

Dairy Packaging Innovation



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Michelle Penlington
National Executive: Marketing and Sustainability



Innovation

[In-uh-vey-shuhn]

“any practice that leverages
creative intervention to respond to an
important challenge”

“Wicked” Problems

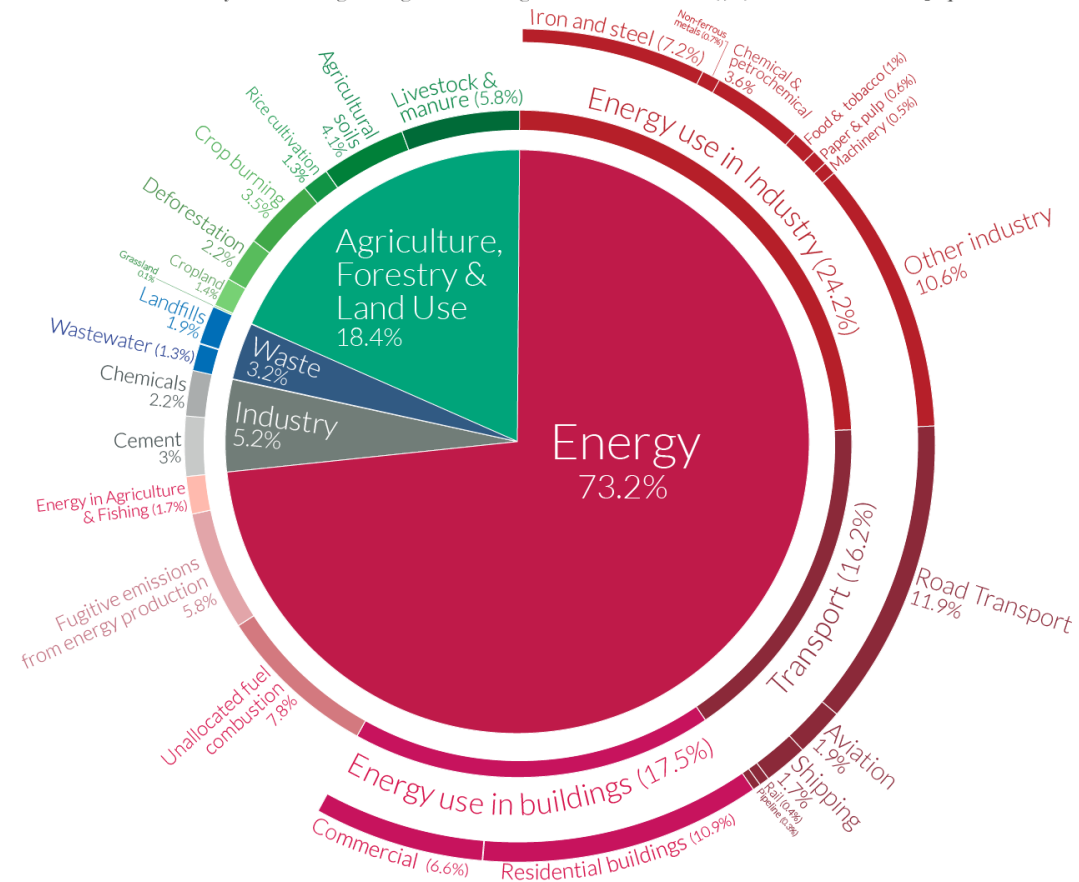


#1 Climate Change

#2 Plastic Pollution

Energy Sector causes ¾ of GHG Emissions

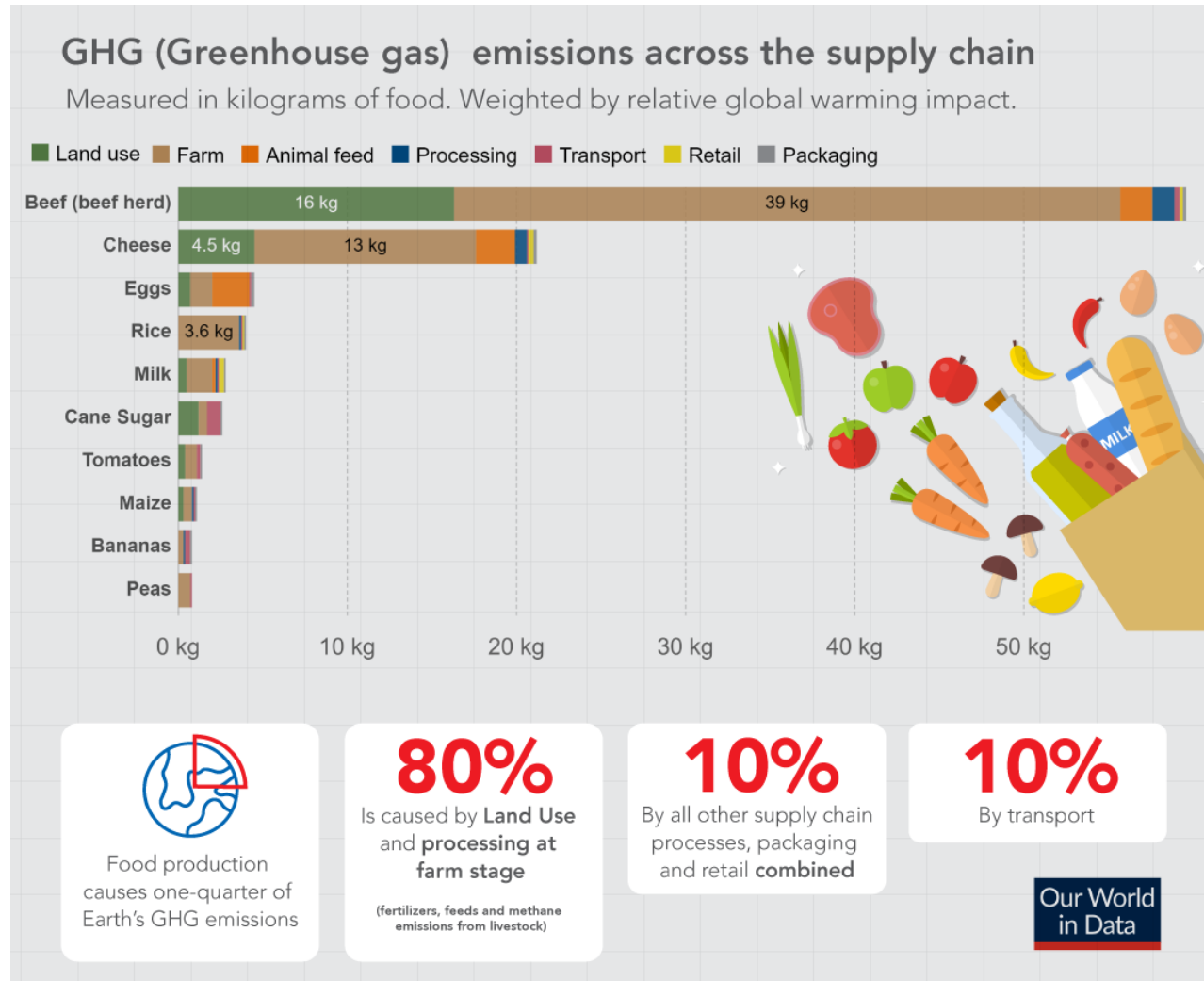
Global greenhouse gas emissions by sector Our World in Data
 This is shown for the year 2016 – global greenhouse gas emissions were 49.4 billion tonnes CO₂eq.



OurWorldinData.org – Research and data to make progress against the world's largest problems.
 Source: Climate Watch, the World Resources Institute (2020). Licensed under CC-BY by the author Hannah Ritchie (2020).

84% of energy is derived from fossil fuels globally

Packaging is a minor GHG contributor



Fresh Produce LCA: Packaging is a minor cause of GHG emissions

A photograph of a power plant with cooling towers and high-voltage power lines against a blue sky. The text is overlaid on the image.

**Eskom is world's top polluter!
Emits more sulphur dioxide than
US + China combined...**

Renewable Energy to Decarbonize

Simplify Supply Chains



A vibrant and crowded street market scene in Africa. The foreground is filled with people, many wearing traditional headwraps and clothing. Several cars are parked or moving slowly through the crowd. In the background, the market extends further with more people and colorful umbrellas. A semi-transparent grey box with white text is overlaid on the upper portion of the image.

25% of Population in Africa
by 2050

Informal Township Economies



humans + the animals we eat



Biomass and Food Security

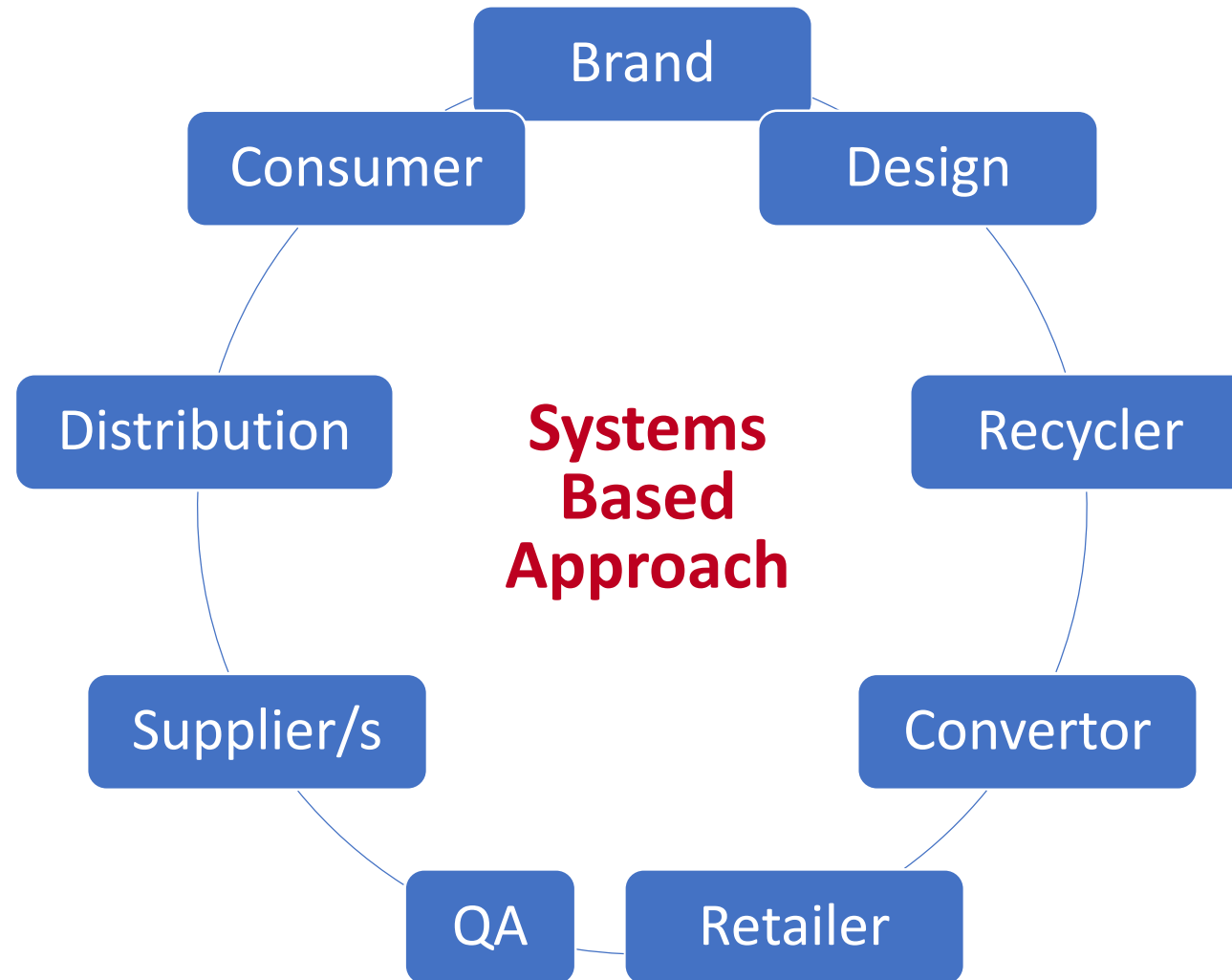


Challenge #1

for Packaging Innovation

Reduce GHG Emissions:
Material Choices, Production Processes
& Distribution Systems

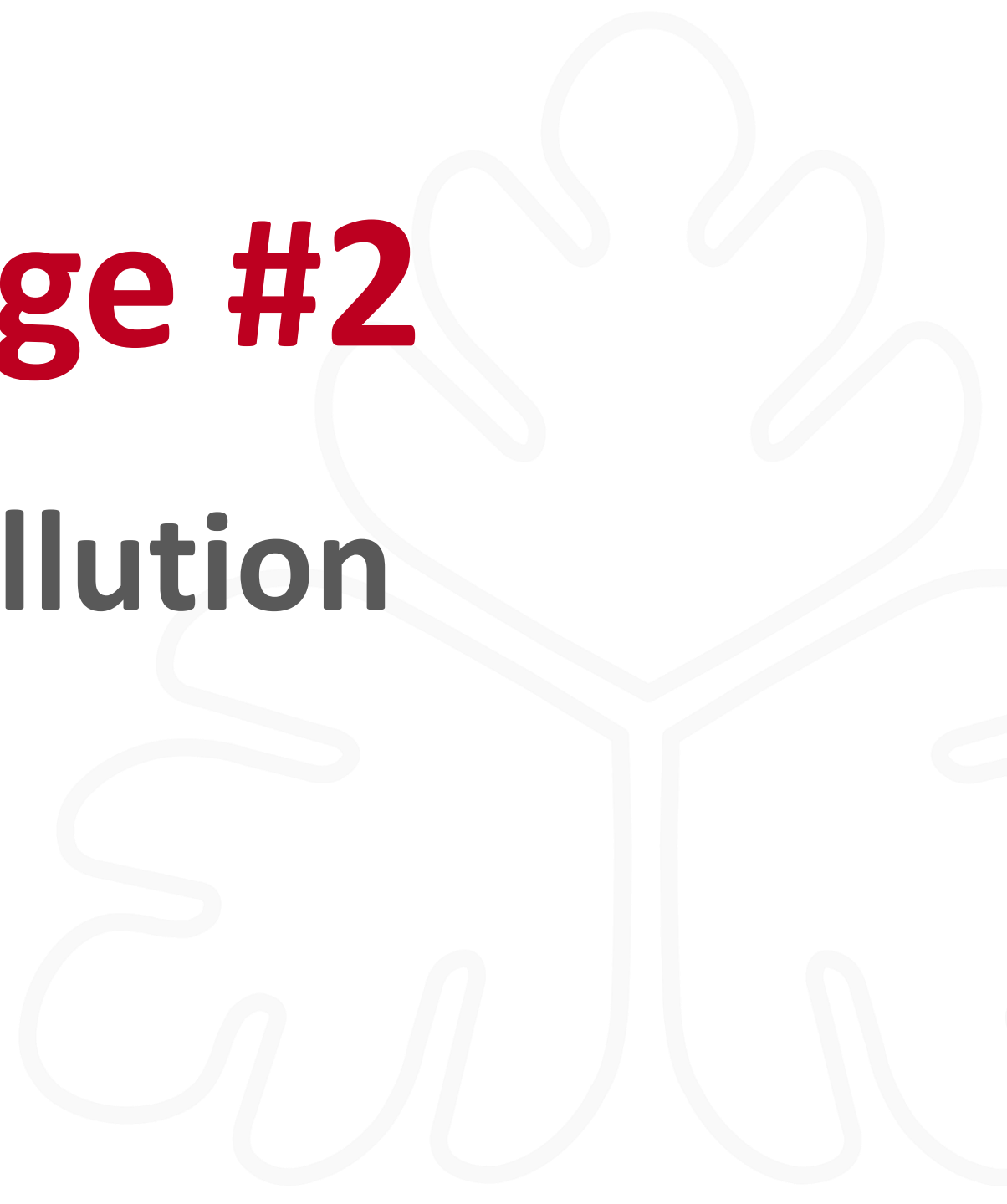
Packaging Innovation Process



New process must adopt a systems based approach

Challenge #2

Plastic Pollution

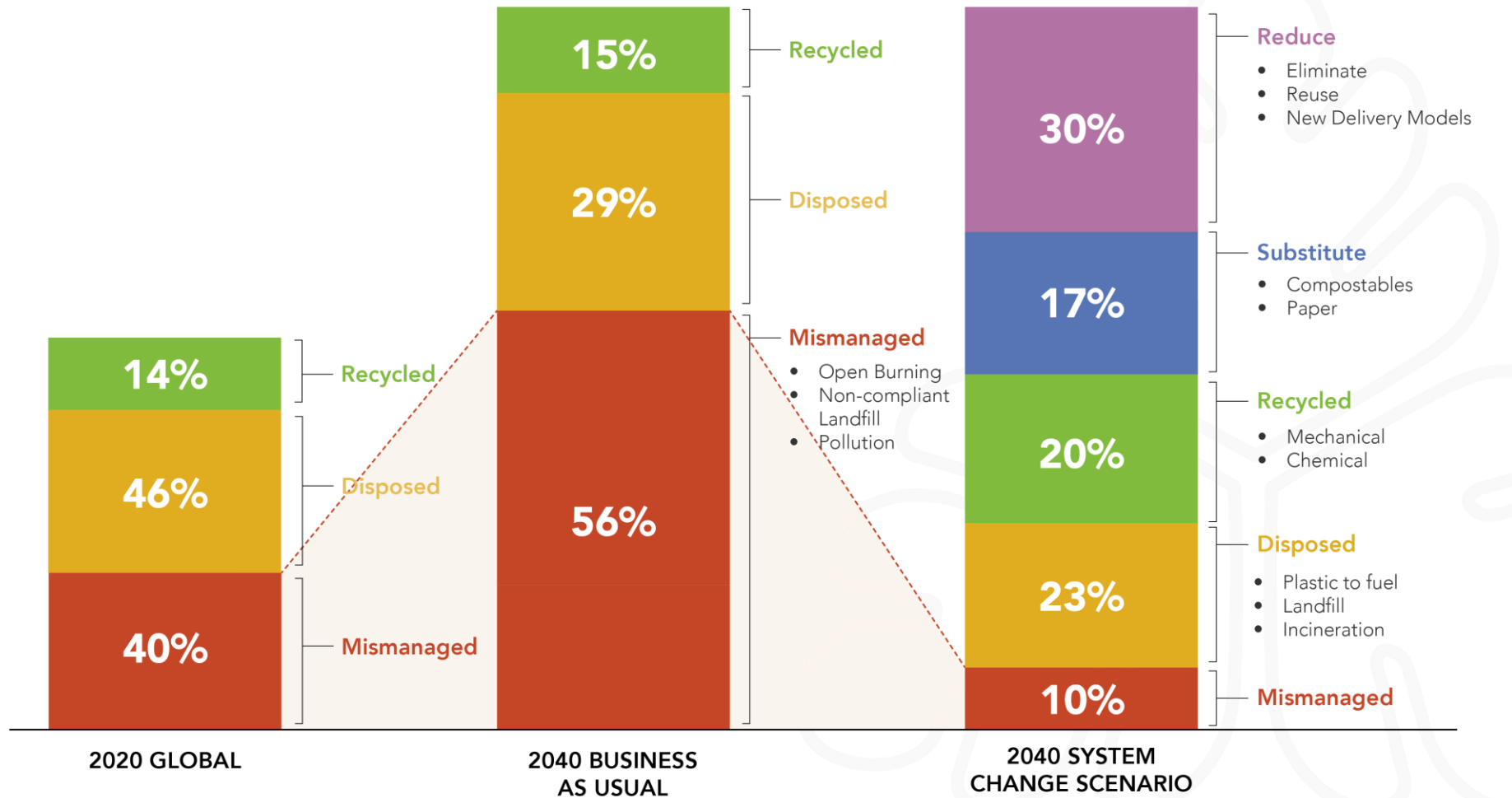


Canary in the Coalmine



Plastic Pollution is an early warning that our system is broken

Systems Change Scenario



Reduce Scenario

- ❖ Modelling excludes “lightweighting” or shifting from rigids to flexibles to retain value
- ❖ “Right weight” to be fit for purpose
- ❖ Essential to prevent plastic nurdles entering waterways



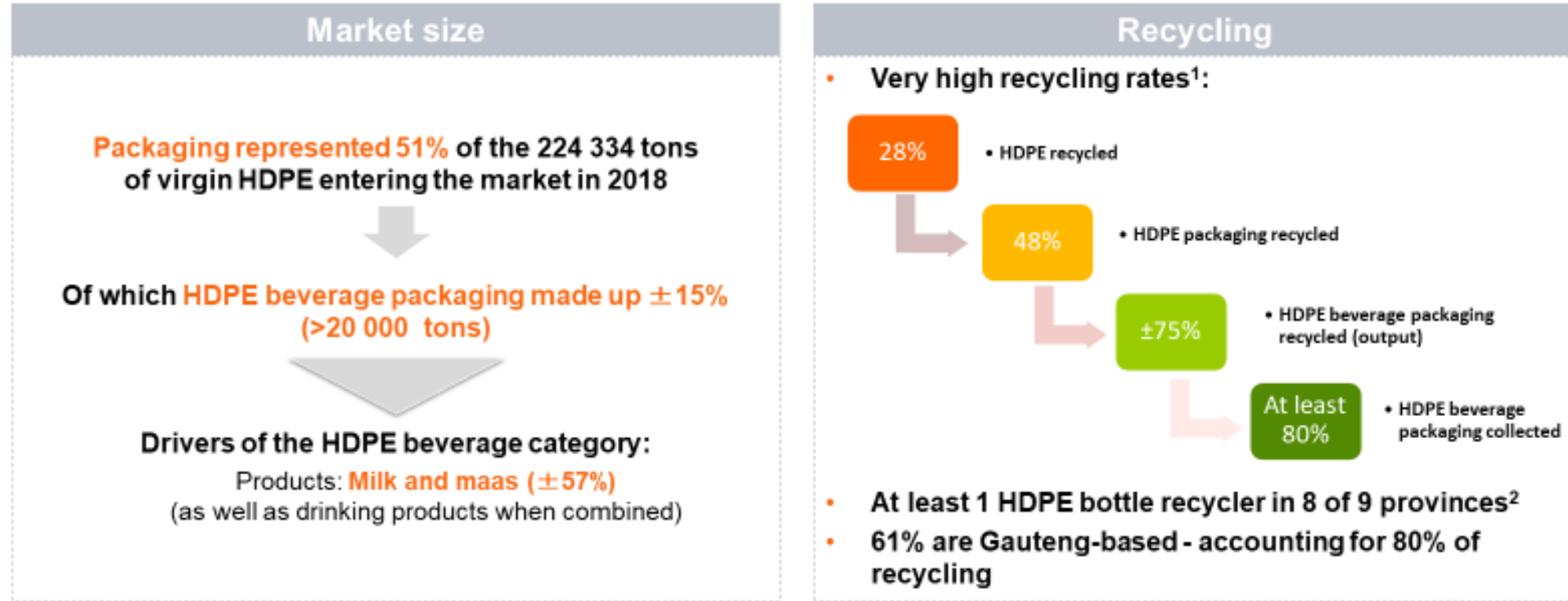
Substitute Scenario

- ❖ Modelling excludes substitution of mono-material plastic rigids with single-use aluminium and aseptic cartons due to potential negative trade-offs in cost, GHG emissions and recycling rates.
- ❖ Focuses on replacing non-recyclable materials.
- ❖ **Mono-material plastic films** are modelled at a **substitution rate of 41%** by 2040, because they comprise over half of plastic entering the ocean today!
- ❖ Conversely, **HDPE and PET dairy packaging** is very well placed with a high recycling rate.



Recycling Scenario

The HDPE beverage packaging market is sizeable and has a very high recycling rate



Of the >20 000 tons of HDPE beverage bottles entering the market, up to 17 500 tons are recycled.



Note: All analysis excludes SI white and translucent HDPE packaging. 1. Detailed surveys with the largest recyclers covered ± 75% of the total HDPE beverage packaging recycled; 2. All provinces except for the Free State.

SA's most recycled milk packaging!

Supporting Data:

± 75% HDPE beverage bottles are recycled
(Source: Moss Group Research: December 2019)

± 60% PET beverage bottles are recycled
(Source: Petco 2019)

± 30% milk sachets (1L) are recycled
(Estimation by dairies and recyclers 2020)

± 11% cartons are recycled
(Source: PAMSA 2019)



Recycling this bottle prevents litter, creates local jobs and supports our economy.

HDPE bottles are recycled into new detergent bottles, piping, furniture, bins and bags.

Why not promote recycling on pack?



Opportunity for on-pack comms to further increase recycling



White and natural HDPE can be upcycled into any colour new bottle so is widely collected for recycling.



Did you know?

- **Bottle closures remain a top 10 litter item**
- **Their small size and light weight make them less likely to be collected for recycling**
- **A waste reclaimer must pick up almost 800 closures to earn a mere R10!**
- **The bottle has a much higher value, which is why 75% are recycled in SA.**
- **Returning the closure to bottle means it will be recycled instead of littered.**



**Together, let's
drive recycling and
help eliminate litter
in South Africa!**

Opportunity for all white HDPE closures with recycling message

Recycling Scenario

- ❖ SA Plastics Pact co-ordinating the roll out of on-pack recycling labelling guidelines (OPRL's) to help consumer recycle
- ❖ This will soon become a requirement under Government's new Extended Producer Responsibility Legislation
- ❖ Packaging must also show the relevant polymer identification codes

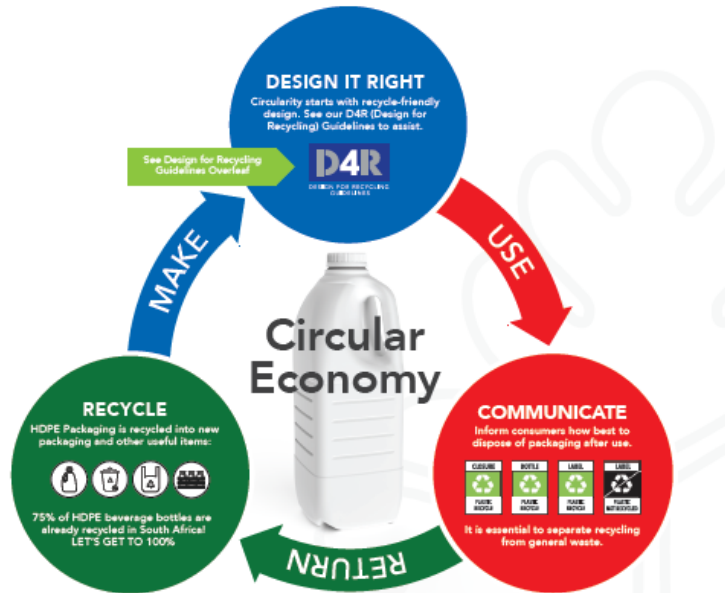


Design for Recycling Guidelines



Circular Economy for HDPE

Let's partner to ensure that our packaging is recyclable and effectively recycled. This will help steer South Africa towards a circular economy where packaging never becomes waste, but rather a valuable resource to make new products, sustain jobs and protect our environment.



For further information please contact our design experts on zerowaste@polyoak.co.za



Design Guidelines

Design for Recycling Guidelines

Follow these guidelines to optimize the recyclability of your packaging to reduce waste to landfill and prevent plastic pollution.

Combining Materials:
The density of High Density Polyethylene (HDPE) is <math><1\text{g/cm}^3</math> (floats in water). To separate the HDPE container from its label/sleeve, the latter must be made from materials with density more than

SHAPE:

- Easy to empty of contents
- Small bottles are less likely to be recycled

COLOURS:
Best Options:

- Natural, white and cream

Caution:
Dark colours can only be recycled into dark products

DECORATION:
Best Options:

- LDPE Stretch Sleeve
- PET label/Shrinksleeve
- Polypropylene label

Caution:

- Direct printing
Note: Heavily inked surfaces darken the recycle
- Adhesives must be water soluble

Avoid:

- PVC labels
- Metalised labels and foils

CLOSURE:
Best Options:

- Made from HDPE, white or natural
- One-piece tamper evident design

Avoid:
Metal and silicon

MATERIAL:
Best Options:

- Pure extrusion grade HDPE or rHDPE (May contain some LDPE or LLDPE)
- Bio-based (plant-derived) HDPE is acceptable as a drop-in material

Avoid:

- Recycled content with Polypropylene (PP) contamination
- Biodegradable plastic as it contaminates the recycling stream

Note: Biodegradable HDPE can not be recycled. Industrial biodegrading facilities do not exist at scale in SA.

ADDITIVES:
Caution:

- Fillers, e.g. CaCO_3 (overall container density to remain less than 1g/cc)

Avoid:

- Oxo-degradable additives

POLYMER IDENTIFICATION CODE:
Must be clearly embossed on the container itself

PE-HD

Note: PIC's have no consumer relevance. They are used by recyclers to identify the material so they know how to recycle it. It does not mean the pack is recyclable.

Design for Recycling Guidelines



Design Guidelines

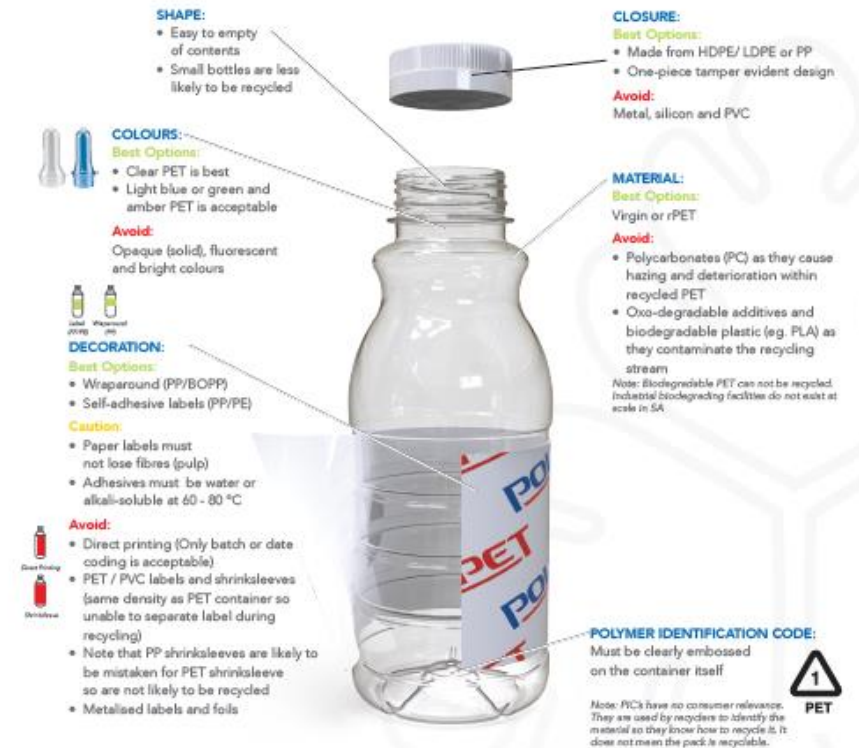
Design for Recycling Guidelines

Follow these guidelines to optimize the recyclability of your packaging to reduce waste to landfill and prevent plastic pollution.

Combining Materials

The density of PET is $>1\text{g/cm}^3$ (sinks in water). Recycling requires separation of the PET container from its closure and label/sleeve. Therefore closures and labels/sleeves must be made from materials with density less than 1g/cm^3 (floats in water), such as Polypropylene (PP) and High/Low Density Polyethylene (HDPE/LDPE).

- ❖ Solid white or cream PET is not recyclable
- ❖ Clear PET is best (can be recycled into new bottles)
- ❖ Avoid PET shrinksleeve on PET bottles (not recycled)



Summary

- ❖ 'Innovation' is about using creativity to solve a **Challenge**
- ❖ Today's biggest challenges are **Climate Change** and **Plastic Pollution**
- ❖ Requires **Innovation Process** to take a systems based approach
- ❖ Dairy is already in a good space
 - ❖ Dairy bottles (HDPE) are the most recycled in SA with potential to increase upward of 75% through on-pack comms & white closures
- ❖ Follow Design for Recycling Guidelines – Opaque (white / cream) PET is not recyclable

It's time Innovation helped solve our biggest challenges, instead of contributing to them.

**If the mission was to
"Save our Planet"
what would you change
on your packaging?**





Thank You

