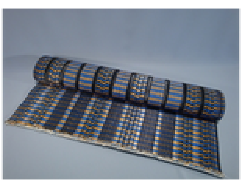
LCA | Plastic Floor Mat

EPFL EssentialTech Centre | ICRC | Climate Action Accelerator | LEURE

Description of Item



Plastic Floor Mat
- Mass: 860g
- Contents: Virgin polypropylene
- Plastic packaging material: LDPE film

Functional unit

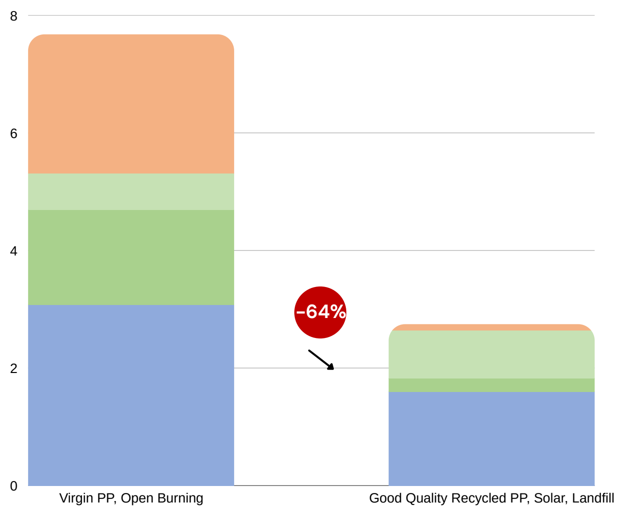
Use of 1 mattress for 10 years

Item	Use life	Reference Flows
Virgin PP	2	1
Good Quality, Recycled	2	1
Poor Quality, Recycled	1	2
Straw	1	2

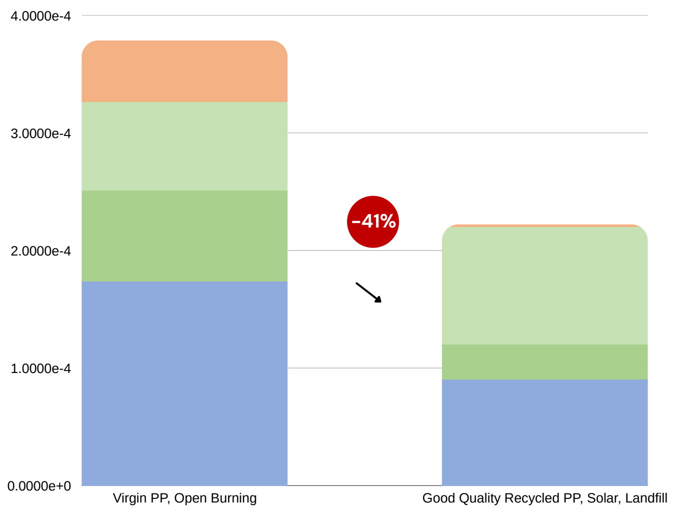
Assumptions

Baseline product produced in India, sent to port by freight train, and shipped to warehousing and distribution locations. No washing is assumed. Open burning assumed for end-of-life.

Results of the computation



Stage		$kgCO_2e$ Scenario 1	$kgCO_2e$ Scenario 2
Raw Material		3.07	1.60
Production		1.62	0.23
Transportation		0.62	0.82
Use		0.00	0.00
End-of-Life		2.36	0.10



Stage		Human Health Scenario 1	Human Health Scenario 2
Raw Material		1.74E-04	9.05E-05
Production		7.72E-05	2.96E-05
Transportation		7.54E-05	9.99E-05
Use		0.00E+00	0.00E+00
End-of-Life		5.21E-05	2.12E-06

Variations (% from baseline figures presented above)

To use recycled material

Computation made by considering recycled polypropylene – of good quality (2 yrs) & bad quality (1 yr)

kgCO2e

Good Quality	Bad Quality
-17%	+67%

Human Health

Good Quality	Bad Quality
-16%	+69%

To use renewable energy during production

Computation made by considering 100% solar energy for electricity & heat

kgCO2e
Renewable Energy
-18%

Human Health
Renewable Energy
-13%

To switch to sanitary landfills

Computation made by considering sanitary landfill (moist infiltration class) at end-of-life

kgCO2e
Sanitary Landfill
-29%

Human Health
Sanitary Landfill
-13%

To produce locally

Computation made by considering suply & distribution via land transportation (i.e. trucks) instead of maritime shipping

kgCO2e
Locally Made
-2%

Human Health
Locally Made
-4%

Best Possible Scenario

Computation made by considering recycled PP produced with solar energy, disposed in a sanitary landfill

kgCO2e
Best Case
-64%

Human Health
Best Case
-41%

Analyses

Combining recycled materials, renewable energy, and better waste management account for the impact reduction of the plastic floor mat with results (reduction of **64% in climate change & 41% in impact on human health**) comparable to that of the straw mat (reduction of 57% in climate change & 42% in impact on human health).

However – the assumption of **poor-quality straw mats lasting 1 year is circumstantial** and could change based on ground realities, therefore the reduction potential would have to be confirmed by additional studies on the lifespan of straw mats in field settings.

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
Cradle-to-grave	**N/A**	**7.68**
Cradle-to-gate	3.1 Purchased Goods	4.69
Distribution freight	3.4 and/or 3.9 Transportation	0.62
Use phase	3.11 Use of distributed product	0
End-of life	3.12 End of life of distributed product	2.36

References

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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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