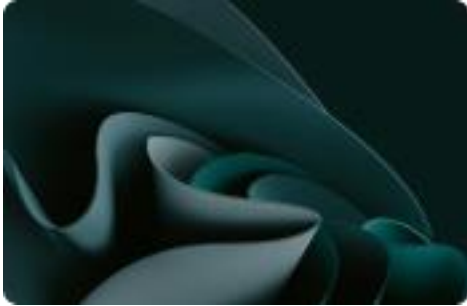


Life Cycle Analyses

ODCUP W



Summary



01 | Methodology



02 | Results

01

Methodology

Environmental Impact Assessment

Functional unit

The functional unit is a quantified performance of a product system for use as a reference unit. One of the primary purposes of a functional unit is to provide a reference to which the input and output data are normalized (in a mathematical sense). Therefore, the functional unit shall be clearly defined and measurable.

Impact Indicator

The impact is measured through the "IPCC 2021 GWP100" method

Electricity impact calculation method

Following guidelines from the GHG Protocol, the impact of electricity is calculated using the location-based approach. This means that the emission factors used represent the average annual carbon intensity of the power grid in the country the processes take place in.

Life Cycle Analyses

Cradle to grave

Emission Factor Inventory

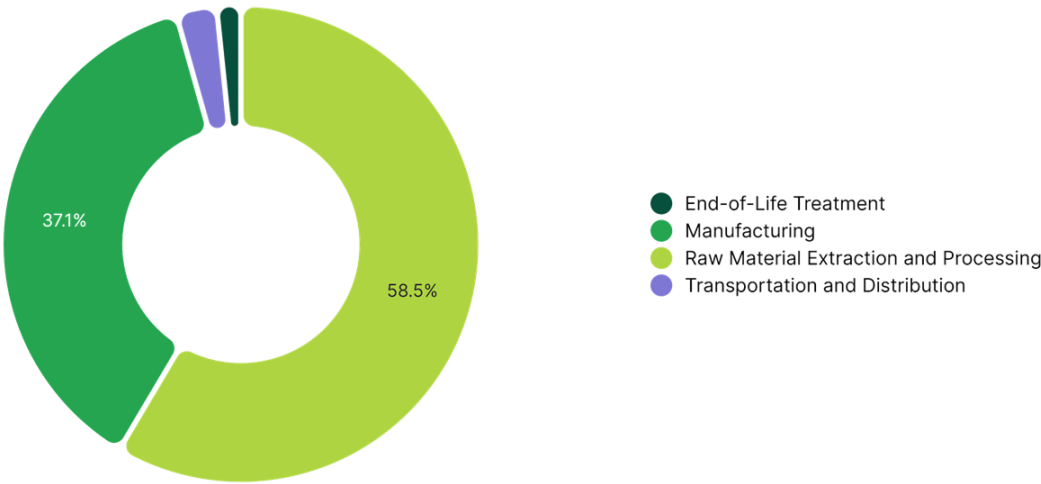
Num	Emission Factor	Source	Value	Unit
1	Hardwood lumber 1kg unspecified	BASE EMPREINTE ADEME 3.0	1.09752	kg
2	Aluminium, primary, ingot Ordinary transforming activity	ECOINVENT 3.10	7.605623188	kg
3	Silicone product Market activity	ECOINVENT 3.10	3.67823119	kg
4	Electricity Total (Scope 2 & 3) People's Republic of China	IEA 2023	0.7231	kWh
5	Freight Boat From CN to FR Waste	WELOW EXPERTS 1.0	0.25227278	kg
6	polyethylene/polypropylene product Ordinary Packaging Activity	ECOINVENT 3.10	1.783532575	kg
7	Waste of Packaging Material Average end of life in the EPR scheme - Impacts	BASE CARBONE ADEME 22.0	0.269	kg
8	Waste aluminium Ordinary transforming activity	ECOINVENT 3.10	0.02555404932	kg

02

Results

Pen cup holder

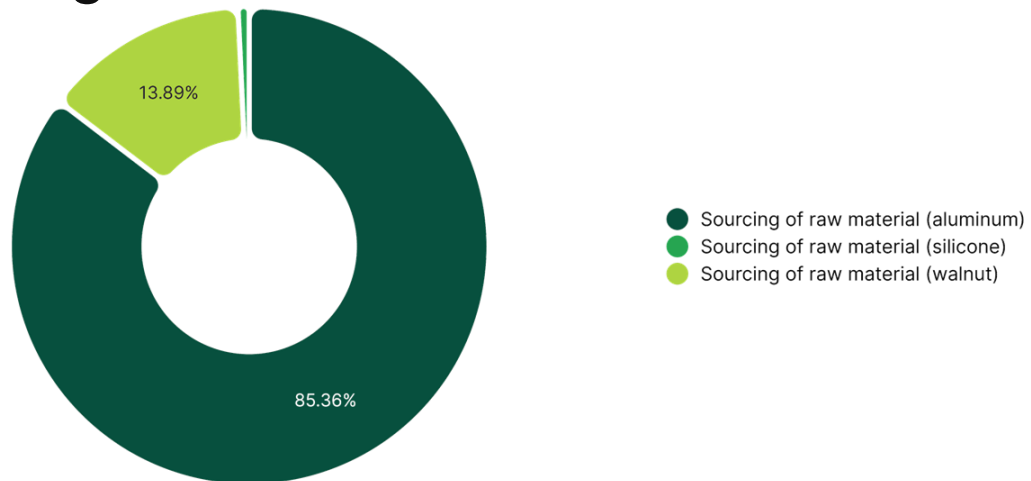
Climate Change



Step	Impact (kg CO ₂ eq)	Percentage (%)
Raw Material Extraction and Processing	0.97	58.52 %
Manufacturing	0.62	37.11 %
Transportation and Distribution	0.05	2.74 %
End-of-Life Treatment	0.03	1.63 %
TOTAL	1.66	100.00 %

Pen cup holder

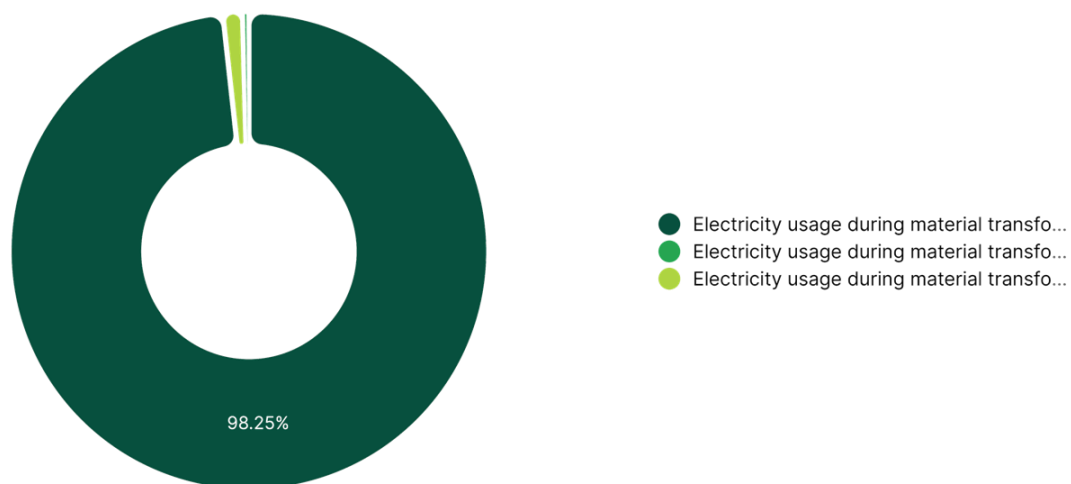
Climate Change - Raw Material Extraction and Processing



Activity	Emission Factor Num	Quantity	Impact (g CO ₂ eq)	Percentage (%)
Sourcing of raw material (aluminum)	2	0.11	828.25	85.36 %
Sourcing of raw material (walnut)	1	0.12	134.73	13.89 %
Sourcing of raw material (silicone)	3	1.98 · 10 ⁻³	7.28	0.75 %
TOTAL			970.27	100.00 %

Pen cup holder

Climate Change - Manufacturing



Activity	Emission Factor Num	Quantity	Impact (g CO ₂ eq)	Percentage (%)
Electricity usage during material transformation (aluminum)	4	0.84	604.51	98.25 %
Electricity usage during material transformation (walnut)	4	0.01	8.09	1.31 %
Electricity usage during material transformation (silicone)	4	$3.67 \cdot 10^{-3}$	2.66	0.43 %
TOTAL			615.26	100.00 %

Pen cup holder

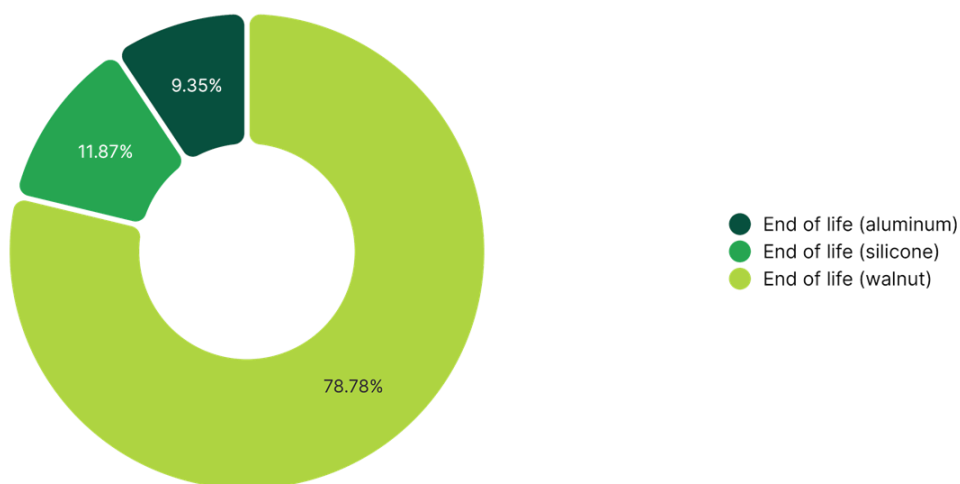
Climate Change - Transportation and Distribution



Activity	Emission Factor Num	Quantity	Impact (g CO ₂ eq)	Percentage (%)
Freight	5	0.18	45.41	100.00 %
TOTAL			45.41	100.00 %

Pen cup holder

Climate Change - End-of-Life Treatment



Activity	Emission Factor Num	Quantity	Impact (g CO ₂ eq)	Percentage (%)
End of life (walnut)	7	0.08	21.3	78.78 %
End of life (silicone)	6	1.8 · 10 ⁻³	3.21	11.87 %
End of life (aluminum)	8	0.1	2.53	9.35 %
TOTAL			27.05	100.00 %

