




ENVIRONMENTAL PRODUCT DECLARATION FINNISH GLULAM, LIIMAPUU



Program operator, publisher:	
Owner of the declaration:	Liimapuuyhdistys
Name of the product:	Glulam
Declaration number:	RTS_242_23
Registration number:	
ECO Platform reference number:	
Issue date:	20.7.2023
Valid to:	20.7.2028
Scope of the declaration	This environmental product declaration covers the environmental impacts of Finnish glulam. The declaration has been prepared in accordance with SFS-EN 15804:2012 + A2:2019 and ISO 14025 standards and the additional requirements stated in the RTS PCR (English version, 26.8.2020). This declaration covers the life cycle stages from cradle to gate, end of life stage and benefits and loads beyond the system boundary.
	 Jukka Seppänen RTS EPD Committee Secretary  Laura Apilo Managing Director

1. GENERAL INFORMATION, THE SCOPE AND VERIFICATION OF THE DECLARATION

EPD of construction products may not be comparable if they do not comply with SFS-EN 15804:2012 + A2:2019 and seen in a building context.

The geographic representative area is Finland. Production included in this EPD covers approximately 30% of all glulam produced in Finland.

1.1 Owner of the declaration, manufacturer

Puutuoteteollisuus ry - Finnish Woodworking Industries
Siltasaarenkatu 12A
00530 Helsinki

1.2 Product name and number

Finnish glulam, liimapuu

1.3 Place of production

Finland; Kauhava, Turku, Kuusamo, Hartola, Heinola, Vierumäki

1.4 Additional information

Additional Information from: info@puutuoteteollisuus.fi

1.5 Product Category Rules and the scope of the declaration

The declaration has been prepared in accordance with SFS-EN 15804:2012 + A2:2019 and ISO 14025 standards and the additional requirements stated in the RTS PCR (English version, 26.8.2020) and SFS-EN 16485:2014 PCR for wood and wood-based products for use in construction. The declaration

1.6 Author of the life-cycle assessment and declaration

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Compiler D. Sc. (tech) Tiina Vainio-Kaila

1.7 Verification

The declaration has been prepared in accordance with SFS-EN 15804:2012 + A2:2019 and ISO 14025 standards and the additional requirements stated in the RTS PCR (English version, 26.8.2020).

The declaration was verified by third party verifier according to abovementioned standards and PCR rules by: Sirje Vares sirje.vares@syke.fi

Third party verification on 1.6.2023.

Verification is valid until 1.6.2028.

1.8 Declaration issue date and validity

Declaration issue date 20.7.2023. The declaration is valid 5 years, until 20.7.2028.

2. PRODUCT INFORMATION

2.1 Product description

The declaration is made for Finnish glulam, which is produced by gluing wood lamellas together. This EPD covers the production of glued laminated timber produced in 6 factories of 4 companies and data has been collected for one year period 2021. The products include various sizes of pillars, made of sustainably grown (PEFC or FCS) pine and spruce wood from Finland. The pillars are used in various types of buildings. The process including the whole life cycle of the glued laminated timber is shown in (Virhe. Viitteen lähde ei löytnyt.). The calculations for the timber are based on the EPD for Finnish sawn wood, RTS EPD 124_21.

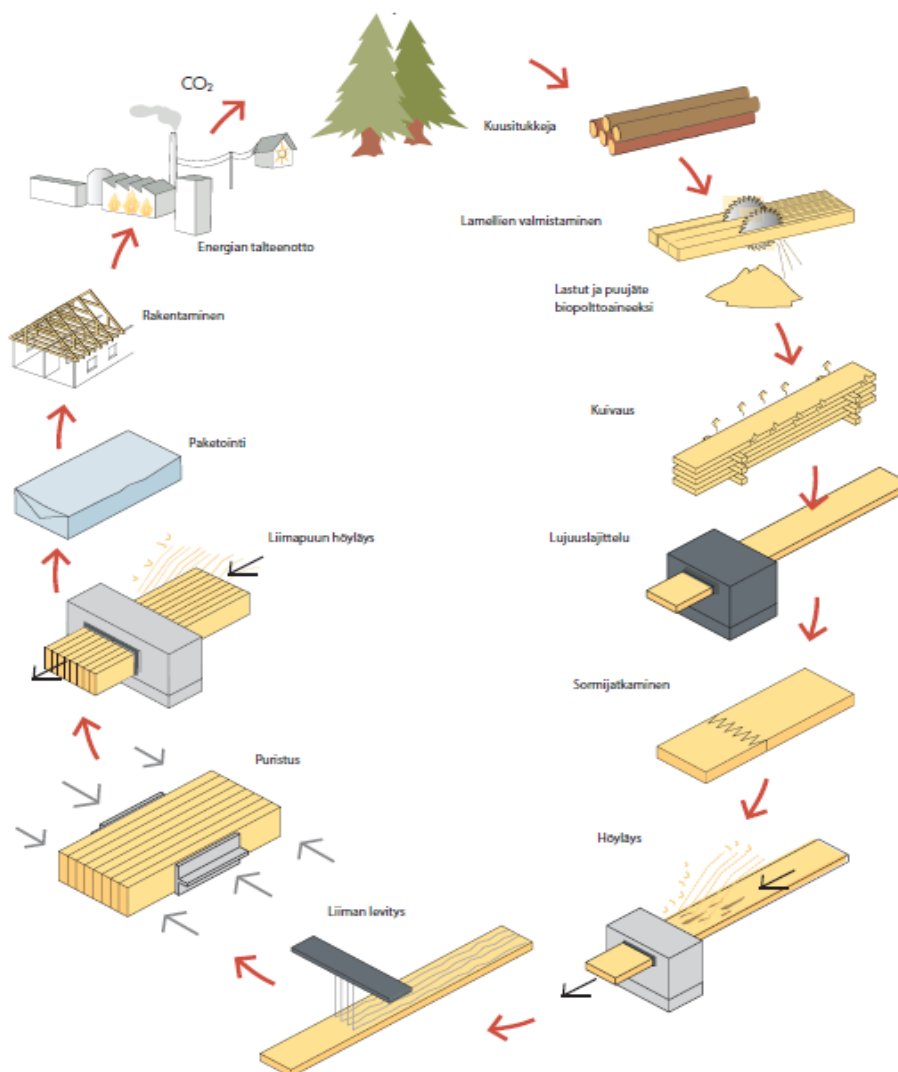


Figure 1. Manufacturing process of glued laminated timber

2.2 Key information of environmental information reported per kilogram

Indicators	Unit	A1	A2	A3	A1-A3	A4	C1	C2-C4	D
Climate change - total	kg CO ₂ eq.	-1.04E+00	5.63E-03	3.69E-03	-1.03E+00	2.64E-02	1.12E-02	1.33E+00	-4.44E-01
Abiotic depletion, minerals & metals	kg Sb eq.	1.31E-07	1.80E-16	9.65E-17	1.31E-07	1.22E-15	3.97E-17	1.60E-08	-1.22E-08
Abiotic depletion of fossil resources	MJ, net calorific value	1.40E+00	5.70E-05	1.61E-05	1.40E+00	2.66E-04	9.57E-05	1.09E-02	5.96E-02
Water use	m ³ world eq. Deprived	3.95E-02	2.20E-05	-7.03E-03	3.25E-02	1.08E-04	2.01E-05	-3.34E-05	-1.06E-02
Biogenic carbon content in product	kg C/kg			0.413					
Use of secondary material	kg/kg	1.28E-03	0.00E+00	0.00E+00	1.28E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00

The Climate change total value differs more than 10% in Kestopalkki factory, Climate change fossil does not differ more than 10% in any of the factories.

2.3 Technical information

Glulam has the CE marking, following the standard EN14080. The technical properties are presented in Table 1.

Table 1. Technical properties of glulam

Property	Classification/value
Strength classification	Typically GL30c, GL30h, GL24c
Fire classification	D-s2,d0
Moisture content, when leaving the factory	max. 15%

2.4 Product raw materials

Producer	Material	Amount [%]	Origin
Kestopalkki	Wood	98	Finland
	Glue	2	Sweden
Late-Rakenteet	Wood	98	Finland
	Glue	2	Sweden
Pölkky	Wood	99	Finland
	Glue	1	Finland/Austria
Verso	Wood	98	Finland
	Glue	2	Sweden

2.5 Substances under European Chemicals Agency’s REACH, SVHC restrictions

None

3. DEFINING THE SYSTEM

3.1 System borders

This EPD covers cradle to gate with modules A4, C1-C4 and module D, as shown in the Figure 2. Geographical representativeness on all included modules is FI/EU. Specific data from the producer is used in modules A1-A4 for all the amounts and generic data is used for the unit emissions.

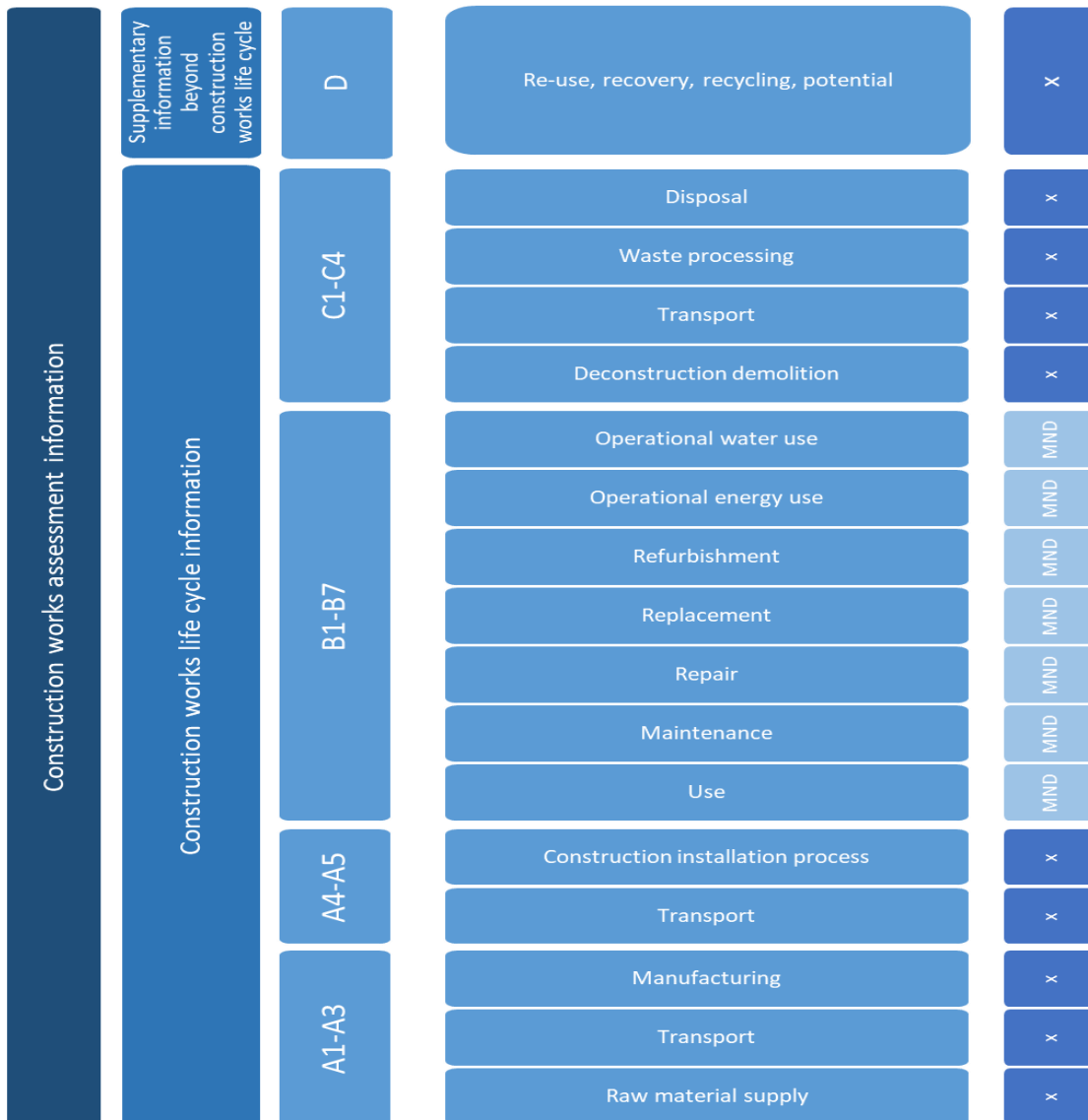


Figure 2 The modules included in this EPD are marked with X and MND = Module not included.

3.2 Declared unit

The unit for which the calculations are made is 1m^3 . The density used in this EPD is $470\text{kg}/\text{m}^3$.

3.3 Cut-off criteria

Data for A1-A4 have been collected from the producer. Modules A1 to A3 include all the raw materials used, energy production (electricity, heat and fuels), including primary production and processing of raw materials and fuels, transport and final disposal or processing of the wastes. The main component is wood, collected from sustainably grown forests.

In module C, 90% of the used glulam is expected to be crushed and burned for energy and 10% is expected to be reused as glulam. The biogenic carbon content coming to the system in A1 is released in C4. The energy use which is taken into account in module D is replacing the production of general Finnish district heat production.

The production of production equipment and means of transport, as well as the machinery, equipment and premises (production goods) needed for production and in production are excluded from the scope of the assessment, as are the commuting of workers.

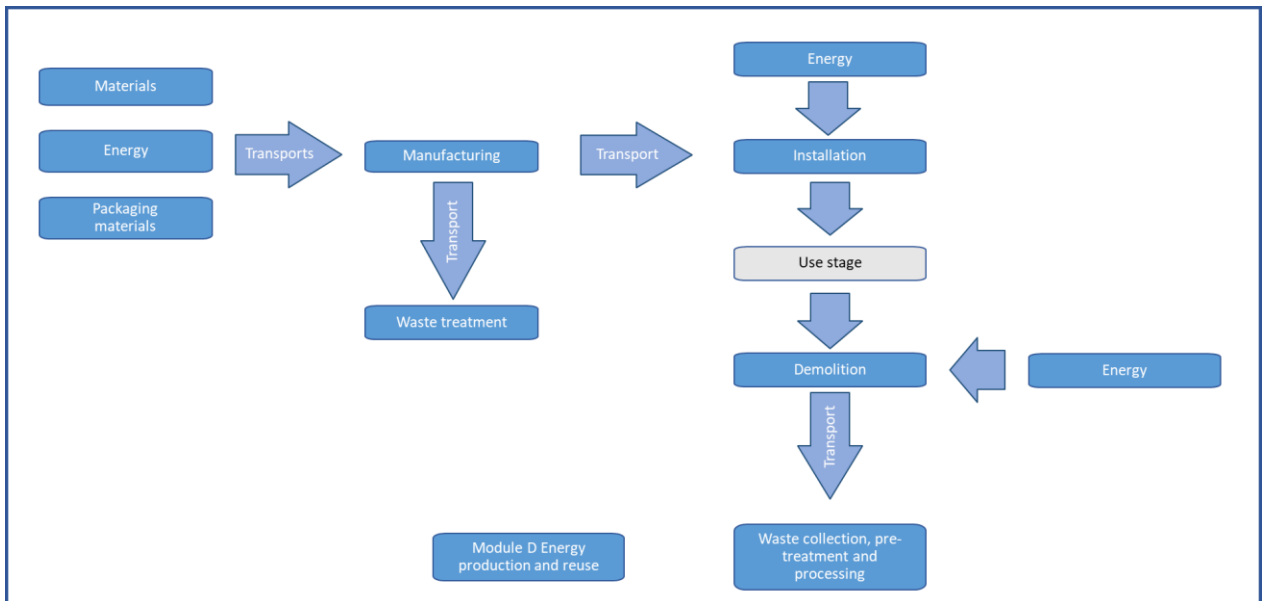


Figure 3. The system borders of the EPD for glulam

3.4 Allocation

The factories producing glulam produce also other products such as sawn wood. Allocation has been made by first taking off the energy used for the drying of timber as this is included in the EPD of sawn wood, which was used as an input in this EPD. The rest of the energy was divided by different products based on the volume. Allocation has been made according to EN 16485:2014, product category rules for wood and wood based products for use in construction.

4. SCOPE OF THE LIFE-CYCLE ASSESSMENT

The results are given as described in RTS PCR.

4.1 Core environmental impacts

Indicators	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Climate change - total	kg CO ₂ eq.	-4.87E+02	2.64E+00	1.73E+00	-4.83E+02	1.24E+01	6.80E+00	5.25E+00	2.32E+01	5.84E+02	2.00E+01	-2.09E+02
Climate change - fossil	kg CO ₂ eq.	9.06E+01	2.62E+00	9.93E-01	9.42E+01	1.23E+01	6.72E+00	5.24E+00	2.30E+01	4.87E+00	3.93E-01	-2.24E+02
Climate change - biogenic	kg CO ₂ eq.	-5.79E+02	1.87E-02	7.39E-01	-5.78E+02	1.10E-01	8.65E-02	1.28E-02	2.56E-01	5.79E+02	1.96E+01	1.48E+01
Climate change - LULUC	kg CO ₂ eq.	5.40E-01	1.06E-03	7.74E-04	5.41E-01	5.88E-03	1.17E-03	5.43E-04	1.37E-02	5.04E-04	1.06E-04	-2.71E-02
Ozone depletion	kg CFC-11 eq.	1.07E-05	6.13E-07	3.90E-08	1.13E-05	2.78E-06	1.41E-06	1.12E-06	5.02E-06	1.04E-06	3.35E-03	-3.92E-06
Acidification	mol H ⁺ eq.	7.28E-01	1.10E-02	2.82E-03	7.42E-01	4.39E-02	6.85E-02	5.45E-02	6.60E-02	5.06E-02	6.20E-08	-6.34E-01
Eutrophication aquatic freshwater	kg PO ₄ eq.	1.88E-02	1.73E-04	1.91E-04	1.92E-02	9.35E-04	2.44E-04	1.62E-04	2.13E-03	1.50E-04	1.06E-04	-1.62E-02
Eutrophication aquatic marine	kg N eq.	2.34E-01	3.22E-03	1.11E-03	2.38E-01	1.15E-02	3.02E-02	2.41E-02	1.22E-02	2.24E-02	1.83E-03	-7.86E-02
Eutrophication terrestrial	mol N eq.	2.58E+00	3.52E-02	7.81E-03	2.63E+00	1.26E-01	3.31E-01	2.64E-01	1.33E-01	2.46E-01	1.56E-02	-5.67E-01
Photochemical ozone formation	kg NMVOC eq.	6.41E-01	1.11E-02	2.46E-03	6.55E-01	4.09E-02	9.10E-02	7.27E-02	5.14E-02	6.76E-02	4.06E-03	-2.36E-01
Depletion of abiotic resources - minerals & metals *	kg Sb eq.	6.16E-05	8.45E-14	4.54E-14	6.16E-05	5.75E-13	3.03E-14	1.86E-14	1.44E-12	1.73E-14	7.53E-06	-5.72E-06
Depletion of abiotic resources - fossil fuels *	MJ, net calorific value	6.58E+02	2.68E-02	7.59E-03	6.58E+02	1.25E-01	5.91E-02	4.50E-02	2.39E-01	4.18E-02	4.82E+00	2.80E+01
Water use *	m ³ world eq. Deprived	1.86E+01	1.04E-02	-3.30E+00	1.53E+01	5.07E-02	1.60E-02	9.44E-03	1.09E-01	8.78E-03	-1.33E-01	-4.99E+00

* 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.

4.2 Additional environmental impacts

Indicators	Unit	A1	A2	A3	A1-A3	A4	A5	C1-C4	D
Particulate Matter emissions	Desease incidence	7.78E-06	2.04E-07	4.73E-08	8.03E-06	7.38E-07	1.80E-06	3.86E-06	2.80E-07
Ionizing radiation, human health **	kBq U235 eq.	4.81E+01	2.07E-01	3.68E-02	4.83E+01	9.83E-01	4.77E-01	2.53E+00	-5.14E+00
Eco-toxicity (freshwater) *	CTUe	1.24E+02	2.41E+00	1.50E-01	1.27E+02	1.09E+01	5.60E+00	2.82E+01	-1.54E+01
Human toxicity, cancer effects *	CTUh	1.95E-07	9.51E-10	2.37E-09	1.99E-07	5.31E-09	2.27E-09	1.51E-08	-1.76E-08
Human toxicity, non-cancer effects *	CTUh	1.48E-06	3.16E-08	1.33E-08	1.52E-06	1.40E-07	3.88E-08	3.11E-07	-1.62E-07
Land use related impacts/Soils quality *	Dimensionless	1.06E+05	2.87E+01	2.55E+00	1.06E+05	8.16E+01	3.24E+00	1.17E+02	-1.11E+04

** 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.

* 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.

4.3 Resource use

	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	1.07E+03	0.00E+00	2.93E-02	1.07E+03	1.08E-01	2.64E+01	2.12E+01	1.67E-01	4.02E+03	1.17E+01	-7.32E+03
Renewable primary energy resources used as raw materials	MJ	0.00E+00	0.00E+00	8.13E+03	8.13E+03	4.13E-02	0.00E+00	0.00E+00	6.36E-02	0.00E+00	0.00E+00	-8.13E+02
Total use of renewable primary energy resources	MJ	1.07E+03	0.00E+00	8.13E+03	9.20E+03	1.50E-01	2.64E+01	2.12E+01	2.30E-01	4.02E+03	1.17E+01	-8.13E+03
Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials	MJ	7.08E-02	0.00E+00	0.00E+00	7.08E-02	5.77E+01	4.39E+01	3.53E+01	8.87E+01	0.00E+00	4.13E+01	-4.05E+02
Nonrenewable primary energy resources used as raw materials	MJ	4.50E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-4.50E+01
Total use of non renewable primary energy resources	MJ	4.50E+02	0.00E+00	0.00E+00	7.08E-02	5.77E+01	4.39E+01	3.53E+01	8.87E+01	0.00E+00	4.13E+01	-4.50E+02
Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net use of fresh water	m ³	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.63E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of secondary material	kg	3.97E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

5. OTHER INDICATORS

5.1 Biogenic carbon content per declared unit

Biogenic carbon content	Unit	A3
Biogenic carbon content in product	kg C	196
Biogenic carbon content in packaging	kg	0

5.2 Wastes

Waste categories	Unit	A1-A3	A4	C1-C4
Hazardous waste disposed	kg	1.00E-02	0.00E+00	0.00E+00
Non hazardous waste disposed	kg	6.90E-01	0.00E+00	0.00E+00
Radioactive waste disposed	kg	0.00E+00	0.00E+00	0.00E+00

5.3 Other environmental indicators

Other environmental indicators	Unit	A1-A3	A4	C1-C4
Components for reuse	kg	0.00E+00	0.00E+00	4.70E+01
Materials for recycling	kg	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	7.77E-06	0.00E+00	4.23E+02
Exported energy (heat)	MJ	0.00E+00	0.00E+00	0.00E+00

6. SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

6.1 Energy in manufacturing phase

Electricity data source	Ecoinvent database, version 3.8; electricity, high voltage, production mix, FI, 2014-01-01 - 2021-12-31
GWP per 1kWh electricity	0.23 kg CO ₂ -Eq
District heating data source	Based on Energiategollisuus report and Ecoinvent processes
GWP per 1kWh energy	0.20 kg CO ₂ -Eq
Heating data source/wood chips	Ecoinvent database, version 3.8; heat and power co-generation, wood chips, 6667 kW, state-of-the-art 2014 FI 2010-01-01 - 2021-12-31
GWP per 1kWh energy	0.0095 kg CO ₂ -Eq
Heating data source/peat	Ecoinvent database, version 3.8; electricity production, peat – FI 1980-01-01 - 2021-12-31
GWP per 1kWh energy	1.04kg CO ₂ -Eq

6.2 Additional technical information, transport to the building site, A4

Scenario information	Quantity	Data source
Full trailer, diesel	0.0375 kg/tkm	Ecoinvent
Specific transport emissions (with the diesel production)	0.166 kg CO ₂ -Eq /tkm	Ecoinvent
Semi-trailer, diesel	0.11 kg/tkm	Ecoinvent
Specific transport emissions (with the diesel production)	0.509 kg CO ₂ -Eq	Ecoinvent
Average distance	145km/full trailer, 33km/semi-trailer	
Capacity utilization % (total)	80%	
Bulk density of transported products kg/m ³	470 kg/m ³	

6.3 Additional technical information, End-of-life

Processes	
Collection process	100% collected separately
Recovery system	10% for reuse 0% for recycling 90% for energy recovery
Disposal	0% for final disposal
Assumptions for scenario development, e.g. transportation	The amount for reuse is expected to rise from the 5% to 10%

6.4 Additional information

Emissions to indoor air

The information is not available

Emissions to soil

The information is not available

Emissions to water

The information is not available

7. REFERENCES

EN15804:2019 Sustainability of construction works. Environmental Product Declarations. Core rules for the product category of construction products

ISO 14025:2011-10 Environmental labels and declarations. Type III environmental declarations. Principles and procedures

Ecoinvent database <http://www.ecoinvent.org/>

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

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

https://cer.rts.fi/wp-content/uploads/rts-pcr_english_a2_2019_260820_valid-1.pdf

EPD of Finnish sawn and planed timber, RTS_124_21 https://cer.rts.fi/wp-content/uploads/rts-epd_124-21_sahateollisuus_sawn-and-planed-lumber.pdf

SFS-EN 16485:2014. Round and sawn timber. Environmental Product Declarations. Product category rules for wood and wood-based products for use in construction.