

# Sustainable Packaging Development



10<sup>th</sup> November 2021

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# Innovation

[ In-uh-vey-shuhn ]

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

# “Wicked” Challenges

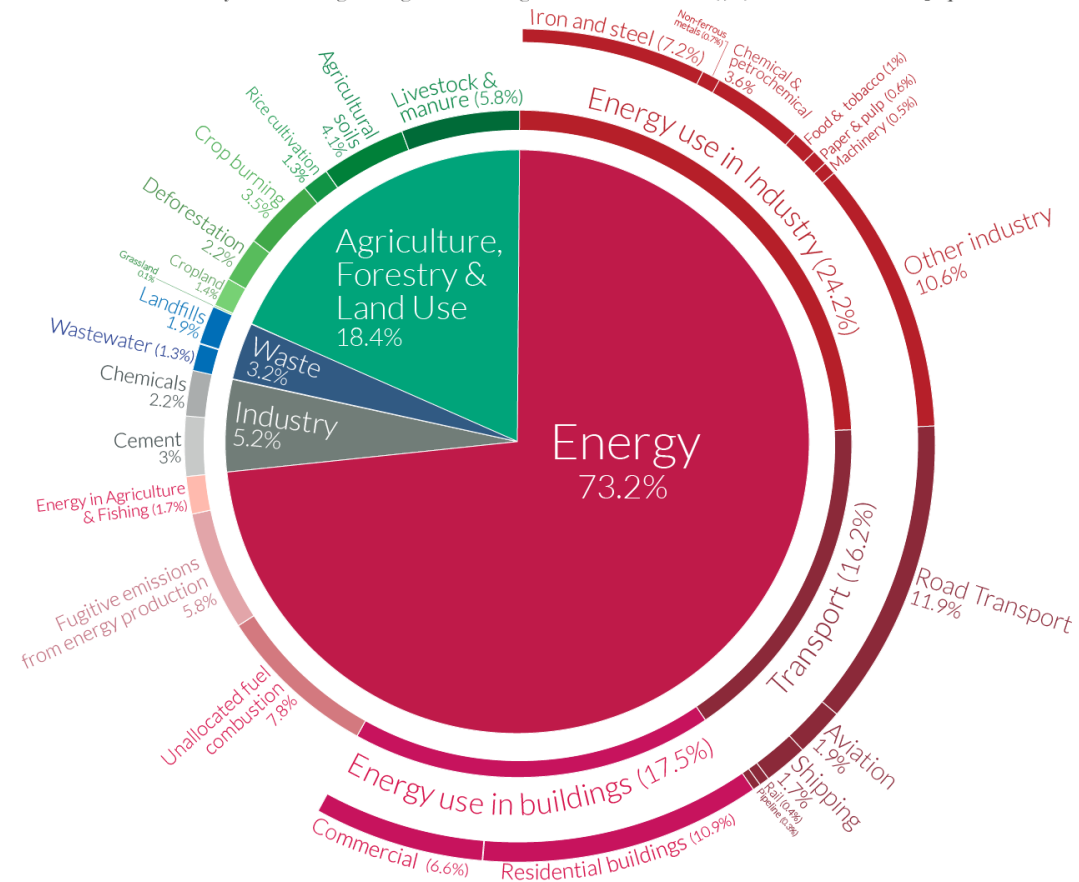


#1 Climate Change

#2 Plastic Pollution

# Energy Sector causes ¾ of GHG Emissions

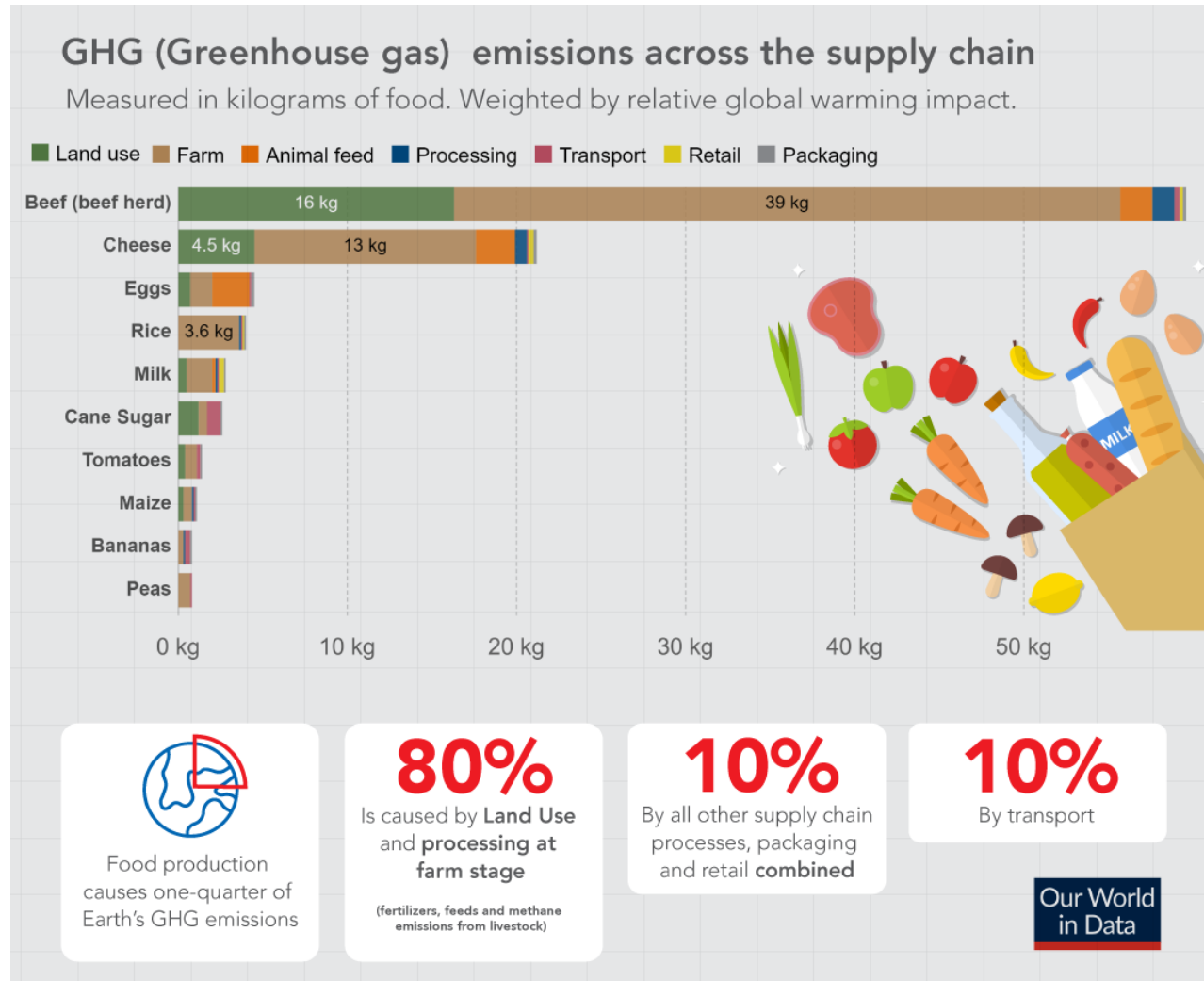
Global greenhouse gas emissions by sector Our World in Data  
 This is shown for the year 2016 – global greenhouse gas emissions were 49.4 billion tonnes CO<sub>2</sub>eq.



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



**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 is overlaid on the upper portion of the image, containing white text.

25% of Population in Africa  
by 2050

# Informal Township Economies





94% of mammals are humans and  
the animals we eat

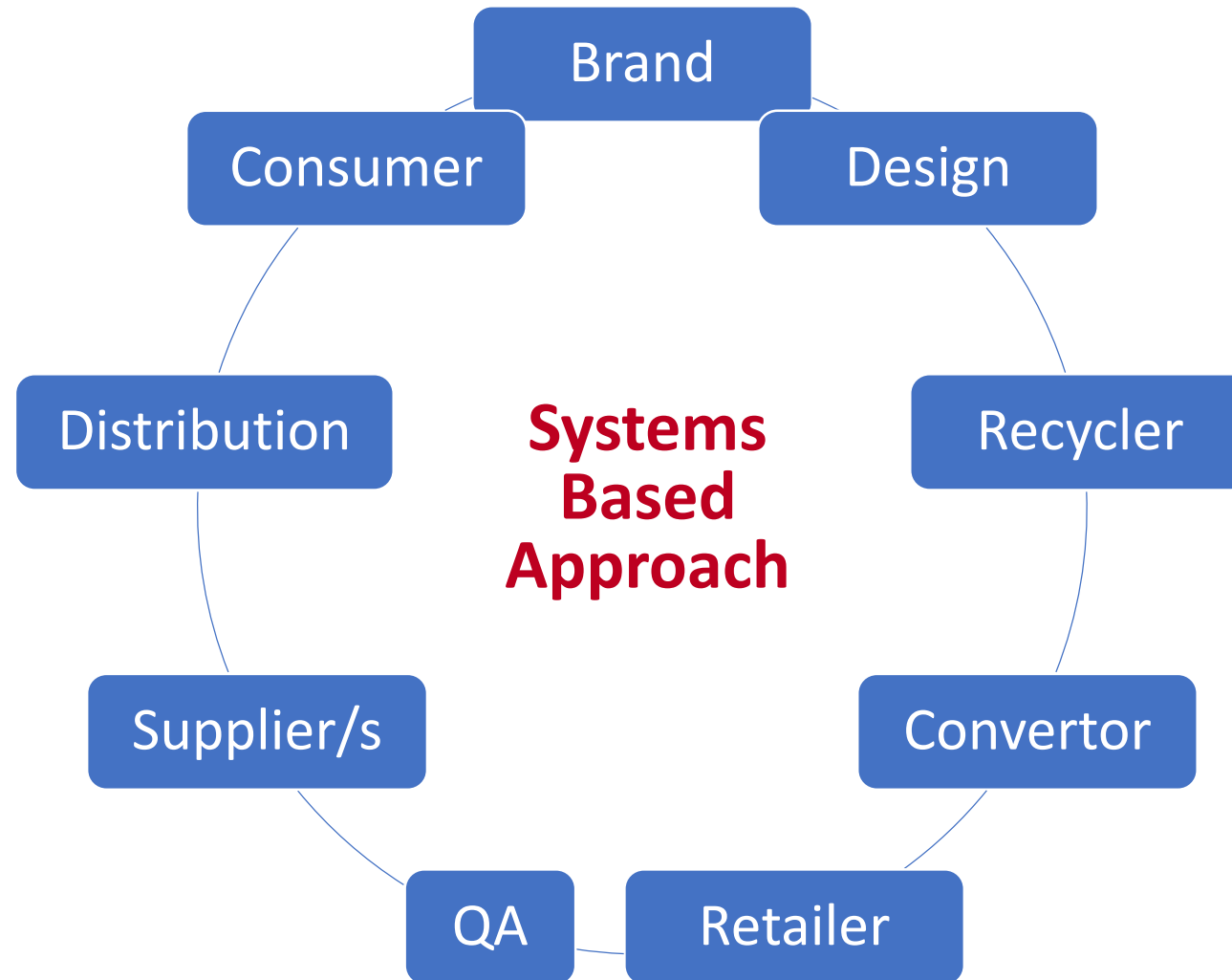
# Biomass and Food Security

# Challenge #1

## for Packaging Innovation

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

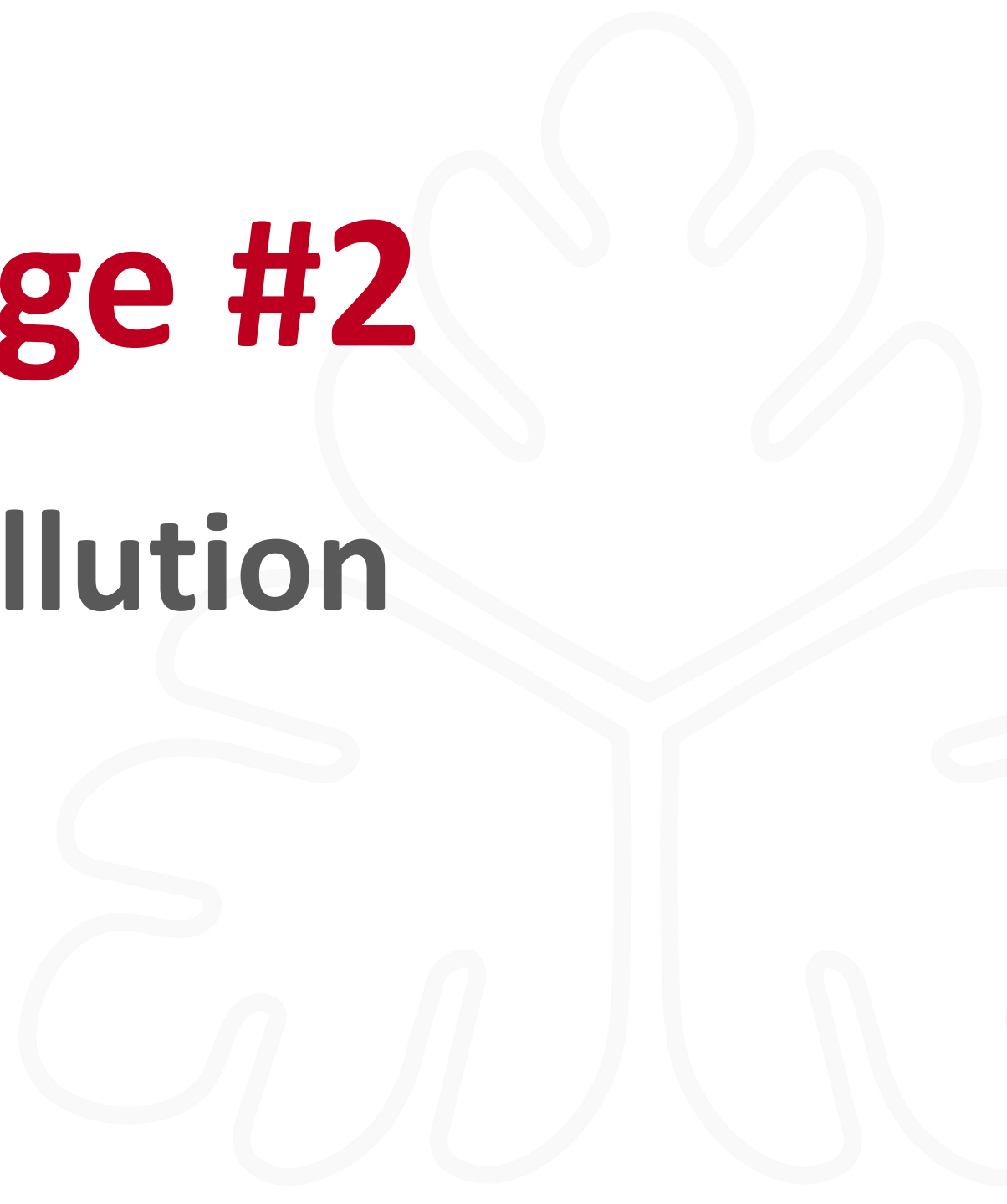
# Packaging Innovation Process



New process must adopt a systems based approach

# Challenge #2

## Plastic Pollution



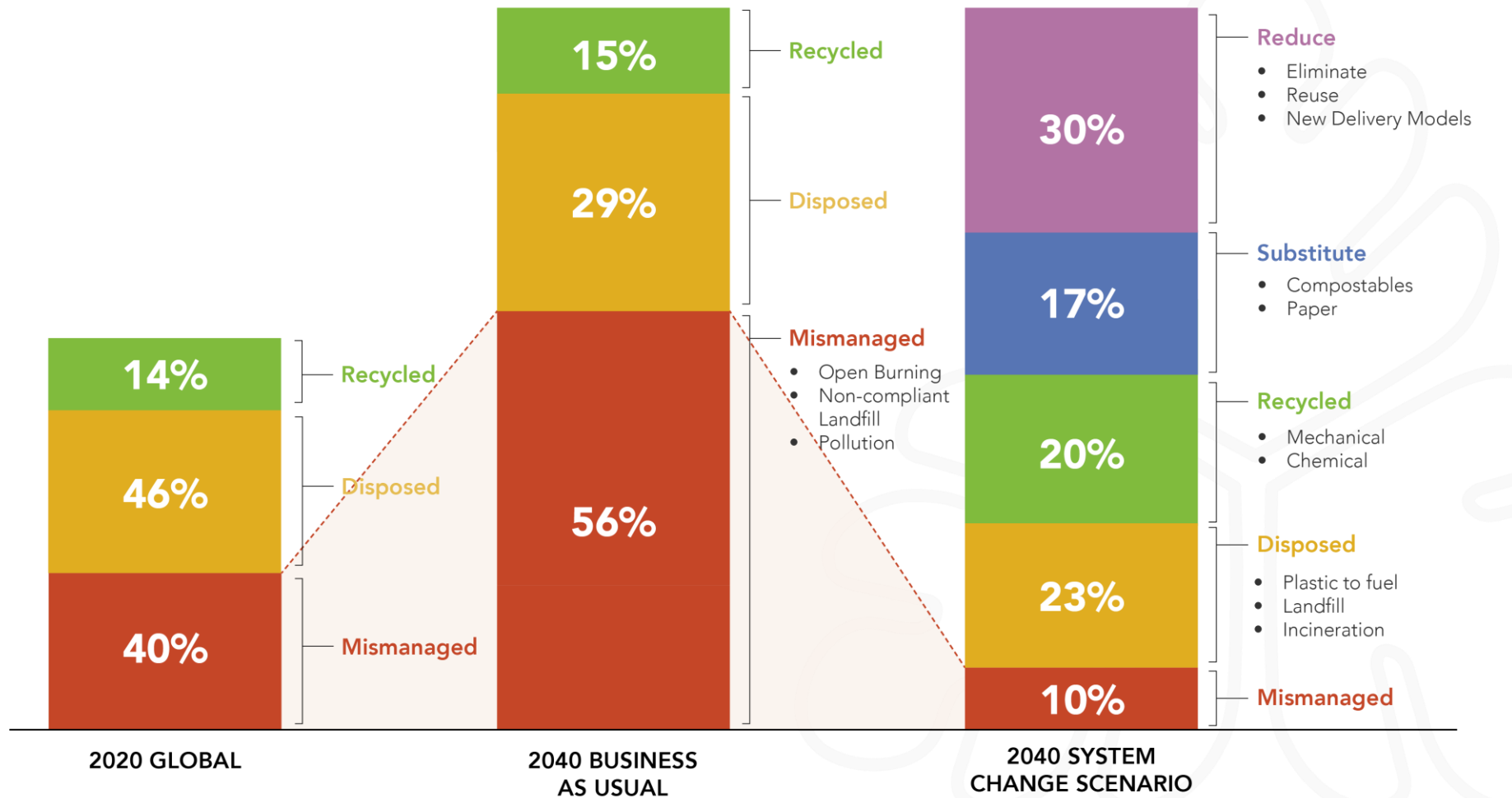
# Canary in the Coalmine



Plastic Pollution is an early warning that our system is broken



# Systems Change Scenario



Source: Breaking the Plastic Wave Report, PEW & SYSTEMIQ, 2020

# 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

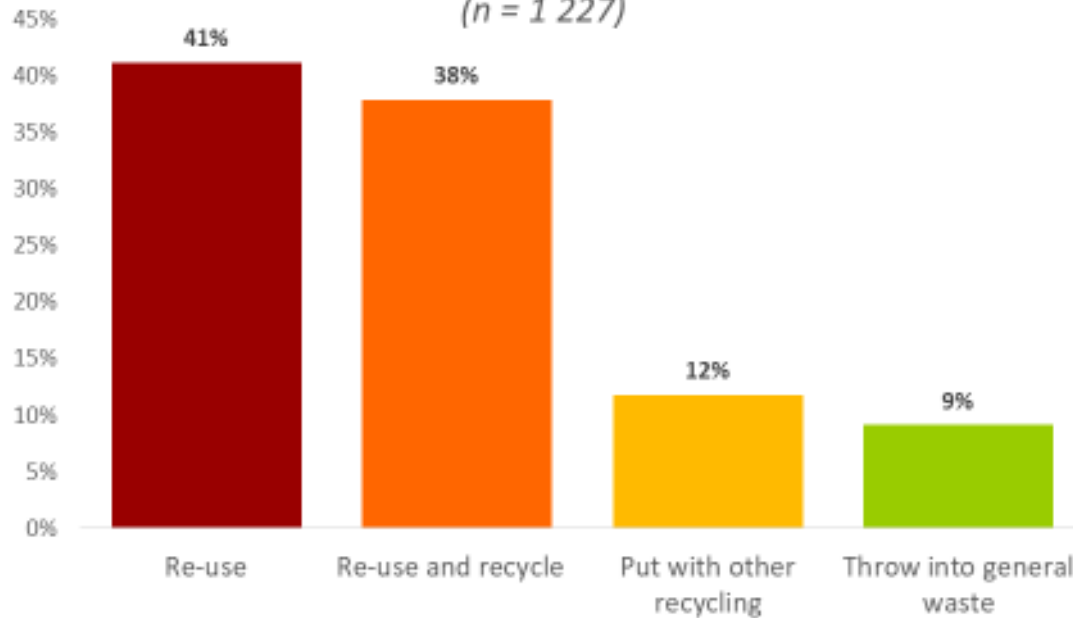




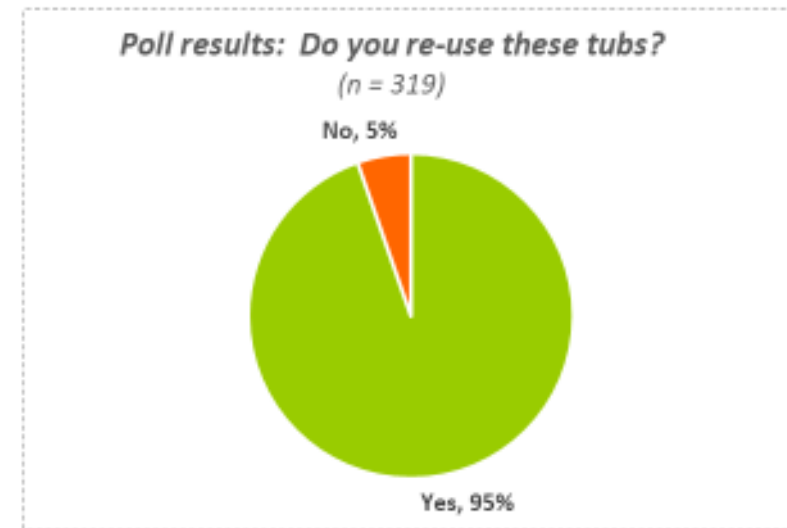
# Reuse Scenario

**Almost 80% of survey respondents claim to re-use tubs, while 95% of poll respondents claim the same**

*Post consumption behaviour – Survey Results  
(n = 1 227)*



*Poll results: Do you re-use these tubs?  
(n = 319)*



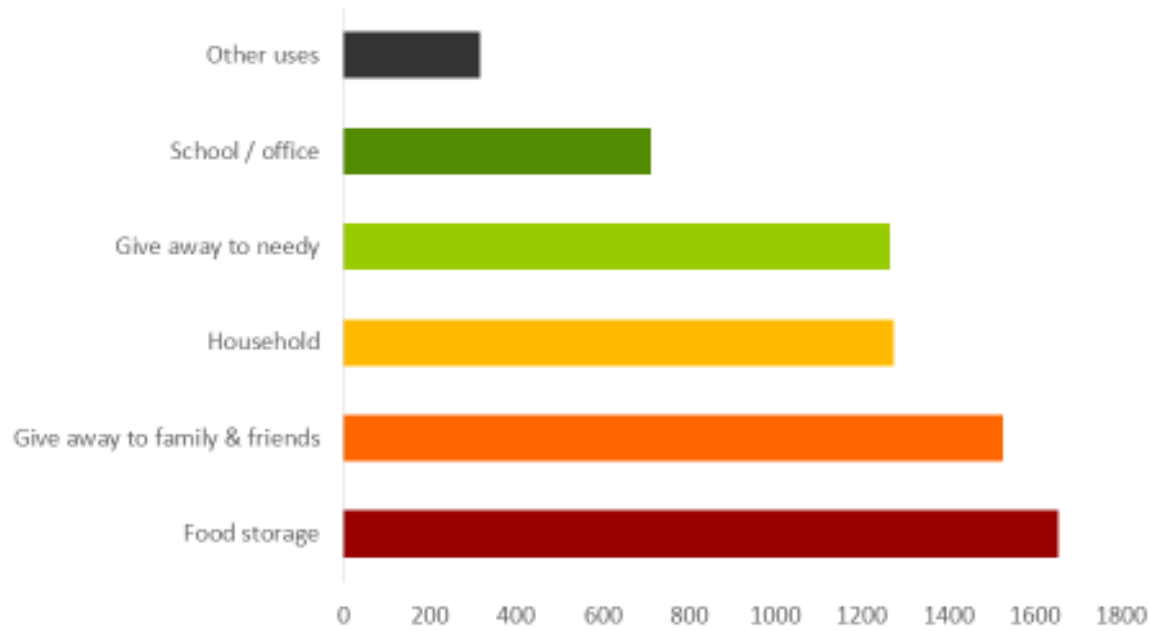
***This validates our hypothesis that these tubs are extensively re-used.***

Source: Survey and social media poll responses.

# Reuse Scenario

There are many uses for tubs, although food storage seems to be the main application

What do you re-use ice-cream, margarine/butter and big yoghurt tubs for?



Other ideas / mentions<sup>1</sup>

Ice Crafts  
 Personal care  
 Plants  
 Toys  
 Pet food  
 Money  
 Memories  
 Decor  
 Gifting  
 Food prep

**In all cases, tubs are not being used to store the original contents again, but rather are being 're-purposed'.**

Sources: Surveys.1. Youth survey (<18 years)

# Reuse Scenario

Consumers provided many ways they find tubs useful

Survey / interviews responses included:

Personal hygiene & beauty  
(soap, toothbrush & paste,  
home remedies, water for  
hands & face wash, make-  
up, jewelry)

Medicine  
storage

Garden  
(compost holder, planters)

Toy  
storage

Craft storage  
(turps, paint, dye, cleaning  
fluid for brushes, water)

Material for crafting  
& for gifting

Pets  
(‘cat poop disposal’, food  
and water dish)

Other  
(ice storage; tea bags to  
make fire lighters)



Source: Survey responses. 1. Photos provided by main market consumers that were interviewed face to face in KZN and GP.

# Reuse Scenario

Follow up calls and social media engagement confirmed some of the 'other' applications<sup>1</sup>

**Plants, seedlings & succulents**  
(all income groups)



Carol – high income



Lee – mid income



Louise – low income

**Pet food**  
(low & high-income)



Yolande – low income



Louise – low income

**Arts & crafts**  
(mid- & low-income)



Dorothy – low income



Louise – low income

**Others mentioned in telephonic interviews:**

- Coffee grinds for garden compost (mid income)
- Hair accessories (mid income)
- Sewing supplies (mid income)
- Gifting (low income)

Those who engaged on the Facebook post also provided other ways these tubs are being re-used:

"As materials for arts and crafts"

"Filled with water at door to clean shoes"

"For my seedlings"

"I give it schools"



1. Household storage, food storage, school / office, give food away to family, friends, needy.

# Reuse Scenario

South Africans who frequent soup kitchens use tubs, along with various other forms of containers to hold food

Products used include:

- "Tupperware"
- Plastic plates (e.g. from Mambos)
- Polystyrene cups
- Mugs
- **Empty plastic tubs** →

"Too expensive to buy and supply as people take them away with them"

- Yoghurt tubs (500ml, 1l)
- Ice cream tubs (1.5, 2l)
- Marg/butter tubs (500 g) – brands seen often: Rama, D'Lite & Flora
- Feta tubs also commonly seen

Sources:

- Corporate donations (e.g. SPAR and PnP)
- Public collection and drop off (where lids are often a requirement)
- Bring their own

Feeding in Action (Stellenbosch)



Meals on Wheels<sup>1</sup>



The Service Dining Rooms (Zonnebloem, CT)



1. Photo sent from a consumer - evidence that Meals on Wheels & other similar organizations are also likely to be significant re-users of the products in scope

# Substitute Scenario

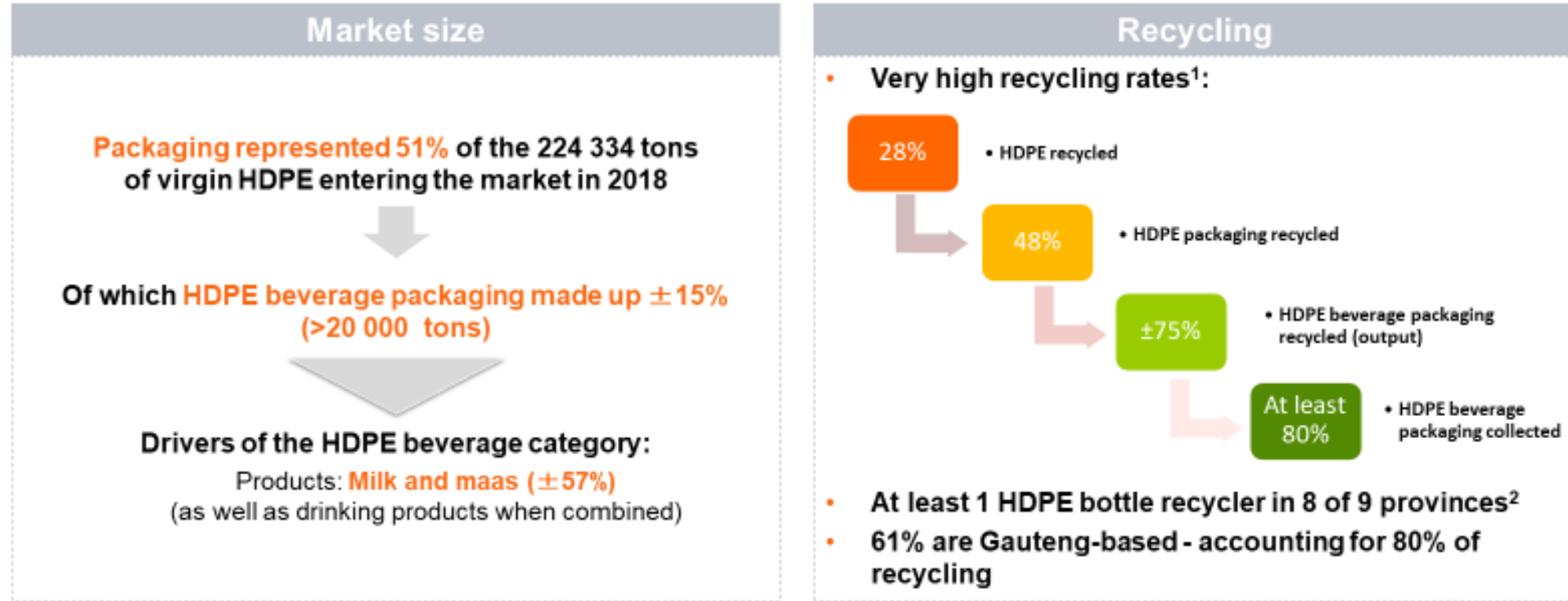
- ❖ Modelling excludes substitution of mono-material plastic rigids with single-use aluminium and aseptic cartons due to potential negative trade-offs in cost, GHG emissions and recycling rates.
- ❖ Focuses on replacing non-recyclable materials.
- ❖ **Mono-material plastic films** are modelled at a **substitution 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 become a requirement under the EPR (Extended Producer Responsibility) Legislation that went live on 5<sup>th</sup> November 2021
- ❖ Packaging must also show the relevant polymer identification codes

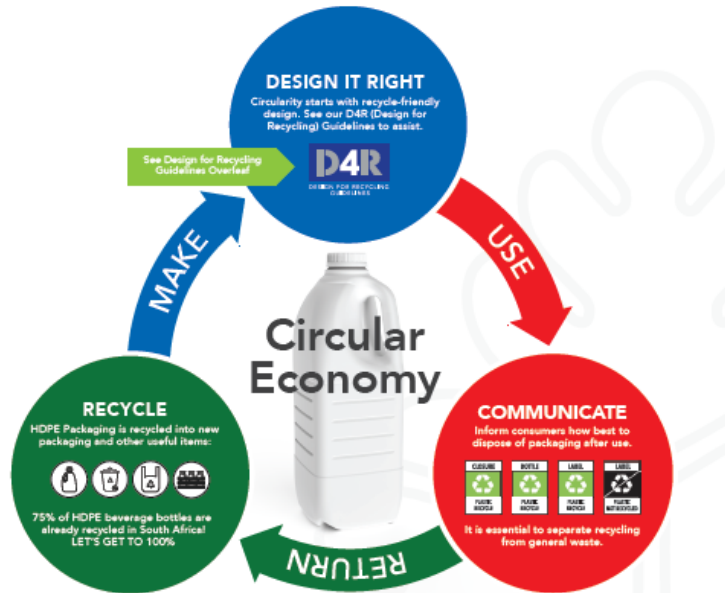


# Design for Recycling Guidelines



## 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](mailto: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

**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.  $\text{CaCO}_3$  (overall container density to remain less than  $1\text{g/cc}$ )

**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.

**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

# Design for Recycling Guidelines



## Design Guidelines

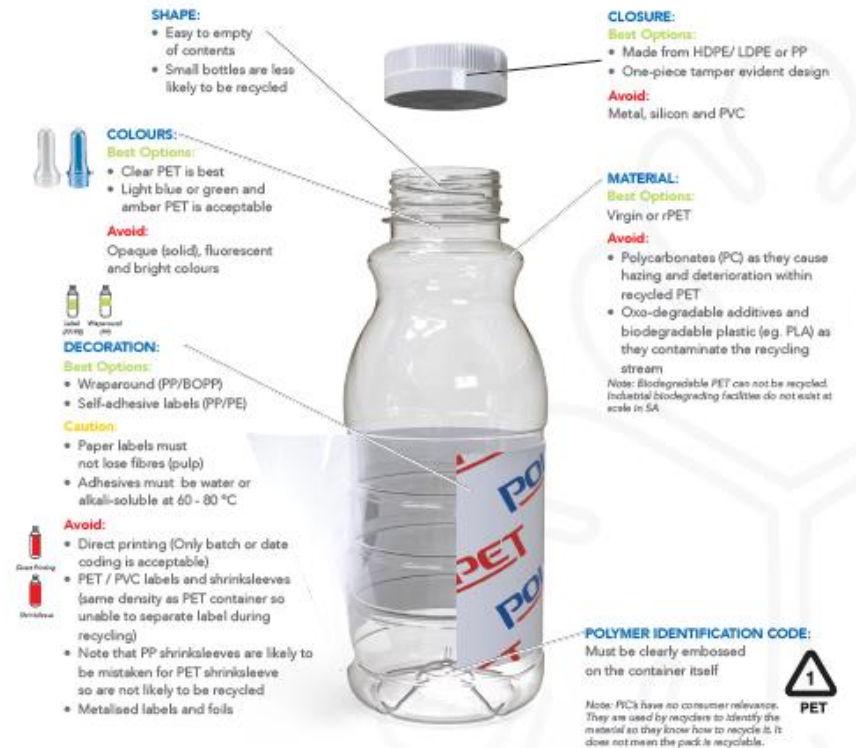
### Design for Recycling Guidelines

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  $1\text{g/cm}^3$  (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 tub packaging (PP) has a high reuse (repurpose) value
- ❖ Dairy bottles (HDPE) are the most recycled
  - ❖ Explore ways to increase from current 75% recycled rate (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.**



**Thank You**

