

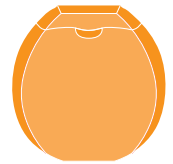
LIFE CYCLE ASSESSMENT LAUNDRY DETERGENT PODS PACKAGING CASE STUDY

LAUNDRY DETERGENT PODS PACKAGE COMPARISON

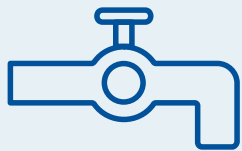
The use of single-dose pods has become a popular method for packaging laundry detergent, replacing liquid or powdered detergent with pre-measured packets. For this Life Cycle Assessment study, two common packaging formats for pods were evaluated for their holistic environmental impact: a flexible stand-up pouch with a zipper and a rigid PET container.



FLEXIBLE STAND-UP POUCH WITH ZIPPER



RIGID PET CONTAINER



WATER CONSUMPTION

Water consumption of the two package formats is driven by differences in packaging weight as well as the use of water to cool molds during the injection molding process for the rigid PET container.

The rigid PET container's water footprint is **+660%** larger than the flexible stand-up pouch.



GREENHOUSE GAS EMISSIONS

When considering the greenhouse gas emissions of the two primary packaging types, the flexible stand-up pouch has a significant advantage largely due to using much less material and a less energy-intensive laminating process.

The injection molding for the rigid PET container results in additional energy used in the process, leading to higher overall emissions **(+726%)**.



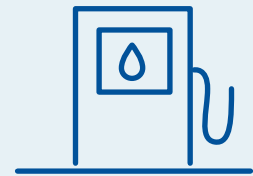
21,209

GRAMS per 1000 kg of product



118,175

GRAMS per 1000 kg of product



FOSSIL FUEL CONSUMPTION

The flexible stand-up pouch comes out favorably in fossil fuel consumption, driven largely by the lightweight nature of the pouch and the energy or conversion efficiency in the manufacturing process. The injection molding process of the rigid PET container's manufacturing stage is much more energy-intensive than the laminating process used by the flexible stand-up pouch.

The rigid PET container has a fossil fuel usage nearly **504%** greater than that of the flexible stand-up pouch with zipper, and the package weight is **6X** heavier.



76.73

MJ-EQUIV



463.68

MJ-EQUIV

END OF USE SUMMARY

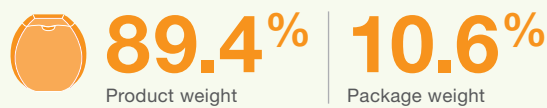
SOURCE REDUCTION BENEFITS

The flexible stand-up pouch with a zipper aligns with the Sustainable Materials Management framework that looks to maximize the use of resources in packaging as well as the U.S. EPA Waste Hierarchy that cites source reduction and reuse as preferred methods to reduce overall waste.

Flexible stand-up pouch:



Rigid PET container:



RECOVERY BENEFITS

STAND-UP FLEXIBLE POUCH



1x
amount of material ending up as municipal solid waste

RIGID PET CONTAINER:





4x
amount of material ending up as municipal solid waste

When taking current recycling rates into consideration, the rigid PET container results in nearly **4X** more material ending up in municipal solid waste than the flexible stand-up pouch.

In order for the PET container to have the same level of municipal solid waste as the flexible stand-up pouch, the recycling rate of both the rigid PET container and cap would need to increase from the current rate of **30%** to more than **80%**.

IMPLICATIONS

The results of the laundry pod case study show that the flexible stand-up pouch has a number of sustainability benefits (fossil fuel usage, carbon impact, water consumption, and municipal solid waste) over the rigid PET container, even when taking the current recycling rate of the rigid PET container into consideration.

FORMAT	FOSSIL FUEL CONSUMPTION (MJ-EQUIV)	GHG EMISSIONS (KG-CO ² EQUIV)	WATER CONSUMPTION (L)	PRODUCT-TO-PACKAGE RATIO (%)	PKG LANDFILLED (G)/1000 KG PODS
STAND-UP FLEXIBLE POUCH 	76.73	3.10	5.00	47.2 : 1 97.9 : 2.1	21,209
RIGID PET CONTAINER 	463.68 (+504%)	25.60 (+726%)	37.98 (+660%)	8.5 : 1 89.4 : 10.6	82,604 (+289%)