Environmental Product Declaration

In accordance with ISO 14025:2006 for:

BALTEK® SBC & SB (CK LP) balsa wood core material

From

3A Composites Core Materials

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

Programme information

Programme:	The International EPD® System
Adress:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
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Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
PCR 2018:10: *Boards, blocks, panels, sheets of plastics, or in composite system, for structural application (non- construction), 2018:10 Version 1.0.2, 2022-11-22, UN CPC 36390, 31420*
PCR review was conducted by: The Technical Committee of the International EPD® System. Review chair: Lars-Gunnar Lindfors. Contact via the Secretariat (info@environdec.com)
Life Cycle Assessment (LCA)
LCA accountability: *Edge Chile (https://edgeenvironment.com/cl/)*
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: *Ruben Carnerero* *Email: r.carnerero@ik-ingenieria.com* Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third-party verifier: ☒ Yes ☐ No

EPDs within the same product category but from different programmes may not be comparable.

EPD owner has the sole ownership, liability and responsibility of the EPD.

What is an EPD?

An Environmental Product Declaration (EPD) is an independently verified and registered document that communicates transparent and comparable information about the life-cycle environmental impact of products.

The following EPD has been developed by 3A Composites Core Materials for its BALTEK® SBC & SB[1] balsa wood core material.

Company information

Owner of the EPD

3A Composites Core Materials
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Contact: Juan E. Matheus - Global Product Manager BALTEK® - Email:juan.matheus@3acomposites.com
Manufacturing Adddress: Plantaciones de Balsa PLANTABAL S.A. | Complejo Industrial Quevedo | Km 4 ½ vía a Valencia, Ecuador.
General Office Address: Airex AG Industrie Nord 26 5643 Sins, Switzerland

Description of the organisation

3A Composites Core Materials is a global organizational unit within the 3A Composites Group, part of Schweiter Technologies (SIX Swiss Exchange: SWTQ). 3A Composites Core Materials is a pioneer and a global leader in sandwich composite technology with more than 80 years of experience. The portfolio consists of high-performing, robust, reliable, yet lightweight and sustainable core materials with the main focus on PET foam and balsa wood.
3A Composites Core Materials demonstrates its best practices through regular external certification and compliance with international golden standards.

Product-related or management system-related certifications
ISO 9001:2015
ISO 14001:2015
ISO 45001:2018

Name and location of production site

Plantaciones de Balsa PLANTABAL S.A. | Complejo Industrial Quevedo | Km 4 ½ vía a Valencia, Ecuador.

[1] In its flexible alternative, called CK LP, which uses scrim (fibreglass)

Product information

Product name

The product in this EPD is BALTEK® SBC & SB (CK LP) balsa wood core material.

Product identification and description

BALTEK® SBC & SB (CK LP) balsa wood products are core materials produced from controlled kiln-dried balsa wood in the 'end-grain' configuration with physical time to kiln control. They have high strength and stiffness to weight ratios and a bond with resins that allows them to be used in various applications such as wind energy, marine, road and rail, industrial, aerospace and defense. Illustration 1 presents an illustration of the panel, and following pictures show the different applications of the product.

Illustration 1- BALTEK® SBC & SB (CK LP) balsa wood core material.

Table 1 shows the different products covered in this study. These products have the same composition, with the only difference in the certification of the wood, but the production practices of the wood are equivalent. Both products are sold in different densities, however, by presenting the information as a declared unit of 1 m^3 there is no material difference in the environmental impacts of these products.

Table 1- Products covered by this EPD

Product Name			BALTEK® SBC			BALTEK® SB	
Properties		Unit (metric)	SBC.50	SBC.80	SBC.100	SB.100	SB.150
Apparent nominal density[2]	ASTM C-271	kg/m³	109	132	148	148	285
Minimum sheet density	ASTM C-271	kg/m³	84	113	136	136	248
Compressive strength perpendicular to the plane	ISO 844	N/mm²	5.5	7.7	9.2	9.2	22
Compressive modulus perpendicular to the plane	ISO 844	N/mm²	1616	2187	2526	2526	4428
Tensile strength perpendicular to the plane (polyester)	ASTM C-297	N/mm²	3.9	5.0	5.7	5.7	12.2

[2] Use this density to transform results in section “Environmental Performance” to 1 ton of each product.

Product Name			BALTEK® SBC			BALTEK® SB	
Properties		Unit (metric)	SBC.50	SBC.80	SBC.100	SB.100	SB.150
Tensile strength perpendicular to the plane (epoxy)	ASTM C-297	N/mm²	9	10.9	12	12	18.3
Tensile modulus perpendicular to the plane	ASTM C-297	N/mm²	1682	2337	2791	2791	6604
Shear strength[3]	ASTM C-273	N/mm²	1.8	2.3	2.6	2.6	5.2
Shear modulus	ASTM C-273	N/mm²	136	166	187	187	362
Thermal conductivity at room temperature	ASTM C-177	W/m*K	0.048	0.059	0.066	0.066	0.084
Standard sheet dimensions	Width	mm ± 5	610	610	610	610	610
	Length	mm ± 10	1220	1220	1220	1220	1220
	Thickness	mm +0.25 / -0.75	4.7 to 76	4.7 to 76	4.7 to 76	4.7 to 76	6 to 76
ContourKore (CK)	Thickness	mm +0.25 / -0.75	4.7 to 50	4.7 to 50	4.7 to 50	4.7 to 50	6 to 50

UN CPC code: 31420

Geographical scope: Global

[3] All samples tested at ¾" thick.

LCA information

A life cycle assessment is a technique for assessing the environmental aspects and potential impacts associated with a product. By considering potential impacts throughout the life cycle of a product (upstream and downstream), the analysis avoids the shifting of burdens from one type of environmental impact to another, from one political region to another and from one stage to the other.

An Environmental Product Declaration (EPD) is an independently verified and registered document that communicates transparent and comparable information about the life cycle environmental impacts of products. The following information describes the scope and methodology of this EPD for 3A Composites Core Materials BALTEK® SBC & SB (CK LP) balsa wood core material, allowing for comparison with other EPDs.

Declared unit

This EPD has a declared unit of 1 m^3 BALTEK® SBC & SB (CK LP) balsa wood core material produced in Ecuador and ready for distribution.

Reference service life

Not relevant for this study, since the scope only includes upstream and core processes according to the requirements of the PCR.

Time representativeness and data collection

Foreground data on physical properties, raw material & energy requirements, transport of raw materials and manufacture of the panels was collected by the company for the year 2021. The information is considered good, as is summarized in Table 2.

Table 2- Foreground data sources and quality

	Product data	Upstream	Core	Downstream
Data	Range and physical properties	Raw material inputs Transportation from suppliers to Ecuador	Energy inputs Water inputs Consumable inputs Waste outputs Internal transport distances Emissions	Not included following the guidelines of the PCR
Source	Collected by 3A Composites Core staff for 2021.	Collected by 3A Composites Core staff for 2021.	Collected by 3A Composites Core staff for 2021.	
Quality	Good.	Good.	Good.	

Database(s) and LCA software used

The inventory data for the process are entered in SimaPro LCA program and linked to the pre-existing data for the upstream feedstocks and services. Data were selected per geographic relevance from ecoinvent 3.6 database (Ecoinvent Centre, 2019).

System diagram

Figure 1 presents the system diagram. The analysis considers upstream and core processes, while downstream processes are not included aligned to the corresponding PCR.

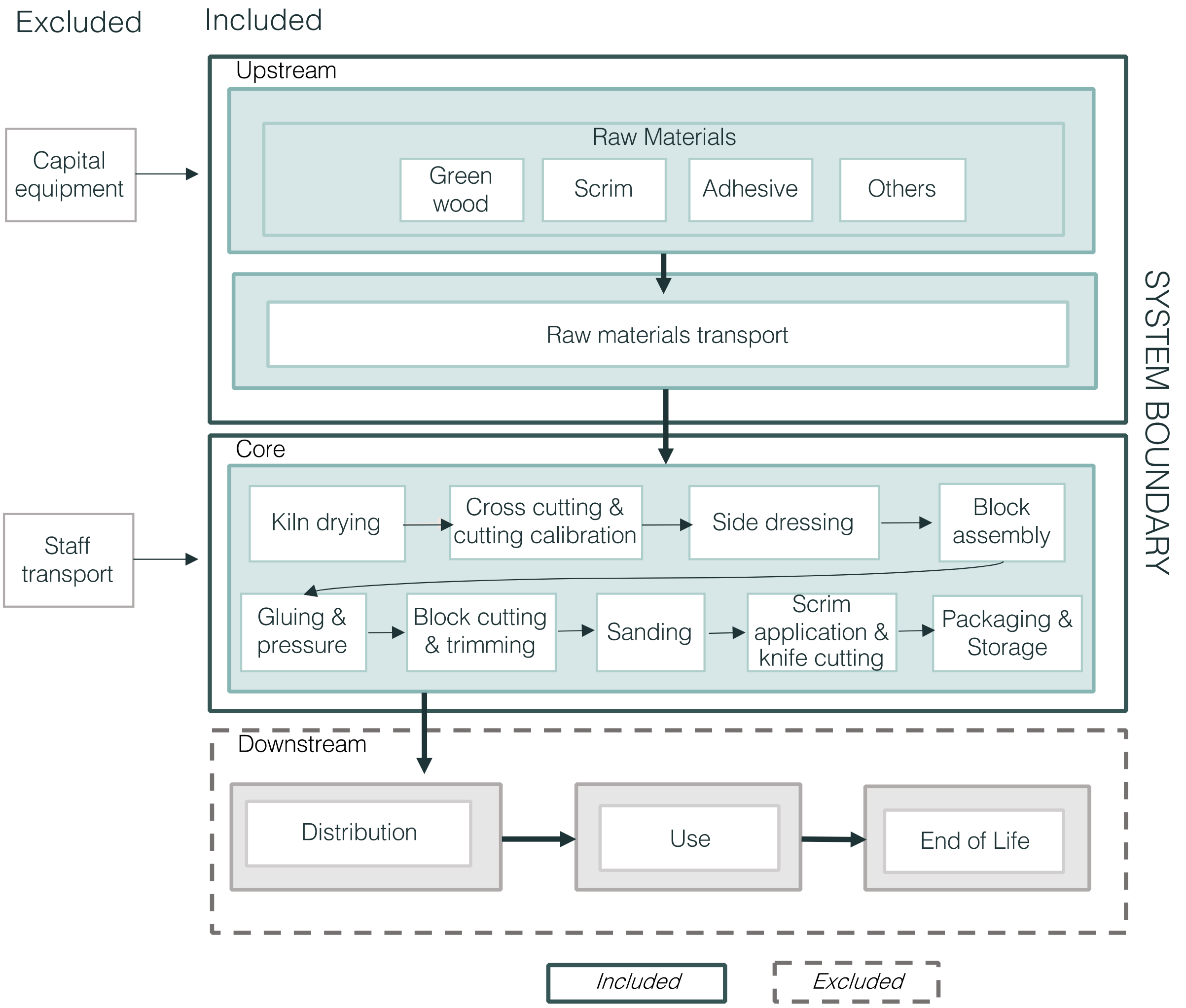

Figure 1- System diagram

Description of system boundaries

Following the PCR, and as previously mentioned in the system diagram, the scope of the study is cradle to gate, including upstream and core processes.

Excluded lifecycle stages

Downstream processes are excluded of the analysis according to the corresponding PCR. This is due to the different uses of the product (as presented above), which generate an important complexity to estimate the impact of the product.

Additionally, according to the PCR, the following exclusions apply to core processes:

- Core processes
    - Manufacturing of production equipment, buildings and other capital goods.
    - Business travel of personnel.
    - Travel to and from work by personnel.
    - Research and development activities.

Allocation

The balsa wood manufacturing process generates different products (kits, panels, blocks). Most of the production stages are common to all products; therefore, allocation of inputs and outputs has been done by volume (m^3) produced. After the panel production, some products go to further processing to obtain kits. These are produced in a different plant (PGS); so, the inputs and outputs of this plant have been excluded.
Additionally, a proportion of products use scrim to improve their flexibility. Production was separated between those products that need scrim (included the ones presented in this report) and those that don't to allocate the impact of this input.

Sensitivity analysis

All the inventory data comes from primary sources provided and backed up by the company, from forest to gate. This avoids the need to perform a sensitivity analysis.

Content declaration

Product

Table 3 presents the product's content, which is mostly balsa wood. There are no environmental or hazardous properties.

Table 3- Product's content

Materials / chemical substances	ton	%	Environmental / hazardous properties
Balsa wood	0.98	≈ 98%	No hazardous properties
Adhesive	0.01	≈ 1%	
Fiberglass	0.01	≈ 1%	
Others	<0.01	< 1%	
TOTAL	1.00	100%	

Packaging

The panels' packaging is only plastic and carboard, with a plastic label containing the information of the product.

Recycled material

There is no recycled material in BALTEK® SBC & SB (CK LP) balsa wood core material.

Environmental performance

This section presents the potential environmental impacts, use of resources, waste production and output flows of 1 m³ of 3A Composites Core Materials for its BALTEK® SBC & SB (CK LP) balsa wood core material.

Potential environmental impact

- On average, raw materials (part of Upstream processes) presents the highest impact contribution to environmental indicators, relevant for example for eutrophication potential-freshwater (54%) and abiotic depletion potential- minerals and metals (57%). Adhesive and fiberglass have the most relevant contribution to both impacts.
- The manufacturing process (Core) has the second highest contribution. Eutrophication potential- terrestrial is among the highest contributors, with 51% of overall impact, followed by acidification potential (49%). For both indicators, the use of fuels, mainly from the burning of biomass, has the highest impact contribution. Water deprivation potential (51% contribution) is also relevant, and it is caused by water use in the process.
- The transport of raw materials (part of Upstream processes) has a relevant contribution to ozone layer depletion (43%) and global warming potential fossil (29%). The burning of fossil fuel in this transport is the key contributor, mostly from the transport of wood from third party suppliers.
- It's also interesting to notice how global warming potential – biogenic has a negative impact, meaning there is carbon sequestration due to the nature of the wood and the activity carried out in forest management.

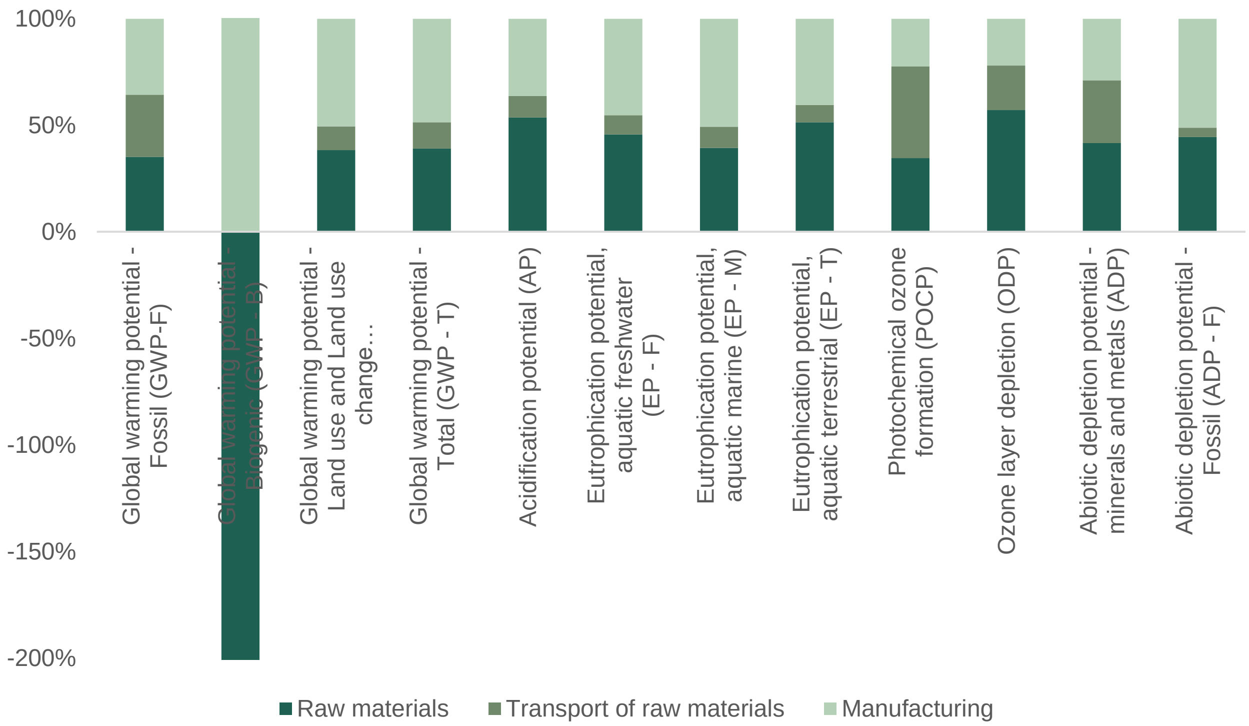

Figure 2- Percentage contribution of life cycle stages to the different potential environmental impact categories.

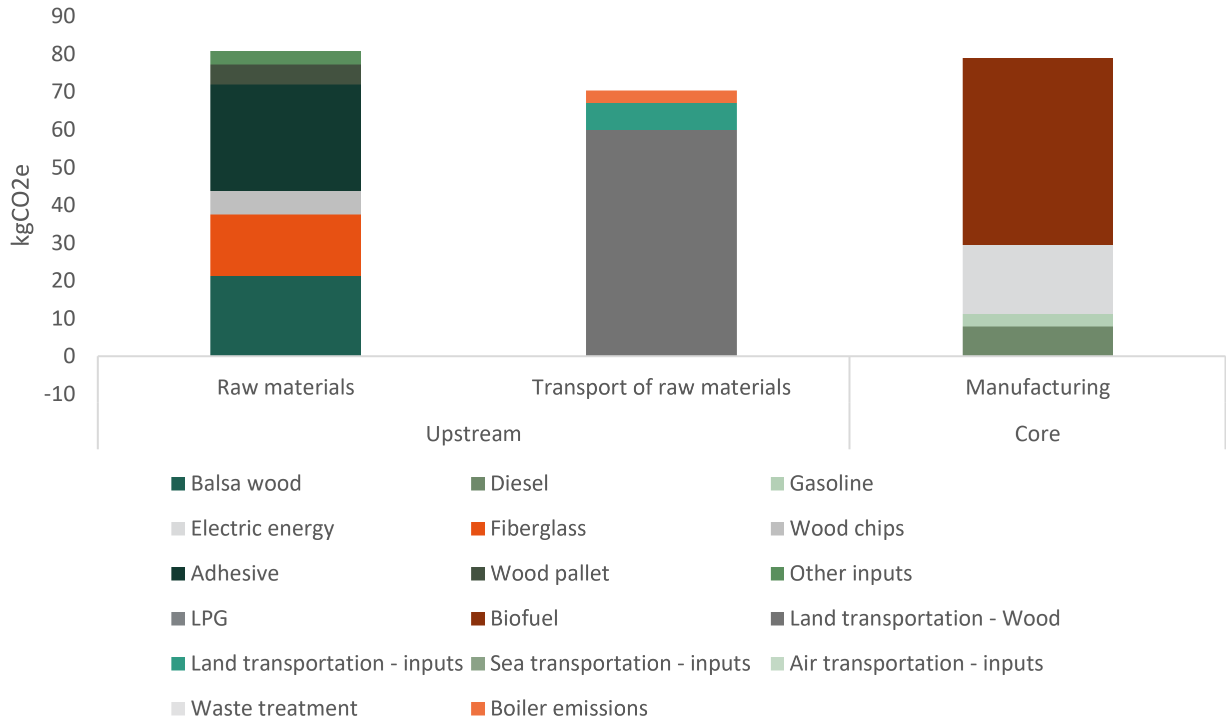

Figure 3- Contribution of main inputs and outputs to fossil global warming potential.

Table 4- Potential environmental impact for 1 m³ of BALTEK® SBC & SB (CK LP) balsa wood core material

PARAMETER		UNIT	Upstream		Core	Downstream	TOTAL
			Raw materials	Transport of raw materials	Manufacturing	Use & EoL	
Global warming potential (GWP)	Fossil	kg CO_2 eq.	8.08E+01	6.71E+01	8.21E+01	INA	2.30E+02
	Biogenic	kg CO_2 eq.	-5.84E+02	2.05E-01	3.09E+02	INA	-2.75E+02
	Land use and land transformation	kg CO_2 eq.	1.10E-01	3.17E-02	1.45E-01	INA	2.87E-01
	TOTAL	kg CO_2 eq.	-5.03E+02	6.74E+01	3.91E+02	INA	-4.47E+01
Acidification potential (AP)	AP	mol H^+ eq.	8.46E-01	2.68E-01	1.05E+00	INA	2.17E+00
Eutrophication potential (EP)	Aquatic freshwater	kg P eq.	2.71E-02	5.11E-03	1.83E-02	INA	5.05E-02
	Aquatic marine	kg N eq.	3.94E-01	7.79E-02	3.91E-01	INA	8.62E-01
	Acquatic terrestrial	mol N eq.	3.38E+00	8.50E-01	4.35E+00	INA	8.57E+00
Photochemical oxidant creation potential (POCP)	POCP	kg NMVOC eq.	1.35E+00	2.11E-01	1.06E+00	INA	2.62E+00
Ozone layer depletion (ODP)	ODP	kg CFC 11 eq.	1.21E-05	1.50E-05	7.89E-06	INA	3.50E-05
Abiotic depletion potential (ADP)	Metals and minerals	kg Sb eq.	8.31E-04	3.05E-04	3.19E-04	INA	1.45E-03
	Fossil resources	MJ, net calorific value	1.41E+03	9.99E+02	9.82E+02	INA	3.39E+03
Water deprivation potential (WDP)	WDP	m^3	3.30E+01	3.25E+00	3.81E+01	INA	7.43E+01

Use of resources

- Raw material (part of the Upstream processes) has the highest use of resources across the different indicators. This is particularly relevant for renewable primary energy resources as raw materials, due to the use of balsa wood. Use of net fresh water is also relevant (66%), followed by renewable primary energy resources as energy carrier (55%).
- The manufacturing process (Core) has the second use of resources, the highest renewable energy as energy carrier because of the burning of biomass for energy to be used in the process.
- The transport of raw materials has relevant contribution to non- renewable primary energy (29%) due to the burning of fossil fuel.

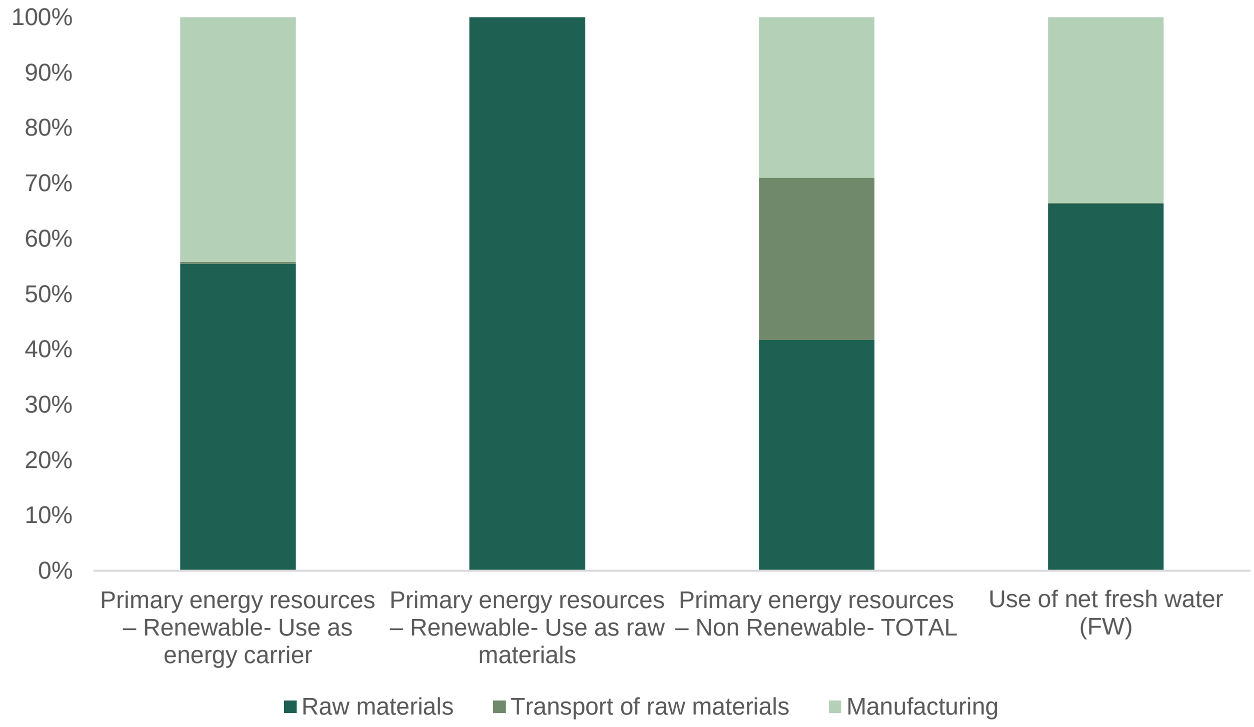

Figure 4: Percentage contribution of life cycle stages to the different use of resources categories.

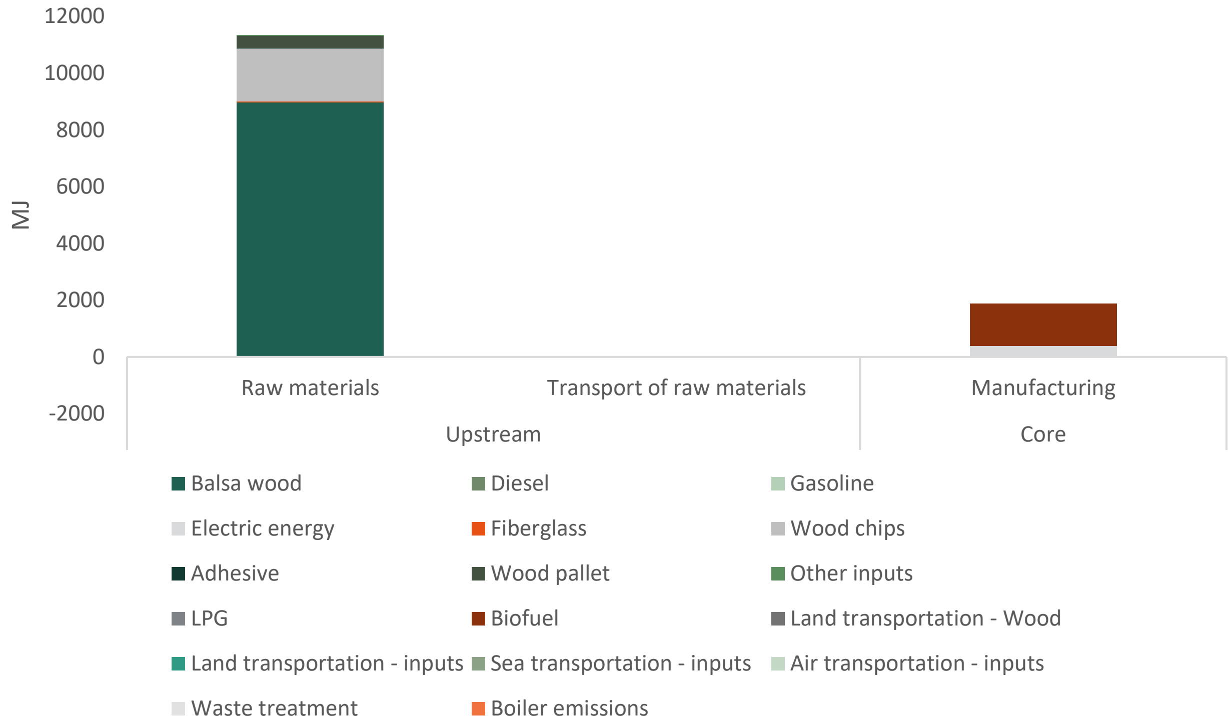

Figure 5- Contribution of main inputs and outputs to total energy use

Table 5- Use of resources for 1 m³ of BALTEK® SBC & SB (CK LP) balsa wood core material

PARAMETER		UNIT	Upstream		Core	Downstream	TOTAL
			Raw materials	Transport of raw materials	Manufacturing	Use & EoL	
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	2.36E+03	1.65E+01	1.88E+03	INA	4.26E+03
	Used as raw materials	MJ, net calorific value	8.97E+03	0	0	INA	8.97E+03
	TOTAL	MJ, net calorific value	1.13E+04	1.65E+01	1.88E+03	INA	1.32E+04
Primary energy resources – Non renewable	Use as energy carrier	MJ, net calorific value	1.51E+03	1.06E+03	1.05E+03	INA	3.62E+03
	Used as raw materials	MJ, net calorific value	0	0	0	INA	0
	TOTAL	MJ, net calorific value	1.51E+03	1.06E+03	1.05E+03	INA	3.62E+03
Secondary material (optional)		kg	0	0	0	INA	0
Renewable secondary fuels (optional)		MJ, net calorific value	0	0	0	INA	0
Non-renewable secondary fuels (optional)		MJ, net calorific value	0	0	0	INA	0
Net use of fresh water (optional)		m^3	6.40E+00	9.31E-03	3.24E+00	INA	9.66E+00

Waste production and output flows (optional)

- Raw materials have the highest generation of hazardous (47%) and radioactive waste (52%). Production process for fiberglass and the adhesive are the main contributors to these wastes.
- Manufacturing also has relevant contribution to waste generation, averaging 40% contribution, with non- hazardous waste the highest contribution (45%). The use of fuels in the process are the main contributors.

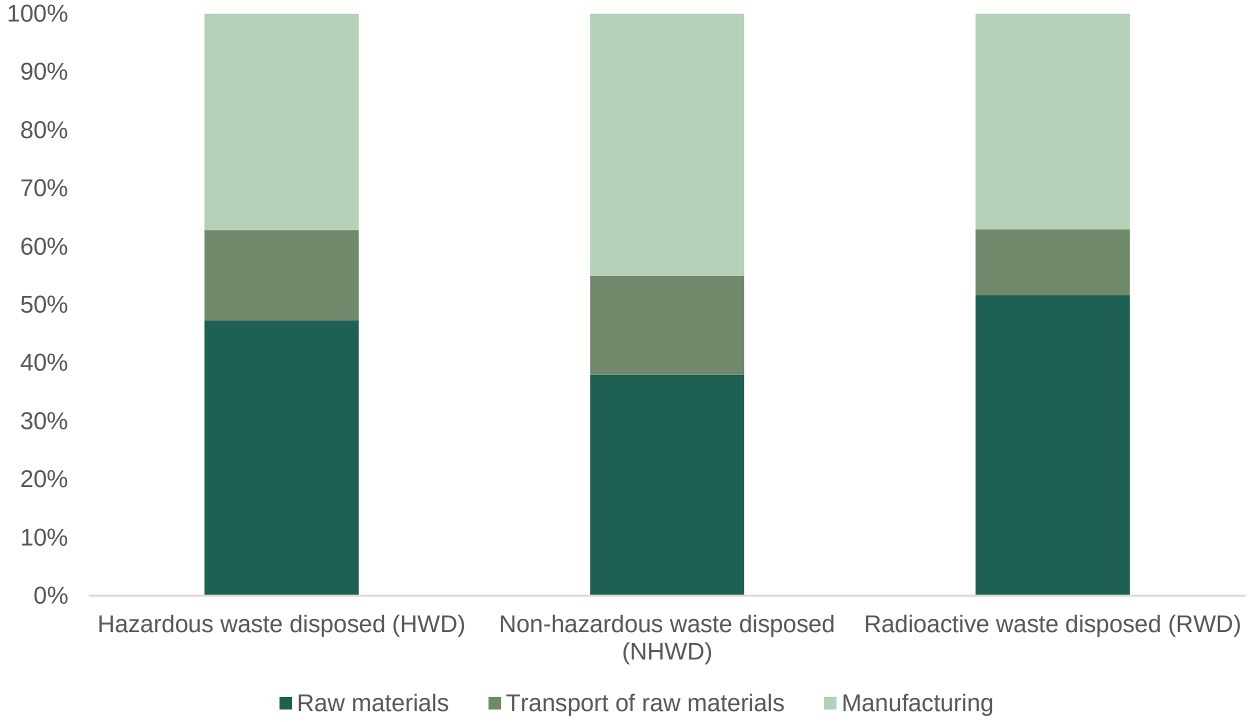

Figure 6- Percentage contribution of life cycle stages to the different waste categories.

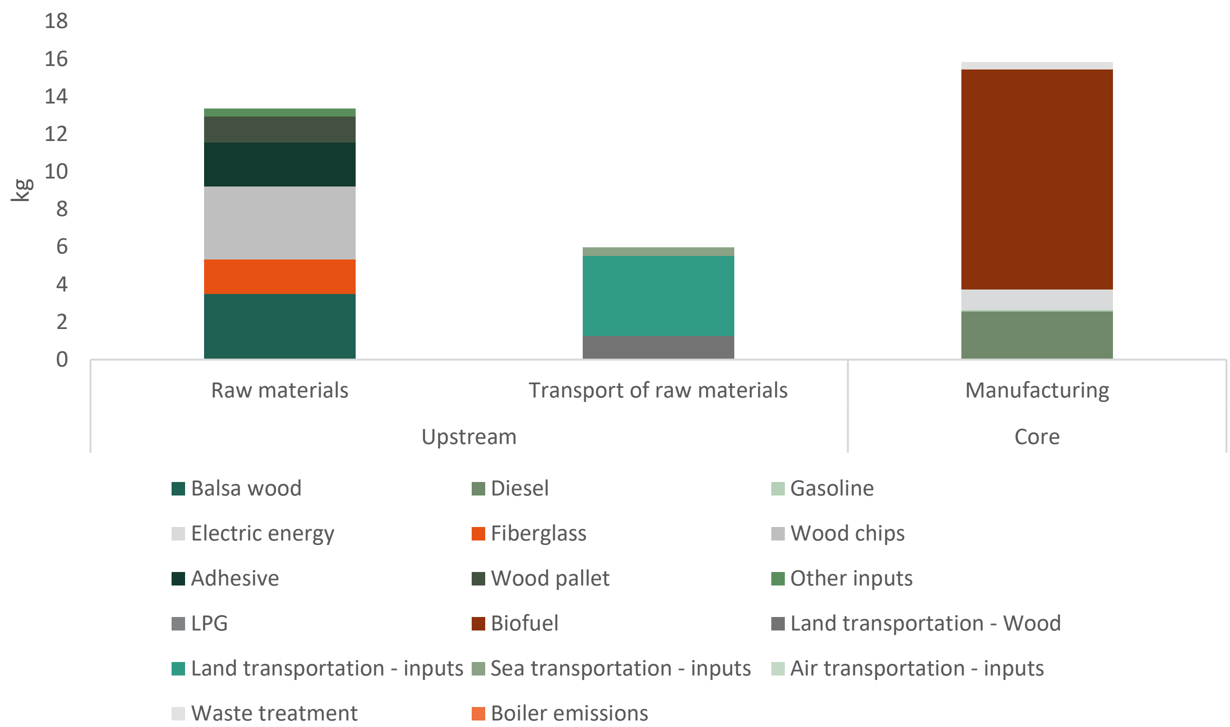

Figure 7- Contribution of main inputs and outputs to non- hazardous waste by module

Waste production

Table 6- Waste production for 1 m^3 of BALTEK® SBC & SB (CK LP) balsa wood core material

PARAMETER	UNIT	Upstream		Core	Downstream	TOTAL
		Raw materials	Transport of raw materials	Manufacturing	Use &EoL	
Hazardous waste disposed	kg	1.45E-03	4.73E-04	1.14E-03	INA	3.05E-03
Non-hazardous waste disposed	kg	1.34E+01	5.97E+00	1.58E+01	INA	3.52E+01
Radioactive waste disposed	kg	5.14E-03	1.12E-03	3.69E-03	INA	9.95E-03

Output flows

Table 7- Output flow for 1 m^3 of BALTEK® SBC & SB (CK LP) balsa wood core material

PARAMETER	UNIT	Upstream		Core	Downstream	TOTAL
		Raw materials	Transport of raw materials	Manufacturing	Use & EoL	
Components for re-use	kg	0	0	0	INA	0
Material for recycling	kg	0	0	1.83E-01	INA	1.83E-01
Materials for energy recovery	kg	0	0	0	INA	0
Exported energy, electricity	MJ	0	0	0	INA	0
Exported energy, thermal	MJ	0	0	0	INA	0

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