Life Cycle Analyses

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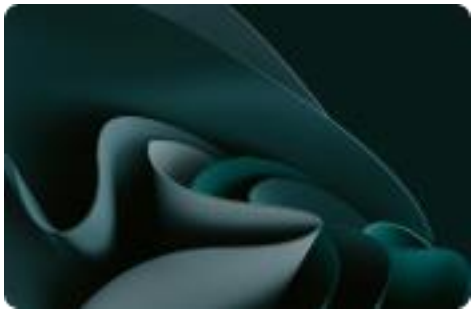
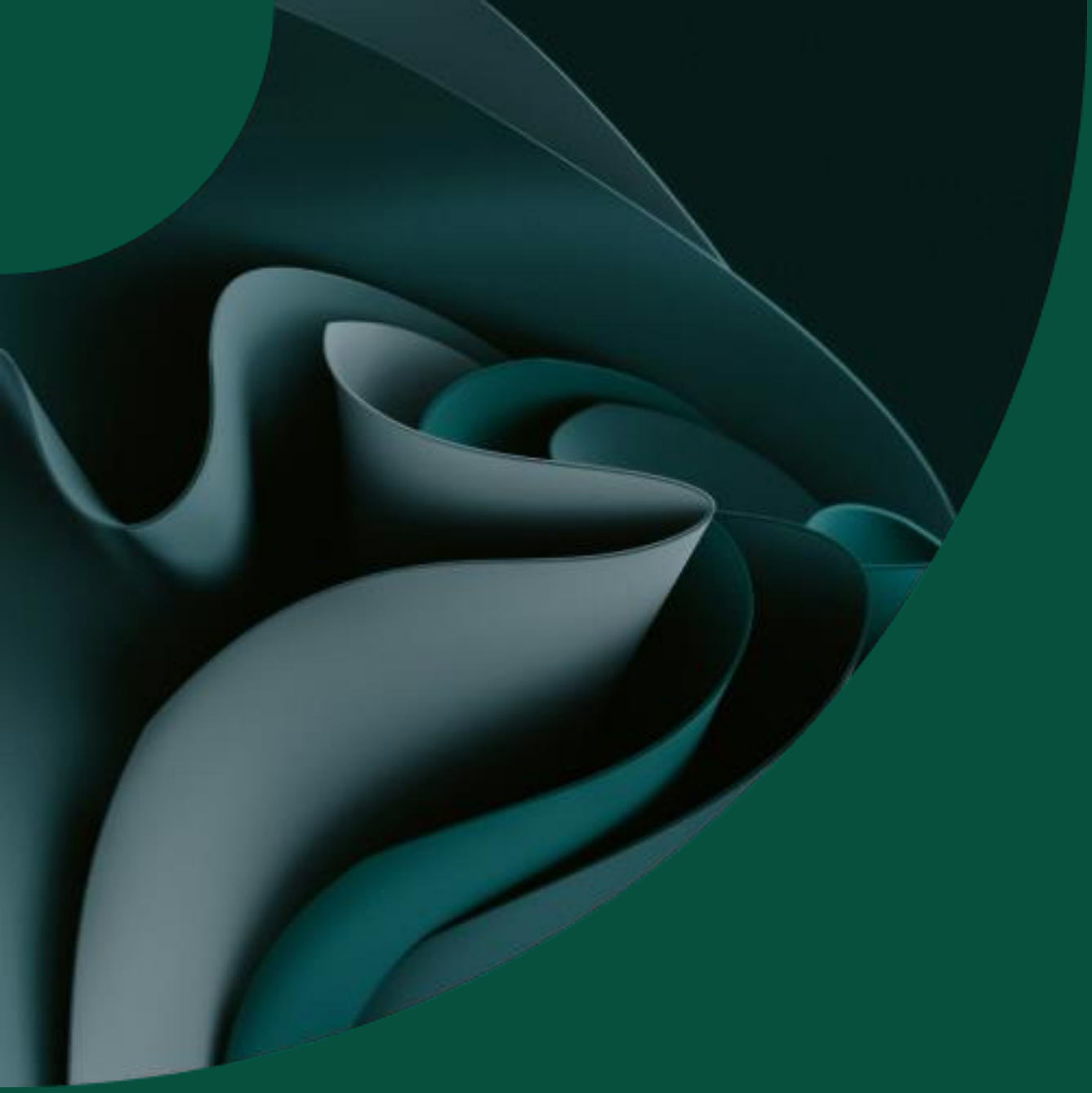
Summary





01 Methodology

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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

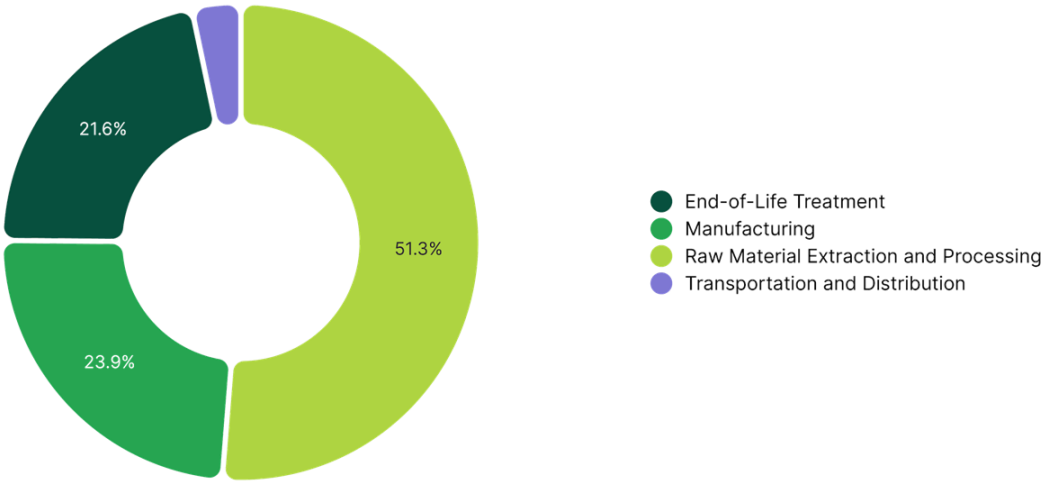
Emission Factor Inventory

Num	Emission Factor	Source	Value	Unit
1	Steel, low-alloyed | Ordinary transforming activity	ECOINVENT 3.10	2.203301567	kg
2	Polypropylene, granulate | Market activity	ECOINVENT 3.10	3.516196993	kg
3	Yarn, cotton | Ordinary transforming activity	ECOINVENT 3.10	7.612678161	kg
4	Polyurethane, rigid foam | Ordinary transforming activity	ECOINVENT 3.10	4.602684501	kg
5	Natural gas - 2022 | Average mix | Consumption | Combustion|SCV	BASE EMPREINTE ADEME 23.4	0.181	kWh
6	Electricity | Total (Scope 2 & 3) | People's Republic of China	IEA 2023	0.7231	kWh
7	Freight | Boat | From CN to FR	WELOW EXPERTS 1.0	0.25227278	kg
8	Waste reinforcement steel | Ordinary transforming activity	ECOINVENT 3.10	0.062734275595	kg
9	Waste polyethylene/polypropylene product | Ordinary	ECOINVENT 3.10	1.783532575	kg
10	Waste yarn and waste textile | Ordinary transforming activity	ECOINVENT 3.10	0.004657246015	kg

02 Results

Dynamic stool

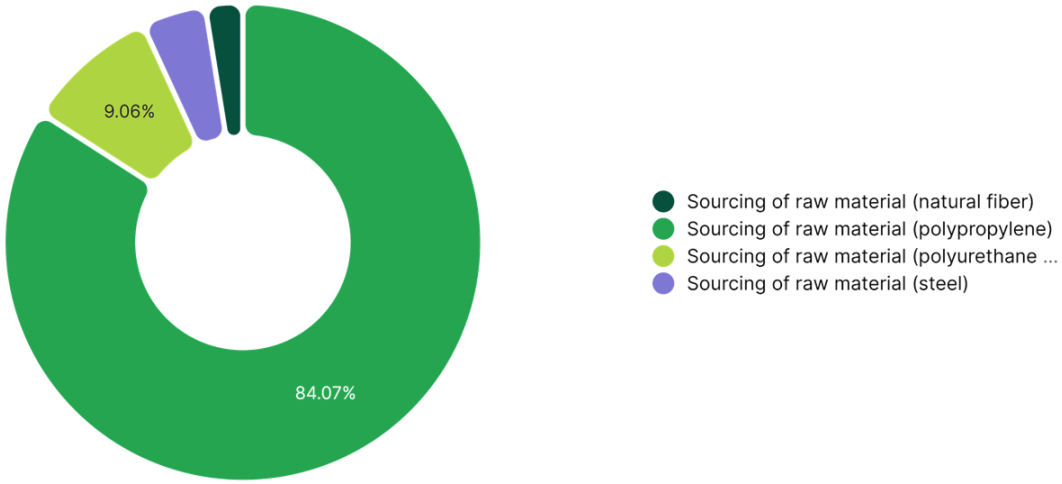
Climate Change



Step	Impact (kg CO_2 eq)	Percentage (%)
Raw Material Extraction and Processing	37.15	51.25 %
Manufacturing	17.31	23.88 %
End-of-Life Treatment	15.63	21.56 %
Transportation and Distribution	2.4	3.31 %
TOTAL	**72.48**	**100.00 %**

Dynamic stool

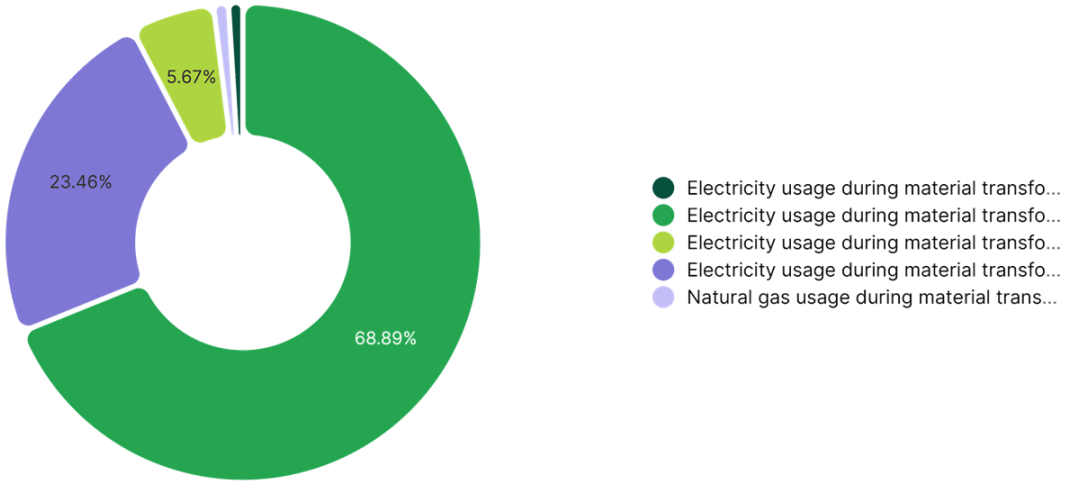
Climate Change - Raw Material Extraction and Processing



Activity	Emission Factor Num	Quantity	Impact (kg CO_2 eq)	Percentage (%)
Sourcing of raw material (polypropylene)	2	8.88	31.23	84.07 %
Sourcing of raw material (polyurethane foam)	4	0.73	3.37	9.06 %
Sourcing of raw material (steel)	1	0.73	1.61	4.34 %
Sourcing of raw material (natural fiber)	3	0.12	0.94	2.53 %
TOTAL			37.15	100.00 %

Dynamic stool

Climate Change - Manufacturing



Activity	Emission Factor Num	Quantity	Impact (kg CO_2 eq)	Percentage (%)
Electricity usage during material transformation (polypropylene)	6	16.49	11.92	68.89 %
Electricity usage during material transformation (steel)	6	5.62	4.06	23.46 %
Electricity usage during material transformation (polyurethane foam)	6	1.36	0.98	5.67 %
Natural gas usage during material transformation (natural fiber)	5	0.97	0.17	1.01 %
Electricity usage during material transformation (natural fiber)	6	0.23	0.17	0.97 %
TOTAL			17.31	100.00 %

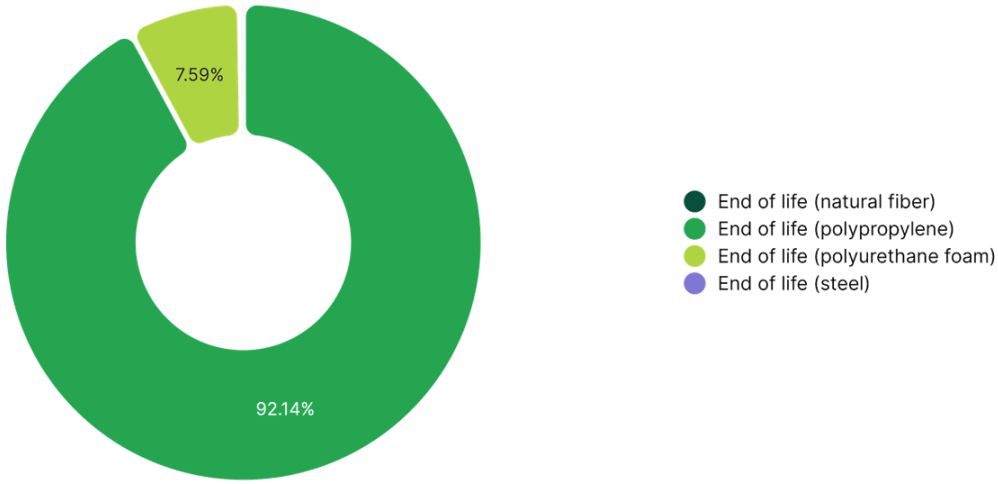
Dynamic stool

Climate Change - Transportation and Distribution

Activity	Emission Factor Num	Quantity	Impact (kg CO_2 eq)	Percentage (%)
Freight	7	9.5	2.4	100.00 %
TOTAL			2.4	100.00 %

Dynamic stool

Climate Change - End-of-Life Treatment



Activity	Emission Factor Num	Quantity	Impact (kg CO_2 eq)	Percentage (%)
End of life (polypropylene)	9	8.07	14.4	92.14 %
End of life (polyurethane foam)	9	0.67	1.19	7.59 %
End of life (steel)	8	0.67	0.04	0.27 %
End of life (natural fiber)	10	0.1	4.42 · 10^-4	0.00 %
TOTAL			15.63	100.00 %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