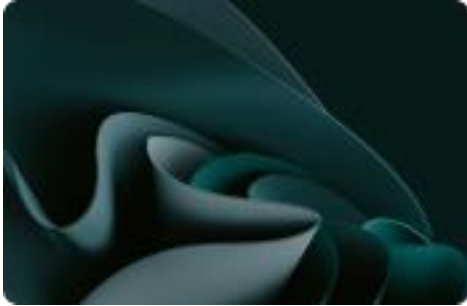


# Life Cycle Analyses

PMMAG2 M



# Summary



**01** | Methodology



**02** | Results

# 01

## Methodology

# Environmental Impact Assessment

<p><b>Functional unit</b></p>	<p>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.</p>
<p><b>Impact Indicator</b></p>	<p>The impact is measured through the "IPCC 2021 GWP100" method</p>
<p><b>Electricity impact calculation method</b></p>	<p>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.</p>
<p><b>Life Cycle Analyses</b></p>	<p>Cradle to grave</p>

# Emission Factor Inventory

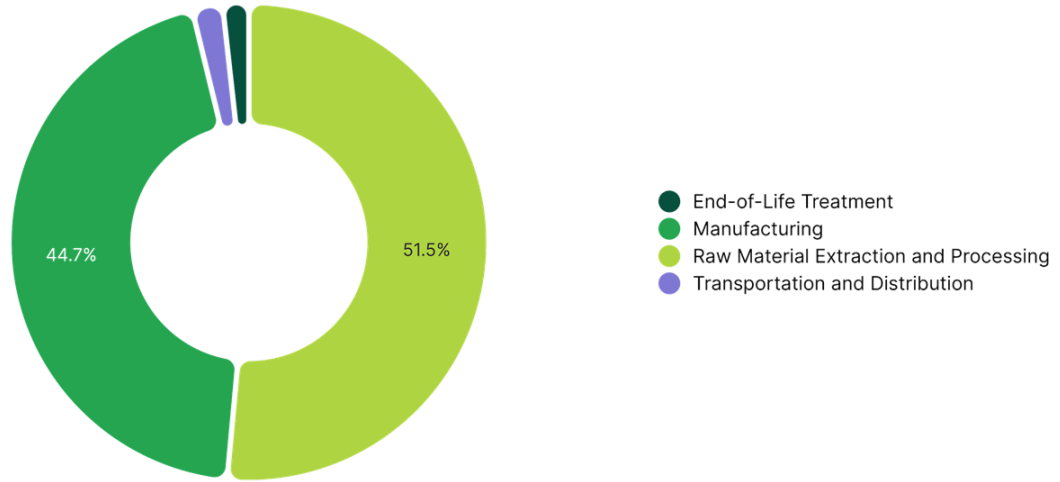
Num	Emission Factor	Source	Value	Unit
1	Magnet / NdFeB	BASE CARBONE ADEME 22.0	33.5	kg
2	Acrylonitrile-butadiene-styrene copolymer   Ordinary transforming activity	ECOINVENT 3.10	4.533718346	kg
3	Steel, low-alloyed   Ordinary transforming activity	ECOINVENT 3.10	2.203301567	kg
4	Electricity   Total (Scope 2 & 3)   People's Republic of China	IEA 2023	0.7231	kWh
5	Freight   Boat   From CN to FR	WELOW EXPERTS 1.0	0.25227278	kg
6	Tinplate scrap, sorted   Ordinary transforming activity	ECOINVENT 3.10	0.03352378077	kg
7	Waste reinforcement steel   Ordinary transforming activity	ECOINVENT 3.10	0.06273427595	kg
8	Residues, MSWI, waste plastic, consumer electronics   Ordinary transforming activity	ECOINVENT 3.10	0.3620299477	kg

# 02

Results

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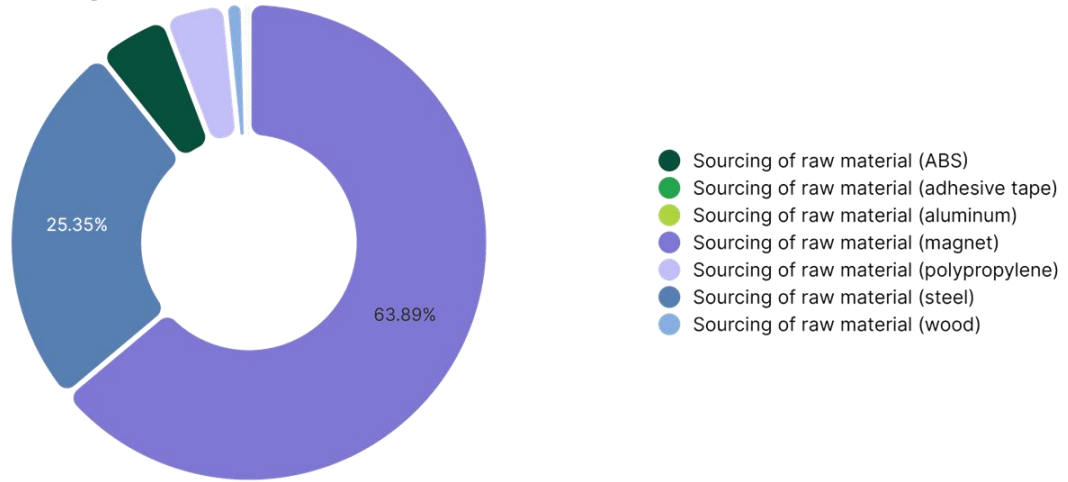
# Climate Change



Step	Impact (kg CO <sub>2</sub> eq)	Percentage (%)
Raw Material Extraction and Processing	5.84	64.60 %
Manufacturing	3.07	33.99 %
Transportation and Distribution	0.1	1.12 %
End-of-Life Treatment	0.03	0.30 %
<b>TOTAL</b>	<b>{{totalImpact7}}</b>	<b>100.00 %</b>

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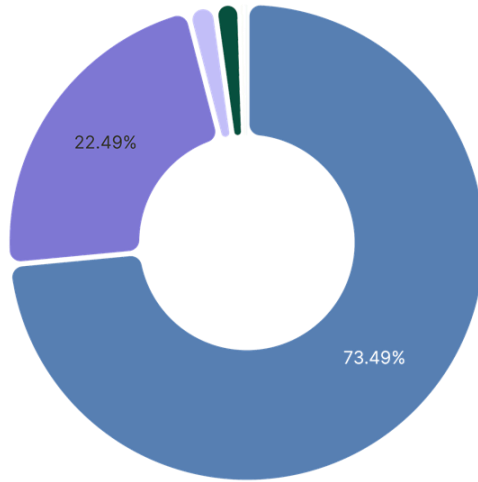
# Climate Change - Raw Material Extraction and Processing



Activity	Emission Factor Num	Quantity	Impact (kg CO <sub>2</sub> eq)	Percentage (%)
Sourcing of raw material (magnet)	1	0.15	5.16	88.33 %
Sourcing of raw material (steel)	3	0.26	0.58	9.96 %
Sourcing of raw material (ABS)	2	0.02	0.1	1.71 %
TOTAL			5.84	100.00 %

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# Climate Change - Manufacturing



- Electricity usage during material transfo...
- Electricity usage during material transfo...
- Electricity usage during material transfo...
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- Electricity usage during material transfo...

Activity	Emission Factor Num	Quantity	Impact (kg CO <sub>2</sub> eq)	Percentage (%)
Electricity usage during material transformation (magnet)	4	2.18	1.58	51.35 %
Electricity usage during material transformation (steel)	4	2.03	1.47	47.69 %
Electricity usage during material transformation (ABS)	4	0.04	0.03	0.96 %
TOTAL			3.07	100.00 %

Peg

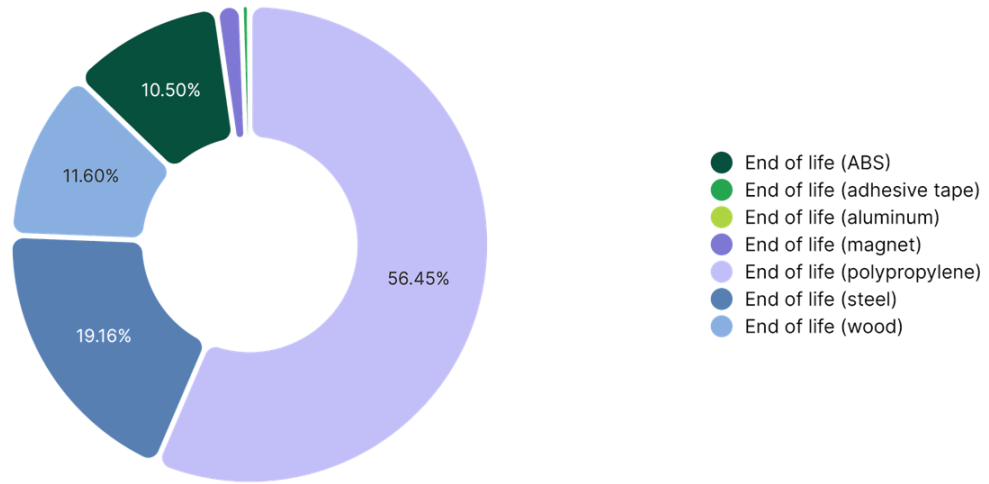
# Climate Change - Transportation and Distribution



Activity	Emission Factor Num	Quantity	Impact (g CO <sub>2</sub> eq)	Percentage (%)
Freight	5	0.4	100.91	100.00 %
TOTAL			100.91	100.00 %

Peg

# Climate Change - End-of-Life Treatment



Activity	Emission Factor Num	Quantity	Impact (g CO <sub>2</sub> eq)	Percentage (%)
End of life (steel)	7	0.24	15.06	55.78 %
End of life (ABS)	8	0.02	7.24	26.83 %
End of life (magnet)	6	0.14	4.69	17.39 %
TOTAL			26.99	100.00 %

