LCA | Jerrycans & Buckets

Presentation of items



Foldable Jerrycan 20L

- Lifespan: 3 months
- Mass: 270 grams
- Materials: Mainly virgin LDPE



Bucket type OXFAM 14L

- Lifespan: 5 years
- Mass: 860 grams
- Materials: Mainly virgin HDPE

Functional unit

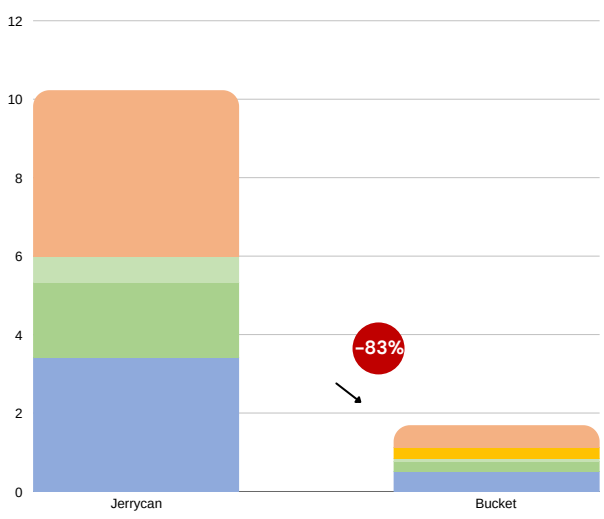
To store 20 L of liquid for 1 year

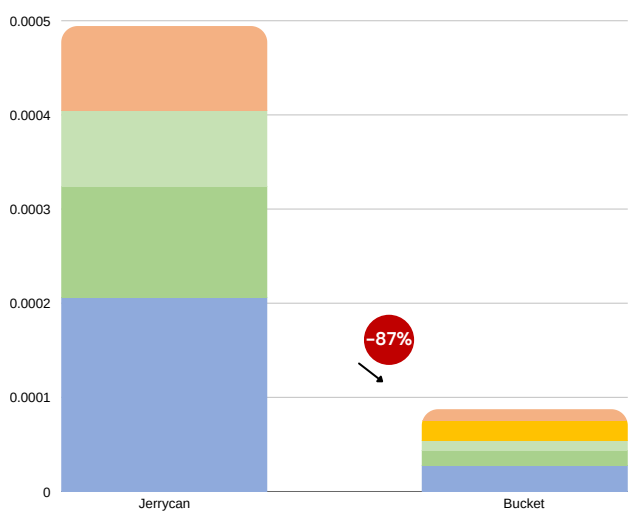
Item	Use life (years)	for 20L storage	Reference Flows
Jerrycan	0.25	1.00	4.00
Bucket	5.00	1.43	0.286

Assumptions

Both products manufactured in China with virgin materials, itemps are distributed by sea to the field (Kenya). No use phase considered for jerrycan, bucket washed every year with 5L of water and soap. Open burning in considered as end of life.

Results of the computation





Stage	kgCO₂e	
	Jerrycan	Bucket
Raw Material	3.41	0.50
Production	1.91	0.26
Transportation	0.66	0.09
Use	0	0.28
End-of-Life	4.25	0.56

Stage	Human Health	
	Jerrycan	Bucket
Raw Material	2.06E-04	2.78E-05
Production	1.18E-04	1.58E-05
Transportation	8.11E-05	1.07E-05
Use	0	2.13E-05
End-of-Life	8.93E-05	1.18E-05

Variations (% from baseline figures presented above)

To use recycled materials

Computation made by considering 100% recycled raw materials for products

kgCO2e	
Jerrycan	Bucket
-20.7%	-21.1%
Human Health	
Jerrycan	Bucket
-20.7%	-12.1%

To use renewable energy for production

Computation made by considering 100% of renewable energy in factory mix

kgCO2e	
Jerrycan	Bucket
-12.2%	-10.0%
Human Health	
Jerrycan	Bucket
-11.8%	-8.9%

To send waste in sanitary landfill

Computation made by considering waste sanitary littered

kgCO2e	
Jerrycan	Bucket
-38.7%	-31.7%
Human Health	
Jerrycan	Bucket
-16.9%	-12.6%

To send waste to municipal incineration

Computation made by considering waste sent in municipal incinerators

kgCO2e	
Jerrycan	Bucket
-1.4%	-1.1%
Human Health	
Jerrycan	Bucket
-16.1%	-11.7%

Best Possible Scenario

Recycled + Renewable + Sanitary Landfill

kgCO2e	
Jerrycan	Bucket
-72.2%	-58.2%
Human Health	
Jerrycan	Bucket
-50.6%	-39.7%

Analyses

To **shift from jerrycans to buckets** for operations can achieve a significant reduction in this field. This product already exists and is used by some organizations, so, it can be operationalized quickly. Then, **working with suppliers to manufacture products with recycled materials and renewable energy** can further lead to a total reduction of 85% from the baseline jerrycan for the same lifespan. Finally, waste is problematic as few facilities exist for collection and treatment. Severals scenarios had been studied to highlight potential impact reduction, without considering recycling as it is still not an available disposal method in these area of intervention. **Advocating for infrastructure development is key to achieving a reduction in end-of-life treatment**.

Emission factors

The values displayed here are not per functional unit but per item. These values can be used to compute a carbon footprint of an organisation and can be adapted to a specific case using the tool

Name	GHG Protocol Categories	kgCO2e/unit	
		Jerrycans	Buckets
Cradle-to-grave	N/A	2.03	8.40
Cradle-to-gate	3.1 Purchased Goods	0.83	3.84
Distribution freight	3.4 and/or 3.9 Transportation	0.14	0.36
Use phase	3.11 Use of distributed product	0	1.40
End-of life	3.12 End of life of distributed product	1.06	2.80

References

Wernet, G., Bauer, C., Steubing, B., Reinhard, J., Moreno-Ruiz, E., and Weidema, B., 2016. '*The ecoinvent database version 3 (part I): overview and methodology*'. The International Journal of Life Cycle Assessment, [online] 21(9), pp.1218–1230. Available at: http://link.springer.com/10.1007/s11367-016-1087-8.

Rajput, A., Tobin Greene, C. and Schmid, S. (no date) 'Life Cycle Assessment (LCA) Methodology'. Available at: https://climateactionaccelerator.org/wp-content/uploads/2025/06/EPFL_LCA_methodology_v1.0.pdf.

Repository of life cycle assessments - Climate Action Accelerator (2025). Available at: https://climateactionaccelerator.org/repository-of-lifecycle-assessments/.

About this project

Designing methodologies and performing life cycle analyses of high-impact items to build a GHG emission factor and environmental impact database adapted to the humanitarian sector with the goal of identifying key strategies to reduce environmental impacts.

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