Environmental Product Declaration

In accordance with ISO 14025:2006 and
EN 15804:2012+A2:2019/AC:2021 for:

Sylva™ CLT Rib

by

Stora Enso

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
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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

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): *PCR 2019:14, v1.2.5 Construction products (EN 15804:A2). Sub-PCR- 006, Wood and wood-based products for use in construction (EN 16485). UN CPC 314*
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 www.environdec.com/contact.*
Life Cycle Assessment (LCA)
LCA accountability: *Product Sustainability, Stora Enso – Division Wood Products*
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: *Martin Erlandsson, IVL Swedish Environmental Research Institute*      Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☒ Yes ☐ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

Please note: *EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, 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. For further information about comparability, see EN 15804 and ISO 14025.*

Company information

Owner of the EPD: Stora Enso
Contact: Product Sustainability – Division Wood Products
Description of the organisation: Part of the global bioeconomy, Stora Enso is a leading provider of renewable products in packaging, biomaterials, wooden construction and paper, and one of the largest private forest owners in the world. We believe that everything that is made from fossil-based materials today can be made from a tree tomorrow. With renewable materials at the foundation, our solutions for paper, packaging, wooden construction and biomaterials are today found across continents and industries. We are active in sectors such as building, retail, food and beverages, manufacturing, publishing, pharmaceutical, cosmetics, confectionary, hygiene and textiles.

The Wood Products division is the largest sawn wood producer in Europe and a leading provider of renewable wood-based solutions for the construction industry. Our growing Building Solutions business offers building concepts to support low-carbon construction and sustainable designs. We develop digital tools to simplify the designing of building projects with wood. We also offer applications for windows, doors and for packaging industries, and our pellets provide a sustainable heating solution.

All our mills run an integrated management system, which is certified in accordance with Chain of Custody (FSC® and/or PEFC), quality management (ISO 9001), environmental management (ISO 14001), health and safety (ISO 45001), and energy management (ISO 50001) requirements.

Product-related or management system-related certifications:
ISO 9001:2015 Quality Management System
ISO 14001:2015 Environmental Management System
ISO 45001:2018 Occupational Health and Safety Management System
ISO 50001:2018 Energy Management System
FSC® and PEFC Chain of Custody multi-site certificates
Due Diligence System standard (FSC® Certified Wood, PEFC, Sustainable Biomass Program)

Name and location of production site(s):

Mill name	Location
Ybbs Sawmill	Bahnhofstrasse 31, 3370 Ybbs an der Donau, Austria
ACDF Industrie	Voie de la Grâce Dieu, 25530 Vercel-Villedieu-le-Camp, France

This EPD covers 100 % of the Sylva™ CLT Rib produced in Ybbs.
Sylva™ CLT Rib produced at ACDF Industrie are covered with the “Environmental and health declaration form (French: FDES) for CLT Rib Panel products by Stora Enso” (INIES registration number: 20220930959) and can be accessed via Download centre | Stora Enso

Product information

Product name: Sylva™ CLT Rib by Stora Enso
Product identification: Sylva™ CLT Rib for floors and roofs is placed on the marked according to ETA-17/0911 (European Technical Assessment)
Product description: Sylva™ CLT Rib by Stora Enso is made by bonding a CLT by Stora Enso panel and GLT (glulam) ribs with a high-strength adhesive. For outstanding performance, our Sylva™ CLT Rib is made from strength-graded boards. This means we have pre-sorted the wood based on its strength, stiffness, density, and appearance for optimal use. Sylva™ CLT Rib is an effective and economical solution for long spans due to their excellent material efficiency. They are available in visual quality, which means it is possible to leave ceilings and soffits exposed.

Sylva™ CLT Rib floors and roofs are a great fit when the building project requires:

- Exposed wood in ceilings
- Optimal space utilization with installations such as sprinklers or lighting, acoustic panels and decorative elements
- Medium to long spans
- Fire resistance without the need to add protective cladding




LCA information

Functional unit / declared unit: 1 m² of Sylva™ CLT Rib panel with a moisture content of 12 %
Reference service life: The RSL is understood as the period of time until the Sylva™ CLT Rib panel is replaced, rebuild, renovated or restored. If properly installed, the service lifetime of the Sylva™ CLT Rib panel is equal to the lifetime of the building, and thus 50 years is the default reference service life. Wood products can reach over 100 years' service life in service classes 1 and 2.
Time representativeness: Data for the study was collected from the CLT production sites and represents year 2020. This data includes raw material supply, transport distances, fuels, energy consumption, packaging, produced CLT by Stora Enso, further processed Sylva™ CLT Rib panels, by-products and waste.
Database used: Ecoinvent 3.8 (November 2021)
LCA software used: SimaPro 9.3.0.3

Description of system boundaries:
Cradle to gate with options, modules C1–C4, module D and with optional modules (A1–A3 + C + D and additional modules).

Target group: business to business and business to consumers

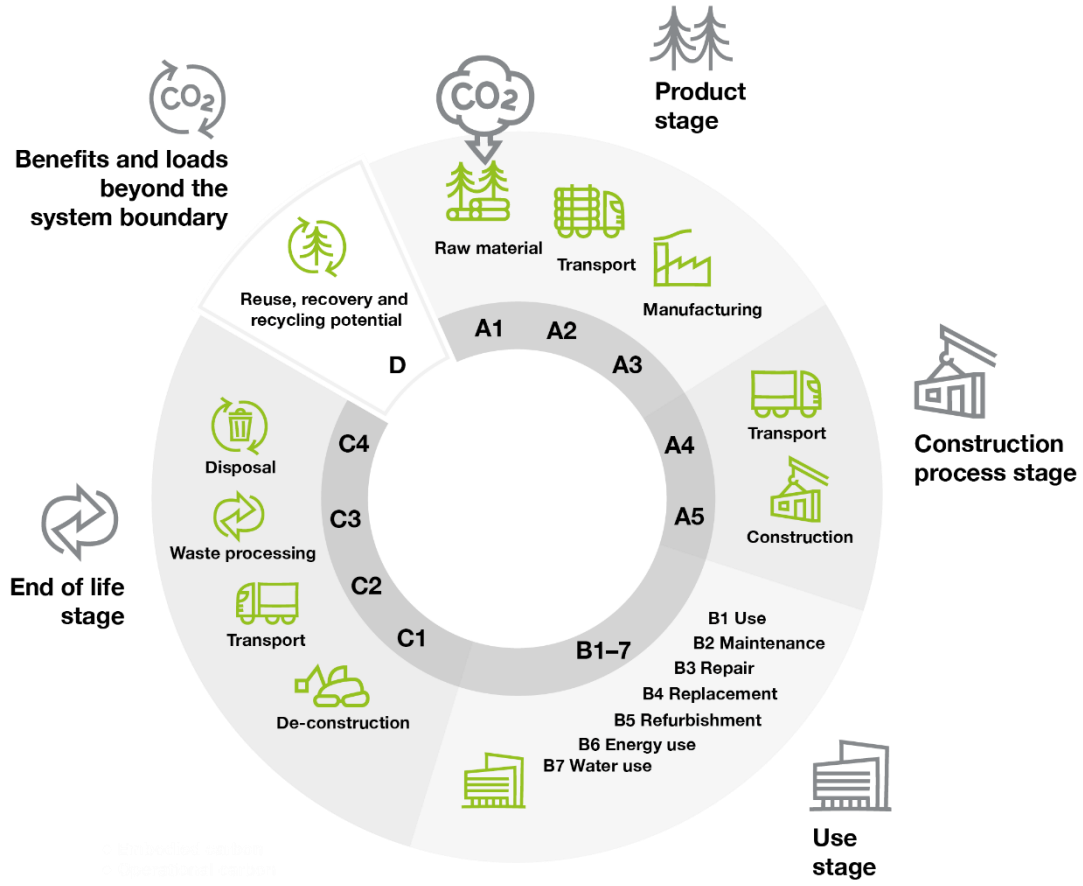
Allocation: Environmental impact from forestry operations is allocated to the roundwood only and nothing to forestry residues such as branches and tops.

The production of sawn timber and further processed CLT by Stora Enso results in several valuable by-products like wood chips used for example in cellulose pulp production, as well as sawdust, bark and dry wood chips that can be used as biofuels.

The environmental impact allocation from the sawmill and further processing have been done between sawn timber and by-products as well as the main product and by-products based on economic revenue in accordance with EN 15804.

Cut-Off Rule: 1 %. This rule is based on the assumption that the input flows do not have a major impact on the environmental impacts as a whole. In insufficient data cases for such material flows known to have the potential to cause significant emissions into air and water or soil related to the environmental indicators, conservative "worst case" assumptions have been used when filling the data gaps.

System diagram:

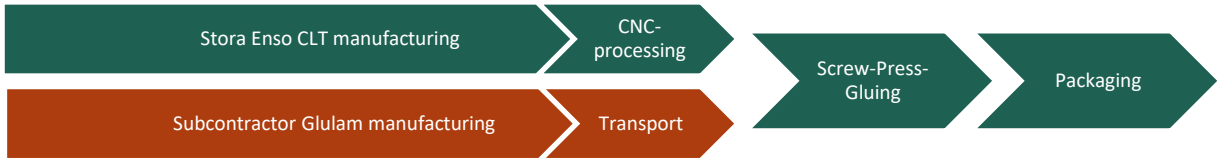


Product stage:

A1: This stage covers the extraction and processing of raw materials, such as forestry operations as well as glue production. All Stora Enso's wood raw material is sourced through a third-party certified wood traceability system. Stora Enso traceability system is certified according to FSC® and PEFC Chain of Custody systems.[1] Glulam needed for Sylva™ CLT Rib are delivered from Austrian suppliers to Ybbs mill for final manufacturing.

A2: This stage covers the transportation of the raw materials to the mill and the fuels needed for on-site transportation. The wood supply operations cover procurement of softwood from Austria, its neighboring countries and Sweden. Purchased logs are spruce logs transported with trucks and train.

A3: This stage covers the production of CLT by Stora Enso (Bad St. Leonhard, Gruvön, Ybbs and Zdirec) and assembly of Sylva™ CLT Rib in Ybbs. Generation of electricity or heat from primary energy resources are counted. Also packaging materials and the treatment of waste not leaving the factory with the product are counted.



More information on the manufacturing process of CLT can be accessed via The making of CLT by Stora Enso - YouTube

[1] FSC® trademark license nr. C125195

Construction process stage:

A4: This stage shows additional information such as average figures from the transportation to the construction sites. The figures show the impact of 1 m² Sylva™ CLT Rib delivered to European customer from Stora Enso's Ybbs production unit. Transportation distance is a weighted average based on % of sales volumes of total Sylva™ CLT Rib category.

Scenario information	Values and units
Vehicle type used for transport	Transport, freight, lorry >32 metric ton, EURO6
Fuel type and consumption of vehicle	Low sulphur diesel 0,015969 liter/tkm
Distance	634 km
Capacity utilisation (including empty returns)	50 %
Bulk density of transported products	485,1 kg/m^3

A5: The construction process includes such packaging waste, which relates to the delivered product as well as the lifting of the Sylva™ CLT Rib. No assembly of the elements is considered because of the multiple application possibilities, meaning additional metal pieces (fittings, screws) or other materials possibly needed for the installation like glues, sealants, rubbers etc. are excluded from the product system.

Use stage:

B1–B7: There are no environmental impacts expected in the use phase, and at least no harmful substances are released to air, water or ground during the use of the product.

End-of-life scenarios:

C1–C4 and Module D: Four alternative European average scenarios have been presented for the end-of-life stage. Wood has an average content in European Construction and Demolition waste of around 2,3 %. Cascading usage should be applied and therefore re-use and recycling should be preferred over incineration. If this principle can't be followed incineration in general is a treatment with the highest net savings and therefore considered as main scenario in this EPD.[2]

Please note: *The end-of-life options are scenario based and the choice of the most appropriate one can vary from situation, country and their legislation, energy and raw material availability. The options should indicate the potential environmental impact. Specific scenarios are available on request.*

See chapter	Environmental information	Additional environmental information		
Scenario	**100 % Incineration with energy recovery**	**100 % Recycling to wood chips**	**100 % Re-Use in coherent form**	**100 % Landfill with energy recovery**
Stage C1	Deconstruction / Demolition of the building. 79,4 kg which equals the declared unit is collected separately per scenario.			
Stage C2	Transport to the incineration site	Transport to the sorting platform	Transport to the sorting platform	Transport to landfill
	Distance is assumed to be 50 km in each scenario.			
Stage C3	Crushing, site operation and wood combustion. Biogenic carbon flows and energy stored as material are balanced out according to EN 16485.	Sorting and crushing at the platform. Biogenic carbon flows and energy stored as material are balanced out according to EN 16485.	Sorting and preparing at the platform. Biogenic carbon flows and energy stored as material are balanced out according to EN 16485.	-
Stage C4	-	-	-	Landfilling (waste operation, leachate treatment and landfill gas combustion). Biogenic carbon flows and energy stored as material are balanced out according to EN

[2] Damgaard, Anders, et al. "Background data collection and life cycle assessment for construction and demolition waste (CDW) management." (2022).

				16485 as if released immediately without taking into account delayed emissions.
Module D	Avoided impact of electricity production and thermal energy recovery.	Avoided impact of forestry, harvesting, wood chips preparation and drying.	Avoided impact of producing rib panel from virgin wood.	Avoided impact of electricity production and thermal energy recovery from landfill gas.
Additional information on Module D scenario	*For the thermal energy recovery, it is assumed that European average heat produced from natural gas is replaced. The replaced electricity is referring to the European average grid mix.*	*Wood chips produced from virgin wood and representing European average market are replaced, considering additional transport and energy to produce wood chips in the same quality from the recycled product.*	*Rib panels produced from virgin wood and representing Stora Enso's rib panel production units, as declared in this EPD, are replaced, considering additional energy for cutting, drilling or sanding of the re-used product.*	*For the thermal energy recovery, it is assumed that European average heat produced from natural gas is replaced. The replaced electricity is referring to the European average grid mix.*

Please note: *Module D declares potential benefits and loads of secondary material, secondary fuel or recovered energy leaving the product system. The information given in Module D lies beyond the system boundary.*

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End-of-life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-Landfill-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	EU	EU	AT	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU

GWP-GHG (A1-A3): specific data used: 64 %*, variation - products: 0 %, variation - sites: 0 %.

*The percentage of specific data is assumed to be larger than 60%, but it cannot be proved since one or several EPDs that are used as data sources lack information on the percentage of specific data used.

Technical information

Properties	Definition
Application	Structural elements for floors & roofs
ETA number	20/0893
Maximum dimensions	Length: 12 m / Width: 2,45 m / Thickness: 0,58 m
Wood species	Spruce (pine, fir, stone pine/larch and other wood types on request)
Moisture content	12 % +/-2 % on delivery
Adhesives	CLT by Stora Enso: Formaldehyde-free PUR adhesive for finger jointing and surface bonding, approved for load-bearing and non-load-bearing components indoors and outdoors according to EN 15425; Formaldehyde-free EPI adhesive for edge bonding Glulam: PUR adhesives, MUF adhesives
Surface quality	Non-visual quality (NVI) and Visual quality (VI)
Fire rating	Sylva™ CLT Rib can be manufactured and certified to meet fire resistance requirements from REI 30 to REI90
Thermal conductivity	0,12 W/(mK)
Service class	Service class 1 and 2 according to EN 1995-1-1

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/m²
CLT by Stora Enso			
Wood (*Picea abies* and *Pinus sylvestris*)	43,5	-	54,7 % / 19,4
Polyurethane (PUR) resin	0,4	-	0 % / 0
Emulsion polymer isocyanate (EPI) resin	< 0,1	-	0 % / 0
Hardener	< 0,1	-	0 % / 0
Glulam (Studiengemeinschaft Holzleimbau e.V. / EPD-SHL-20180027-IBG1-DE)			
Wood (white wood, ~ 83% picea abies)	32,2	-	40,6 % / 14,4
Melamine urea formaldehyde (MUF) resin	0,7	-	0 % / 0
Phenol resorcinol formaldehyde (PRF) resin	< 0,1	-	0 % / 0
Polyurethane (PUR) resin	< 0,1	-	0 % / 0
Rib assembly			
Screws (steel)	1,5	-	0 % / 0
Polyurethane (PUR) resin	< 0,1	-	0 % / 0
TOTAL	**79,4**	**-**	**95,3 % / 33,8**

Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
Plastic wrap	< 0,1	< 0,1	0
TOTAL	**< 0,1**	**< 0,1**	**0**

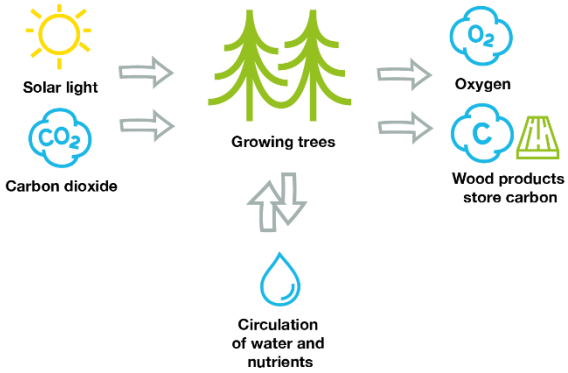
Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% per declared unit
Total	-	-	-

Biogenic carbon content at the factory gate

Biogenic carbon content	Unit (expressed per declared unit)
Biogenic carbon content in product	124 kg CO_2 eq. / m^2 = 33,8 kg C / m^2
Biogenic carbon content in accompanying packaging	0 kg CO_2 eq. / m^2 = < 0,1 kg C / m^2
Please note: *1 kg biogenic carbon is equivalent to 44/12 kg of CO_2*	

Carbon sequestration and storage:

The sequestration of carbon dioxide (CO_2) is unique to renewable materials. Biogenic carbon content of a renewable material is an outcome of the CO_2 that has effectively been removed from the atmosphere by photosynthesis of growing trees and other plants, and turned into sugars (carbon) and oxygen. The quantity of atmospheric CO_2 has thus been reduced. The longer the CO_2 is not in the atmosphere but stays stored in a material, the greater the environmental benefit.



Biogenic carbon of wood is calculated according to the EN 16485 and 16449 standards. Half of the dry mass of wood is carbon. Each kg of stored biogenic carbon is equal to ~3.67 kg of CO_2, which is effectively removed from the atmosphere. In case of an average Sylva™ CLT Rib the biogenic carbon content is -124 kg CO_2 eq./ m^2. Biogenic carbon enters the product system in forest (module A1) and for calculation purpose it is assumed to leave latest from the product system in the end-of-life stage (module C). This assumption can be made when wood is sourced from sustainably managed forest.

Environmental Information

Below tables are describing the environmental indicator results of 1 m² Sylva™ CLT Rib along its life cycle. INCINERATION as the most representative end-of-life scenario in Europe is applied. The incineration scenario is describing the dismantling and chipping of CLT Rib before incineration and is replacing average European heat produced with natural gas and average European market high voltage electricity. Other end-of-life scenarios have been made available in the chapter "Additional environmental information".

Mandatory impact category indicators according to EN 15804+A2

Results per declared unit – 1 m² Sylva™ CLT Rib													
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**A5**	**B1-B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	1,94E+1	1,15E+0	1,25E+0	**2,18E+1**	4,32E+0	6,48E-1	0,00E+0	6,48E-1	3,41E-1	4,29E+0	0,00E+0	-6,32E+1
GWP-biogenic	kg CO_2 eq.	-1,24E+2	6,66E-4	4,22E-2	**-1,24E+2**	1,59E-3	1,04E-4	0,00E+0	1,04E-4	1,25E-4	1,24E+2	0,00E+0	-1,16E-1
GWP luluc	kg CO_2 eq.	1,43E-1	5,72E-4	3,18E-3	**1,46E-1**	1,62E-3	6,41E-5	0,00E+0	6,41E-5	1,28E-4	3,95E-4	0,00E+0	-4,63E-2
GWP total	kg CO_2 eq.	-1,04E+2	1,16E+0	1,29E+0	**-1,02E+2**	4,33E+0	6,48E-1	0,00E+0	6,48E-1	3,41E-1	1,28E+2	0,00E+0	-6,34E+1
ODP	kg CFC 11 eq.	6,49E-7	5,01E-7	1,76E-7	**1,33E-6**	1,08E-6	1,37E-7	0,00E+0	1,37E-7	8,51E-8	2,98E-7	0,00E+0	-8,71E-6
AP	mol H^+ eq.	1,02E-1	5,65E-3	1,50E-2	**1,23E-1**	1,38E-2	3,23E-3	0,00E+0	3,23E-3	1,09E-3	3,42E-2	0,00E+0	-2,96E-1
EP-freshwater	kg P eq.	1,58E-3	1,26E-5	5,85E-5	**1,66E-3**	3,09E-5	2,13E-6	0,00E+0	2,13E-6	2,43E-6	1,73E-5	0,00E+0	-2,07E-3
EP-marine	kg N eq.	2,90E-2	1,18E-3	4,39E-3	**3,46E-2**	3,03E-3	1,25E-3	0,00E+0	1,25E-3	2,39E-4	1,57E-2	0,00E+0	-3,90E-2
EP-terrestrial	mol N eq.	3,18E-1	1,30E-2	5,74E-2	**3,89E-1**	3,37E-2	1,38E-2	0,00E+0	1,38E-2	2,66E-3	1,78E-1	0,00E+0	-4,35E-1
POCP	kg NMVOC eq.	5,82E-2	4,71E-3	1,18E-2	**7,47E-2**	1,33E-2	3,89E-3	0,00E+0	3,89E-3	1,05E-3	4,72E-2	0,00E+0	-1,29E-1
ADP minerals&metals[3]	kg Sb eq.	1,54E-4	3,07E-6	1,55E-5	**1,73E-4**	1,03E-5	3,31E-7	0,00E+0	3,31E-7	8,16E-7	3,47E-6	0,00E+0	-2,84E-5
ADP-fossil[3]	MJ	2,40E+2	3,21E+1	4,51E+1	**3,17E+2**	7,04E+1	8,81E+0	0,00E+0	8,81E+0	5,55E+0	2,05E+1	0,00E+0	-1,07E+3
WDP[3]	m^3	6,52E+0	6,47E-2	7,41E-1	**7,32E+0**	2,35E-1	1,26E-2	0,00E+0	1,26E-2	1,85E-2	2,12E-1	0,00E+0	-4,90E+0
Acronyms	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												

Additional mandatory and voluntary impact category indicators

Results per declared unit – 1 m² Sylva™ CLT Rib													
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**A5**	**B1-B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[4]	kg CO_2 eq.	1,96E+1	1,16E+0	1,29E+0	**2,20E+1**	4,33E+0	6,48E-1	0,00E+0	6,48E-1	3,41E-1	4,31E+0	0,00E+0	-6,34E+1

[3] Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

[4] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.

Resource use indicators

Results per declared unit – 1 m² Sylva™ CLT Rib													
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**A5**	**B1-B7**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	1,98E+2	3,82E-1	9,08E+1	**2,89E+2**	8,95E-1	4,96E-2	0,00E+0	4,96E-2	7,06E-2	4,45E-1	0,00E+0	-7,40E+1
PERM	MJ	1,25E+3	0,00E+0	0,00E+0	**1,25E+3**	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	-1,25E+3	0,00E+0	0,00E+0
PERT	MJ	1,45E+3	3,82E-1	9,08E+1	**1,54E+3**	8,95E-1	4,96E-2	0,00E+0	4,96E-2	7,06E-2	-1,25E+3	0,00E+0	-7,40E+1
PENRE	MJ	2,75E+2	3,41E+1	4,79E+1	**3,57E+2**	7,47E+1	9,36E+0	0,00E+0	9,36E+0	5,89E+0	2,20E+1	0,00E+0	-1,16E+3
PENRM	MJ	2,07E+1	0,00E+0	4,97E+0	**2,56E+1**	0,00E+0	-4,97E+0	0,00E+0	0,00E+0	0,00E+0	-2,07E+1	0,00E+0	0,00E+0
PENRT	MJ	2,96E+2	3,41E+1	5,29E+1	**3,83E+2**	7,47E+1	4,39E+0	0,00E+0	9,36E+0	5,89E+0	1,28E+0	0,00E+0	-1,16E+3
SM	kg	0,00E+0	0,00E+0	0,00E+0	**0,00E+0**	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
RSF	MJ	5,82E+0	0,00E+0	0,00E+0	**5,82E+0**	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
NRSF	MJ	0,00E+0	0,00E+0	0,00E+0	**0,00E+0**	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
FW	m^3	1,61E-1	2,52E-3	9,22E-2	**2,56E-1**	7,75E-3	4,44E-4	0,00E+0	4,44E-4	6,11E-4	3,83E-2	0,00E+0	-3,79E-1
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water												

Waste indicators

Results per declared unit – 1 m² Sylva™ CLT Rib													
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**A5**	**B1-B7**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	4,30E-3	8,14E-5	4,00E-2	**4,44E-2**	1,70E-4	2,41E-5	0,00E+0	2,41E-5	1,34E-5	5,76E-5	0,00E+0	-7,92E-4
Non-hazardous waste disposed	kg	1,37E+0	1,25E+0	5,92E-1	**3,22E+0**	6,58E+0	1,18E-2	0,00E+0	1,18E-2	5,19E-1	5,50E-1	0,00E+0	-1,60E+0
Radioactive waste disposed	kg	8,56E-3	2,22E-4	5,11E-4	**9,29E-3**	4,77E-4	6,08E-5	0,00E+0	6,08E-5	3,76E-5	1,07E-4	0,00E+0	-4,97E-3

Output flow indicators

Results per declared unit – 1 m² Sylva™ CLT Rib													
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**A5**	**B1-B7**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0,00E+0	0,00E+0	0,00E+0	**0,00E+0**	0,00E+0	1,08E-1	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
Material for recycling	kg	0,00E+0	0,00E+0	0,00E+0	**0,00E+0**	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
Materials for energy recovery	kg	0,00E+0	0,00E+0	0,00E+0	**0,00E+0**	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	7,84E+1	0,00E+0	0,00E+0
Exported energy, electricity	MJ	0,00E+0	0,00E+0	9,00E-1	**9,00E-1**	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
Exported energy, thermal	MJ	0,00E+0	0,00E+0	4,81E-1	**4,81E-1**	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0

Additional environmental Information – alternative end-of-life scenarios Re-Use / Recycling / Landfill

Results per declared unit – 1 m² Sylva™ CLT Rib

		Re-use					Recycling					Landfill				
Indicator	**Unit**	**C1**	**C2**	**C3**	**C4**	**D**	**C1**	**C2**	**C3**	**C4**	**D**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	6,48E-1	3,41E-1	0,00E+0	0,00E+0	-1,98E+1	6,48E-1	3,41E-1	9,21E-1	0,00E+0	-2,65E+0	6,48E-1	3,41E-1	0,00E+0	7,52E-1	-7,38E-3
GWP-biogenic	kg CO_2 eq	1,04E-4	1,25E-4	1,24E+2	0,00E+0	-1,83E-1	1,04E-4	1,25E-4	1,24E+2	0,00E+0	-2,52E-2	1,04E-4	1,25E-4	0,00E+0	1,62E+2	-2,26E-5
GWP luluc	kg CO_2 eq	6,41E-5	1,28E-4	0,00E+0	0,00E+0	-1,39E-1	6,41E-5	1,28E-4	9,19E-5	0,00E+0	-3,03E-2	6,41E-5	1,28E-4	0,00E+0	1,69E-4	-9,06E-6
GWP total	kg CO_2 eq	6,48E-1	3,41E-1	1,24E+2	0,00E+0	-2,01E+1	6,48E-1	3,41E-1	1,25E+2	0,00E+0	-2,71E+0	6,48E-1	3,41E-1	0,00E+0	1,62E+2	-7,41E-3
ODP	kg CFC 11 eq.	1,37E-7	8,51E-8	0,00E+0	0,00E+0	-1,06E-6	1,37E-7	8,51E-8	1,97E-7	0,00E+0	-1,88E-7	1,37E-7	8,51E-8	0,00E+0	2,41E-7	-7,31E-10
AP	mol H^+ eq.	3,23E-3	1,09E-3	0,00E+0	0,00E+0	-1,07E-1	3,23E-3	1,09E-3	9,57E-3	0,00E+0	-2,23E-2	3,23E-3	1,09E-3	0,00E+0	5,68E-3	-2,32E-5
EP-freshwater	kg P eq.	2,13E-6	2,43E-6	0,00E+0	0,00E+0	-1,57E-3	2,13E-6	2,43E-6	3,05E-6	0,00E+0	-3,91E-4	2,13E-6	2,43E-6	0,00E+0	8,10E-6	-4,09E-7
EP-marine	kg N eq.	1,25E-3	2,39E-4	0,00E+0	0,00E+0	-2,86E-2	1,25E-3	2,39E-4	4,23E-3	0,00E+0	-5,76E-3	1,25E-3	2,39E-4	0,00E+0	4,43E-3	-3,51E-6
EP-terrestrial	mol N eq.	1,38E-2	2,66E-3	0,00E+0	0,00E+0	-3,23E-1	1,38E-2	2,66E-3	4,64E-2	0,00E+0	-6,71E-2	1,38E-2	2,66E-3	0,00E+0	2,34E-2	-3,99E-5
POCP	kg NMVOC eq.	3,89E-3	1,05E-3	0,00E+0	0,00E+0	-5,82E-2	3,89E-3	1,05E-3	1,28E-2	0,00E+0	-2,25E-2	3,89E-3	1,05E-3	0,00E+0	1,87E-2	-1,16E-5
ADP minerals&metals[3]	kg Sb eq.	3,31E-7	8,16E-7	0,00E+0	0,00E+0	-1,64E-4	3,31E-7	8,16E-7	4,74E-7	0,00E+0	-2,59E-5	3,31E-7	8,16E-7	0,00E+0	2,20E-6	-4,36E-9
ADP-fossil[3]	MJ	8,81E+0	5,55E+0	0,00E+0	0,00E+0	-2,89E+2	8,81E+0	5,55E+0	1,26E+1	0,00E+0	-5,63E+1	8,81E+0	5,55E+0	0,00E+0	1,74E+1	-1,43E-1
WDP[3]	m^3	1,26E-2	1,85E-2	0,00E+0	0,00E+0	-6,94E+0	1,26E-2	1,85E-2	1,80E-2	0,00E+0	-3,36E+0	1,26E-2	1,85E-2	0,00E+0	9,04E-2	-9,11E-4
GWP-GHG[4]	kg CO_2 eq.	6,48E-1	3,41E-1	0,00E+0	0,00E+0	-2,00E+1	6,48E-1	3,41E-1	9,21E-1	0,00E+0	-2,68E+0	6,48E-1	3,41E-1	0,00E+0	4,45E+1	-7,41E-3
PERE	MJ	4,96E-2	7,06E-2	0,00E+0	0,00E+0	-2,75E+2	4,96E-2	7,06E-2	7,10E-2	0,00E+0	-4,88E+2	4,96E-2	7,06E-2	0,00E+0	7,70E-1	-1,46E-2
PERM	MJ	0,00E+0	0,00E+0	-1,25E+3	0,00E+0	-1,19E+3	0,00E+0	0,00E+0	-1,25E+3	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	-1,25E+3	0,00E+0
PERT	MJ	4,96E-2	7,06E-2	-1,25E+3	0,00E+0	-1,46E+3	4,96E-2	7,06E-2	-1,25E+3	0,00E+0	-4,88E+2	4,96E-2	7,06E-2	0,00E+0	-1,25E+3	-1,46E-2
PENRE	MJ	9,36E+0	5,89E+0	0,00E+0	0,00E+0	-3,26E+2	9,36E+0	5,89E+0	1,34E+1	0,00E+0	-6,02E+1	9,36E+0	5,89E+0	0,00E+0	1,85E+1	-1,54E-1
PENRM	MJ	0,00E+0	0,00E+0	-2,07E+1	0,00E+0	-2,44E+1	0,00E+0	0,00E+0	-2,07E+1	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	-2,07E+1	0,00E+0
PENRT	MJ	9,36E+0	5,89E+0	-2,07E+1	0,00E+0	-3,51E+2	9,36E+0	5,89E+0	-7,26E+0	0,00E+0	-6,02E+1	9,36E+0	5,89E+0	0,00E+0	-2,16E+0	-1,54E-1
SM	kg	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
RSF	MJ	0,00E+0	0,00E+0	0,00E+0	0,00E+0	-5,53E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
NRSF	MJ	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
FW	m^3	4,44E-4	6,11E-4	0,00E+0	0,00E+0	-2,42E-1	4,44E-4	6,11E-4	6,37E-4	0,00E+0	-1,04E-1	4,44E-4	6,11E-4	0,00E+0	2,20E-2	-6,98E-5
HWD	kg	2,41E-5	1,34E-5	0,00E+0	0,00E+0	-4,21E-2	2,41E-5	1,34E-5	3,46E-5	0,00E+0	-6,59E-5	2,41E-5	1,34E-5	0,00E+0	2,14E-5	-1,07E-7
NHWD	kg	1,18E-2	5,19E-1	0,00E+0	0,00E+0	-3,04E+0	1,18E-2	5,19E-1	1,69E-2	0,00E+0	-6,02E-1	1,18E-2	5,19E-1	0,00E+0	1,57E+2	-2,87E-4
RWD	kg	6,08E-5	3,76E-5	0,00E+0	0,00E+0	-8,74E-3	6,08E-5	3,76E-5	8,72E-5	0,00E+0	-2,54E-4	6,08E-5	3,76E-5	0,00E+0	1,13E-4	-6,35E-7
CRU	kg	0,00E+0	0,00E+0	7,84E+1	0,00E+0	5,00E-2	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
MFR	kg	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	7,84E+1	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
MER	kg	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
EEE	MJ	0,00E+0	0,00E+0	0,00E+0	0,00E+0	-7,90E-1	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	5,10E-2	0,00E+0
EET	MJ	0,00E+0	0,00E+0	0,00E+0	0,00E+0	-3,92E-1	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	3,54E-2	0,00E+0

Acronyms	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; 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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water; HWD = Hazardous waste; NHWD = Non-hazardous waste; RWD = Radioactive waste; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported energy, electric; EET = Exported energy, thermal; *

Additional impact category indicators according to EN 15804+A2 – all modules including incineration end-of-life scenario

Results per declared unit – 1 m² Sylva™ CLT Rib													
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**A5**	**B1-B7**	**C1**	**C2**	**C3**	**C4**	**D**
Particulate matter emissions	Disease incidence	3,37E-6	9,10E-8	1,71E-7	**3,63E-6**	3,78E-7	5,06E-8	0,00E+0	5,06E-8	2,98E-8	4,46E-7	0,00E+0	-1,65E-6
Ionising radiation, human health[5]	kBq U235 eq.	1,13E+0	1,42E-1	9,07E-1	**2,18E+0**	3,05E-1	3,75E-2	0,00E+0	3,75E-2	2,41E-2	7,13E-2	0,00E+0	-4,87E+0
Ecotoxicity (freshwater)[3]	CTUe	4,76E+2	2,14E+1	1,13E+2	**6,11E+2**	5,50E+1	5,16E+0	0,00E+0	5,16E+0	4,34E+0	3,14E+1	0,00E+0	-3,51E+2
Human toxicity, cancer effects[3]	CTUh	4,92E-8	5,08E-10	1,97E-9	**5,16E-8**	1,50E-9	5,80E-10	0,00E+0	5,80E-10	1,18E-10	2,38E-8	0,00E+0	-1,38E-8
Human toxicity, non-cancer effects[3]	CTUh	3,74E-7	1,50E-8	5,64E-8	**4,45E-7**	5,78E-8	3,55E-9	0,00E+0	3,55E-9	4,56E-9	7,67E-8	0,00E+0	-2,54E-7
Land use related impacts / soil quality[3]	dimensionless	1,12E+4	1,83E+1	1,97E+2	**1,14E+4**	8,05E+1	1,12E+0	0,00E+0	1,12E+0	6,35E+0	4,22E+0	0,00E+0	-9,41E+1

Additional impact category indicators according to EN 15804+A2 - alternative end-of-life scenarios Re-Use / Recycling / Landfill

Results per declared unit – 1 m² Sylva™ CLT Rib																
		Re-use					**Recycling**					**Landfill**				
Indicator	**Unit**	**C1**	**C2**	**C3**	**C4**	**D**	**C1**	**C2**	**C3**	**C4**	**D**	**C1**	**C2**	**C3**	**C4**	**D**
Particulate matter emissions	Disease incidence	5,06E-8	2,98E-8	0,00E+0	0,00E+0	-3,20E-6	5,06E-8	2,98E-8	2,54E-7	0,00E+0	-8,41E-7	5,06E-8	2,98E-8	0,00E+0	1,22E-7	-5,90E-11
Ionising radiation, human health[5]	kBq U235 eq.	3,75E-2	2,41E-2	0,00E+0	0,00E+0	-2,02E+0	3,75E-2	2,41E-2	5,38E-2	0,00E+0	-3,20E-1	3,75E-2	2,41E-2	0,00E+0	8,04E-2	-7,55E-4
Ecotoxicity (freshwater)[3]	CTUe	5,16E+0	4,34E+0	0,00E+0	0,00E+0	-5,73E+2	5,16E+0	4,34E+0	7,39E+0	0,00E+0	-1,27E+2	5,16E+0	4,34E+0	0,00E+0	1,48E+1	-4,35E-2
Human toxicity, cancer effects[3]	CTUh	5,80E-10	1,18E-10	0,00E+0	0,00E+0	-4,88E-8	5,80E-10	1,18E-10	2,86E-10	0,00E+0	-1,89E-8	5,80E-10	1,18E-10	0,00E+0	5,00E-10	-1,28E-12
Human toxicity, non-cancer effects[3]	CTUh	3,55E-9	4,56E-9	0,00E+0	0,00E+0	-4,17E-7	3,55E-9	4,56E-9	5,36E-9	0,00E+0	-8,15E-8	3,55E-9	4,56E-9	0,00E+0	6,52E-8	-3,49E-11
Land use related impacts / soil quality[3]	dimensionless	1,12E+0	6,35E+0	0,00E+0	0,00E+0	-1,08E+4	1,12E+0	6,35E+0	1,61E+0	0,00E+0	-2,65E+3	1,12E+0	6,35E+0	0,00E+0	4,53E+1	-1,25E-2

[3] Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

[5] Disclaimer: 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.

References

EPD International (2021): General Programme Instructions for the International EPD® System. version 4.0 dated 2021-03-29.

EPD International (2018): PCR 2019:14 Construction products, version 1.2.5, dated 2022-11-01

EPD International (2021): C-PCR-006 (to PCR 2019:14). Wood and wood-based products for use in construction, version 2019-12-20

Standards

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

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

EN 16449:2014 Wood and wood-based products. Calculation of the biogenic carbon content of wood and conversion to carbon dioxide

EN 15942:2012 Sustainability of construction works - Environmental product declarations - Communication format business-to-business

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

ISO 14044:2006 Environmental management. Life Cycle Assessment. Requirements and guidelines.

Detailed product information

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