Lab 10: Sustainability Case Study

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Laboratory Performed: November 18th, 2021

I pledge my honor that I have abided by the Stevens Honor System

Bemin Shaker

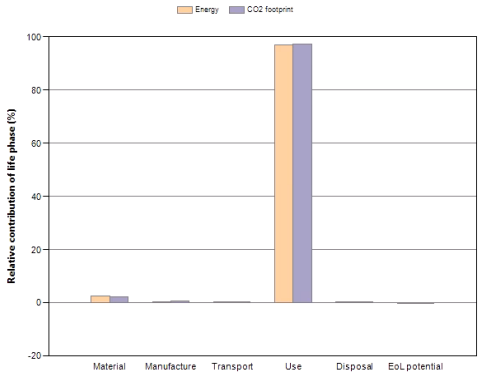
Gwendolyn Marchi

Alexander Gaskins

Results

Case A:

Summary:

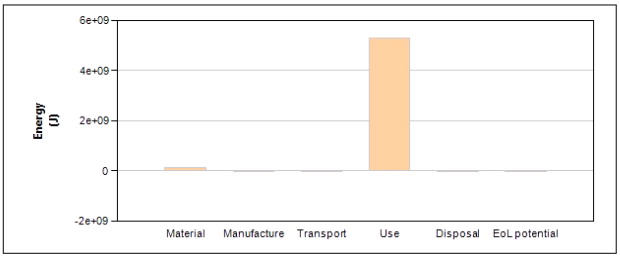


GRANTA EduPack

Eco Audit Report

Energy Analysis

Summary



	Energy (J/year)
Equivalent annual environmental burden (averaged over 5 year product life):	1.09e+09

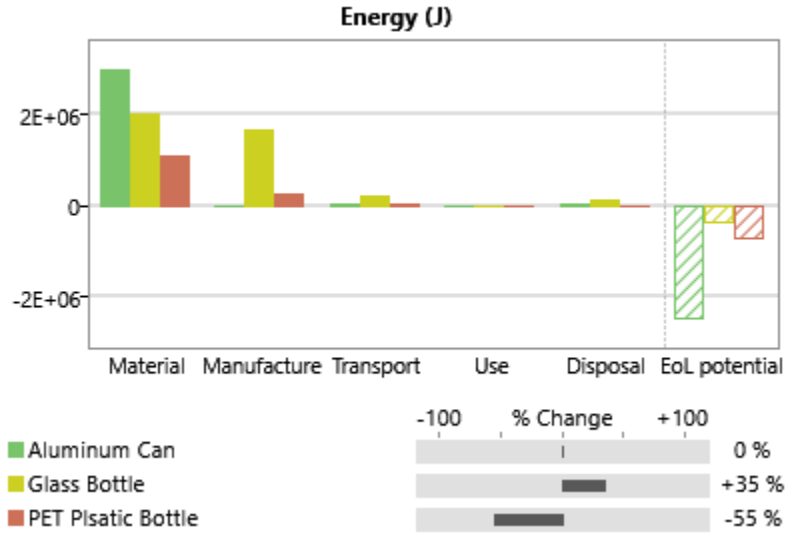
Phase	Energy (J)	Energy (%)	CO2 footprint (kg)	CO2 footprint (%)
Material	1.39e+08	2.6	7.24	2.3
Manufacture	2.47e+07	0.5	1.87	0.6
Transport	6.03e+03	0.0	0.000434	0.0
Use	5.3e+09	97.0	311	97.1
Disposal	3.85e+05	0.0	0.027	0.0
Total (for first life)	**5.46e+09**	**100**	**320**	**100**
End of life potential	-2.39e+06		-0.125	

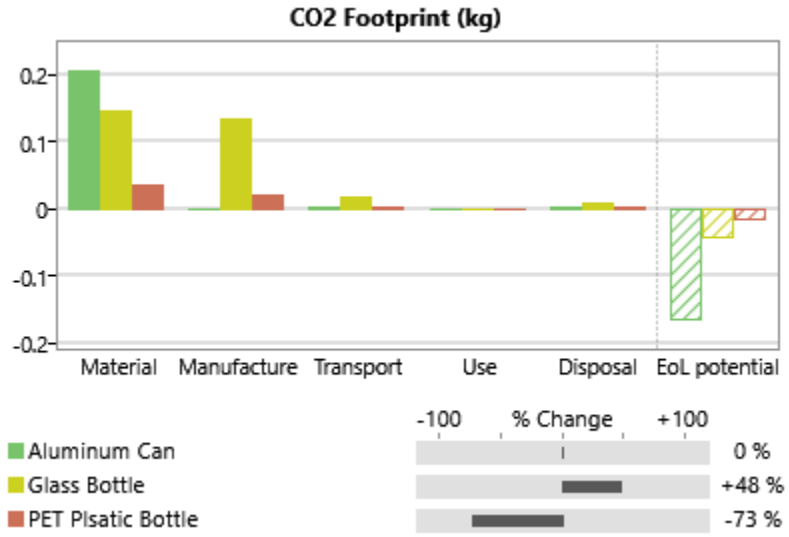
NOTE: Differences of less than 20% are not usually significant. Page 1 / 3

Component	Material	Recycled content* (%)	Part mass (kg)	Qty.	Total mass (kg)	Energy (J)	%
Housing	Polypropylene (PP)	Virgin (0%)	0.91	1	0.91	6.3e+07	45.2
Small Steel Parts	Stainless steel	Virgin (0%)	0.12	1	0.12	8.7e+06	6.3
Small Aluminum Parts	Age-hardening wrought Al-alloys	Virgin (0%)	0.08	1	0.08	1.6e+07	11.3
Heating Element	Nickel-chromium alloys	Virgin (0%)	0.026	1	0.026	5.7e+06	4.1
Glass Carafe	Borosilicate glass	Virgin (0%)	0.33	1	0.33	9.5e+06	6.8
Electronics	Printed circuit board assembly	Virgin (0%)	0.025	1	0.025	3.2e+06	2.3
Power Cable	Cable	Virgin (0%)	0.15	1	0.15	1.4e+07	9.8
Power Plug	Plugs, inlet and outlet	Virgin (0%)	0.067	1	0.067	7.8e+06	5.6
Packaging, Padding	Flexible Polymer Foam (LD)	Virgin (0%)	0.015	1	0.015	1.4e+06	1.0
Packaging, Box	Paper and cardboard	Virgin (0%)	0.13	1	0.13	6.4e+06	4.6
Other Components	Polycarbonate (PC)	Virgin (0%)	0.04	1	0.04	4.2e+06	3.0
Total				**11**	**1.9**	**1.4e+08**	**100**

*Typical: Includes 'recycle fraction in current supply'

Case B:





Phase	Energy (J)	Energy (%)	CO2 footprint (kg)	CO2 footprint (%)
Material	2.97e+06	99.1	0.204	99.0
Manufacture	0	0.0	0	0.0
Transport	1.74e+04	0.6	0.00125	0.6
Use	0	0.0	0	0.0
Disposal	1.04e+04	0.3	0.00073	0.4
Total (for first life)	**3e+06**	**100**	**0.206**	**100**
End of life potential	-2.46e+06		-0.164	

NOTE: Differences of less than 20% are not usually significant.

See notes on precision and data sources.

Tuesday, November 16, 2021

Phase	Energy (J)	Energy (%)	CO2 footprint (kg)	CO2 footprint (%)
Material	2.03e+06	50.2	0.145	47.9
Manufacture	1.66e+06	41.0	0.133	43.7
Transport	2.24e+05	5.5	0.0161	5.3
Use	0	0.0	0	0.0
Disposal	1.34e+05	3.3	0.00941	3.1
Total (for first life)	**4.05e+06**	**100**	**0.304**	**100**
End of life potential	-3.67e+05		-0.0438	

Phase	Energy (J)	Energy (%)	CO2 footprint (kg)	CO2 footprint (%)
Material	1.07e+06	79.3	0.0354	62.9
Manufacture	2.55e+05	18.9	0.0192	34.0
Transport	1.51e+04	1.1	0.00109	1.9
Use	0	0.0	0	0.0
Disposal	9.1e+03	0.7	0.000637	1.1
Total (for first life)	**1.35e+06**	**100**	**0.0563**	**100**
End of life potential	-7.04e+05		-0.0156	