

# Centre of Environmental Research

Waste Management,  
Circular Economy and  
Environmental Security

WP 1.D Ecodesign and consumer  
behavior

Environment - Environment for Life  
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**C R** Waste Management, Circular Economy and  
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Republic as part of the Environment for Life Program.

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# **Envisearch – development of an environmental database of packaging and packaging materials**

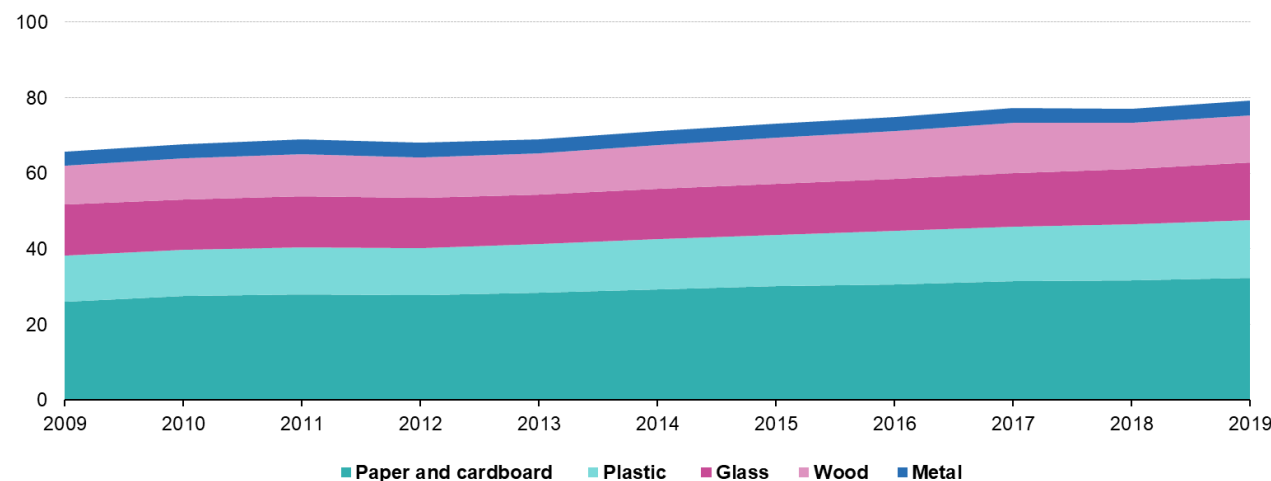
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# Growth of packaging waste

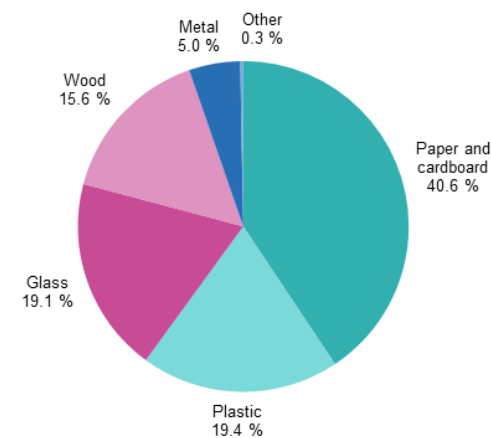
- an increase of 20% (2009 – 2019)

**Packaging waste generated by packaging material, EU, 2009–2019**  
(million tonnes)



Note: Eurostat estimates between 2009 and 2011.  
Source: Eurostat (online data code: env\_waspac)

**Packaging waste generated by packaging material, EU, 2019**  
(%)



Note: Eurostat estimates.  
Source: Eurostat (online data code: env\_waspac)

# Do we need packaging?

## Function

Protection

Manipulation

Information

Marketing

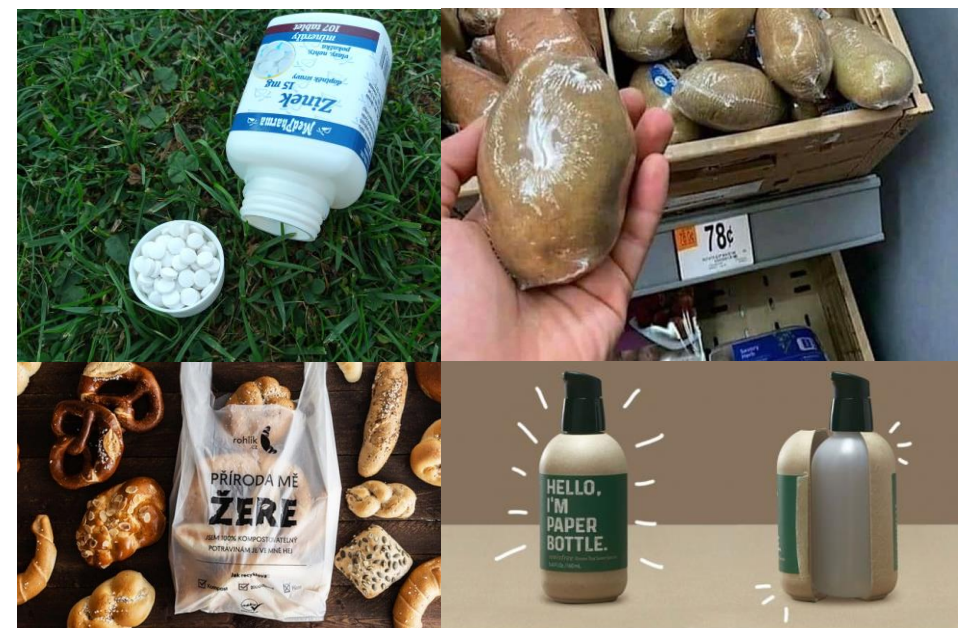
## Problem

Excessive  
packaging

Non-recyclable  
packaging

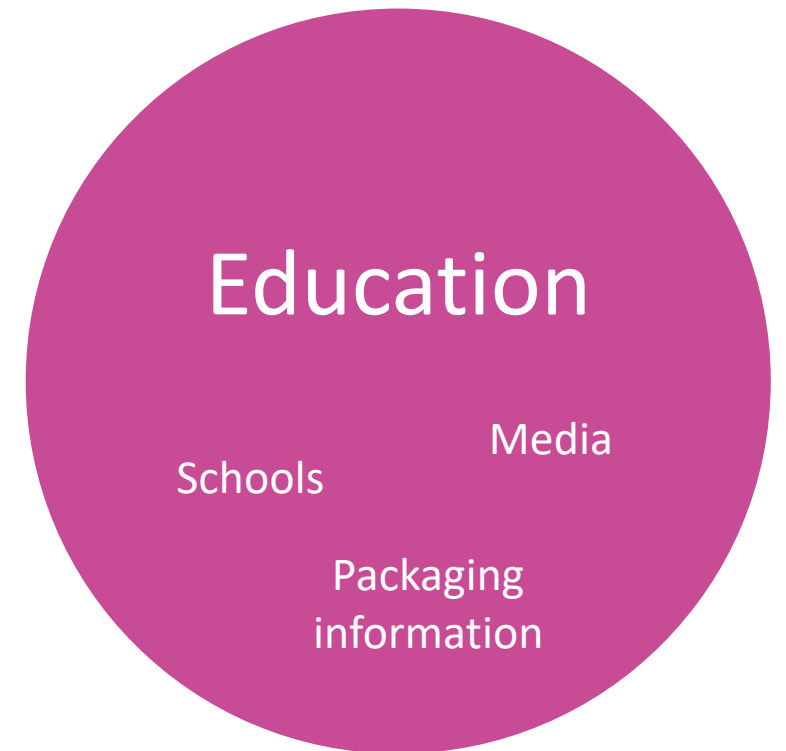
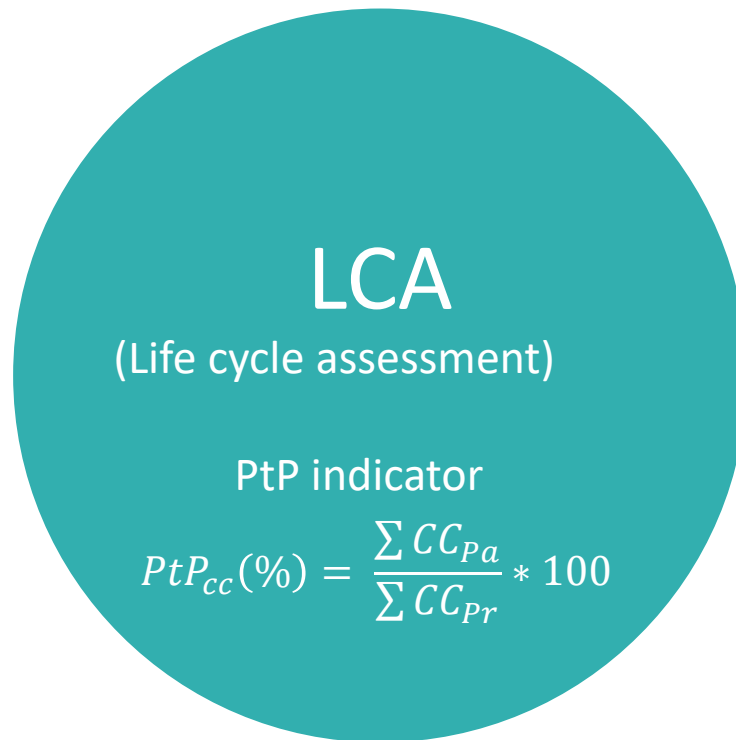
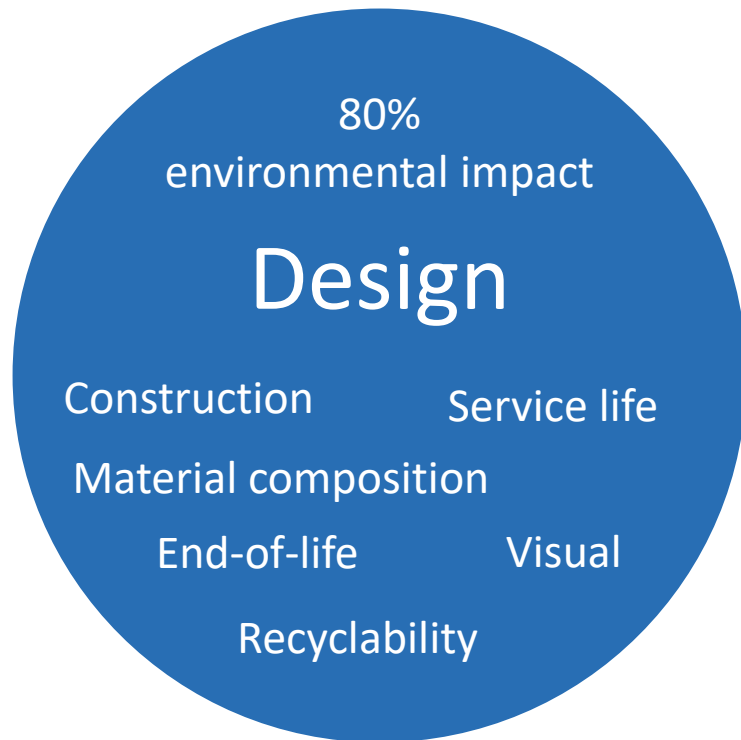
Unnecessary  
packaging

Deceptive  
packaging



<https://bizarobal.zerowasters.cz>

# Solution



# Solution procedure

- Preliminary analysis of packaging in the consumer basket (VUT Brno)
- Two default database designs (guide + product card)
- Presenting of database intent to designers and manufacturers
- Implementation of the database into the web interface
- Development of new database features
- Filling the database with additional packaging
- Life cycle assessment of packaging
- Packaging end-of-life impact assessment

## How does it work?

We will guide you step by step through the database to help you find the best solution for you. The database is designed to find both conventional and unconventional solutions that can inspire you to find new solutions for a sustainable future.

For individual products that have the same function, the impacts in the global warming category are then quantified. You can add individual products to the weighing and compare them with others in your selection.

Are you looking for specific products? Use the "database" tab and use the filters to find what you need.

[FIND SOLUTION](#)[GO TO DATABASE](#)

1)

## Properties of the packaged product

What category does the product you want to pack belong to? Choose one.

FLUID	SOLID	SEMI-SOLID	LOOSE	SKIP
<p>A liquid product is any product that contains even a small amount of liquid</p> <p><b>Examples</b></p> <ul style="list-style-type: none"> <li>• water</li> <li>• pickled camembert</li> <li>• can of tomatoes</li> <li>• kefir milk</li> </ul>	<p>A solid product is one that retains its shape when stored properly</p> <p><b>Examples</b></p> <ul style="list-style-type: none"> <li>• potatoes</li> <li>• chocolate</li> <li>• butter</li> <li>• eggs</li> </ul>	<p>A semi-solid product is a product that does not flow but needs a different packaging solution than a solid product.</p> <p><b>Examples</b></p> <ul style="list-style-type: none"> <li>• cream cheese</li> <li>• margarine</li> <li>• jam</li> <li>• spread</li> </ul>	<p>This category includes a product which is composed of small solids and is loose</p> <p><b>Examples</b></p> <ul style="list-style-type: none"> <li>• cereals</li> <li>• flour</li> <li>• legumes</li> <li>• detergents</li> </ul>	

2)

## Permeability method

What category does the product you want to pack belong to? Choose one.

HERMETICALLY CLOSED	BREATHABLE CLOSED	OPEN	SKIP
<p>It is a container that is impermeable to air and liquids</p> <p><b>Examples</b></p> <ul style="list-style-type: none"> <li>• water</li> <li>• pickled camembert</li> <li>• can of tomatoes</li> <li>• kefir milk</li> </ul>	<p>It is a packaging that allows the packaging to be breathable, but at the same time prevents leakage of the packaged product</p> <p><b>Examples</b></p> <ul style="list-style-type: none"> <li>• potatoes</li> <li>• tomatoes</li> <li>• rice</li> <li>• flour</li> </ul>	<p>Is such a packaging that holds the individual products together, they are mainly boxes, baskets and the like</p> <p><b>Examples</b></p> <ul style="list-style-type: none"> <li>• grapes</li> <li>• strawberry</li> </ul>	

3)

## Volume

What category does the product you want to pack belong to? Choose one.

<200ml	<500ml	<1000ml	>1000ml	SKIP
<p><b>Examples</b></p> <ul style="list-style-type: none"> <li>• anchovies</li> <li>• sun cream</li> <li>• spread</li> <li>• ice coffee</li> </ul>	<p><b>Examples</b></p> <ul style="list-style-type: none"> <li>• beer</li> <li>• pickled camembert</li> <li>• pickles</li> <li>• kefir milk</li> </ul>	<p><b>Examples</b></p> <ul style="list-style-type: none"> <li>• water</li> <li>• ketchup</li> <li>• flour</li> <li>• milk</li> </ul>	<p><b>Examples</b></p> <ul style="list-style-type: none"> <li>• potatoes</li> <li>• pasta</li> <li>• paint color</li> <li>• windshield washer water</li> </ul>	

4)

## Results

Below you can see the products belonging to your chosen category and their impacts in the global warming category. Some may be unsuitable for your solution, but are shown to show alternative, unconventional packaging methods and compare their impacts.

primary fluid hermetically closed <500ml





Materials

Products

parametres

[home](#)
[material](#)
[metals](#)
[aluminium](#)
[sheet 0.5 mm](#)

Price [CZK/Kg]

25,- - 100,-

Weight [Kg/m3]

25Kg - 100Kg

Thickness [mm]

1mm - 100mm

Number of materials

1 - 5

Material category

☐ Plastic  
☒ Metal  
☐ Paper  
☐ Glass  
☐ Wood

Optical properties

☐ Transparent  
☒ Translucent  
☐ Opaque

Surface structure

☐ rough  
☒ soft  
☐ smooth

Forming technology

☐ Injection  
☒ Pressing  
☐ Vacuumed  
☐ Termoforming  
☐ Cutting  
☐ Rolling

Hardness of material

☐ Hard  
☒ Tough  
☒ Flexible  
☐ Fragile

UV protection

☐ full  
☒ partial  
☐ none

Normy ISO, DIN

☐ ISO xxxxx xxxxx  
☒ ISO xxxxx xxxxx  
☐ ISO xxxxx xxxxx  
☐ DIN xxxxx xxxxx  
☒ DIN xxxxx xxxxx  
☐ DIN xxxxx xxxxx

Aluminium

Aluminium sheet is defined as cold-rolled material over 0.2mm thick but not exceeding 6mm thick. Alloy Selection Guide: The wide range of alloys available can be broadly split into two groups, the work hardening alloys and the heat treatable alloys.

Price for Kg (CZK)

242,-

Price for m² (CZK)

394,-

Environmental aspects

Environmental impact (total)

Carbon footprint kg Co2 -eq

Recyclability easy

Environmental product declaration (EPD)

Material composition

Glass	95%
Paper	3%
Metal + HDPE	2%

Properties per m²

Volume	500ml
Weight	200g
Number of materials	3
Material type	Fragile
Product type	Recyclable
Dominant material	Aluminium

Other information

Estimated number of cycles	---
Producer	XXX
Typical secondary packaging	---
Typical tertiary packaging	Europallet

Typical products

Materials

Products

parametres

[home](#)
[product](#)
[primary](#)
[fluid](#)
[hermetically closed](#)
[<500ml](#)

Price [Kč/Kg]

25,- - 100,-

Weight [Kg/m3]

25Kg - 100Kg

Thickness [mm]

1mm - 100mm

Number of materials

1 - 5

Category

☐ Material  
☒ Product (Package)

Connection type

☐ Glued  
☒ Welded  
☐ Pressed  
☐ Removable

Optical properties

☐ Transparent  
☒ Translucent  
☐ Opaque

Cap type

☐ Lockable  
☒ Disposable  
☐ Other

Forming technology

☐ Injection  
☒ Pressing  
☐ Vacuumed  
☐ Termoforming  
☐ Cutting  
☐ Rolling

Use for

☒ Foodstuffs  
☒ Liquids  
☐ Gas  
☐ Chemicals  
☐ Bulk  
☐ Toxic  
☐ Radioactive

UV protection

☐ full  
☒ partial  
☐ none

standards ISO, DIN

☐ ISO xxxxx xxxxx  
☒ ISO xxxxx xxxxx  
☐ ISO xxxxx xxxxx  
☐ DIN xxxxx xxxxx  
☒ DIN xxxxx xxxxx  
☐ DIN xxxxx xxxxx

Glass bottle - 500ml

Description: Here will be short description about glass bottle. This one is typically used for beer.

Price for Kg (CZK)

15,-

Price for Pcs (CZK)

3,-

Environmental aspects

Environmental impact (total)

Carbon footprint kg Co2 -eq

Separability easy

Benchmark/certification

Material composition

Glass	95%
Paper	3%
Metal + HDPE	2%

Properties

Volume	500ml
Weight	200g
Number of materials	3
Material type	Fragile
Product type	Backed up
Dominant material	Glass

Other information

Estimated number of cycles	6x
Producer	Vetropack
Typical secondary packaging	HDPE Crate (20pcs)
Typical tertiary packaging	Europallet (1600pcs)

Variant design

Obaly – Envisearch

← → ↺ 🏠

🔒 https://envisearch.com/kategorie-produktu/database/obaly/ 60% ☆ 🔍 Vyhledat

📄 📄 📄 📄 📄

Envisearch

Databáze ▾ Průvodce Moje oblíbené Moje porovnání O nás Kontakt

Obaly

Kovové produkty

Jednorázové obaly

Cena [Kč]

0 52

Objem [ml]

0 52

Hmotnost [g]

0 52

Typ materiálu

- vyberte typ materiálu ▾

Počet materiálů

2 2

Dominantní materiál

☐ Metal (0)

☐ HDPE (2)

Typ produktu

Jednorázový (3)

Environmentální dopad

0 45673

Uhlíková stopa [CO2 eq.]

0 452

Separability

☐ Dobře (3)

Materiálové složení

☐ Papír (1)

☐ Plech (0)

☐ Polyethylen folie (0)

☐ Karton (0)

☐ Low density polyethylene (LDPE) (1)

☐ Sklo bílé (1)

☐ Hliník (0)

☐ Polyethylentereftalát (PET) (1)

obaly

Lahev skleněná

Stopa: 452 CO<sub>2</sub> eq.

Dopad: 45673

Hmotnost: 0.3 g

Separability: dobře

obaly

Papírový kelímek s víčkem

Stopa: 0.019 CO<sub>2</sub> eq.

Dopad: 0.05

Hmotnost: -

Separability: dobře

obaly




Plastová lahev

Stopa: 354 CO<sub>2</sub> eq.

Dopad: 673

Hmotnost: 0.2 g

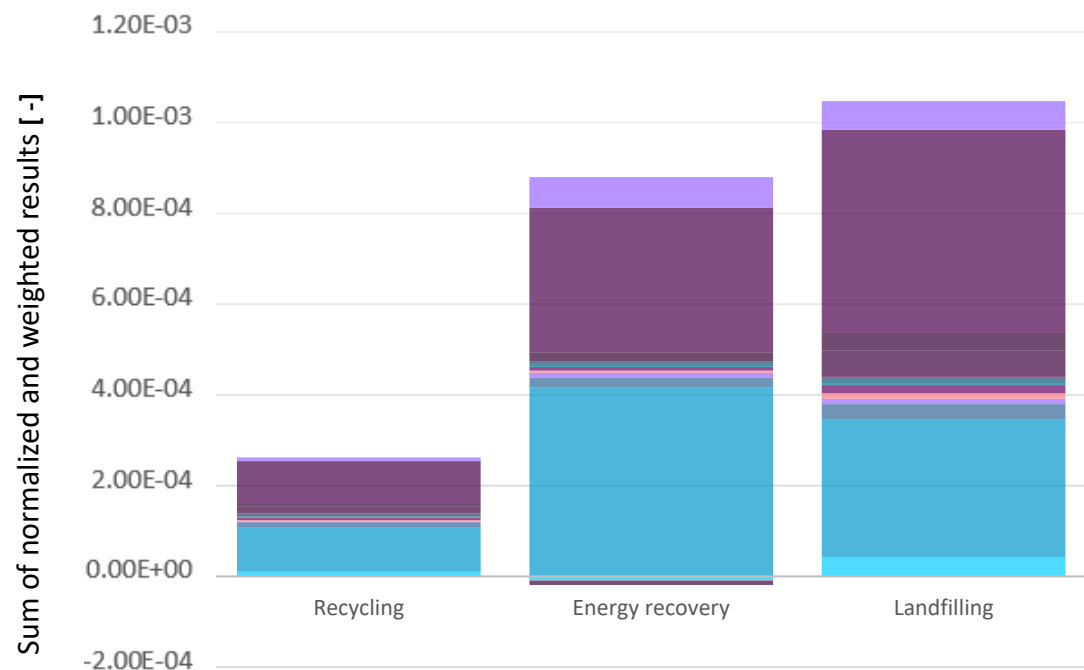
Separability: dobře

	<div>Odstranit ✕</div> 	<div>Odstranit ✕</div> 	<div>Odstranit ✕</div> 
TITLE	Papírový kelímek s víčkem	Plastová lahev	Plechovka
PRICE	8 Kč	52 Kč	123 Kč
DESCRIPTION	Papírový kelímek s papírovým víčkem a folií. Typicky užíván pro balení a přepravu jogurtů a jemu podobných potravin.	Fusce tellus. Nulla accumsan, elit sit amet varius semper, nulla mauris mollis quam, tempor suscipit diam nulla vel leo.	Etiam commodo dui eget wisi. Morbi scelerisque luctus velit. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus.
ENVIRONMENTÁLNÍ DOPAD	0.05	673	45678
UHLÍKOVÁ STOPA [CO2 EQ.]	0.019	354	452
PRODYŠNOST	hermeticky uzavřený	hermeticky uzavřený	hermeticky uzavřený
VLASTNOSTI BALENÉHO PRODUKTU	polopevný	kapalný	kapalný
MATERIÁLY	papír, low density polyethylene (LDPE)	polyethylentereftalát (PET)	hliník
SEPARABILITA	dobře	dobře	dobře
ODHADOVANÝ POČET CYKLŮ	1	1	3

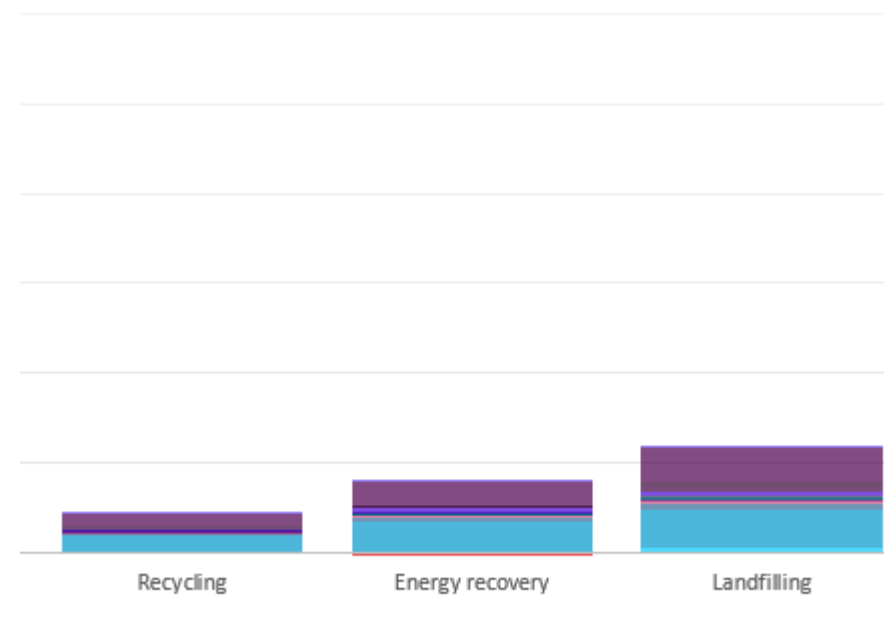
# End-of-life impact

Normalized and weighted results. EF  
3.0

PET bottle + EoL



Composite package for  
yoghurt + EoL



■ Acidification  
 ■ Eutrophication, marine  
 ■ Ionising radiation, human health  
 ■ Photochemical ozone formation, human health  
 ■ Climate Change - total  
 ■ Eutrophication, terrestrial  
 ■ Land Use  
 ■ Resource use, fossils

■ Ecotoxicity, freshwater - total  
 ■ Human toxicity, cancer - total  
 ■ Ozone depletion  
 ■ Resource use, mineral and metals  
 ■ Eutrophication, freshwater  
 ■ Human toxicity, non-cancer - total  
 ■ Particulate matter  
 ■ Water use

# Work plan for 2022 and 2023

The collection of data on primary, secondary and tertiary packaging from manufacturers will continue

Creation of questionnaires for data collection on packaging recycling technologies

Testing the database in the web interface

Development of new features

Filling the database with other packaging



<https://forms.gle/JawtFSA8CjEYbyP89>