XLAM DOLOMITI
production

EPD®
THE INTERNATIONAL EPD® SYSTEM

ENVIRONMENTAL PRODUCT DECLARATION

in accordance with
ISO 14025
EN 15804:2012+A2:2019/AC:2021

Panel X-Lam 3 layers thickness 57 mm

Programme:	The International EPD® System, www.environdec.com
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ECO PLATFORM EPD VERIFIED

THE WOOD BUILDING R-EVOLUTION

1. PROGRAMME INFORMATION

PROGRAMME:	The International EPD® System
ADDRESS:	EPD International AB Box 210 60 - SE-100 31 Stoccolma Svezia
WEB SITE	www.environdec.com
E-mail	info@environdec.com

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)	
Product category rules (PCR):	PCR 2019:14 Construction products, version 1.11
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.
Independent third-party verification of the declaration and data, according to ISO 14025:2006:	☐ EPD process certification (Internal) ☑ EPD verification (External)
Third party verifier:	Ugo Pretato, Studio Fieschi e Soci s.r.l.
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.

EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

2. PRODUCT INFORMATION

OWNER OF THE EPD

XLAM Dolomiti s.r.l., viale Venezia 35, in Castelnuovo (TN).

PRODUCT NAME

Panel X-Lam 3 layers thickness 57 mm.

COMPANY PROFILE

XLAM DOLOMITI is a company of 'Gruppo Paterno' that produces structural elements in wood and supplies designers and enterprises with maximum technical support to guarantee products certified and manufactured in short supply chains using traced lumber. XLAM DOLOMITI uses wood from forests with a certification of sustainable forest management and as far as possible, with preference being given to the use of wood from local sources of supply.

PRODUCT IDENTIFICATION

This EPD has been prepared in accordance with **ISO** 14025, EN **15804:2012+A2:2019/AC:2021, PCR 2019:14** versione 1.11 and the international EPD System. It covers the XLAM Panel 3 layers and 57mm thick, manufactured at XLAM's manufacturing facility in Italy for use in buildings.

MANUFACTURER INFORMATION

This EPD covers panel produced at XLAM Italian factory located in Castelnuovo, Trento. This EPD is based on a life cycle assessment study compiled in November 2021 with input and environmental output data collected in 2019 and 2020.

Product description

The XLAM panel (to be read: "cross-lam", where "X" indicates the orthogonal arrangement of the wooden elements that make up the panel) or CLT (Cross Laminated Timber) is an engineered timber product made of glued wooden layers staked crosswise. The XLAM panel is used as a load-bearing wall, floor, roof or as a partition element. This construction technique was developed in the Germanic-speaking area in the 90s and spread rapidly across the rest of Europe (today the market also reaches countries outside of Europe). It is based on the use of solid wood laminated panels that are produced by XLAM DOLOMITI with variable thickness from 57 to 297 mm and maximum dimensions of up to 3.5 meters wide and 13.5 meters long.

The XLAM panel is made up of layers which are very similar to those used for the manufacture of glued laminated timber, which, instead of being glued together in order to form linear bearing elements (beams, arches, portals), are arranged in crosswise layers as in plywood.

XLAM Panel of 57 mm is structural timber panel made by face gluing togheter 3 layers of finger-jointed spruce boads with a moisture curing polyurethane adhesive in alternating 90 degree angles. Three layer are pressed togheter in a hydraulic press qhile the glue cures.

In Italy and Europe, the species of wood mainly used for the boards of the XLAM panels is the Spruce, a softwood

tree forming extensive forests in the Alps and more generally in Central and Northern Europe, with excellent mechanical properties intended for structural use.

Production

Within the production of XLAM DOLOMITI panels, layers made of trimmed, planed and classified wooden boards are used. The boards are jointed by means of finger joints to reach the desired length and are arranged side by side, touching each other showing a short gap.
A monolithic panel is obtained by gluing the layers one above the other and orthogonally, and then applying mechanical pressure; the layers are kept under pressure long as may be necessary for the glue **formaldehyde free** to bond. Finally, the panel is processed using numerical control machines in order to achieve openings (doors, windows, staircases, skylights, etc.) as required in the design phase.
The final result of the industrial process of laying-up and assembly is a large structural surface a building material absolutely innovative and high-performing, obtained from a simple and ancient material like wood, but by using an advanced and sophisticated technology and technique.
From the point of view of the mechanical characteristics, the XLAM panel is a lightweight solid board, which is extremely rigid and durable which combines the qualities of two materials already known and tested: the great load-bearing capacity of laminated wood with the two dimensionality and stability of plywood.

Areas of application of the product

XLAM Panels provide a structural building system particularly suited to single and multi-unit buildings, and for other subdivided buildings such as schools, health care facilities and commercial offices. Panels is applied as individual components for floors, internal and external walls and roofs, or as a complete structural system encompassing all of these.

The XLAM panel has increased the potential of wood construction, revolutionising the way bearing elements are perceived, compared to a wooden frame or lattice systems (such as the American platform frame system) where the walls and floor elements, are made by combining a frame, made by linear elements - with a thin panel and the structural panelling. In fact, there has been a shift from the linear and unidirectional element, like the wooden element, to a new material which is highly innovative and structurally efficient both as plate (floor) and as sheet (walls), as well as deep beams that can be exposed to a static load in different directions.

Declared Unit

This EPD applies to 1 m^3 of **XLAM Panel 3 layers thickness 57 mm**, at an average moisture content of 13%, density 450 kg/m^3.
Classification of product: UN CPC Ver 2.1, code 31421, “Other plywood, veneered panels and similar laminated wood, of coniferous wood”.

Declared Unit	Environmental performance results refer to: **XLAM Panel 3 layers thickness 57 mm, at an average moisture content of 13%, density 450 kg/m³**
Reference Service Life (RSL)	50 years
Temporal representativeness	Primary data relating to the production facility refer to the year 2020.
Database and LCA software	Ecoinvent 3.6 e Simapro 9.2
System boundaries	**Product Stage:** A1: production of raw materials, fuels, energy carriers. A2: transport of raw materials to the production site. A3: manufacture of product and ancillary materials A4: transport to customers. A5: installation. B1 to B7: uses, maintenance, repair, replacement, refurbishment, operationa energy use and operational water use. C1 and C2: demolition and transport to waste processing. C3: waste processing. C4: disposal. D: landfill, re-use, recovery and recycling.
Allocation	The allocation of input and output flows was carried out on the basis of the mass weighted. A similar mass allocation methodology was followed to allocate flows deriving from general plant processes (consumption of non process electricity, natural gas, waste and CO2 emissions of chimneys). For the process electricity the allocation is based on the number of layers of the panel.
Cut-off	In accordance with the EN 15084 standard, a minimum of 95% of the total mass and energy flows per module has been included.
Electric mix (A3)	The consumption of electricity used in the manufacturing processes of the A1 module derives all from the national grid (GO certificate 100% renewable), according to the following mix of sources: hydro 45%, wind 18%, photovoltaic 15%, geothermal 6% and biogas 16%.
Exclusions	Processes identified as having little significance with respect to overall environmental performance were excluded. The environmental impacts of administrative activities, movement of workers to and from the workplace, cleaning activities, construction of machinery and plants, internal transport at the XLAM Dolomiti plant were excluded.
Environmental impact assessment	The Life Cycle Impact Assessment phase was carried out using the methods for calculating the potential environmental impact indicators defined by the EN 15804: 2019 standard, Annex C. For the characterization factors, the EC-JRC factors have been applied, available at the web address: https://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml
Technical support for the LCA	Bureau Veritas Nexta Srl – www.nexta.bureauveritas.it

XLAM DOLOMITI

DECLARED MODULES, GEOGRAPHICAL REPRESENTATION, DATA VARIATION

	Product stage			Construction process stage		Use stage							End of life stage				Resouece Recovery stage
	Raw materials 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-potential
Mod	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Mod decl	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Geo.	**EU**	**EU**	**IT**	**EU**	**EU**	**EU**	**EU**	**EU**	**EU**	**EU**	**EU**	**EU**	**EU**	**EU**	**EU**	**EU**	**EU**
Spec data	**>90%**					-	-	-	-	-	-	-	-	-	-	-	-
Var prod	**Not relevant**					-	-	-	-	-	-	-	-	-	-	-	-
Var sites	**Not relevant**					-	-	-	-	-	-	-	-	-	-	-	-

X = Module declared; ND = Module not declared

A1-D STAGES

A1 – Raw materials supply

The module includes the upstream production processes of the raw materials necessary for the production of panel like forestry processes, production of kiln-dried sawn softwood timber (treated and utreated), from all the suppliers.

A2 - Transport

The module includes the transport of raw materials by road to the XLAM production site in Castelnuovo (TN).

A3 - Manufacturing

The module includes the panels manufacturing activities carried out in the XLAM production plant in Castelnuovo (TN), including trimming, finger-jointing, planning of lamellas, application of adhesive, pressing, CNC machining and finishing

A4 – Transport to Customer/Distribution (Module A4)

The value was calculated considering the supplies of 2020.

A5 - Installation

Installation process includes construction work as the use of equipment for the erection of the structure (lifting of CLT panels by crane).

B1-B7

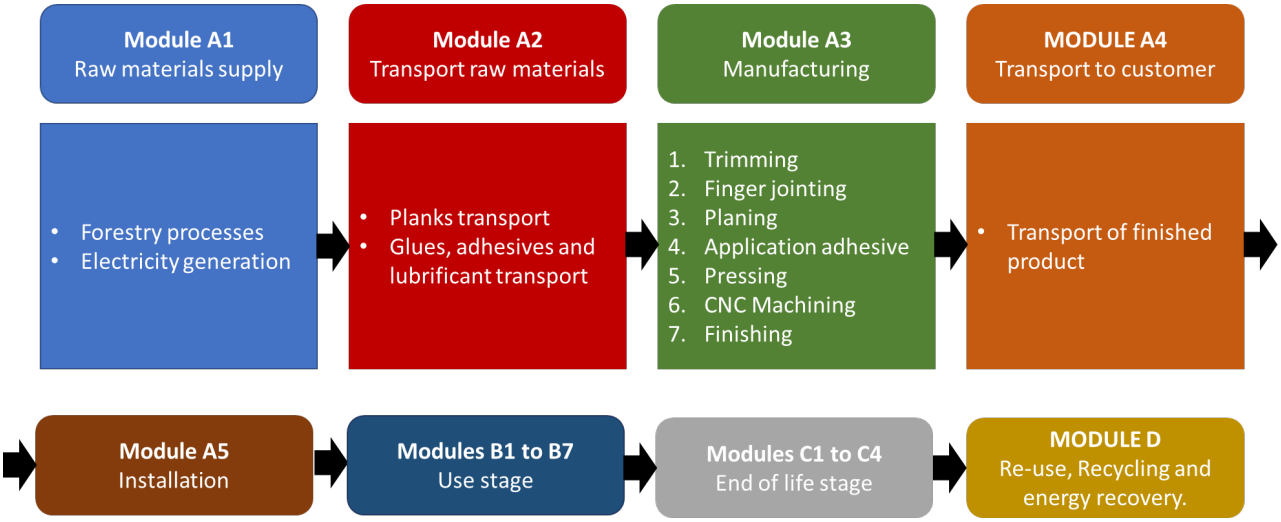
The product, in the use phase, does not need maintenance and does not have environmental implications.

End of life (Module C)

Waste processing (Module C3) is applicable for the energy recovery, recycling and reuse scenarios and disposal (Module C4) is applicable for the landfill scenarios.

Recovery and Recycling Potential (Module D)

Module D accounts for the potential benefits of reuse and recycling at the end of its first use in a building. Energy credits for the recovery of energy embodied in CLT by combustion (energy recovery scenario) or the generation of electricity from combustion of natural gas from the very small volumes of methane generated by disposal in lined and sealed landfill (landfill scenarios) are also included.



5. CONTENT DECLARATION INGLUDING PACKAGING

Content declaration - Panel X-Lam 3 layers (*)			
Product components	Weight, %	Post-consumer material, weight-%	Renewable material, weight-%
Wood	98,5%	0	100
Adhesives	1,5%	0	0
Packaging materials	0%	0	0

(*) The product does not contain substances in the Candidate List of Substances of Very High Concern (SVHC) with exceeds the limits for registration with the European Chemicals Agency.

6. ENVIRONMENTAL IMPACT INDICATORS

An introduction to each environmental impact indicator is provided below. The best-known effect of eachindicator is listed.

- **Global Warming Potential (GWP) > Climate Change**

A measure of greenhouse gas emissions, such as carbon dioxide and methane. These emissions increase absorption of radiation emitted by the earth, intensifying the natural greenhouse effect. Contributions to GWP can come from either fossil or biogenic sources, e.g. burning fossil fuels or burning wood. GWP is reported as a total (GWP) as well as both for just fossil carbon (GWPF), including biogenic carbon (GWPB) and land use and land use change carbon (GWP luluc).

- **Ozone Depletion Potential (ODP) > Ozone Hole**

A measure of air emissions that contribute to the depletion of the stratospheric ozone layer, causing higher levels of ultraviolet B (UVB) to reach the earth's surface with detrimental effects on humans, animals, and plants.

- **Acidification Potential (AP) > Acid Rain**

A measure of emissions that cause acidifying effects to the environment. Acidification potential is a measure of a molecule's capacity to increase the hydrogen ion (H+) concentration in the presence of water, thus decreasing the pH value. Potential effects include fish mortality, forest decline and the deterioration of building materials.

- **Eutrophication Potential (EP) > Algal Blooms**

A measure of nutrient enrichment that may cause an undesirable shift in species composition and elevated biomass production in both aquatic and terrestrial ecosystems. It includes potential impacts of excessively high levels of macronutrients, the most important of which are nitrogen (N) and phosphorus (P).

- **Photochemical Ozone Creation Potential (POCP) > Smog**

A measure of emissions of precursors that contribute to ground level smog formation (mainly ozone O3), produced by the reaction of VOCs and carbon monoxide in the presence of nitrogen oxides under the influence of UV light. Ground level ozone may be harmful to human and ecosystem health and may also damage crops.

- **Abiotic Depletion Potential > Resource Consumption**

The consumption of non-renewable resources leads to a decrease in the future availability of the functions supplied by these resources. Depletion of mineral resource elements (ADPE) and non-renewable fossil energy resources (ADPF) are reported separately.

Panel X-Lam 3 layers thickness 57 mm (1 m^3)

Stage A1 - A5

- **Potential Environmental Impacts/Product construction**

Indicators	Unit	A1	A2	A3	A1-A2-A3	A4	A5
GWP-total	kg CO2 eq	-6,69E+02	4,72E+01	3,12E+02	-3,10E+02	1,27E+02	1,75E+02
GWP-fossil	kg CO2 eq	1,09E+02	4,71E+01	2,58E+01	1,82E+02	1,27E+02	1,75E+02
GWP-biogen.	kg CO2 eq	-7,80E+02	4,96E-02	2,86E+02	-4,94E+02	2,08E-02	4,78E-02
GWP-luluc	kg CO2 eq	1,68E+00	1,74E-02	6,64E-04	1,70E+00	6,49E-02	1,38E-02
GWP-GHG[1]	kg CO2 eq	1,10E+02	4,66E+01	2,76E+01	1,84E+02	1,26E+02	1,73E+02
ODP	kg CFC11eq	2,57E-05	1,08E-05	1,39E-06	3,79E-05	2,75E-05	3,77E-05
AP	mol H+ eq	7,74E-01	2,47E-01	4,06E-02	1,06E+00	2,55E+00	1,83E+00
EP-freshw.	kg P eq	5,05E-02	4,65E-03	-1,42E-04	5,50E-02	6,80E-03	6,31E-03
EP-freshw.	Kg PO4 eq	1,55E-01	1,43E-02	-4,37E-04	1,69E-01	2,09E-02	1,94E-02
EP-marine	kg N eq	1,85E-01	8,18E-02	2,27E-02	2,89E-01	6,56E-01	8,07E-01
EP-terrestrial	mol N eq	2,37E+00	8,97E-01	1,86E-01	3,45E+00	7,27E+00	8,85E+00
POCP	kgNMVOCeq	8,79E-01	2,73E-01	5,17E-02	1,20E+00	1,93E+00	2,43E+00
ADPmin&met[2]	kg Sb eq	2,66E-03	8,74E-04	3,50E-04	3,89E-03	1,50E-03	2,72E-04
ADPfossil[2]	MJ	2,01E+03	7,29E+02	7,92E+01	2,82E+03	1,78E+03	2,41E+03
WDP[2]	m3 depriv.	1,47E+02	2,56E+00	4,30E-01	1,50E+02	4,31E+00	3,74E+00

GWP-total = Climate change; **GWP-fossil** = Climate change – fossil; **GWP-biogenic** = Climate change – biogenic; **GWP-luluc** = Climate change - land use and land use change; **GWP-GHG** = GWP total excluded biogenic carbon dioxide emissions and biogenic carbon stored in the product; **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

1: The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.
2: 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.

- **Resource Use/Product construction**

Indicators	Unit	A1	A2	A3	A1-A2-A3	A4	A5
PERE	MJ	1,05E+04	1,16E+01	1,40E+00	1,06E+04	1,73E+01	1,31E+01
PERM	MJ	8,66E+03	0,00E+00	0,00E+00	8,66E+03	0,00E+00	0,00E+00
PERT	MJ	1,92E+04	1,16E+01	1,40E+00	1,92E+04	1,73E+01	1,31E+01
PENRE	MJ	2,16E+03	7,74E+02	8,42E+01	3,01E+03	1,89E+03	2,56E+03
PENRM	MJ	2,27E+00	0,00E+00	0,00E+00	2,27E+00	0,00E+00	0,00E+00
PENRT	MJ	2,16E+03	7,74E+02	8,42E+01	3,02E+03	1,89E+03	2,56E+03
SM	Kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	3,72E+00	9,26E-02	6,89E-03	3,82E+00	1,48E-01	1,32E-01

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 production/Product construction**

Indicators	Unit	A1	A2	A3	A1-A2-A3	A4	A5
HW	kg	6,21E-03	4,62E-03	2,81E-04	1,11E-02	2,98E-03	6,55E-03
NHW	kg	2,84E+01	5,37E+01	6,24E+00	8,83E+01	8,01E+01	2,92E+00
RW*	kg	4,19E-02	7,38E-03	4,95E-03	5,42E-02	5,70E-04	1,23E-02

HW = Hazardous waste disposed; **NHW** = Non-hazardous waste disposed; **RW** = Radioactive waste disposed;

** Values from dataset in Ecoinvent 3.6 databases. The processes carried out in the XLAM DOLOMITI production plant do not produce radioactive waste.*

- **Output Flows/Product construction**

Indicators	Unit	A1	A2	A3	A1-A2-A3	A4	A5
REUSE	Kg	0,00E+00	0,00E+00	0,00E+00		0,00E+00	0,00E+00
RECYCLE	Kg	0,00E+00	0,00E+00	0,00E+00		0,00E+00	0,00E+00
EN-REC	Kg	0,00E+00	0,00E+00	0,00E+00		0,00E+00	0,00E+00
EE-E	MJ	0,00E+00	0,00E+00	0,00E+00		0,00E+00	0,00E+00
EE-T	MJ	0,00E+00	0,00E+00	0,00E+00		0,00E+00	0,00E+00

REUSE = Components for reuse; **RECYCLE** = Materials for recycling ; **EN-REC** = Materials for energy recovery; **EE-E**= Exported energy electricity; **EE-T**= Exported energy Thermal energy

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. The product do not have any impact on the consumption (energy and water) of the building and there aren't maintenance operation on the panel during use phase.

- **Potential Environmental Impacts/Product construction**

Indicators	Unit	B1	B2	B3	B4	B5	B6	B7
GWP-total	kg CO2 eq	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWP-fossil	kg CO2 eq	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWP-biogen.	kg CO2 eq	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWP-luluc	kg CO2 eq	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWP-GHG[1]	kg CO2 eq	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ODP	kg CFC11eq	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
AP	mol H+ eq	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EP-freshw.	kg P eq	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EP-freshw.	Kg PO4 eq	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EP-marine	kg N eq	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EP-terrestrial	mol N eq	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
POCP	kgNMVOCeq	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ADPmin&met	kg Sb eq	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ADPfossil	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
WDP	m3 depriv.	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

GWP-total = Climate change; **GWP-fossil** = Climate change – fossil; **GWP-biogenic** = Climate change – biogenic; **GWP-luluc** = Climate change - land use and land use change; **GWP-GHG** = GWP total excluded biogenic carbon dioxide emissions and biogenic carbon stored in the product; **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

1: The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.
2: 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.

- **Resource Use/Product construction**

Indicators	Unit	B1	B2	B3	B4	B5	B6	B7
PERE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
SM	Kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

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 production/Product construction**

Indicators	Unit	B1	B2	B3	B4	B5	B6	B7
HW	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NHW	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RW*	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

HW = Hazardous waste disposed; **NHW** = Non-hazardous waste disposed; **RW** = Radioactive waste disposed;

- **Output Flows/Product construction**

Indicators	Unit	B1	B2	B3	B4	B5	B6	B7
REUSE	Kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RECYCLE	Kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EN-REC	Kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EE-E	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EE-T	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

REUSE = Components for reuse; **RECYCLE** = Materials for recycling ; **EN-REC** = Materials for energy recovery; **EE-E**= Exported energy electricity; **EE-T**= Exported energy Thermal energy

END OF LIFE SCENARIOS (STAGE C & D)

Real life reference examples of the range of end of life option are currently not avaiable because CLT is a relatively new building material so buildings constructed with CLT have not yet been demolished or deconstructed.

In general, when a wood product used in buildings reaches the end of life, it may either be reused, recycled, combusted or landfilled, so four theoretical alternative scenarios have been developed for the end of life stage (C1–C4 & D):

- Reuse: XLAM Panel is reused in coherent form. C1: demolition of the building, C2: transportation to the XLAM Dolomiti farm, C3: preparing for reuse, D: product for reuse, reuse of product - substituting virgin material;
- Recycling: XLAM Panel chipping for recycling. C1: demolition of the building, C2: transportation to the sorting 100 km, C3: preparing for recycling, D: chips to recycling, recovery of wood chips, substituting new panel;
- Incineration: XLAM Panel incineration for energy recovery C1: demolition of the building, C2: transportation to the sorting 100 km, C3: preparing for incineration, D: chips to incineration (75% efficiency), D: substitution of natural gas in heat production;
- Landfilling: XLAM Panel is landfilled with DOCF=25% (degradable organic carbon fraction). C1: demolition of the building, C2: transportation to the sorting 100 km, C3: preparing for landfilling, C4: landfilling process, D: the methane uptake from landfill partly substitutes natural gas in electricity production (30% efficiency in electrical conversion).

The most common fates for end of life wood products in Italy are landfill and reuse, and technical valuation about recycling and incineration are in progress (due to adehesive content of CLT panels).

All other end of life scenarios are possible for XLAM panels, therefore data for each scenario has been included within this EPD.

XLAM DOLOMITI

SCENARIO REUSE Stage C1 – C4 e D

- **Potential Environmental Impacts/Product construction**

Indicators	Unit	C1	C2	C3	C4	D
GWP-total	kg CO2 eq	1,95E+01	1,27E+02	7,80E+02	0,00E+00	-9,64E+02
GWP-fossil	kg CO2 eq	1,79E+01	1,27E+02	0,00E+00	0,00E+00	-1,82E+02
GWP-biogen.	kg CO2 eq	1,57E+00	2,08E-02	7,80E+02	0,00E+00	-7,80E+02
GWP-luluc	kg CO2 eq	2,72E-03	6,49E-02	0,00E+00	0,00E+00	-1,70E+00
GWP-GHG[1]	kg CO2 eq	1,77E+01	1,26E+02	0,00E+00	0,00E+00	-1,84E+02
ODP	kg CFC11eq	2,49E-06	2,75E-05	0,00E+00	0,00E+00	-3,79E-05
AP	mol H+ eq	9,30E-02	2,55E+00	0,00E+00	0,00E+00	-1,06E+00
EP-freshw.	kg P eq	4,44E-03	6,81E-03	0,00E+00	0,00E+00	-5,49E-02
EP-freshw.	Kg PO4 eq	1,36E-02	2,09E-02	0,00E+00	0,00E+00	-1,69E-01
EP-marine	kg N eq	1,33E-02	6,56E-01	0,00E+00	0,00E+00	-2,89E-01
EP-terrestrial	mol N eq	1,78E-01	7,27E+00	0,00E+00	0,00E+00	-3,44E+00
POCP	kgNMVOCeq	4,02E-02	1,93E+00	0,00E+00	0,00E+00	-1,20E+00
ADPmin&met	kg Sb eq	1,95E-05	1,50E-03	0,00E+00	0,00E+00	-3,88E-03
ADPfossil	MJ	2,67E+02	1,78E+03	0,00E+00	0,00E+00	-2,81E+03
WDP	m3 depriv.	1,01E+01	4,31E+00	0,00E+00	0,00E+00	-1,49E+02

GWP-total = Climate change; **GWP-fossil** = Climate change – fossil; **GWP-biogenic** = Climate change – biogenic; **GWP-luluc** = Climate change - land use and land use change; **GWP-GHG** = GWP total excluded biogenic carbon dioxide emissions and biogenic carbon stored in the product; **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

1: The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.
2: 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.

- **Resource Use/Product construction**

Indicators	Unit	C1	C2	C3	C4	D
PERE	MJ	6,43E+01	1,73E+01	0,00E+00	0,00E+00	-1,89E+03
PERM	MJ	0,00E+00	0,00E+00	8,66E+03	0,00E+00	-8,66E+03
PERT	MJ	6,43E+01	1,73E+01	8,66E+03	0,00E+00	-1,06E+04
PENRE	MJ	2,88E+02	1,89E+03	0,00E+00	0,00E+00	-3,01E+03
PENRM	MJ	1,44E-03	8,01E-02	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	2,88E+02	1,89E+03	0,00E+00	0,00E+00	-3,01E+03
SM	Kg	0,00E+00	0,00E+00	4,50E+02	0,00E+00	4,50E+02
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	2,78E-01	1,48E-01	0,00E+00	0,00E+00	-3,78E+00

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 production/Product construction**

Indicators	Unit	C1	C2	C3	C4	D
HW	kg	2,57E-04	2,98E-03	0,00E+00	0,00E+00	-1,11E-02
NHW	kg	7,75E-01	8,01E+01	0,00E+00	0,00E+00	-8,83E+01
RW*	kg	7,26E-04	1,23E-02	0,00E+00	0,00E+00	-1,29E-02

HW = Hazardous waste disposed; **NHW** = Non-hazardous waste disposed; **RW** = Radioactive waste disposed;

- **Output Flows/Product construction**

Indicators	Unit	C1	C2	C3	C4	D
REUSE	Kg	0,00E+00	0,00E+00	4,50E+02	0,00E+00	0,00E+00
RECYCLE	Kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EN-REC	Kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EE-E	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EE-T	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

REUSE = Components for reuse; **RECYCLE** = Materials for recycling ; **EN-REC** = Materials for energy recovery; **EE-E**= Exported energy electricity; **EE-T**= Exported energy Thermal energy

.

- **Potential Environmental Impacts/Product construction**

Indicators	Unit	C1	C2	C3	C4	D
GWP-total	kg CO2 eq	1,95E+01	1,95E+01	7,80E+02	0,00E+00	-4,17E+02
GWP-fossil	kg CO2 eq	1,79E+01	1,95E+01	0,00E+00	0,00E+00	-3,80E+02
GWP-biogen.	kg CO2 eq	1,57E+00	9,73E-03	7,80E+02	0,00E+00	-3,72E+01
GWP-luluc	kg CO2 eq	2,72E-03	8,46E-03	0,00E+00	0,00E+00	-1,37E-02
GWP-GHG[1]	kg CO2 eq	1,77E+01	1,93E+01	0,00E+00	0,00E+00	-3,14E+02
ODP	kg CFC11eq	2,49E-06	4,34E-06	0,00E+00	0,00E+00	-5,24E-05
AP	mol H+ eq	9,30E-02	9,57E-02	0,00E+00	0,00E+00	1,59E-01
EP-freshw.	kg P eq	4,44E-03	1,68E-03	0,00E+00	0,00E+00	-3,88E-03
EP-freshw.	Kg PO4 eq	1,36E-02	5,15E-03	0,00E+00	0,00E+00	-1,19E-02
EP-marine	kg N eq	1,33E-02	3,17E-02	0,00E+00	0,00E+00	4,74E-02
EP-terrestrial	mol N eq	1,78E-01	3,47E-01	0,00E+00	0,00E+00	1,40E+00
POCP	kgNMVOCeq	4,02E-02	9,95E-02	0,00E+00	0,00E+00	4,06E-02
ADPmin&met	kg Sb eq	1,95E-05	7,05E-04	0,00E+00	0,00E+00	-6,66E-05
ADPfossil	MJ	2,67E+02	2,93E+02	0,00E+00	0,00E+00	-6,20E+03
WDP	m3 depriv.	1,01E+01	9,07E-01	0,00E+00	0,00E+00	-1,25E+00

GWP-total = Climate change; **GWP-fossil** = Climate change – fossil; **GWP-biogenic** = Climate change – biogenic; **GWP-luluc** = Climate change - land use and land use change; **GWP-GHG** = GWP total excluded biogenic carbon dioxide emissions and biogenic carbon stored in the product; **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

1: The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.
2: 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.

- **Resource Use/Product construction**

Indicators	Unit	C1	C2	C3	C4	D
PERE	MJ	6,43E+01	4,97E+00	-8,66E+03	0,00E+00	-8,66E+03
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	6,43E+01	4,97E+00	-8,66E+03	0,00E+00	-8,66E+03
PENRE	MJ	2,88E+02	3,11E+02	0,00E+00	0,00E+00	-6,88E+03
PENRM	MJ	1,44E-03	0,00E+00	0,00E+00	0,00E+00	-1,53E+01
PENRT	MJ	2,88E+02	3,11E+02	0,00E+00	0,00E+00	-6,89E+03
SM	Kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-8,66E+03
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,53E+01
FW	m3	2,78E-01	3,48E-02	0,00E+00	0,00E+00	-9,98E-02

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 production/Product construction**

Indicators	Unit	C1	C2	C3	C4	D
HW	kg	2,57E-04	7,87E-04	0,00E+00	0,00E+00	-7,82E-03
NHW	kg	7,75E-01	1,15E+01	0,00E+00	0,00E+00	3,97E+01
RW*	kg	7,26E-04	1,98E-03	0,00E+00	0,00E+00	0,00E+00

HW = Hazardous waste disposed; **NHW** = Non-hazardous waste disposed; **RW** = Radioactive waste disposed;

- **Output Flows/Product construction**

Indicators	Unit	C1	C2	C3	C4	D
REUSE	Kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RECYCLE	Kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EN-REC	Kg	0,00E+00	0,00E+00	4,50E+02	0,00E+00	0,00E+00
EE-E	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EE-T	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

REUSE = Components for reuse; **RECYCLE** = Materials for recycling ; **EN-REC** = Materials for energy recovery; **EE-E**= Exported energy electricity; **EE-T**= Exported energy Thermal energy

SCENARIO RECYCLE Stage C1 – C4 e D

- **Potential Environmental Impacts/Product construction**

Indicators	Unit	C1	C2	C3	C4	D
GWP-total	kg CO2 eq	1,95E+01	1,95E+01	7,80E+02	0,00E+00	-8,01E+02
GWP-fossil	kg CO2 eq	1,79E+01	1,95E+01	0,00E+00	0,00E+00	-2,06E+01
GWP-biogen.	kg CO2 eq	1,57E+00	9,73E-03	7,80E+02	0,00E+00	-7,80E+02
GWP-luluc	kg CO2 eq	2,72E-03	8,46E-03	0,00E+00	0,00E+00	-1,31E-01
GWP-GHG[1]	kg CO2 eq	1,77E+01	1,93E+01	0,00E+00	0,00E+00	3,90E+01
ODP	kg CFC11eq	2,49E-06	4,34E-06	0,00E+00	0,00E+00	-3,13E-06
AP	mol H+ eq	9,30E-02	9,57E-02	0,00E+00	0,00E+00	-1,70E-01
EP-freshw.	kg P eq	4,44E-03	1,68E-03	0,00E+00	0,00E+00	-1,05E-02
EP-freshw.	Kg PO4 eq	1,36E-02	5,15E-03	0,00E+00	0,00E+00	-3,23E-02
EP-marine	kg N eq	1,33E-02	3,17E-02	0,00E+00	0,00E+00	-5,10E-02
EP-terrestrial	mol N eq	1,78E-01	3,47E-01	0,00E+00	0,00E+00	-5,91E-01
POCP	kgNMVOCeq	4,02E-02	9,95E-02	0,00E+00	0,00E+00	-1,49E-01
ADPmin&met	kg Sb eq	1,95E-05	7,05E-04	0,00E+00	0,00E+00	-6,18E-04
ADPfossil	MJ	2,67E+02	2,93E+02	0,00E+00	0,00E+00	-4,12E+02
WDP	m3 depriv.	1,01E+01	9,07E-01	0,00E+00	0,00E+00	-1,23E+01

GWP-total = Climate change; **GWP-fossil** = Climate change – fossil; **GWP-biogenic** = Climate change – biogenic; **GWP-luluc** = Climate change - land use and land use change; **GWP-GHG** = GWP total excluded biogenic carbon dioxide emissions and biogenic carbon stored in the product; **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

1: The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.
2: 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.

- **Resource Use/Product construction**

Indicators	Unit	C1	C2	C3	C4	D
PERE	MJ	6,43E+01	4,97E+00	0,00E+00	0,00E+00	-2,94E+03
PERM	MJ	0,00E+00	0,00E+00	-8,66E+03	0,00E+00	0,00E+00
PERT	MJ	6,43E+01	4,97E+00	-8,66E+03	0,00E+00	-2,94E+03
PENRE	MJ	2,88E+02	3,11E+02	0,00E+00	0,00E+00	-4,40E+02
PENRM	MJ	1,44E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	2,88E+02	3,11E+02	0,00E+00	0,00E+00	-4,40E+02
SM	Kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,50E+02
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	2,78E-01	3,48E-02	0,00E+00	0,00E+00	-4,11E-01

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 production/Product construction**

Indicators	Unit	C1	C2	C3	C4	D
HW	kg	2,57E-04	7,87E-04	0,00E+00	0,00E+00	-1,15E-03
NHW	kg	7,75E-01	1,15E+01	0,00E+00	0,00E+00	3,23E+01
RW*	kg	7,26E-04	1,98E-03	0,00E+00	0,00E+00	-2,23E-03

HW = Hazardous waste disposed; **NHW** = Non-hazardous waste disposed; **RW** = Radioactive waste disposed;

- **Output Flows/Product construction**

Indicators	Unit	C1	C2	C3	C4	D
REUSE	Kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RECYCLE	Kg	0,00E+00	0,00E+00	4,50E+02	0,00E+00	0,00E+00
EN-REC	Kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EE-E	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EE-T	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

REUSE = Components for reuse; **RECYCLE** = Materials for recycling ; **EN-REC** = Materials for energy recovery; **EE-E**= Exported energy electricity; **EE-T**= Exported energy Thermal energy

- **Potential Environmental Impacts/Product construction**

Indicators	Unit	C1	C2	C3	C4	D
GWP-total	kg CO2 eq	1,95E+01	1,95E+01	0,00E+00	8,92E+02	-2,96E+01
GWP-fossil	kg CO2 eq	1,79E+01	1,95E+01	0,00E+00	5,00E+00	-2,96E+01
GWP-biogen.	kg CO2 eq	1,57E+00	9,73E-03	0,00E+00	8,87E+02	-8,04E-03
GWP-luluc	kg CO2 eq	2,72E-03	8,46E-03	0,00E+00	-1,95E-03	-8,49E-04
GWP-GHG[1]	kg CO2 eq	1,77E+01	1,93E+01	0,00E+00	5,98E+02	-2,88E+01
ODP	kg CFC11eq	2,49E-06	4,34E-06	0,00E+00	-2,87E-06	-5,97E-06
AP	mol H+ eq	9,30E-02	9,57E-02	0,00E+00	9,52E-04	-3,54E-02
EP-freshw.	kg P eq	4,44E-03	1,68E-03	0,00E+00	1,67E-04	-2,58E-04
EP-freshw.	Kg PO4 eq	1,36E-02	5,15E-03	0,00E+00	5,12E-04	-7,91E-04
EP-marine	kg N eq	1,33E-02	3,17E-02	0,00E+00	9,45E-03	-1,03E-02
EP-terrestrial	mol N eq	1,78E-01	3,47E-01	0,00E+00	1,06E-01	-1,11E-01
POCP	kgNMVOCeq	4,02E-02	9,95E-02	0,00E+00	2,31E-01	-3,75E-02
ADPmin&met	kg Sb eq	1,95E-05	7,05E-04	0,00E+00	6,31E-05	-7,09E-06
ADPfossil	MJ	2,67E+02	2,93E+02	0,00E+00	-5,20E+02	-4,29E+02
WDP	m3 depriv.	1,01E+01	9,07E-01	0,00E+00	3,85E+00	-1,47E+00

GWP-total = Climate change; **GWP-fossil** = Climate change – fossil; **GWP-biogenic** = Climate change – biogenic; **GWP-luluc** = Climate change - land use and land use change; **GWP-GHG** = GWP total excluded biogenic carbon dioxide emissions and biogenic carbon stored in the product; **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

1: The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.
2: 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.

- **Resource Use/Product construction**

Indicators	Unit	C1	C2	C3	C4	D
PERE	MJ	6,43E+01	4,97E+00	0,00E+00	-1,35E+00	-5,50E-01
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	6,43E+01	4,97E+00	0,00E+00	-1,35E+00	-5,50E-01
PENRE	MJ	2,88E+02	3,11E+02	0,00E+00	-5,82E+02	-4,76E+02
PENRM	MJ	1,44E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	2,88E+02	3,11E+02	0,00E+00	-5,82E+02	-4,76E+02
SM	Kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	2,78E-01	3,48E-02	0,00E+00	8,65E-02	-3,59E-02

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 production/Product construction**

Indicators	Unit	C1	C2	C3	C4	D
HW	kg	2,57E-04	7,87E-04	0,00E+00	-4,06E-04	-6,65E-04
NHW	kg	7,75E-01	1,15E+01	0,00E+00	3,95E+02	-2,82E-01
RW*	kg	7,26E-04	1,98E-03	0,00E+00	5,69E-04	-2,95E-05

HW = Hazardous waste disposed; **NHW** = Non-hazardous waste disposed; **RW** = Radioactive waste disposed;

- **Output Flows/Product construction**

Indicators	Unit	C1	C2	C3	C4	D
REUSE	Kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RECYCLE	Kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EN-REC	Kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EE-E	MJ	0,00E+00	0,00E+00	0,00E+00	1,35E+02	0,00E+00
EE-T	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

REUSE = Components for reuse; **RECYCLE** = Materials for recycling ; **EN-REC** = Materials for energy recovery; **EE-E**= Exported energy electricity; **EE-T**= Exported energy Thermal energy

Information on biogenic carbon content

Impact category	Unit	Total
Biogenic carbon content in product	kg C	212,7
Biogenic carbon content in packaging	kg C	Not applicable*

** product sold without packaging*

Additional environmental impact indicators

The values of the following additional environmental impact indicators have been calculated by LCA analysis and are available on request by writing to: a info@xlamdolomiti.it

Indicator	Particulate matter emissions	Ionising radiation, human health*	Ecotoxicity (freshwater)**	Human toxicity, cancer effects**	Human toxicity, non- cancer effects**	Land use related impacts / soil quality**
Unit	Disease incidence	kBq U235eq	CTUe	CTUe	CTUe	dimensionless

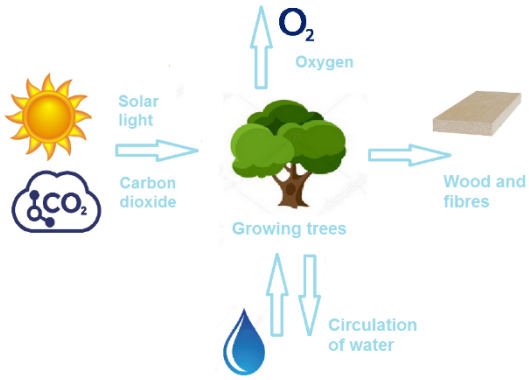
** This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing 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 experience with the indicator.*

7. ADDITIONAL ENVIRONMENTAL INFORMATION

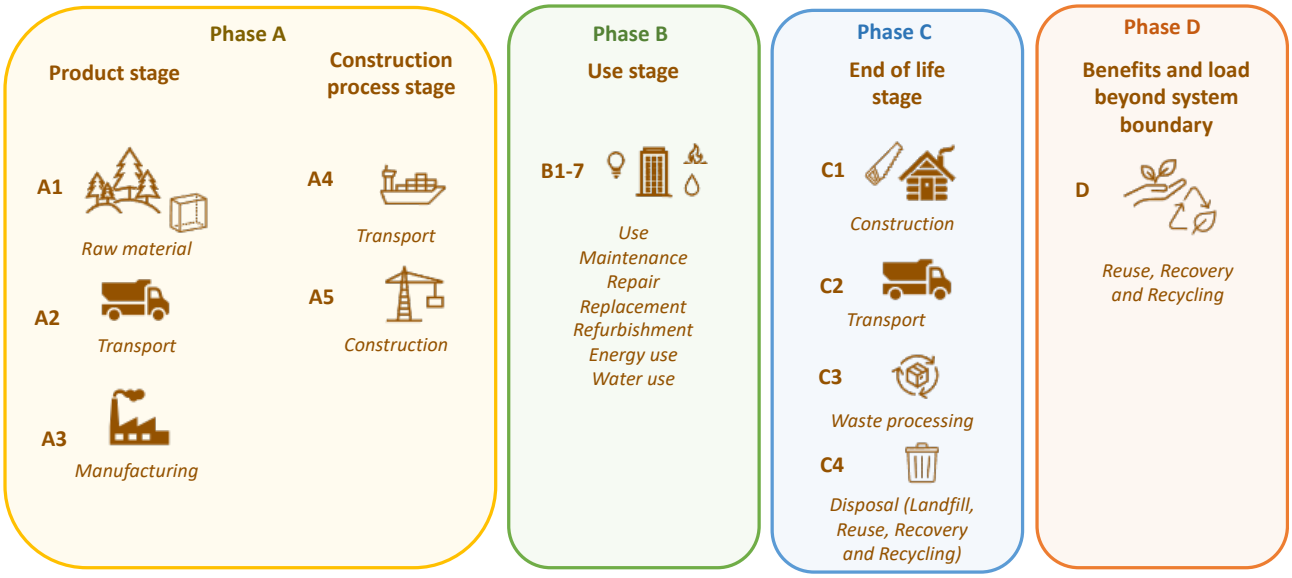
Sequestration of Carbon Dioxide

During growth, trees absorb carbon dioxide (CO_2) from the atmosphere through the process of photosynthesis and convert this into carbon-based compounds that constitute various components of a tree, including wood.



The source of XLAM DOLOMITE feedstock are plantations which are independently certified.

Plantation management activities including harvesting, the manufacture and transport of timber, adhesives require energy which releases carbon dioxide into the atmosphere. When the XLAM panel reaches the end of life it may be re-used, recycled, used as fuel to make energy or sent to landfill. In some cases the carbon may be released back into the environment.



- Healt & Safety

XLam operate a centralised, cloud-based environmental and safety management platform at all our workplaces. Health, safety, and wellbeing of our people and creating a positive safety culture across the XLam group is a fundamental business imperative and a core part of everything we do. Compliance with the law and recognised codes of practice is a given.

- Indoor Environment Quality

XLam panels are manufactured using polyurethane (PU) resin, which is formaldehyde-free. Formaldehyde is neither a component in the formulation, nor is it formed or liberated during curing, during use of the panel or during disposal at the end of their life cycle.

- Sound Protection

Protective tapes and seals are inserted between the panels in order to prevent the transmission of noise between adjacent units and between subsequent walls.

8. DIFFERECES VERSUS PREVIOUS VERSION

First version of the EPD.

9. REFERENCES

- International EPD® System - General Programme Instructions, Version 3.01
- International EPD® System - PCR 2019:14 Construction products, versione 1.1
- EN 15804:2012+A2:2019 Sustainability of Construction Works
- EN 16485 – EPD Wood based product.
- ISO 14020:2000 Environmental labels and declarations-General principles
- ISO 14025:2010 Environmental labels and declarations-Type III Environmental Declarations-Principles and procedures
- ISO 14040:2006/AMD 1:2020 Environmental management - Life cycle assessment - Principles and framework - Amendment 1
- ISO 14044:2006/AMD 2:2020 Environmental management - Life cycle assessment - Requirements and guidelines - Amendment 2
- Bureau Veritas Nexta - Report LCA, Prodotti XLAM Dolomiti – Rev2, November 2021