ENVIRONMENTAL PRODUCT DECLARATION

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

Glulam timber boards

ECOBIRCH AS

Programme: The international EPD® system, www.environdec.com
Programme operator: EPD International AB
EPD registration number: S-P-13446
Publication date: 2024-05-13
Valid until: 2029-04-12
Geographical scope: Global

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com.

GENERAL INFORMATION

MANUFACTURER INFORMATION

Manufacturer	Ecobirch AS
Address	Niidu 11 80010 Pärnu, Estonia
Contact details	ecobirch@ecobirch.eu
Website	https://ecobirch.eu/

PRODUCT IDENTIFICATION

Product name	Glulam timber boards
Place(s) of production	Estonia

The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but registered in different EPD programmes may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison.

EPD INFORMATION

EPD program operator	The International EPD System
EPD standards	This EPD is in accordance with EN 15804+A2 based on EF 3.0 and ISO 14025 standards.
Product category rules	The CEN standard EN 15804 serves as the core PCR. In addition, the Int´l EPD System PCR 2019:14 Construction products, version 1.3.2 (31.12.2023) is used.
EPD author	Daniel Satola, Diana Matejuk Civitta International
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☒ External verification
Verification date	2024-04-12
EPD verifier	Anni Oviir, Rangi Maja OÜ
EPD number	S-P-13446
Publishing date	2024-05-13
EPD valid until	2029-04-12

PRODUCT INFORMATION

PRODUCT DESCRIPTION

Ecobirch manufactures pine and birch glulam boards, including solid wood work surfaces and shelves for the DIY (i.e., “do it yourself”) sector and glulam boards for the staircase, window and furniture industry. Glulam boards are made on an automatic production line. All manufacturing processes are conducted in the same manufacturing plant in Pärnu, Estonia.

Product example – Glulam timber board:

PRODUCT APPLICATION

Glulam boards are used for the furniture industry, the DIY sector and construction materials for store chains.

TECHNICAL SPECIFICATIONS

Glulam boards are made from birch (*Betula pendula* OR *Betula pubescens*), pine (*Pinus sylvestris*) and black alder (*Alnus glutinosa*).

PHYSICAL PROPERTIES OF THE PRODUCT

Thickness: 18–45 mm
Width: Up to 1250 mm
Length: Up to 6000 mm
Moisture content: Varies by species (Birch: 8-18%, Pine: 10-12%, Black Alder: 8-10%). Average moisture content in product: 12% +/- 2%
Density: Varies by species (Birch: 650 kg/m³, Pine: 528 kg/m³, Black Alder: 690 kg/m³). Average density of the product: 650 kg/m³

ADDITIONAL TECHNICAL INFORMATION

Further information can be found at https://ecobirch.eu/.

PRODUCT RAW MATERIAL COMPOSITION

Product and Packaging Material	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Main product (glulam board)			
Hardwood wood	650	0	100%/0.50kgC/kg
Polyurethane adhesive	4.5	0	0
Packaging			
Wooden pallet	13.3	0	100%/ 0.4kgC/kg
Cardboard	10.8	0	100%/0.4kgC/kg
Plastic film	2.5	0	0

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Fossil materials	<1%	Europe
Bio-based materials	>99%	Europe

92% of the raw material for glulam boards is FSC-certified.

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

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of 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. Raw material preparation processes comprise of cutting and drying (in the case of wet material) raw material (round- and softwood). The manufacturing process includes calibration (cutting and planning material to size), optimizing (sizing and sorting according to semi-finished material lamella quality), finger-jointing and gluing, calibrating finger-joint material, pressing, finishing/curing, and packaging. The products are packaged using plastic film, wood (pallets), and paper/cardboard.

TRANSPORT AND INSTALLATION (A4-A5)

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

Transportation impacts that occur from final product delivery to the construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.
The typical installation place was assumed as a weighted average of sold product destinations globally. According to the manufacturer, transportation does not cause losses, as products are packaged properly. For the global scenario, the final product is transported 220 km by lorry, and 5927 km by sea. The vehicle capacity utilization volume factor is assumed to be 1. Environmental impacts from installation into the building (A5) include the treatment of wood and plastic waste from packaging.

The additional environmental impacts are presented in Annex 2, considering local transportation scenarios based on the EU and US market. For the EU scenario, the final product is transported 963 km by lorry, and 477 km by sea. For the US scenario, the final product is transported 127 km by lorry, and 10 775 km by sea.

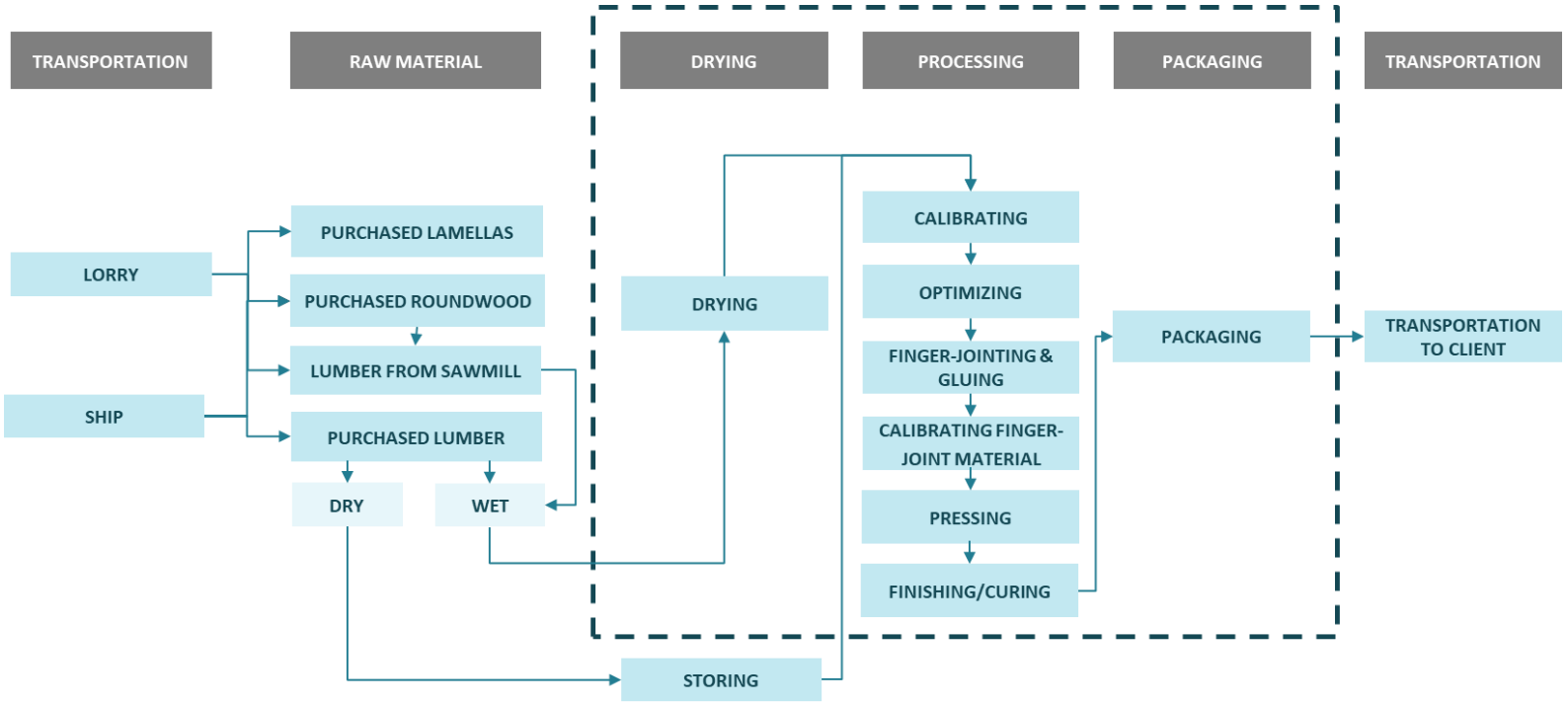
PRODUCT USE AND MAINTENANCE (B1-B7)

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)

Demolition is assumed to consume 0,01 kWh per kg of product (C1). At the end of the product´s life, it is assumed that 100% of the products are collected as wood waste (sorted and shredded). Demolition is assumed to consume 0,01 kWh per kg of product. 85% of the sorted wood waste is incinerated for energy recovery (C3) and the remaining 15% is assumed to be incinerated without energy recovery (C4)
Environmental benefits of generated electricity and heat in Modules C3 and is considered. It was assumed that the sorted wood waste is incinerated for energy recovery in the same ratio as in module C3.

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	2023

DECLARED AND FUNCTIONAL UNIT

Declared unit	1m3
Mass per declared unit	654 kg

BIOGENIC CARBON CONTENT

The product's biogenic carbon content at the factory gate

Biogenic carbon content in the product, kg C	314.2
Biogenic carbon content in packaging, kg C	9.4

SYSTEM BOUNDARY

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	D	D
x	x	x	x	x	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x	x	x
Geography, by two-letter ISO country code or regions. The International EPD System only.																		
EU	EU	EU	GLO	GLO	-	-	-	-	-	-	-	GLO	GLO	GLO	GLO	GLO		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR.

CUT-OFF CRITERIA

The study does not exclude any modules or processes that are stated mandatory in EN 15804:2012+A2:2019 and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw materials and energy consumption. All inputs and outputs of the unit processes, for which data is available, 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. In this study, as per EN 15804, allocation is conducted in the following order;

1. Allocation should be avoided.
2. Allocation should be based on physical properties (e.g. mass, volume) when the difference in revenue is small.
3. Allocation should be based on economic values.

The allocation of the raw materials, electricity, heating, and fossil fuel consumption between the main product under investigation (glulam board) and by-products the allocation has been made on an economic basis, considering the high difference in revenue between glulam boards and by-products.
Allocation used in Ecoinvent 3.8 environmental data sources follows the methodology 'allocation, cut-off by classification'. This methodology is in line with the requirements of EN 15804.

The allocations in the Ecoinvent 3.8 datasets used in this study follow the Ecoinvent system model 'Allocation, cut-off, EN15804'.

BIOGENIC CARBON AND GWP-BIOGENIC

Biogenic carbon content in products and packaging has been calculated according to EN 16449. Irrespective of the chosen co-product allocation, biogenic carbon content reflects physical flows. Carbon sequestration and neutrality have been assumed for all volume of used wooden materials.

ENVIRONMENTAL IMPACT DATA

Disclaimer: It is discouraged to use the results of modules A1-A3 without considering the results of module C. The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	-6,64E+02	9,86E+01	4,32E+01	MND	MND	MND	MND	MND	MND	MND	3,31E+00	3,26E+01	8,99E+02	1,59E+02	-4,29E+02
GWP – fossil	kg CO_2e	4,24E+02	9,95E+01	9,85E+00	MND	MND	MND	MND	MND	MND	MND	3,31E+00	3,26E+01	3,80E+01	3,39E+00	-4,29E+02
GWP – biogenic	kg CO_2e	-1,09E+03	0,00E+00	3,33E+01	MND	MND	MND	MND	MND	MND	MND	6,06E-04	0,00E+00	8,99E+02	1,59E+02	0,00E+00
GWP – LULUC	kg CO_2e	2,37E+00	5,28E-02	5,77E-04	MND	MND	MND	MND	MND	MND	MND	3,30E-04	1,28E-02	1,54E-01	0,00E+00	-1,15E-01
Ozone depletion pot.	kg CFC_{-11}e	7,12E-05	2,11E-05	7,84E-07	MND	MND	MND	MND	MND	MND	MND	7,07E-07	7,55E-06	4,88E-06	0,00E+00	-4,36E-05
Acidification potential	mol H^+e	3,17E+00	1,49E+00	4,19E-02	MND	MND	MND	MND	MND	MND	MND	3,44E-02	1,32E-01	2,64E-01	1,53E-01	-9,68E-01
EP-freshwater[2)]	kg Pe	2,33E-02	6,54E-04	1,95E-05	MND	MND	MND	MND	MND	MND	MND	1,10E-05	2,29E-04	9,07E-04	5,30E-04	-1,38E-02
EP-marine	kg Ne	7,71E-01	3,78E-01	1,86E-02	MND	MND	MND	MND	MND	MND	MND	1,52E-02	3,95E-02	9,73E-02	7,66E-02	-1,70E-01
EP-terrestrial	mol Ne	8,27E+00	4,19E+00	2,03E-01	MND	MND	MND	MND	MND	MND	MND	1,67E-01	4,36E-01	1,05E+00	8,39E-01	-1,90E+00
POCP ("smog")[3)]	kg NMVOCe	2,87E+00	1,12E+00	5,48E-02	MND	MND	MND	MND	MND	MND	MND	4,59E-02	1,33E-01	2,80E-01	4,13E-01	-6,22E-01
ADP-minerals & metals[4)]	kg Sbe	8,31E-04	2,66E-04	4,06E-06	MND	MND	MND	MND	MND	MND	MND	1,68E-06	1,16E-04	1,16E-04	0,00E+00	-3,64E-04
ADP-fossil resources	MJ	3,49E+03	1,37E+03	5,11E+01	MND	MND	MND	MND	MND	MND	MND	4,45E+01	4,84E+02	4,90E+02	0,00E+00	-7,29E+03
Water use[5)]	m^3e depr.	1,62E+02	5,31E+00	2,00E+00	MND	MND	MND	MND	MND	MND	MND	1,20E-01	2,24E+00	4,17E+01	2,42E+00	-5,44E+01

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, PEF

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	6,08E-05	6,41E-06	1,00E-06	MND	MND	MND	MND	MND	MND	MND	9,22E-07	2,81E-06	3,70E-06	4,93E-06	-3,47E-06
Ionizing radiation[6)]	kBq U235e	7,33E+01	6,33E+00	2,25E-01	MND	MND	MND	MND	MND	MND	MND	2,05E-01	2,53E+00	3,28E+00	0,00E+00	-6,88E+01
Ecotoxicity (freshwater)	CTUe	7,93E+03	1,12E+03	6,47E+01	MND	MND	MND	MND	MND	MND	MND	2,68E+01	4,02E+02	5,96E+02	4,85E+02	-3,03E+03
Human toxicity, cancer	CTUh	4,50E-07	4,58E-08	3,13E-09	MND	MND	MND	MND	MND	MND	MND	1,03E-09	1,24E-08	4,40E-08	1,26E-06	-6,33E-08
Human tox. non-cancer	CTUh	6,24E-06	9,56E-07	1,09E-07	MND	MND	MND	MND	MND	MND	MND	1,94E-08	4,08E-07	1,56E-06	6,79E-06	-1,80E-06
SQP[7)]	-	2,02E+05	6,82E+02	7,74E+00	MND	MND	MND	MND	MND	MND	MND	5,79E+00	2,81E-06	3,29E+02	0,00E+00	-6,34E+02

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-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8)]	MJ	2,40E+04	1,37E+01	4,45E-01	MND	MND	MND	MND	MND	MND	MND	2,54E-01	6,94E+00	2,38E+01	0,00E+00	-2,79E+02
Renew. PER as material	MJ	2,11E+04	0,00E+00	-2,86E+02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	-1,79E+04	-3,16E+03	0,00E+00
Total use of renew. PER	MJ	4,51E+04	1,37E+01	-2,86E+02	MND	MND	MND	MND	MND	MND	MND	2,54E-01	6,94E+00	-1,79E+04	-3,16E+03	-2,79E+02
Non-re. PER as energy	MJ	6,58E+03	1,37E+03	5,11E+01	MND	MND	MND	MND	MND	MND	MND	4,45E+01	4,84E+02	4,89E+02	0,00E+00	-7,29E+03
Non-re. PER as material	MJ	1,23E+02	0,00E+00	-1,23E+02	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	6,70E+03	1,37E+03	-7,16E+01	MND	MND	MND	MND	MND	MND	MND	4,45E+01	4,84E+02	4,89E+02	0,00E+00	-7,29E+03
Secondary materials	kg	2,85E+00	5,11E-01	2,67E-02	MND	MND	MND	MND	MND	MND	MND	1,74E-02	1,62E-01	3,97E-01	0,00E+00	-4,51E-01
Renew. secondary fuels	MJ	7,90E+00	4,38E-03	1,64E-04	MND	MND	MND	MND	MND	MND	MND	5,70E-05	1,79E-03	3,20E-03	0,00E+00	-1,47E-03
Non-ren. secondary fuels	MJ	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^3	2,81E+00	1,36E-01	2,21E-02	MND	MND	MND	MND	MND	MND	MND	2,70E-03	6,09E-02	-2,53E-02	0,00E+00	-1,67E+00

8) PER = Primary energy resources

END OF LIFE – WASTE

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	1,29E+01	1,93E+00	6,12E-02	MND	MND	MND	MND	MND	MND	MND	5,96E-02	5,43E-01	0,00E+00	0,00E+00	-1,28E+01
Non-hazardous waste	kg	3,55E+02	2,58E+01	2,70E+01	MND	MND	MND	MND	MND	MND	MND	4,19E-01	9,64E+00	0,00E+00	0,00E+00	-6,19E+02
Radioactive waste	kg	4,69E-02	9,26E-03	3,22E-04	MND	MND	MND	MND	MND	MND	MND	3,13E-04	3,33E-03	0,00E+00	0,00E+00	-1,82E-02

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	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	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	2,98E+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 energy rec	kg	2,40E-01	0,00E+00	2,66E+01	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	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	7,55E+03	0,00E+00	0,00E+00

SCENARIO DOCUMENTATION

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	Electricity, Estonia, residual mix (2022). LCA study for country-specific residual electricity mixes based on AIB 2022
Electricity $kgCO_2e$ / kWh	0.80
District heating data source and quality	Heat and power co-generation, wood. Ecoinvent 3.8
District heating $kgCO_2e$ / MJ	0.0024

Transport scenario documentation (A4) – Global market

Scenario parameter	Value
Specific transport CO_2e emissions, kg CO_2e / tkm	0.022
Average transport distance, km	Road – 520km, Sea 5 927 km
Capacity utilization (including empty return) %	100%
Bulk density of transported products	650 kg/m^3
Volume capacity utilization factor	1

Additional transportation scenarios: EU and US/ROW and corresponding environmental impacts are presented in Annex 2.

End-of-life scenario documentation

Scenario parameter	Value
Collection process – kg collected separately	654
Collection process – kg collected with mixed waste	0
Recovery process – kg for re-use	0
Recovery process – kg for recycling	0
Recovery process – kg for energy recovery	556
Disposal (total) – kg for final deposition	98
Scenario assumptions e.g. transportation	End-of-life product is transported 300 km with an average lorry.

BIBLIOGRAPHY

General Programme Instructions of the International EPD® System. Version 4.0

ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations. Principles and procedures.

ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.

ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.

ISO 21930:2017 Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services

Ecoinvent database v3.8 (2021) and One Click LCA database.

EN 15804:2012+A2:2019 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.

Int´l EPD System PCR 2019:14 Construction products, version 1.3.2 (31.12.2023)

ABOUT THE MANUFACTURER

Ecobirch manufactures pine and birch glulam boards for the furniture industry and the DIY sector, as well as construction materials for store chains. The company is part of the Combi Group, which connects eight domestic timber industries.

The Combi Group is a vertically integrated timber manufacturing group that values local produce and employs nearly 650 people. In addition to Ecobirch, the Group includes two sawmills – Combimill Sakala and Combimill Reopalu, finishing plants – Combiwood, Vaidawood, and Vindor, and component manufacturers for timber industries – Combilink and Vincom.

Manufacturer	Ecobirch AS
EPD author	Daniel Satola, Civitta International
EPD verifier	Anni Oviir, Rangi Maja OÜ
EPD program operator	The International EPD System
Background data	This EPD is based on Ecoinvent 3.8 (Allocation, cut-off, EN15804) and One Click LCA databases.
LCA software	The LCA and EPD have been created using One Click LCA Pre-Verified EPD Generator for Wood and plant-fibre based products

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 compliance with EN 15804, 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 background report (project report) for this EPD

Why does verification transparency matter? Read more online.

VERIFICATION OVERVIEW

The following independent third party has verified this specific EPD:

EPD verification information	Answer
Independent EPD verifier	Anni Oviir, Rangi Maja OÜ
EPD verification started on	2024-02-12
EPD verification completed on	2024-04-12
Approver of the EPD verifier	The International EPD System

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 EN 15804:2012+A2:2019.

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.

VERIFICATION AND REGISTRATION (INTERNATIONAL EPD SYSTEM)

ISO standard ISO 21930 and CEN standard EN 15804 serves as the core Product Category Rules (PCR)	
PCR	PCR 2019:14 Construction products, version 1.3.2
PCR review was conducted by:	The Technical Committee of the International EPD® System. See www.environdec.com/TC for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat at www.environdec.com/contact.
Independent third-party verification of the declaration and data, according to ISO 14025:2006:	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☒ External verification
Third party verifier	Anni Oviir, Rangi Maja OÜ
	Approved by: The International EPD® System Technical Committee, supported by the Secretariat
Procedure for follow-up during EPD validity involves third party verifier	☒ yes ☐ no

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ANNEX 1: ENVIRONMENTAL IMPACTS – EN 15804+A1, CML/ISO 21930

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO_2e	4,19E+02	9,86E+01	9,77E+00	MND	MND	MND	MND	MND	MND	MND	3,27E+00	3,23E+01	3,73E+01	1,92E+01	-4,19E+02
Ozone depletion Pot.	kg CFC_{-11}e	5,71E-05	1,67E-05	6,27E-07	MND	MND	MND	MND	MND	MND	MND	5,60E-07	5,98E-06	3,93E-06	0,00E+00	-3,74E-05
Acidification	kg SO_2e	2,55E+00	1,19E+00	2,99E-02	MND	MND	MND	MND	MND	MND	MND	2,45E-02	1,03E-01	1,97E-01	1,05E-01	-8,04E-01
Eutrophication	kg PO_4^3e	6,40E-01	1,55E-01	1,00E-02	MND	MND	MND	MND	MND	MND	MND	5,69E-03	2,33E-02	1,16E-01	6,18E-02	-4,92E-01
POCP (“smog”)	kg C_2H_4e	2,09E-01	3,34E-02	6,90E-04	MND	MND	MND	MND	MND	MND	MND	5,36E-04	4,21E-03	7,08E-03	2,30E-01	-5,07E-02
ADP-elements	kg Sbe	9,66E-04	2,60E-04	3,56E-06	MND	MND	MND	MND	MND	MND	MND	1,65E-06	1,13E-04	1,11E-04	0,00E+00	-3,64E-04
ADP-fossil	MJ	6,70E+03	1,37E+03	5,11E+01	MND	MND	MND	MND	MND	MND	MND	4,45E+01	4,84E+02	4,89E+02	0,00E+00	-7,29E+03

ANNEX 2: ENVIRONMENTAL IMPACT DATA RELATED TO TRANSPORTATION SCENARIOS: EU AND US/REST OF WORLD (RoW) MARKETS

Transport scenario documentation (A4) – EU market

Scenario parameter	Value
Specific transport CO_2e emissions, kg CO_2e / tkm	0.12
Average transport distance, km	Road 963 km, Sea 477 km
Capacity utilization (including empty return) %	100%
Bulk density of transported products	650 kg/m^3
Volume capacity utilization factor	1

Transport scenario documentation (A4) – US/RoW market

Scenario parameter	Value
Specific transport CO_2e emissions, kg CO_2e / tkm	0.011
Average transport distance, km	Road – 127km, Sea 10 775 km
Capacity utilization (including empty return) %	100%
Bulk density of transported products	650 kg/m^3
Volume capacity utilization factor	1

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A4 – EU scenario	A4 – US/RoW scenario
GWP – total[1)]	kg CO_2e	1,16E+02	8,34E+01
GWP – fossil	kg CO_2e	1,17E+02	8,41E+01
GWP – biogenic	kg CO_2e	0,00E+00	0,00E+00
GWP – LULUC	kg CO_2e	4,87E-02	5,65E-02
Ozone depletion pot.	kg $CFC_{-11}e$	2,57E-05	1,70E-05
Acidification potential	mol H^+e	5,70E-01	2,31E+00
EP-freshwater[2)]	kg Pe	9,72E-04	3,73E-04
EP-marine	kg Ne	1,62E-01	5,70E-01
EP-terrestrial	mol Ne	1,79E+00	6,34E+00
POCP ("smog")[3)]	kg NMVOCe	5,32E-01	1,65E+00
ADP-minerals & metals[4)]	kg Sbe	4,00E-04	1,48E-04
ADP-fossil resources	MJ	1,69E+03	1,08E+03
Water use[5)]	m^3e depr.	7,33E+00	3,52E+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, PEF

Impact category	Unit	A4 – EU scenario	A4 – US/RoW scenario
Particulate matter	Incidence	9,79E-06	3,43E-06
Ionizing radiation[6)]	kBq U235e	7,83E+00	5,00E+00
Ecotoxicity (freshwater)	CTUe	1,54E+03	7,49E+02
Human toxicity, cancer	CTUh	4,45E-08	4,70E-08
Human tox. non-cancer	CTUh	1,43E-06	5,38E-07
SQP[7)]	-	1,15E+03	2,69E+02

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	A4 – EU scenario	A4 – US/RoW scenario
Renew. PER as energy[8)]	MJ	1,96E+01	8,50E+00
Renew. PER as material	MJ	0,00E+00	0,00E+00
Total use of renew. PER	MJ	1,96E+01	8,50E+00
Non-re. PER as energy	MJ	1,69E+03	1,08E+03
Non-re. PER as material	MJ	0,00E+00	0,00E+00
Total use of non-re. PER	MJ	1,69E+03	1,08E+03
Secondary materials	kg	5,60E-01	4,68E-01
Renew. secondary fuels	MJ	7,08E-03	1,99E-03
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00
Use of net fresh water	m^3	1,97E-01	8,09E-02

8) PER = Primary energy resources

END OF LIFE – WASTE

Impact category	Unit	A4 – EU scenario	A4 – US/RoW scenario
Hazardous waste	kg	2,42E+00	1,50E+00
Non-hazardous waste	kg	3,83E+01	1,46E+01
Radioactive waste	kg	1,12E-02	7,57E-03