD-PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of the data collected and used in the LCA calculations, the way the LCA-based calculations have been carried out, the presentation of environmental data in the EPD, and other additional environmental information, as present with respect to the procedural and methodological requirements in ISO 14025:2010 and reference standard.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.

Magaly González Vázquez, as an authorized verifier acting for EPD Hub Limited  
29.11.2024

