UBC Engineering

SOLIDWORKS Sustainability Report

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VANT 151 Team 4 .

Model Name: VANT 151 Tricycle Project

Weight:	228.55 g
Built to last:	1.0 year
Duration of use:	1.0 year

Manufacturing Region

The choice of manufacturing region determines the energy sources and technologies used in the modeled material creation and manufacturing steps of the product's life cycle.

Use Region

The use region is used to determine the energy sources consumed during the product's use phase (if applicable) and the destination for the product at its end-of-life. Together with the manufacturing region, the use region is also used to estimate the environmental impacts associated with transporting the product from its manufacturing location to its use location.

Summary

Learn more about Life Cycle Assessment

Sustainability Report

Model Name:	VANT 151 Tricycle Project	Weight:	228.55 g
		Built to last:	1.0 year
		Duration of use:	1.0 year

Assembly Process

Region:	North America
Energy type:	None
Energy amount:	0.00 kWh
Built to last:	1.0 year

Use

Region:	North America
Energy type:	Electricity
Energy amount:	82713.56 kWh
Duration of use:	1.0 year

Transportation

Truck distance:	2600 km
Train distance:	0.00 km
Ship distance:	0.00 km
Airplane Distance:	0.00 km

End of Life

Recycled:	33 %
Incinerated:	13 %
Landfill:	54 %

Comments

Click here for alternative units such as 'Miles Driven in a Car'

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Environmental Impact (calculated using CML impact assessment methodology)

Carbon Footprint

6.7E+4 kg CO_2e

Material:	0.979 kg CO_2e
Manufacturing:	210 kg CO_2e
Use:	6.7E+4 kg CO_2e
Transportation:	0.059 kg CO_2e
End of Life:	0.126 kg CO_2e

Total Energy Consumed

9.7E+5 MJ

Material:	14 MJ
Manufacturing:	3100 MJ
Use:	9.7E+5 MJ
Transportation:	0.879 MJ
End of Life:	0.092 MJ

Air Acidification

450 kg SO_2e

Material:	5.1E-3 kg SO_2e
Manufacturing:	1.4 kg SO_2e
Use:	450 kg SO_2e
Transportation:	2.7E-4 kg SO_2e
End of Life:	6.4E-5 kg SO_2e

Water Eutrophication

16 kg PO_4e

Material:	2.3E-4 kg PO_4e
Manufacturing:	0.053 kg PO_4e
Use:	16 kg PO_4e
Transportation:	6.0E-5 kg PO_4e
End of Life:	1.6E-4 kg PO_4e

Material Financial Impact

0.50 USD

Comments

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Component Environmental Impact

Top Ten Components Contributing Most to the Four Areas of Environmental Impact

Component	Carbon	Water	Air	Energy
Cargo Shelf	52	0.013	0.352	760
Frame	45	0.011	0.306	660
Rear Sprocket	32	7.9E-3	0.214	460
Rear Wheel	26	6.3E-3	0.172	370
Link Plate	16	3.9E-3	0.106	230
SG90 - Micro Servo 9g - Tower Pro.1	14	3.4E-3	0.092	200
Rear Axle	7.7	1.9E-3	0.052	110
Heat Sink	7.7	1.9E-3	0.052	110
Handlebar	6.4	1.6E-3	0.043	92
SG90 - Micro Servo 9g - Tower Pro.2	0.301	7.4E-5	2.0E-3	4.4

Comments

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Baseline

Model Name: VANT 151 Tricycle Project

Weight:	230 g
Built to last:	1.0 year
Duration of use:	1.0 year

Manufacturing Region
The choice of manufacturing region determines the energy sources and technologies used in the modeled material creation and manufacturing steps of the product's life cycle.

Use Region
The use region is used to determine the energy sources consumed during the product's use phase (if applicable) and the destination for the product at its end-of-life. Together with the manufacturing region, the use region is also used to estimate the environmental impacts associated with transporting the product from its manufacturing location to its use location.

Comments

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Model Name:	VANT 151 Tricycle Project	Weight:	228.55 g
		Built to last:	1.0 year
BASELINE		Duration of use:	1.0 year

Assembly Process

Region:	North America
Energy type:	None
Energy amount:	0.00 MJ
Built to last:	1.0 year

Use

Region:	North America
Energy type:	None
Energy amount:	1.2E+6 MJ
Duration of use:	1.0 year

Transportation

Truck distance:	2600 km
Train distance:	0.00 km
Ship distance:	0.00 km
Airplane Distance:	0.00 km

End of Life

Recycled:	33 %
Incinerated:	13 %
Landfill:	54 %

Comments

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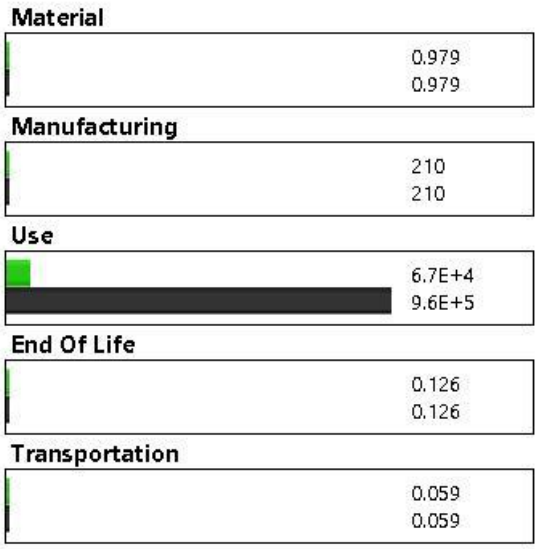
Model Name:	VANT 151 Tricycle Project	Weight:	230 g
		Built to last:	1.0 year
BASELINE		Duration of use:	1.0 year

Environmental Impact Comparison

New Design: Better Worse | Original Design: Baseline

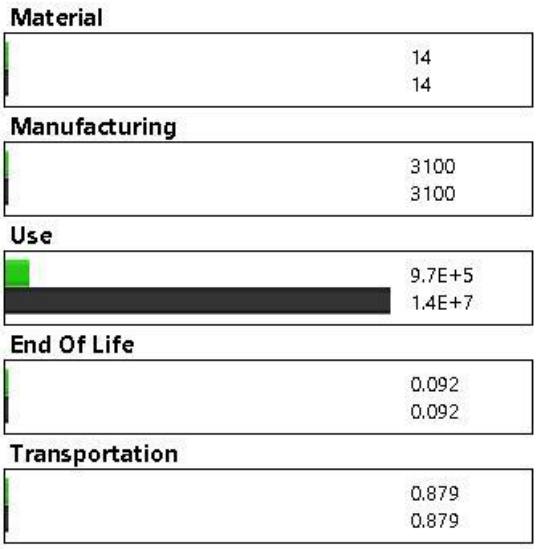
Carbon Footprint - Comparison

Total : 6.7E+4 kg CO_2e
: 9.6E+5 kg CO_2e



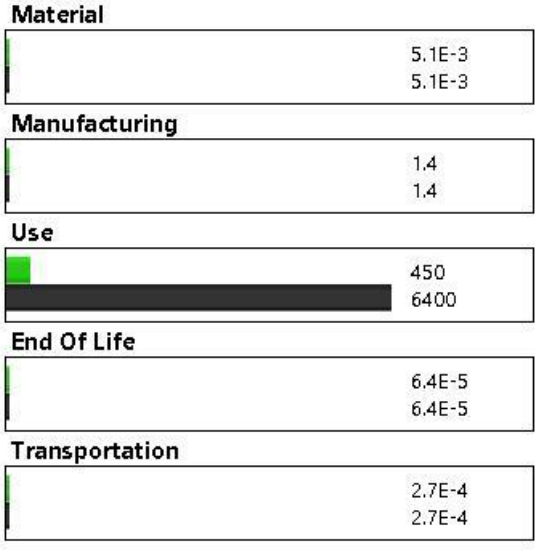
Total Energy Consumed - Comparison

Total : 9.7E+5 MJ
: 1.4E+7 MJ



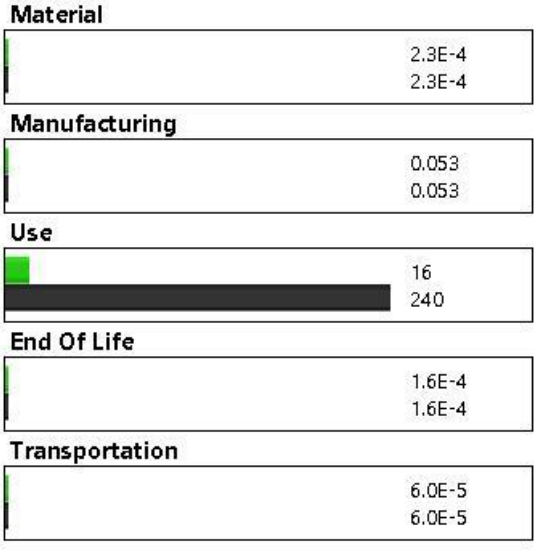
Air Acidification - Comparison

Total : 450 kg SO_2e
: 6400 kg SO_2e



Water Eutrophication - Comparison

Total : 16 kg PO_4e
: 240 kg PO_4e



Material Financial Impact Comparison

Comments

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Sustainability Report


RAW MATERIAL
EXTRACTION
MATERIAL
PROCESSING
PART
MANUFACTURING
ASSEMBLY
PRODUCT
USE
END OF LIFE
SUSTAINABLE
DESIGN

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Glossary

Air Acidification - Sulfur dioxide, nitrous oxides other acidic emissions to air cause an increase in the acidity of rainwater, which in turn acidifies lakes and soil. These acids can make the land and water toxic for plants and aquatic life. Acid rain can also slowly dissolve manmade building materials such as concrete. This impact is typically measured in units of either kg **sulfur dioxide equivalent (SO_2), or moles H+ equivalent**.

Carbon Footprint - Carbon-dioxide and other gasses which result from the burning of fossil fuels accumulate in the atmosphere which in turn increases the earth's average temperature. Carbon footprint acts as a proxy for the larger impact factor referred to as Global Warming Potential (GWP). Global warming is blamed for problems like loss of glaciers, extinction of species, and more extreme weather, among others.

Total Energy Consumed - A measure of the non-renewable energy sources associated with the part's lifecycle in units of megajoules (**MJ**). This impact includes not only the electricity or fuels used during the product's lifecycle, but also the upstream energy required to obtain and process these fuels, and the embodied energy of materials which would be released if burned. PED is expressed as the net calorific value of energy demand from non-renewable resources (e.g. petroleum, natural gas, etc.). Efficiencies in energy conversion (e.g. power, heat, steam, etc.) are taken into account.

Water Eutrophication - When an over abundance of nutrients are added to a water ecosystem, eutrophication occurs. Nitrogen and phosphorous from waste water and agricultural fertilizers causes an overabundance of algae to bloom, which then depletes the water of oxygen and results in the death of both plant and animal life. This impact is typically measured in either kg **phosphate equivalent (PO_4) or kg nitrogen (N) equivalent**.

Life Cycle Assessment (LCA) - This is a method to quantitatively assess the environmental impact of a product throughout its entire lifecycle, from the procurement of the raw materials, through the production, distribution, use, disposal and recycling of that product.

Material Financial Impact - This is the financial impact associated with the material only. The mass of the model is multiplied by the financial impact unit (units of currency/units of mass) to calculate the financial impact (in units of currency).

Learn more about Life Cycle Assessment