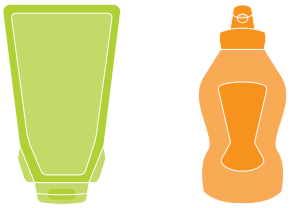
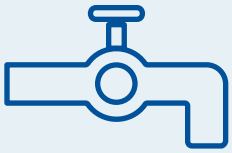
STREAMLINED LIFE CYCLE ASSESSMENT* MUSTARD PACKAGING CASE STUDY

MUSTARD PACKAGE COMPARISON

Mustard is one of the world's oldest condiments and has traditionally been packaged in HDPE bottles or glass jars. This Life Cycle Assessment study with a cradle-to-grave boundary compared the environmental impact of mustard packed in an HDPE bottle to that of a premade STANDCAP Pouch, an award-winning inverted flexible pouch.



STANDCAP POUCH HDPE BOTTLE



WATER CONSUMPTION

It takes less water **(-17.7%)** to produce the premade STANDCAP Pouch than the HDPE bottle, which can be traced to the water-intensive cooling process used in manufacturing rigid plastic.

GREENHOUSE GAS EMISSIONS

The premade STANDCAP Pouch has a much lower GHG emission impact **(-40.7%)** than the HDPE bottle because the pouch uses much less material. And since more material from HDPE bottles end up as municipal solid waste, they have a greater end-of-life impact than the pouch, even though HDPE bottles are recycled at a rate of **31.1%.**

.08726
KG-CO^2 EQUIV

.1472
KG-CO^2 EQUIV

FOSSIL FUEL CONSUMPTION

The premade STANDCAP Pouch uses less fossil fuel **(-45.5%)** compared to the HDPE bottle, which is largely due to the bottle's extra weight — nearly **2x** as much as the pouch — and the additional energy required in the blow molding process.

1.86
MJ-EQUIV

3.41
MJ-EQUIV

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Lightweight. Less Waste. Less Energy Consumption. GLENROY.COM/ECO

*All environmental impact metrics were developed using the streamlined life cycle assessment tool, EcoImpact-COMPASS®

END OF USE SUMMARY

SOURCE REDUCTION BENEFITS

According to the U.S. EPA Waste Hierarchy, the most preferred method for waste management is source reduction and reuse.

A major benefit of flexible packaging is the high product-to-package ratio that it offers.

High product-to-package ratio:

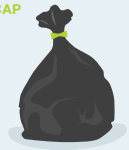
95.3% Product weight | **4.7%** Package weight

Low product-to-package ratio:

91.7% Product weight | **8.3%** Package weight

RECOVERY BENEFITS

STANDCAP POUCH



1x
amount of material ending up as municipal solid waste

While many multi-material flexible packages are not yet recovered and recycled in any significant amount, they still result in an overall reduction in the amount of material sent to landfill versus other types of packaging.

PET BOTTLE

1.3x
amount of material ending up as municipal solid waste

The premade STANDCAP Pouch results in less material landfilled, even though the current pouch is not considered recyclable and the HDPE bottle has a recycling rate of **31.1%.**

IMPLICATIONS

When the premade STANDCAP Pouch and traditional HDPE bottle are used for mustard, the flexible structure will generally have a favorable outcome for fossil fuel and water usage, GHG emissions and material discarded. This is largely driven by the flexible pouch using less material than the rigid bottle, which results in less energy used in manufacturing and transporting of the package materials, among other environmental impacts.

FORMAT	FOSSIL FUEL CONSUMPTION (MJ-EQUIV)	GHG EMISSIONS (KG-CO^2 EQUIV)	WATER CONSUMPTION (L)	PRODUCT-TO-PACKAGE RATIO (%)	PKG LANDFILLED ((G)/1000 KG HONEY)
STANDCAP POUCH	1.86 **(-45.5%)**	.08726 **(-40.7%)**	26.83 **(-17.7%)**	20.3:1 **(95.3%:4.7%)**	49,223 **(-18.8%)**
HDPE BOTTLE	3.41	.1472	32.62	11.1:1	66,397

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For more information and methodologies of assessments, please visit www.flexpack.org or www.glenroy.com to download Glenroy's "A Life Cycle Assessment Comparison for the Glenroy Premade STANDCAP Pouch in the Sauces and Personal Care Market versus Rigid Packaging Options" report and refer to pages 14-17.