Life Cycle Analyses

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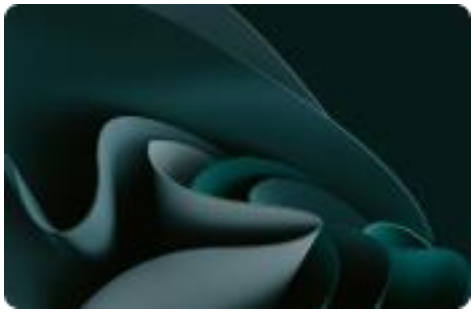
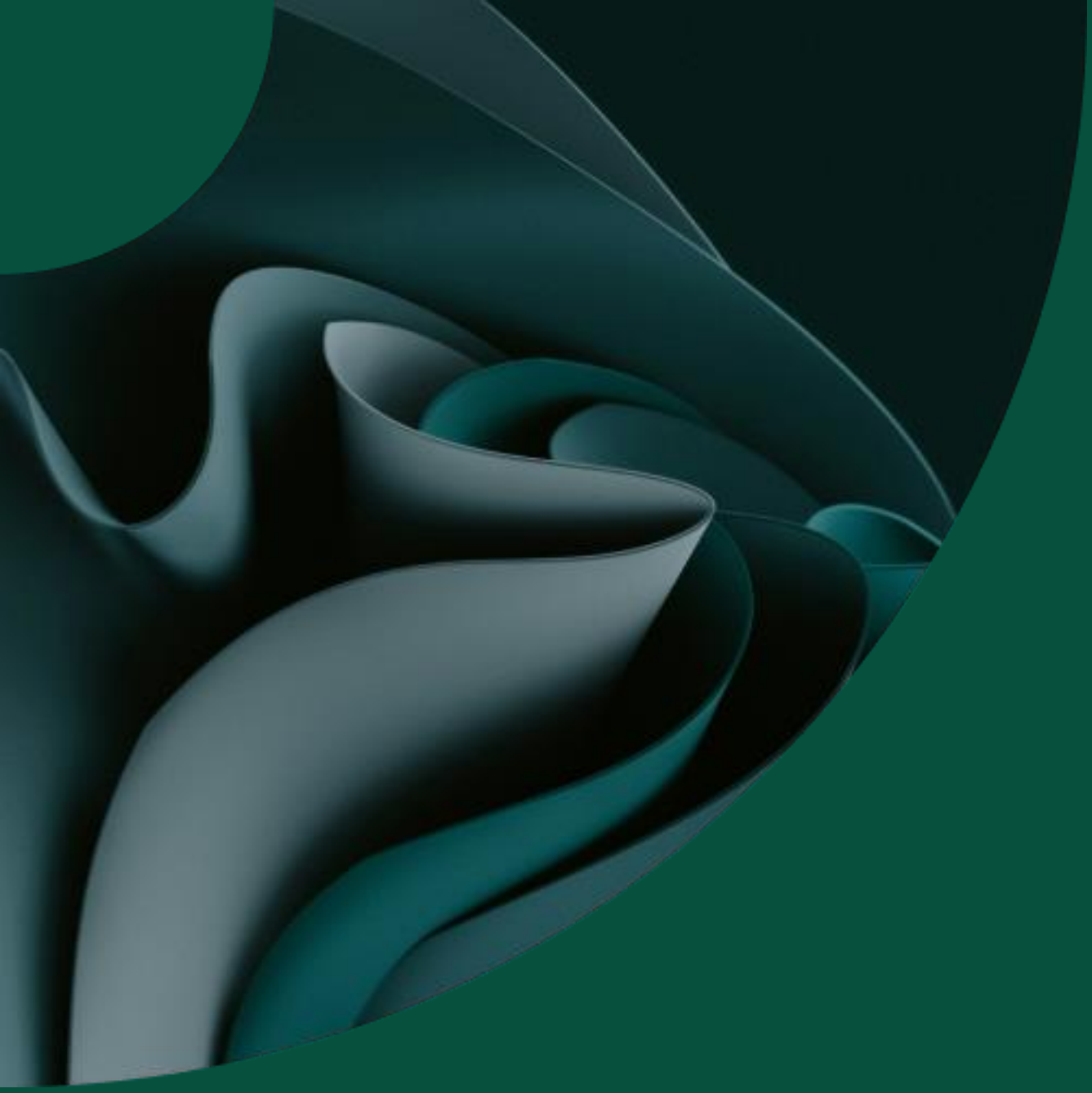
Summary





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	Polypropylene, granulate | Market activity	ECOINVENT 3.10	3.52	kg
2	Steel, low-alloyed | Ordinary transforming activity	ECOINVENT 3.10	2.20	kg
3	Synthetic rubber | Ordinary transforming activity	ECOINVENT 3.10	2.88	kg
4	Electricity | Total (Scope 2 & 3) | People's Republic of China	IEA 2023	0.72	kWh
5	Freight | Boat | From CN to FR	WELOW EXPERTS 1.0	0.25	kg
6	Waste reinforcement steel | Ordinary transforming activity	ECOINVENT 3.10	0.06	kg
7	Waste polyethylene/polypropylene product | Ordinary transforming activity	ECOINVENT 3.10	1.78	kg
8	Residues, MSWI, waste rubber, unspecified | Ordinary transforming activity	ECOINVENT 3.10	0.34	kg

02 Results

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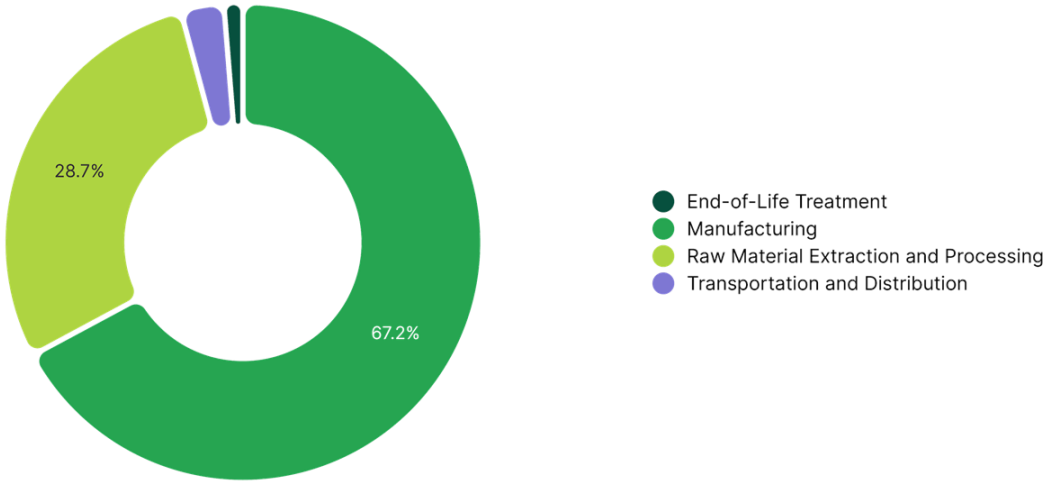
Climate Change



Step	Impact ($kg\ CO_2\ eq$)	Percentage (%)
Manufacturing	55.43	67.16 %
Raw Material Extraction and Processing	23.65	28.66 %
Transportation and Distribution	2.4	2.90 %
End-of-Life Treatment	1.05	1.28 %
TOTAL	**82.53**	**100.00 %**

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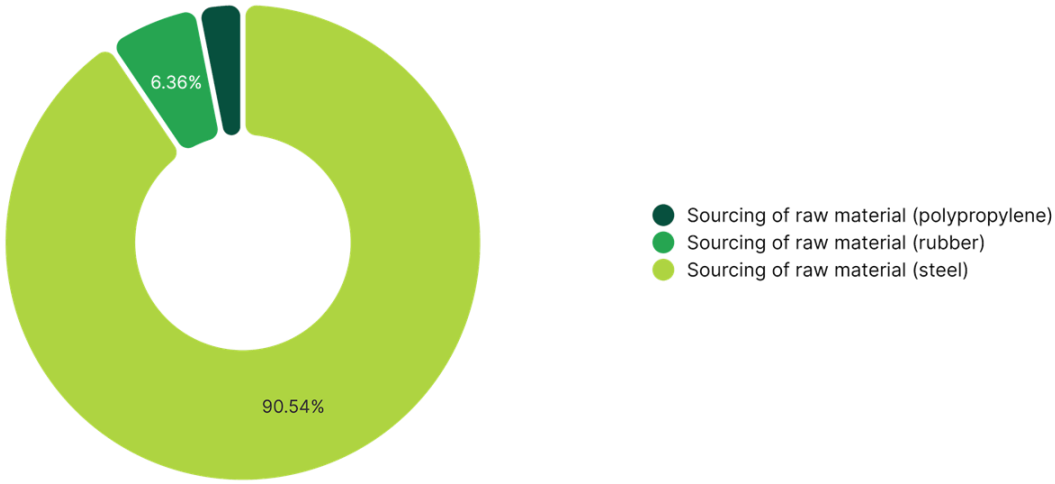
Climate Change - Raw Material Extraction and Processing



Activity	Emission Factor Num	Quantity	Unité	Impact (kg CO_2 eq)	Percentage (%)
Sourcing of raw material (steel)	2	9.72	kg	21.41	90.54 %
Sourcing of raw material (rubber)	3	0.52	kg	1.5	6.36 %
Sourcing of raw material (polypropylene)	1	0.21	kg	0.73	3.11 %
TOTAL				23.65	100.00 %

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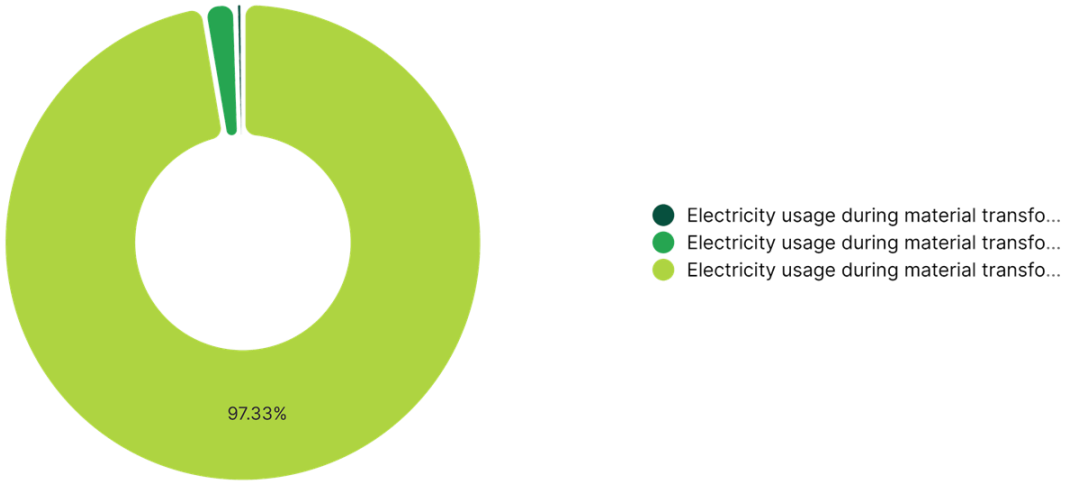
Climate Change - Manufacturing



Activity	Emission Factor Num	Quantity	Unité	Impact (kg CO_2 eq)	Percentage (%)
Electricity usage during material transformation (steel)	4	74.61	kWh	53.95	97.33 %
Electricity usage during material transformation (rubber)	4	1.66	kWh	1.2	2.17 %
Electricity usage during material transformation (polypropylene)	4	0.39	kWh	0.28	0.51 %
TOTAL				55.43	100.00 %

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Climate Change - Transportation and Distribution

Activity	Emission Factor Num	Quantity	Unité	Impact (kg CO_2 eq)	Percentage (%)
Freight	5	9.5	kg	2.4	100.00 %
TOTAL				2.4	100.00 %

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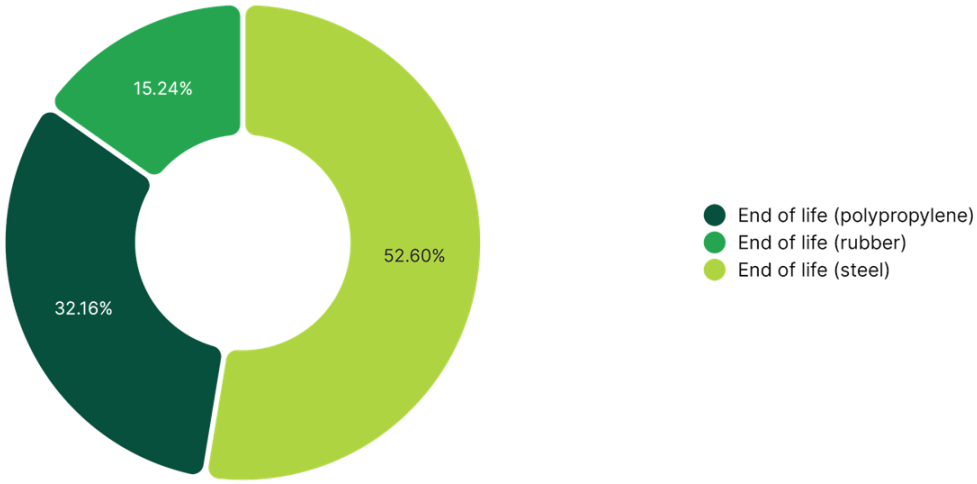
Climate Change - End-of-Life Treatment



Activity	Emission Factor Num	Quantity	Unité	Impact (kg CO_2 eq)	Percentage (%)
End of life (steel)	6	8.84	kg	0.55	52.60 %
End of life (polypropylene)	7	0.19	kg	0.34	32.16 %
End of life (rubber)	8	0.48	kg	0.16	15.24 %
TOTAL				1.05	100.00 %