

Plastics | SA

# Circular City Labs Textbook

*A digital guide to building a sustainable circular economy through reusable plastics, innovation, and inclusive collaboration in South Africa.*



Circular City Labs  
Testing Reusable Packaging Systems in Cities



Implemented by





# Introduction

This digital textbook contains consolidated training materials, based on the Accelerator programme training sessions that formed part of the *Circular City Labs: 'Testing Reusable Packaging Systems'* project.

The purpose of this textbook is to capture and consolidate lessons learned through the project's implementation to reach a wider audience along the circular economy value chain.







# Project Background

The *Circular City Labs: ‘Testing Reusable Packaging Systems’* project was commissioned by the *German Federal Ministry for Economic Cooperation and Development (BMZ)* and funded through the *BMZ Initiative for Climate and Environmental Protection (IKU)*.

The project aimed to reduce greenhouse gas emissions through waste prevention, test reusable packaging systems, and strengthen women’s participation in local circular economies.

Implemented by *GIZ* in partnership with *Plastics SA*, the project selected *Gcwalisa* as its pilot partner. In addition, three other businesses from the proposal pool were invited to join an accelerator programme designed to build their capacity in circular economy practices, reuse systems, and gender inclusion.





# Piloting Partner

**Gcwalisa**, a grocery outlet in Alexandra township, Johannesburg, operates on a weigh-and-pay model that enables customers to buy only what they need, helping to reduce the ‘poverty tax’ often faced by low-income households unable to buy in bulk.

During the pilot phase, **Gcwalisa** introduced reusable plastic packaging fitted with QR barcodes to track return cycles, replacing single-use packaging and promoting circular economy practices. The initiative also created jobs for 4 women through reuse ambassadors who engaged customers and raised awareness; two of the women were retained after the pilot.

With an average return rate of 35%, the project demonstrated strong community participation and delivered both environmental and socio-economic benefits, successfully meeting its intended objectives.

[www.gcwalisa.com](http://www.gcwalisa.com)





# Accelerator Programme

The **ACEN** study on scaling packaging reuse models in South Africa highlighted key challenges faced by reuse initiatives, including limited access to financing, difficulties in adapting supply chains for reuse, and the absence of clear health and safety standards.

Recommended interventions included collaborative learning, innovative funding mechanisms, stronger supply chain partnerships, and the development of operating standards for reuse models.

In response, the accelerator programme, implemented by **GIZ** and **Plastics SA**, was designed to address these barriers by providing targeted training and mentorship to selected businesses such as **Gcwalisa**, **Shix Mineral Ice**, **Reusify**, and **Smartfill**, strengthening their capacity to implement and scale circular packaging solutions across South Africa.

Read more about the [ACEN](#) study.



*Reference: Barnes, K. and Gihring, K. (2025). Scaling reuse-refill in South Africa: Learnings from local experience. African Circular Economy Network (ACEN) for Circular City Labs South Africa, GIZ, and Plastics SA.*



# **Chapter 1**

# **Economic & environmental impact of reuse**



## Introduction

### *François Chartier-Kastler*

François co-created the consulting firm InOff Plastic and the platform Planet Reuse.

For the last 5 years, he has supported retailers, food & beverage producers as well as hospitality companies to deplastify their activity through the adoption of upstream solutions (reuse & refillable packaging, single-use non plastic packaging, selling in bulk).

François is based in France and, in 2024, published the first edition of the European Reuse Barometer: based on the interview of 90 reuse solutions throughout Europe to highlight the maturity of the reuse industry in Europe.







# ECONOMIC AND ENVIRONMENTAL IMPACT OF REUSE

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GIZ Circularity Lab, April 2025



# WHO AM I?



**François Chartier-Kastler**



**Co-founder and Managing Director**

InOff Plastic is a consulting firm. We support companies to deplastify their activity through the adoption of upstream solutions (reuse & refillable packaging, single-use non plastic packaging, selling in bulk)



**PLANET REUSE**  
Platform & Network for Reusable Packaging

**Co-founder, Funding & Outreach**

Planet Reuse is the first European online platform and network bringing together professionals to connect, learn and collaborate on the topic of reuse and reusable packaging solutions.



# THE EUROPEAN REUSE BAROMETER 2024 EDITION



## – Scope –

Environmental, economic and social impacts

### QUALITATIVE INDICATORS

- Sectors in which the solutions operate.
- Creation year
- ...

### QUANTITATIVE INDICATORS

#### Economic:

- Average return rate and retention time.
- Existence of financial incentives.
- Share of profitable solutions.
- Share of solutions having raised funding.
- ...



# 90

**TOTAL NUMBER OF SOLUTIONS  
CONSIDERED FOR THE FIRST VERSION  
OF THE REUSE BAROMETER.**

new loop

Re-uz  
LESS IS NOW

REMPIL'

MY COFFEE  
CUP

LA CONSIGNE  
HAVRAISE

ZW  
BF

ibbeo  
BB  
COSMETIQUES

ALPES  
CONSIGNE

J'AIME  
MES  
BOUTEILLES  
CONSIGNE POUR  
RÉEMPLOI

Hipli

Boox

TOPSY  
RING

sykell | EINFACH  
MEHRWEG

BOÎTES  
NOMADES

Bleu!

Bako  
Consignez-vous !

scofût

zero00  
DAS MEHRWEGSYSTEM  
FÜR KOSMETIK & DROGERIE

RE-ZIP

POPOPO



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# **INTRODUCTION TO PACKAGING STAKES & OPPORTUNITIES**

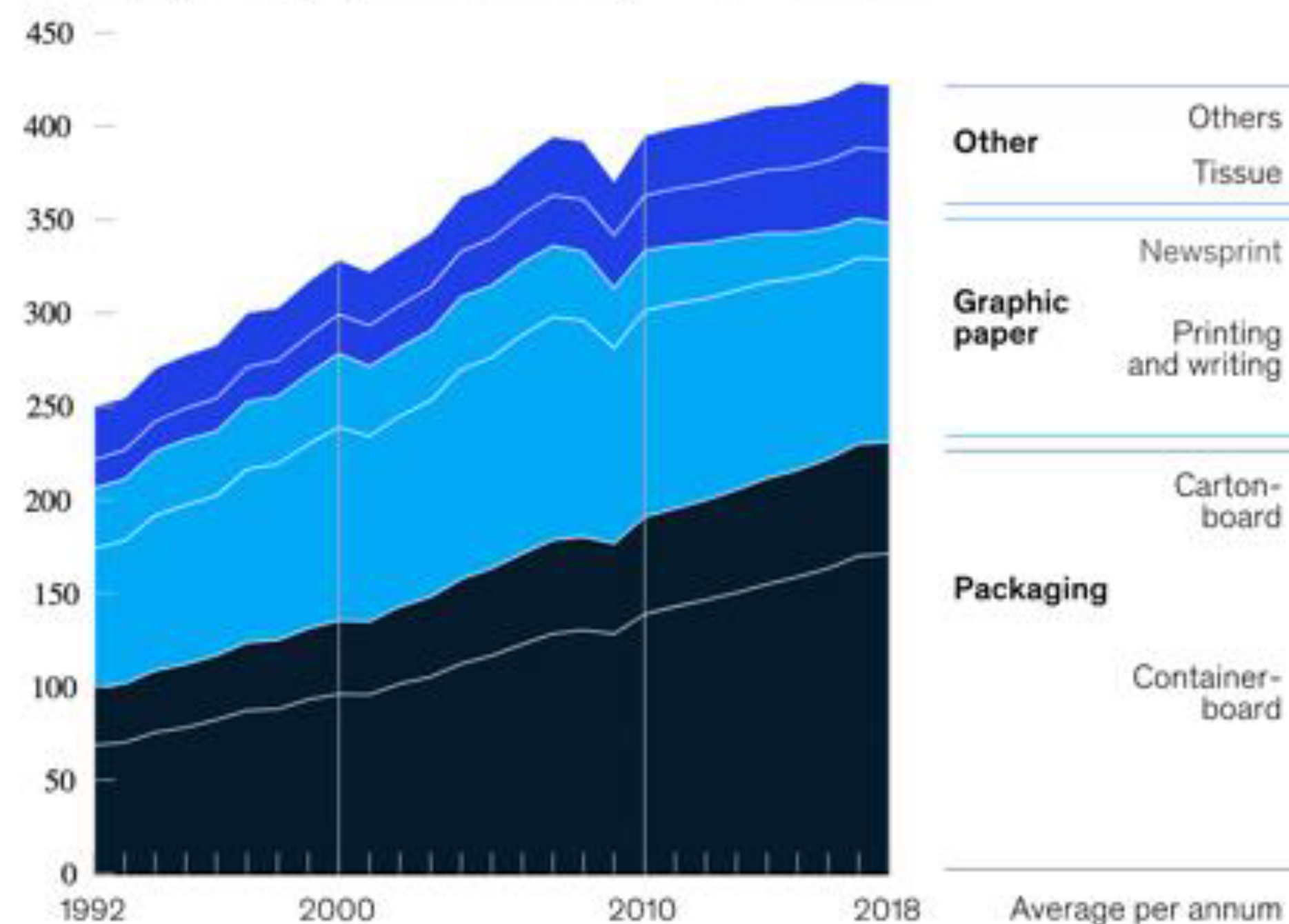
The background of the slide is a dark navy blue. It features abstract, flowing, wavy lines in a reddish-pink color. These lines originate from the left side and curve towards the right, creating a sense of movement and depth. The lines vary in thickness and curvature, some appearing as single strokes while others are more complex, layered patterns.



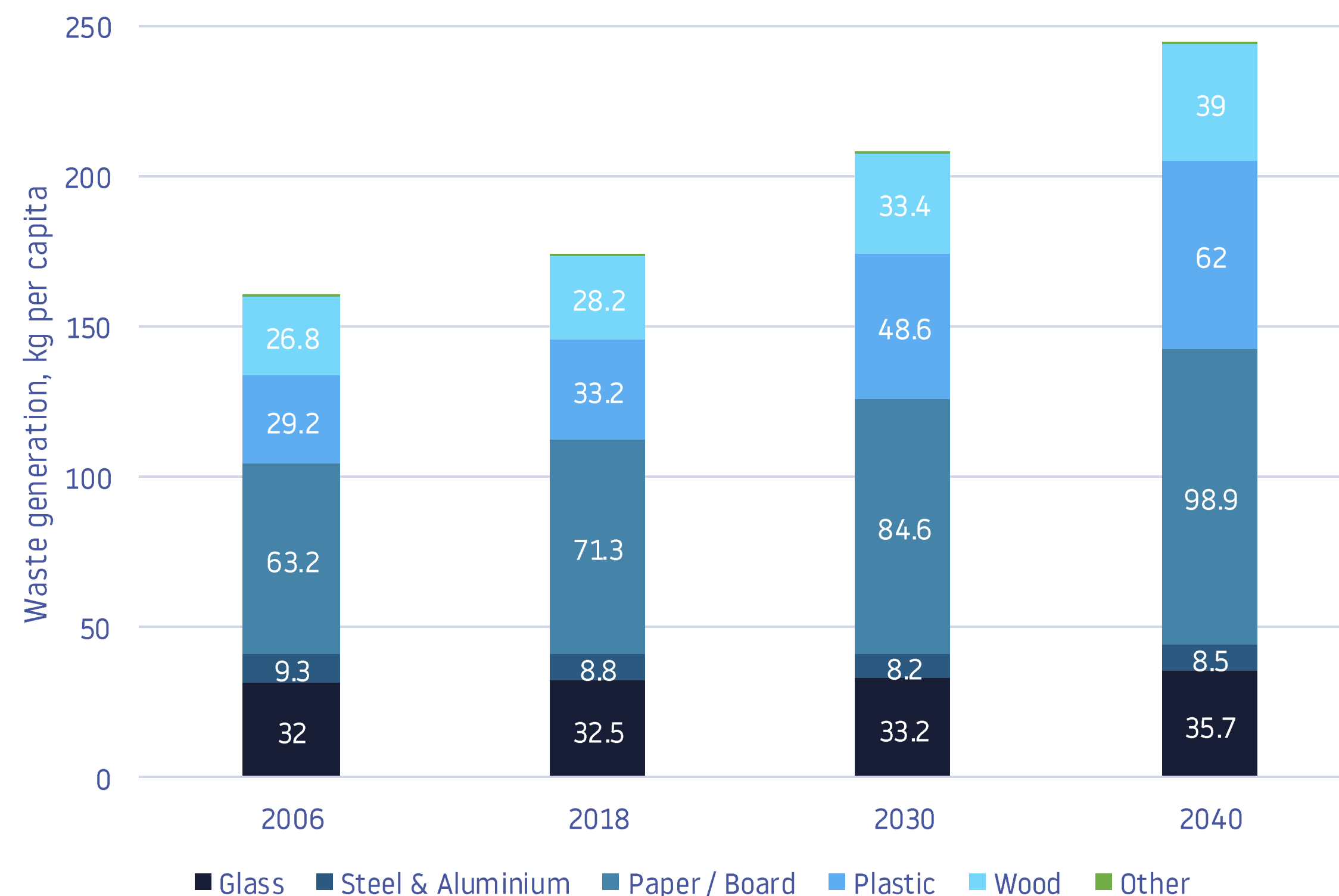
# MAIN PACKAGING STAKES & OPPORTUNITIES.

- In the last decades, SUP production has increased, driven by the growth of e-commerce and eating on the go
- Packaging waste is at its highest level in history: in 2021, each European produced around 189 kg of packaging waste.
- In the past ten years, packaging waste increased by 20%, surpassing the rate of economic growth

Global paper and paperboard market, million metric tons



Source : McKinsey & RISI, 2019



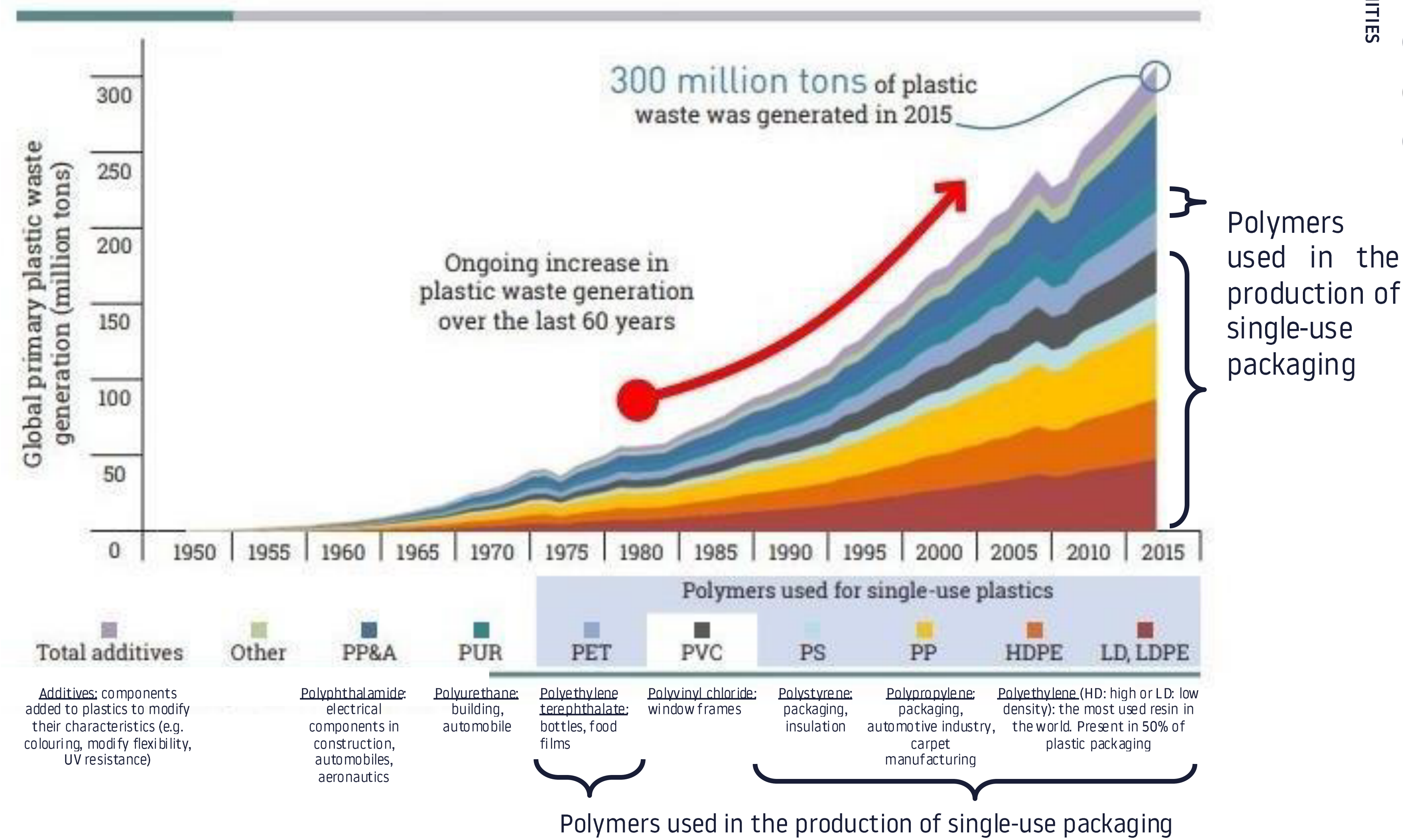
Source : European Commission, 2022



# CURRENT PLASTIC PACKAGING SITUATION (1/3).

Global plastic production is growing exponentially...

Most of this production is used to create single-use plastics. Most of these are packaging that are only used for a few seconds or minutes by consumers before being thrown away...



Source : Graph from the report« Production, use, and fate of all plastics ever made », Geyer, Jambeck et Law, 2017

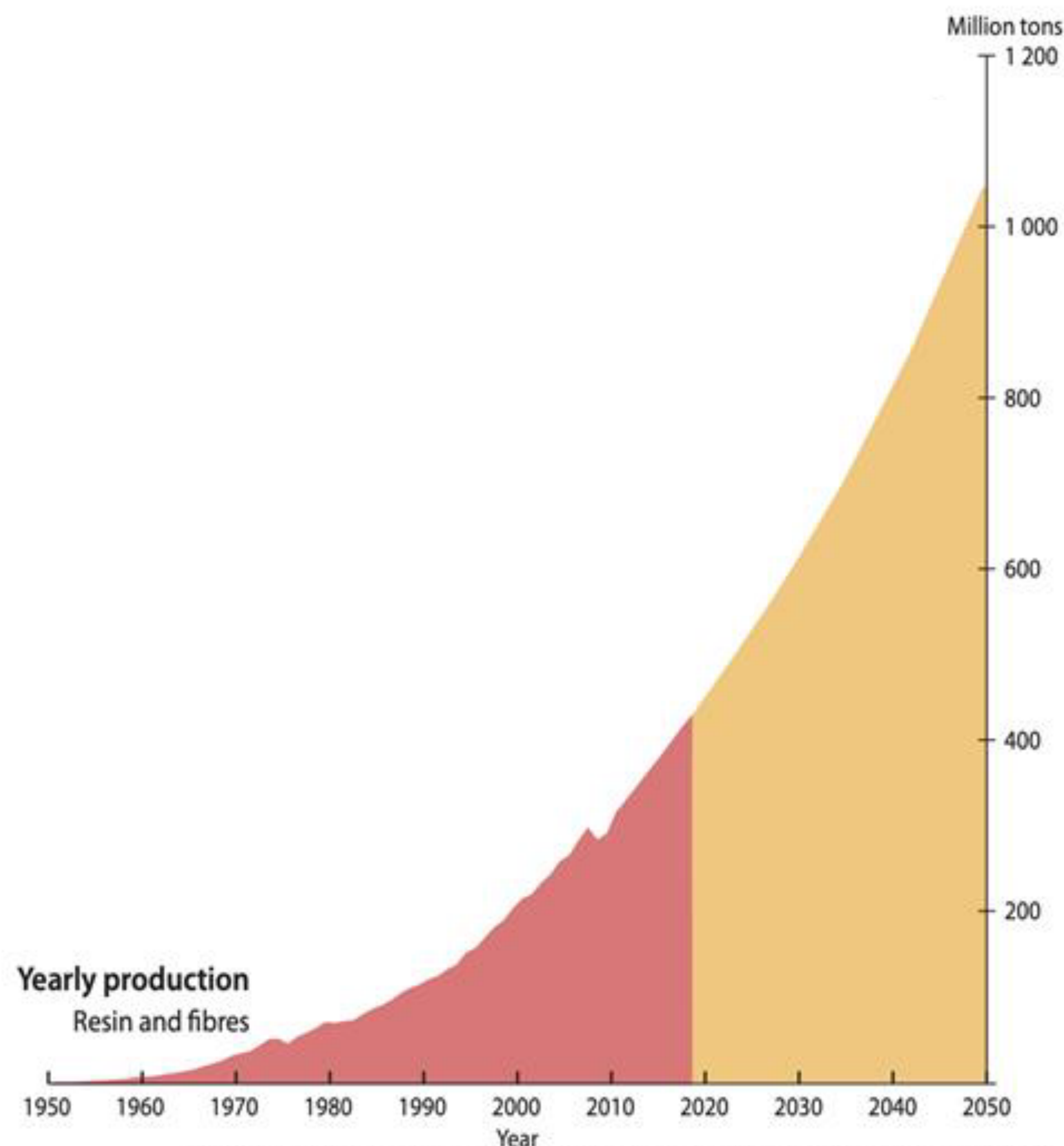


# CURRENT PLASTIC PACKAGING SITUATION (2/3).

**...it is expected that this production will continue to grow...**

Currently 6% of the world's oil is used to produce plastic, this figure is expected to increase to 20% by 2050<sup>1</sup>.

Petrochemicals in general (e.g. manufacturing of plastic, fertilizers, clothing) should represent 50% of oil production by 2050 (compared to 1/3 currently). This growth in petrochemicals in general and plastics in particular would allow the oil industry to compensate for their loss of income coming from the reduction in oil demand for the automobile industry which now prefers electric motors to thermal engines<sup>2</sup>...



Sources:

<sup>1</sup>World Economic Forum, 2016

<sup>2</sup>Report "The Future of Petrochemicals", International Energy Agency, 2018

Source: Report "From Pollution to Solution", UNEP, 2021

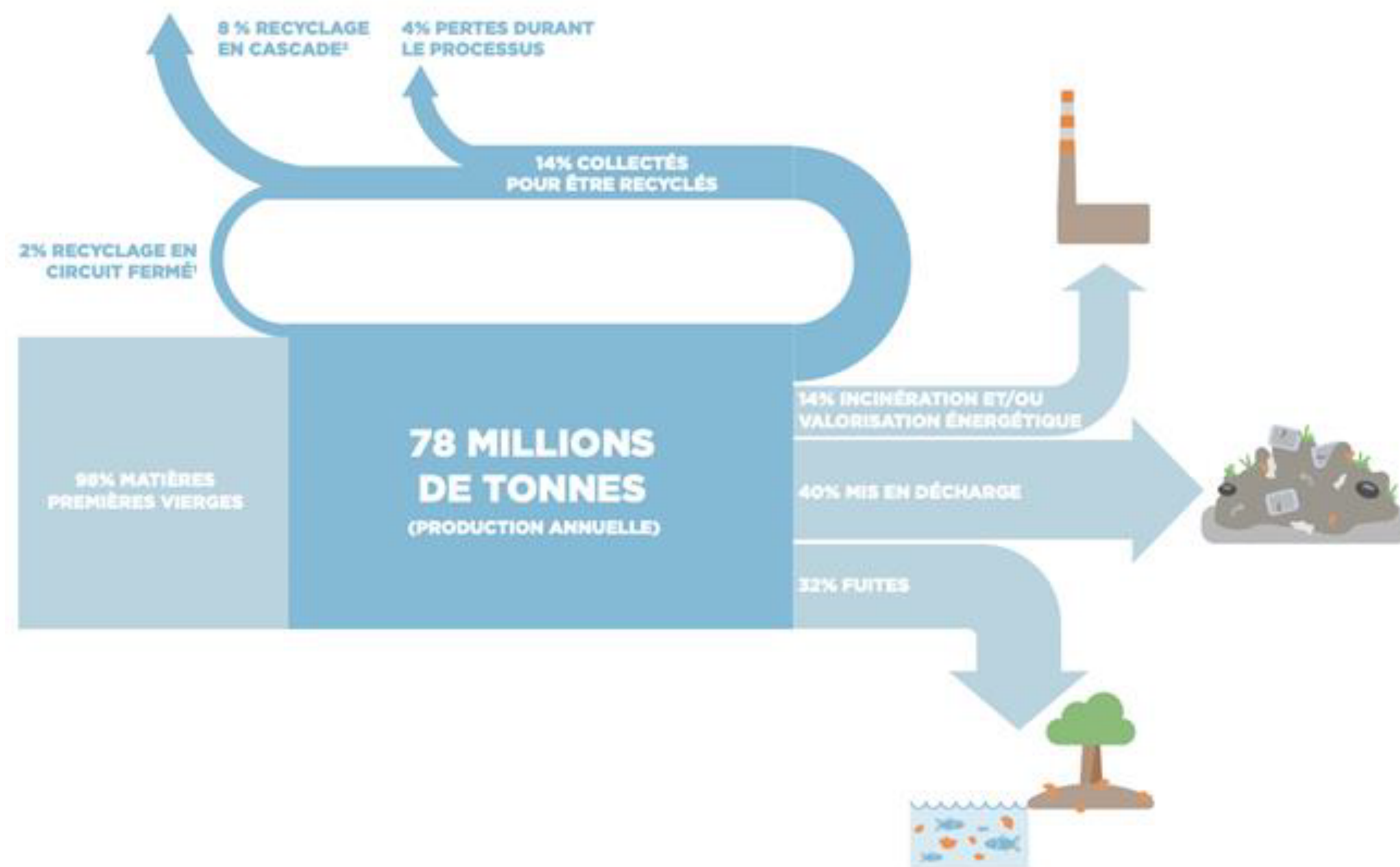


# CURRENT PLASTIC PACKAGING SITUATION (3/3).

...unfortunately single-use plastic's end of life is not viable.

72% of plastic packaging is buried or lost in nature, 14% is incinerated. 8% is recycled in an open loop<sup>1</sup> and 2% in a closed loop<sup>2</sup>. Recycling is not the only option to effectively combat plastic pollution.

Plastic pollution must also be managed at source: by reducing the production of single-use plastic packaging. To do so, concrete solutions exist: selling products in reusable packaging, in bulk and in single-use non plastic packaging. These three types of solutions are called upstream solutions.



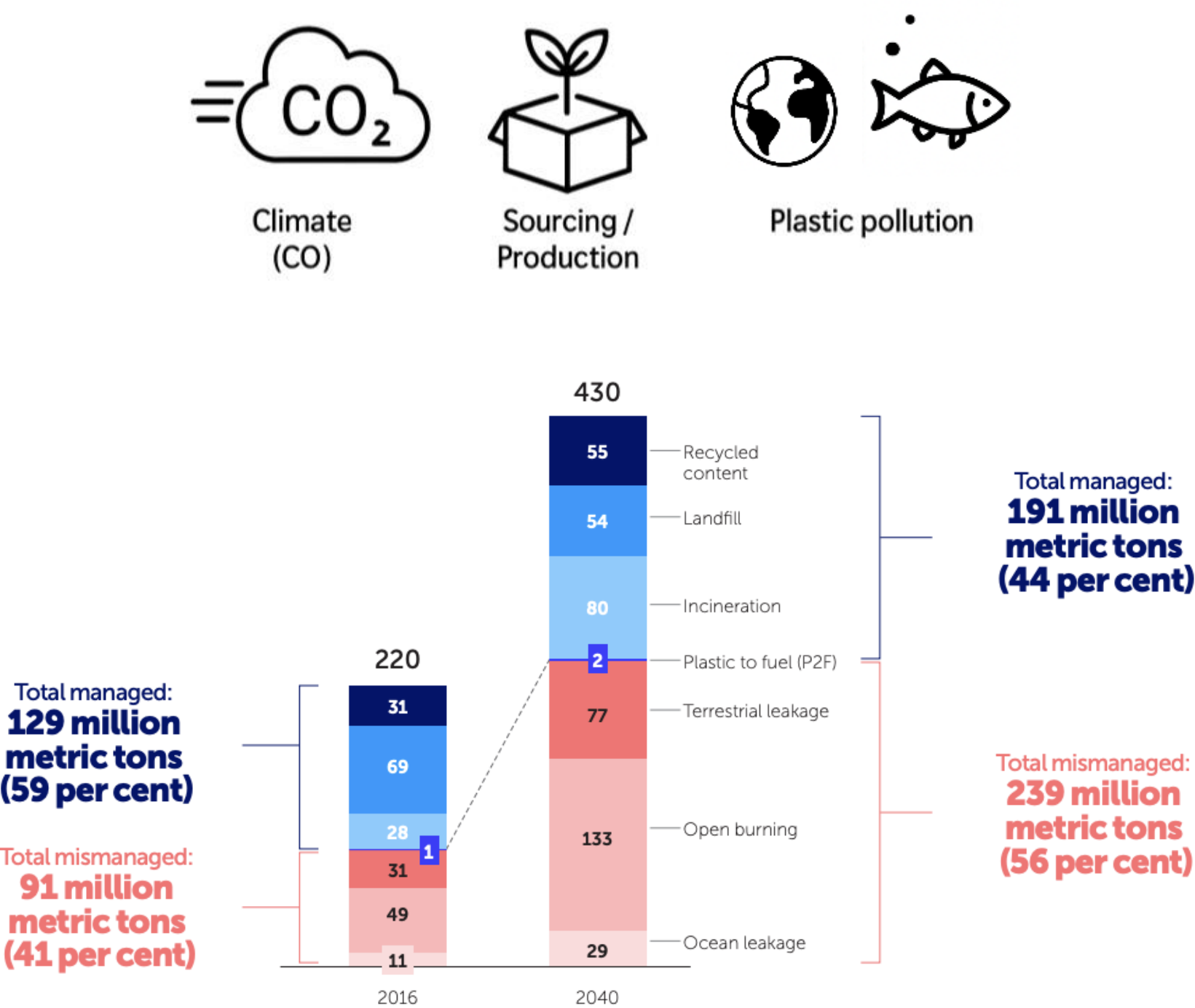
<sup>1</sup>Open loop recycling: Recycling of plastics in lower value applications (e.g. plastic packaging such as a PET bottle is recycled into textile fiber used to produce clothing, once the clothing gets old it will then be discarded or recycled in insulation). This loop is not circular.

<sup>2</sup>Closed-loop recycling: Recycling of plastics in identical applications or of similar quality (e.g. a PET bottle recycled into a PET bottle)

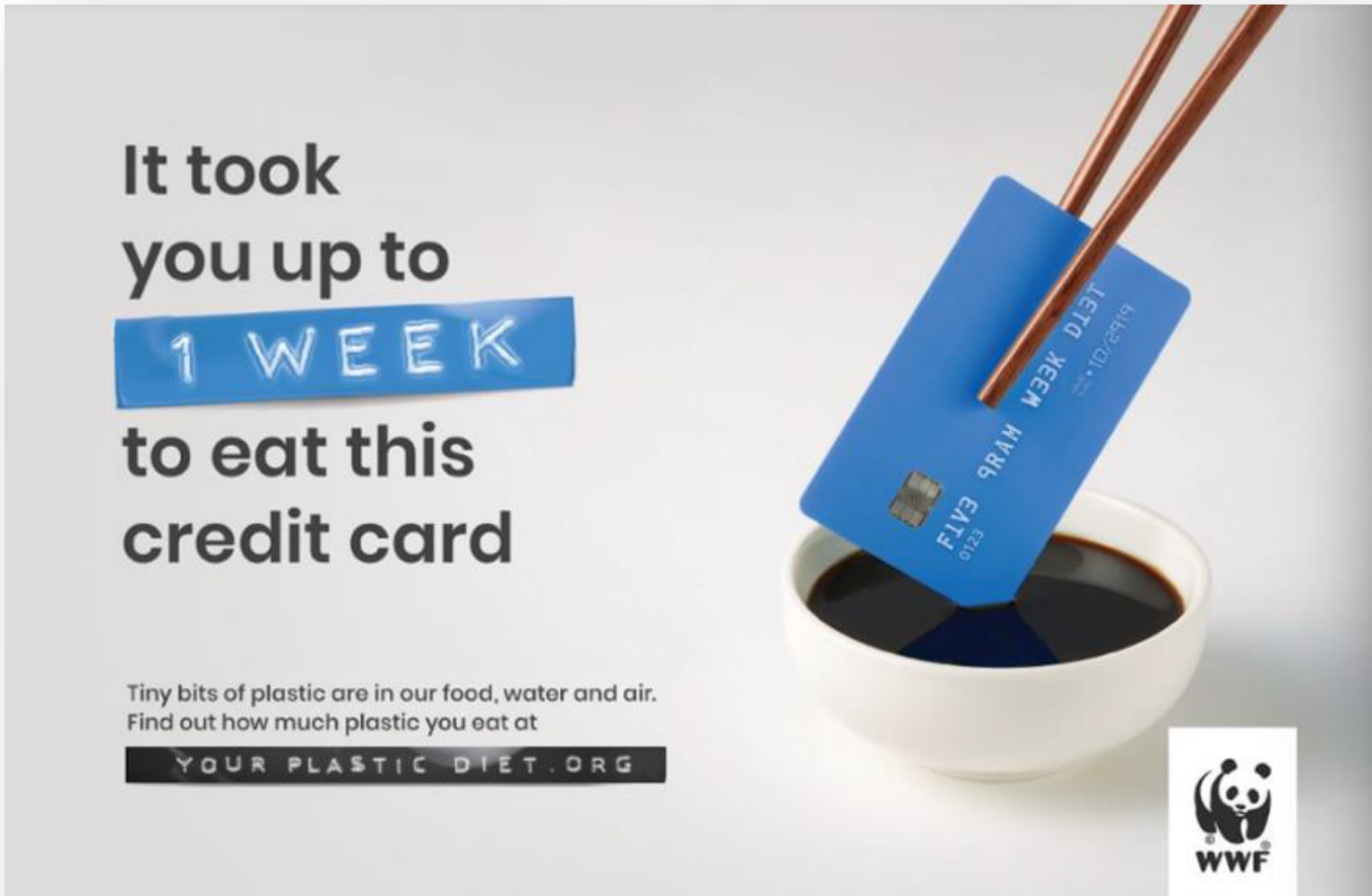


# IMPACTS OF SINGLE-USE PLASTIC PACKAGING.

## Environmental

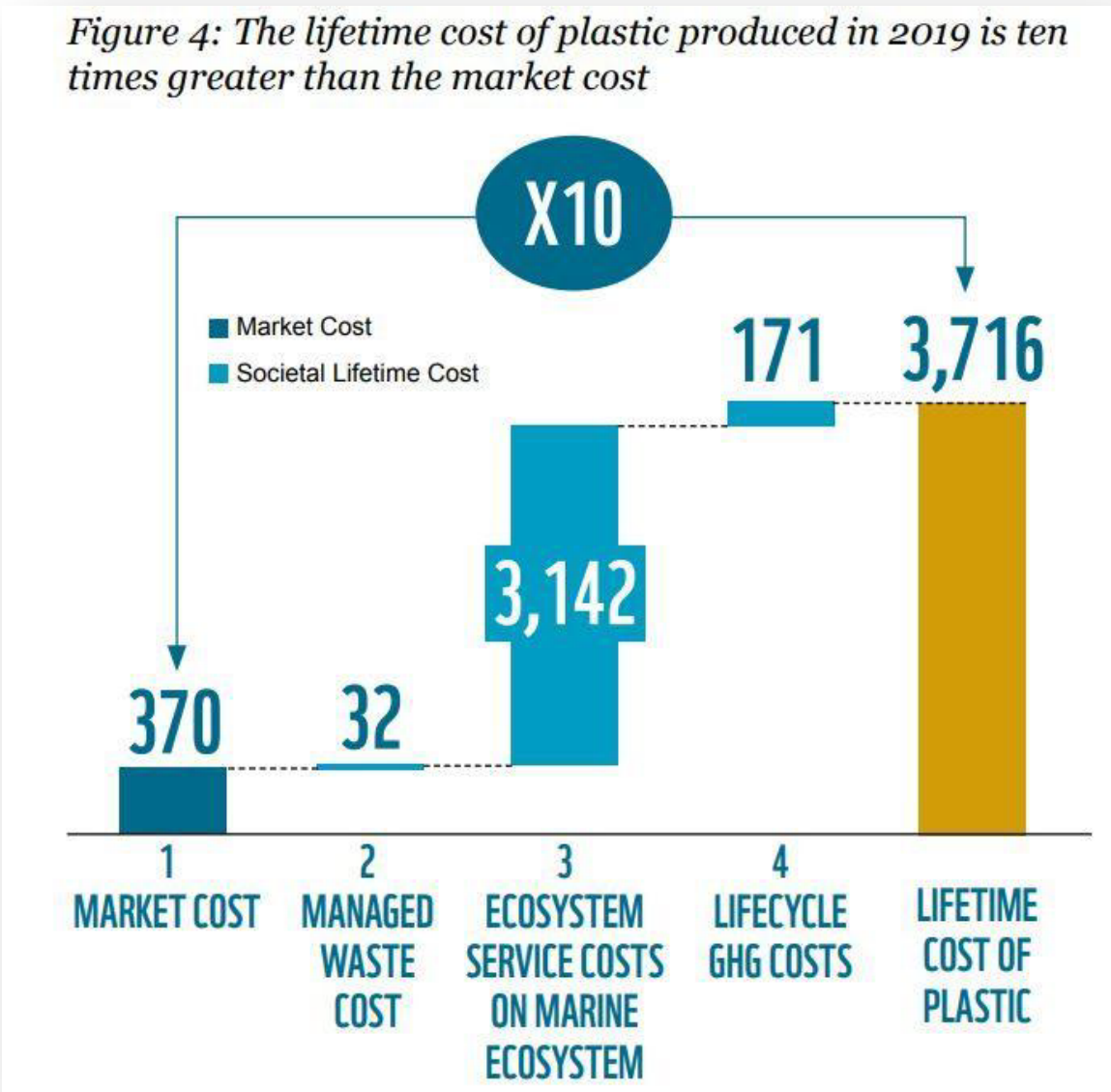


## Social



WWF, 2019

## Economic



WWF, 2021

Source: Report "Breaking the Plastic Wave", The Pew Charitable Trusts and Systemiq, 2020



# CURRENT GLASS AND PAPER PACKAGING SITUATION.

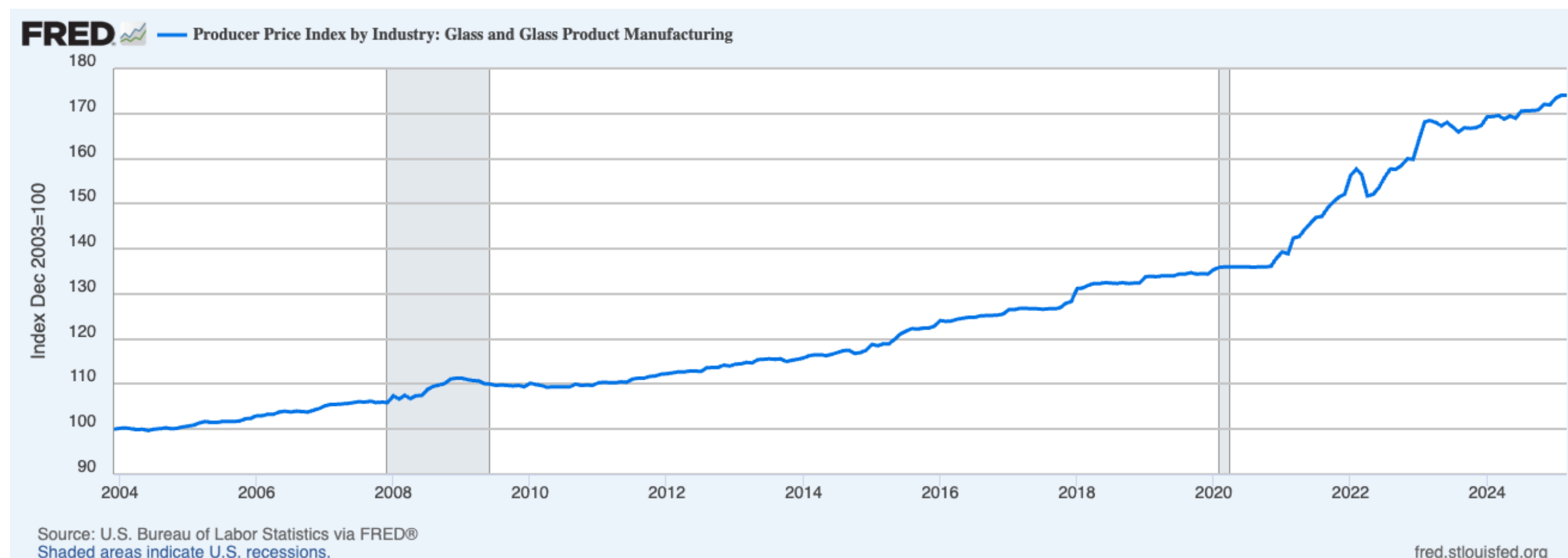
## Paper and cardboard recycling challenges:

- Recycling rates of food-contact paper packaging are low due to difficulty in separating non-paper materials.
- In theory, paper and cardboard can be recycled around eight times, but on average, European paper fibres are only recycled 3.5 times.
- Recycling processes cannot cope with 3 to 10% non-pulpable (or non-paper) materials.
- Production of paper packaging also contributes to deforestation, water stress, biodiversity loss, and climate change (across its whole lifecycle).



## Glass Packaging Costs & Impact:

- Single-use glass has the highest environmental impact due to its energy-intensive production, while reusable glass bottles significantly reduce emissions and resource use after two cycles and can last for 25-30 uses.
- In the context of inflation and an increase in the price of raw materials, glass bottles are becoming more expensive and harder to source, with prices doubling over the last decade.
- According to the World Economic Forum, reusable glass was planned to become more cost-effective than single-use glass by 2024.



Source : Producer Price Index: Glass and Glass Product Manufacturing., 2025



# A GROWING LEGAL PRESSURE (1/3).

## Regulations at the European level

- Freshly adopted 'Packaging and Packaging Waste Directive' (PPWR)



UN Treaty  
Intergovernmental  
Negotiating Committee  
on Plastic Pollution (INC)



### SWEDEN

Increase in reusable packaging by at least 20% by 2026 and 30% by 2030 (vs. 2022)



### GERMANY

70% of reusable bottles



### FRANCE

5% of all packaging must be reusable by 2023 and 10% by 2027



### PORTUGAL

30% of all packaging must be reusable by 2030



### AUSTRIA

25% reusable packaging by 2025 and at least 30% for bottles by 2030



### ROMANIA

5% of packaging must be reusable by 2020 and 5% annual increase until 2025





# A GROWING LEGAL PRESSURE (2/3).

The PPWR was adopted by the European Council in December 2024, the [final text can be consulted here](#). To reduce packaging waste across EU, each country must reduce its packaging waste per capita compared to 2018. They must meet a reduction of at least 5 % by 2030, 10 % by 2035 and 15% by 2040 (Art. 43.1).

Reusable packaging is one of the most effective tool to reduce this packaging waste per capita (among reducing our consumption and selling in bulk). Therefore, mandatory reuse targets have been set for 2030:

## **Transport packaging (including e-commerce)**

- 40% reusable packaging for packaging used to transport or sell products (including e-commerce) (excluding flexible packaging in contact with food) (70 % by 2040) (Art. 29.1).
- Packaging used for transporting products, within the territory of the Union, between different sites on which the operator performs its activity shall ensure that such packaging is reusable within a re-use system (Art. 29.2).
- 10% of grouped packaging in the form of boxes must be reused (excluding cardboard packaging) (25 % by 2040) (Art. 29.5).

## **Beverage packaging**

- 10% of reusable packaging (excluding highly perishable products such as milk, spirits, wine) (40 % by 2040) (Art. 29.6).

## **Exemptions (Art. 29.14)**

Member States may exempt economic operators for 5 years from the obligations under this Article under the following conditions:

- a. the exempting Member State reaches 5 % above the targets for recycling of packaging waste per material to be achieved by 2025 and is expected to reach 5 % above the 2030 target;
- b. the exempting Member State is on track to achieve the relevant waste prevention targets set out in Article 43 and can demonstrate to have reduced the packaging waste generated per capita by at least 3 % by 2028 compared to 2018;





# A GROWING LEGAL PRESSURE (3/3).



As civil society, scientists, and youth movements have been vocal in demanding a strong treaty to "end plastic pollution", over 175 countries agreed at the UN Environment Assembly in 2022 to begin negotiations to establish a legally binding treaty to combat plastic pollution. After 5 sessions (Punta del Este - Uruguay, Paris, Nairobi, Ottawa, Busan), Key disagreements, particularly over limiting plastic production and the treaty's enforceability, led to the adjournment of talks. The next round is scheduled in Geneva in August 2025.

The primary points of disagreement include:

- **Limiting plastic production:** Over 100 countries advocate for binding global targets to reduce plastic production, while major oil-producing nations like Saudi Arabia, Iran, and Russia oppose such measures.
- **Chemicals of Concern:** Several countries and NGOs are calling for mandatory disclosure of chemicals used in plastic products (transparency framework for plastic additives, public registry of plastic chemicals and polymers of concern) though, industry groups (e.g. Exxon, Dow, BASF) and countries (e.g., U.S., Saudi Arabia) with large chemical/plastics sectors were resistant to this proposal.
- **Scope and Enforcement:** Debates persist over whether the treaty should impose mandatory global regulations or allow for voluntary national actions.
- **Financial Mechanisms:** Discussions continue about how to fund the treaty's implementation and enforcement, with disagreements over financial responsibilities.

At that point of time, governments can either continue to negotiate a treaty with universal support but little impact or agree with a more limited number of countries on strong rules across the full lifecycle of plastics and with a comprehensive financing mechanism (that this is what most governments, businesses and citizens want).



# INTRODUCTION TO REUSABLE PACKAGING

The background features a dark blue field with several thin, flowing red lines that create a sense of movement and depth. These lines are concentrated in the lower half of the image, with some extending towards the top right corner. A small, solid red horizontal line is positioned directly beneath the word "REUSABLE" in the title.



# FINDING A BALANCE BETWEEN **UPSTREAM** AND **DOWNSTREAM**.

**80 % less annual plastic leakage into the ocean relative to business as usual is achievable by 2040 using existing technologies.**

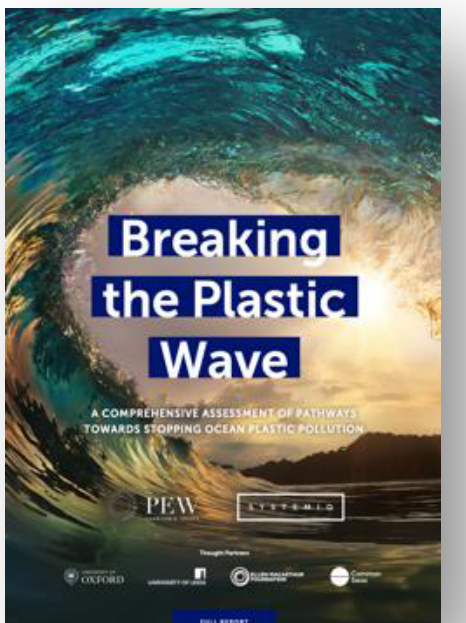
**There is a debate about whether the focus should be put on:**

- **"Upstream"** (pre-consumer, such as material redesign, plastic reduction, and substitution) or,
- **"Downstream"** solutions (postconsumer, such as recycling and disposal).

**Both should be pursued:**

- Upstream solutions should be prioritized but will need to be scaled carefully to limit adverse social or environmental effects.
- Downstream solutions are also essential but limited by economic viability and the realistic speed of infrastructure development in the face of growing plastic waste production. Moreover, given the potential negative impacts on human health and the environment of some downstream disposal technologies, their use should be weighed against different trade-offs and carefully controlled.

1. **Reduce growth in plastic production** and consumption to avoid nearly one-third of projected plastic waste generation through elimination, reuse, and new delivery models.
2. **Substitute plastic with paper** and compostable materials, switching one-sixth of projected plastic waste generation.
3. **Design products and packaging for recycling** to expand the share of economically recyclable plastic from an estimated 21 per cent to 54 per cent.
4. **Expand waste collection rates** in the middle-/low-income countries to 90 per cent in all urban areas and 50 per cent in rural areas and support the informal collection sector.
5. **Double mechanical recycling capacity globally** to 86 million metric tons per year.
6. **Develop plastic-to-plastic conversion**, potentially to a global capacity of up to 13 million metric tons per year.
7. **Build facilities to dispose of the 23 per cent of plastic that cannot be recycled economically**, as a transitional measure.
8. **Reduce plastic waste exports** by 90 per cent to countries with low collection and high leakage rates.



Source : Report  
"Breaking the Plastic Wave", The Pew Charitable Trusts and Systemiq , 2020



# REUSE, ONE OF THE SOLUTIONS TO TACKLE PACKAGING WASTE.



Reducing the production and use of plastic at the source provides the greatest opportunity for GHG emissions mitigation, the opportunity to reduce plastic leakage globally by up to half by 2040 and often represents opportunities for net gains.



Reuse systems provide the highest opportunity to reduce plastic pollution (a reduction of 30 per cent by 2040) by replacing some of the most problematic and unnecessary products.



Source : Report “Breaking the Plastic Wave”, The Pew Charitable Trusts and Systemiq , 2020



Source : Report “Turning off the Tap: How the world can end plastic pollution and create a circular economy”,UNEP, 2023

Accelerating the market for reusable products, to transform the throwaway economy to a reuse society, by creating the enabling environment to ensure the reuse market has a stronger business case than the single-use plastics market.

## Remark on the PPWR definition of reuse

Article 3. 27: re-use means any operation by which reusable packaging is used again multiple times for the same purpose for which it was conceived;

Note 63: To promote the circularity and sustainable use of packaging, reusable packaging and re-use systems should be incentivised. For that purpose, it is necessary to clarify the notion of reusable packaging and ensure that it is linked not only to the packaging design, but also to the setting up of re-use systems that comply with minimum requirements as set out in this Regulation.



Source : EU Regulation on packaging and packaging waste (PPWR), December 2024

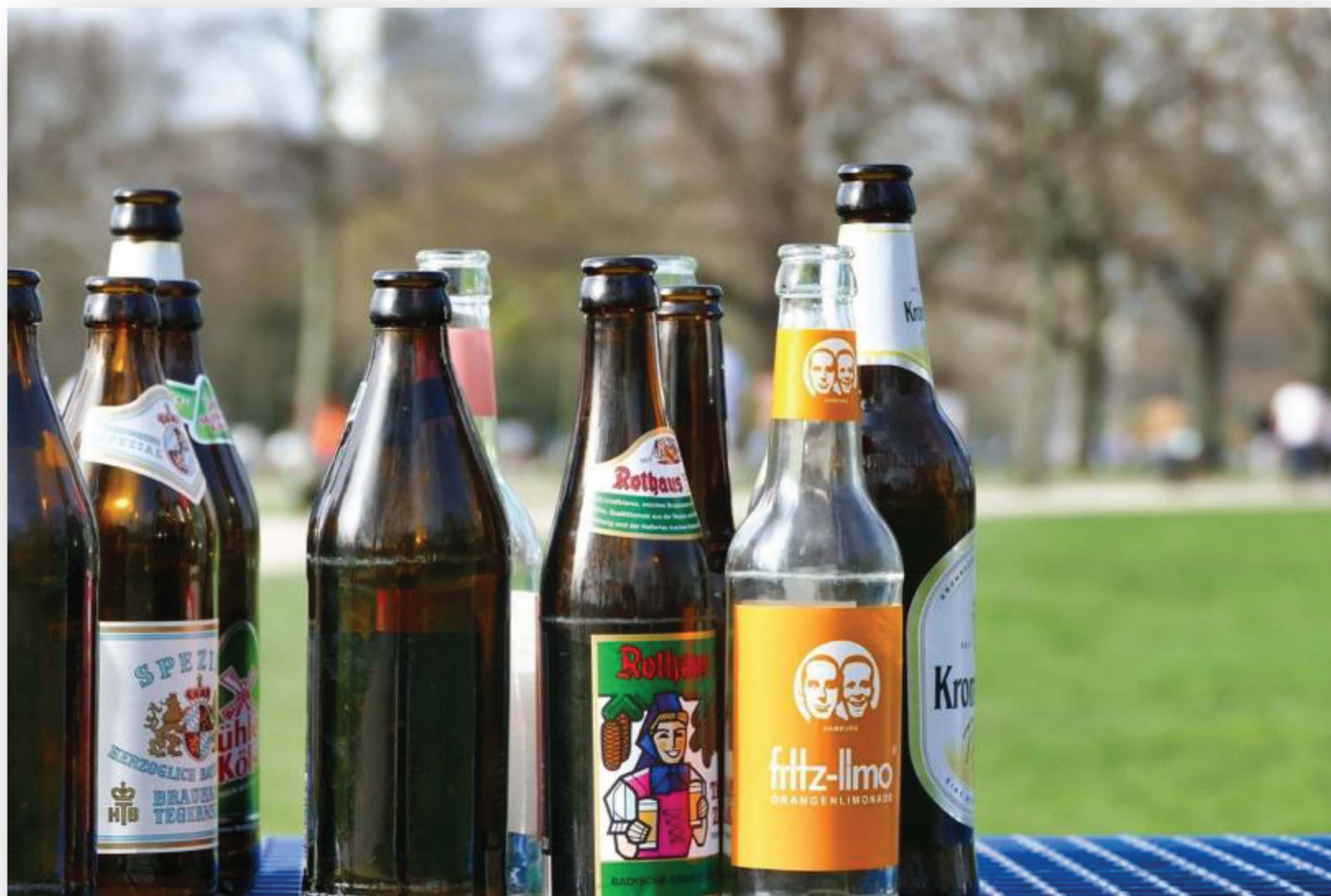


# REUSABLE AND STANDARDISED MODELS ARE **ALREADY COMMON.**

## Germany's Pfand system

One of the most well-established deposit return system (DRS) in the world. 42% of all beverages are filled in refillable containers in Germany

- **Glass bottles** (0.5L or 0.33L standard bottles): beer, soft drinks, mineral water, juices.
- **Reusable PET bottles** (thicker and sturdier than single-use PET): carbonated drinks, water, and juice



## Standardized Shipping Containers

Used worldwide for intermodal freight transport (ships, trains, trucks), they are defined primarily by the International Organization for Standardization (ISO) under ISO 668.



## Standardized Pallets

- Euro Pallet (EPAL / EUR-pallet) (1200 x 800 mm)
- GMA Pallet (US Standard) (48" x 40" (1219 x 1016 mm))
- ISO Pallet Sizes (six officially recognized sizes)





# THE **FOUR SECTORS** WHERE REUSABLE PACKAGING ARE FOUND.

## Hospitality

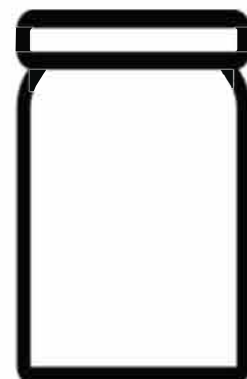


*HoReCa beverage  
bottles*

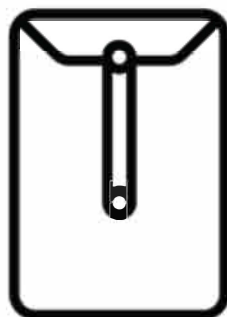


*On site dining &  
takeaway*

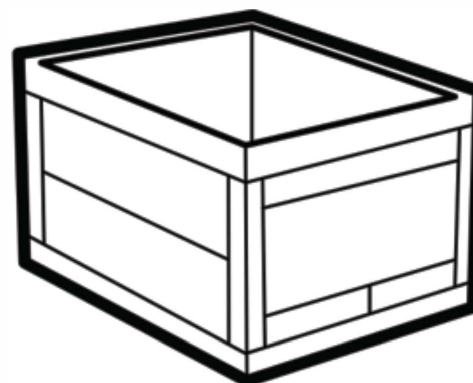
## Retail



## E-commerce

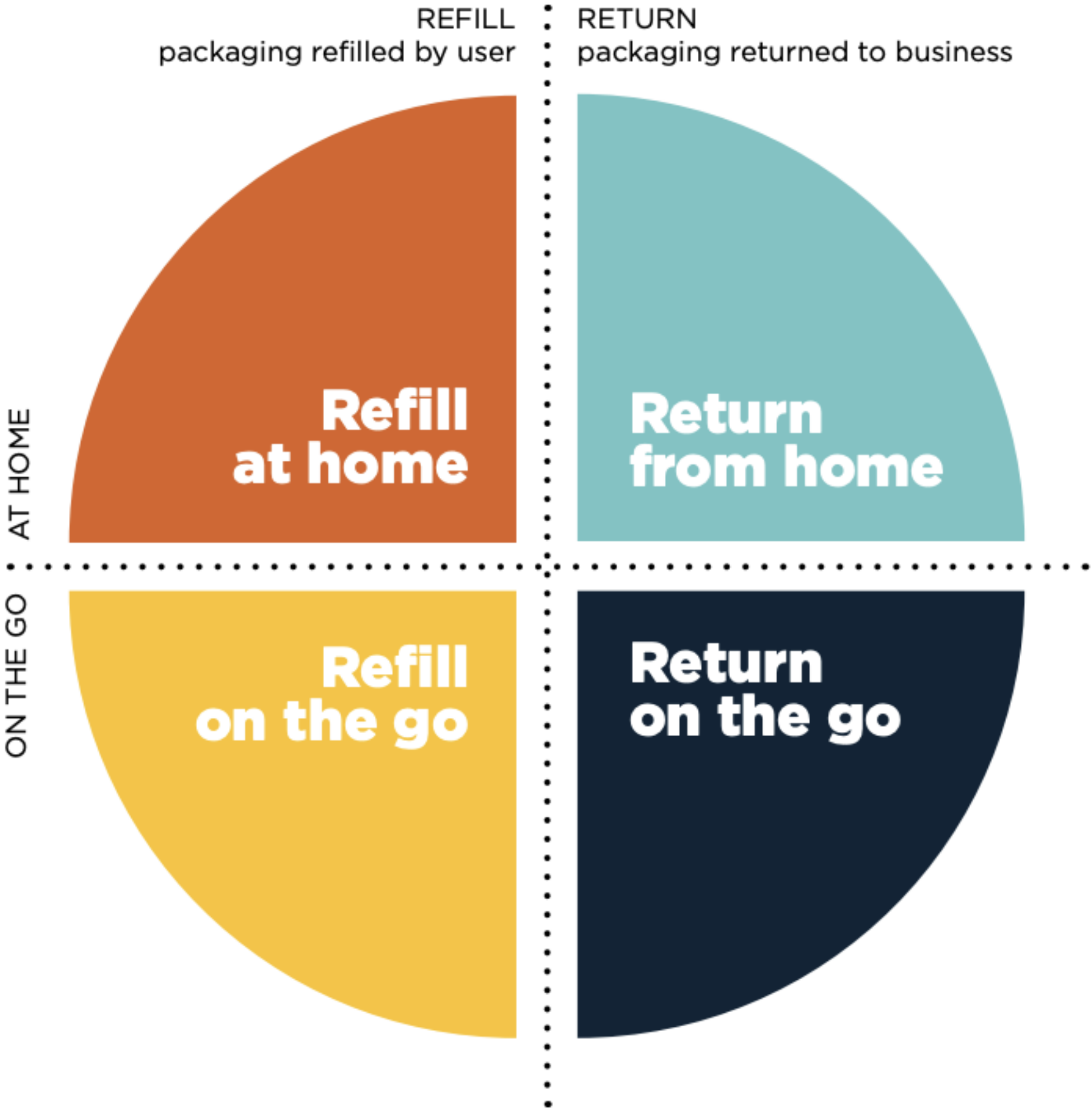


## Transport / Industrial





# THE FOUR REUSE & REFILL MODELS DEFINED BY EMF.



**Refill at home**  
users refill their reusable container at home (e.g. with refills delivered through a subscription service)

**Return from home**  
packaging is picked up from home by a pick-up service (e.g. by a logistics company)

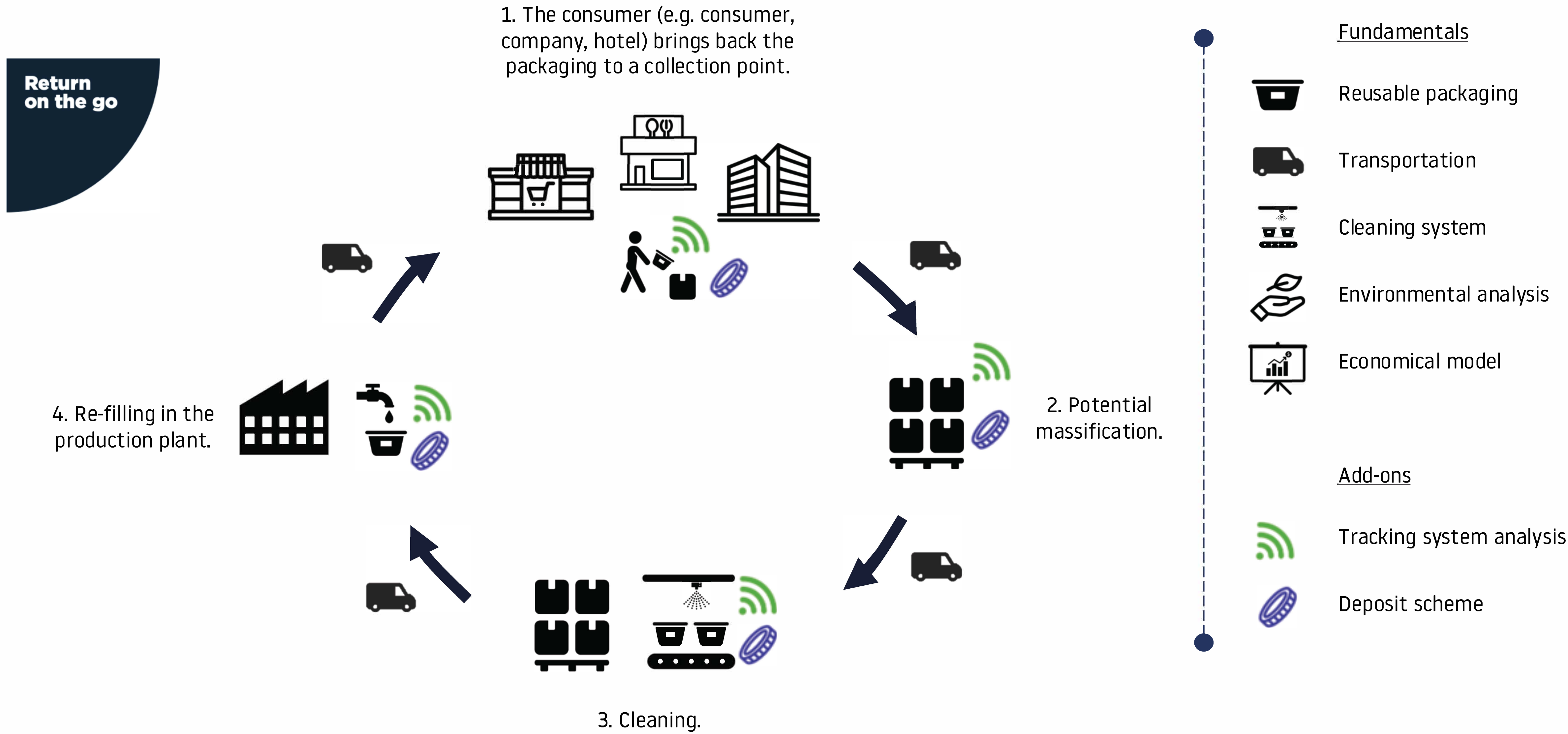
**Refill on the go**  
users refill their reusable container away from home (e.g. at an in-store dispensing system)

**Return on the go**  
users return the packaging at a store or drop-off point (e.g. in a deposit return machine or mailbox)

Source : Report “Reuse – rethinking packaging”, Ellen MacArthur Foundation , 2019.

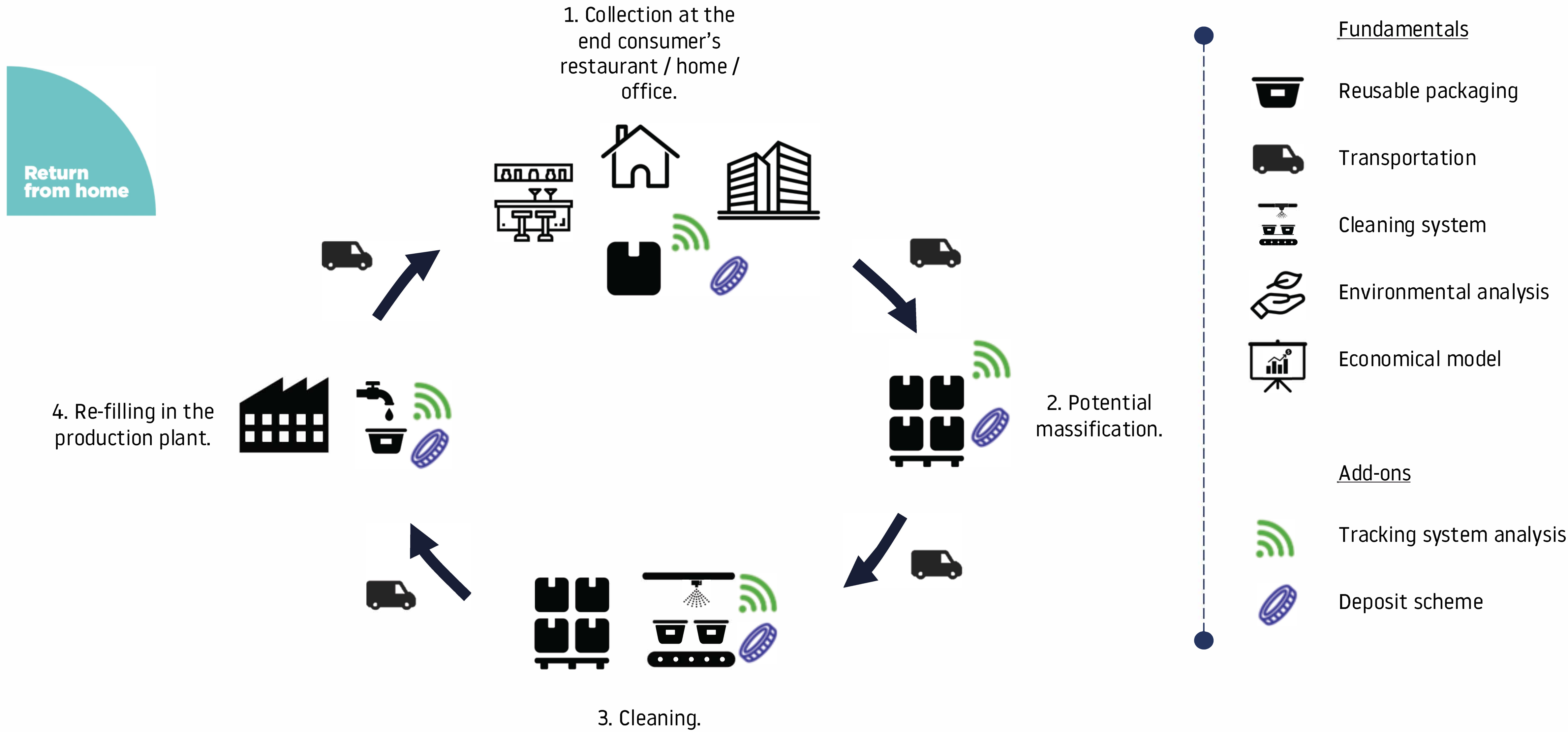


# OPERATIONS BEHIND A REUSE MODEL (1/2).





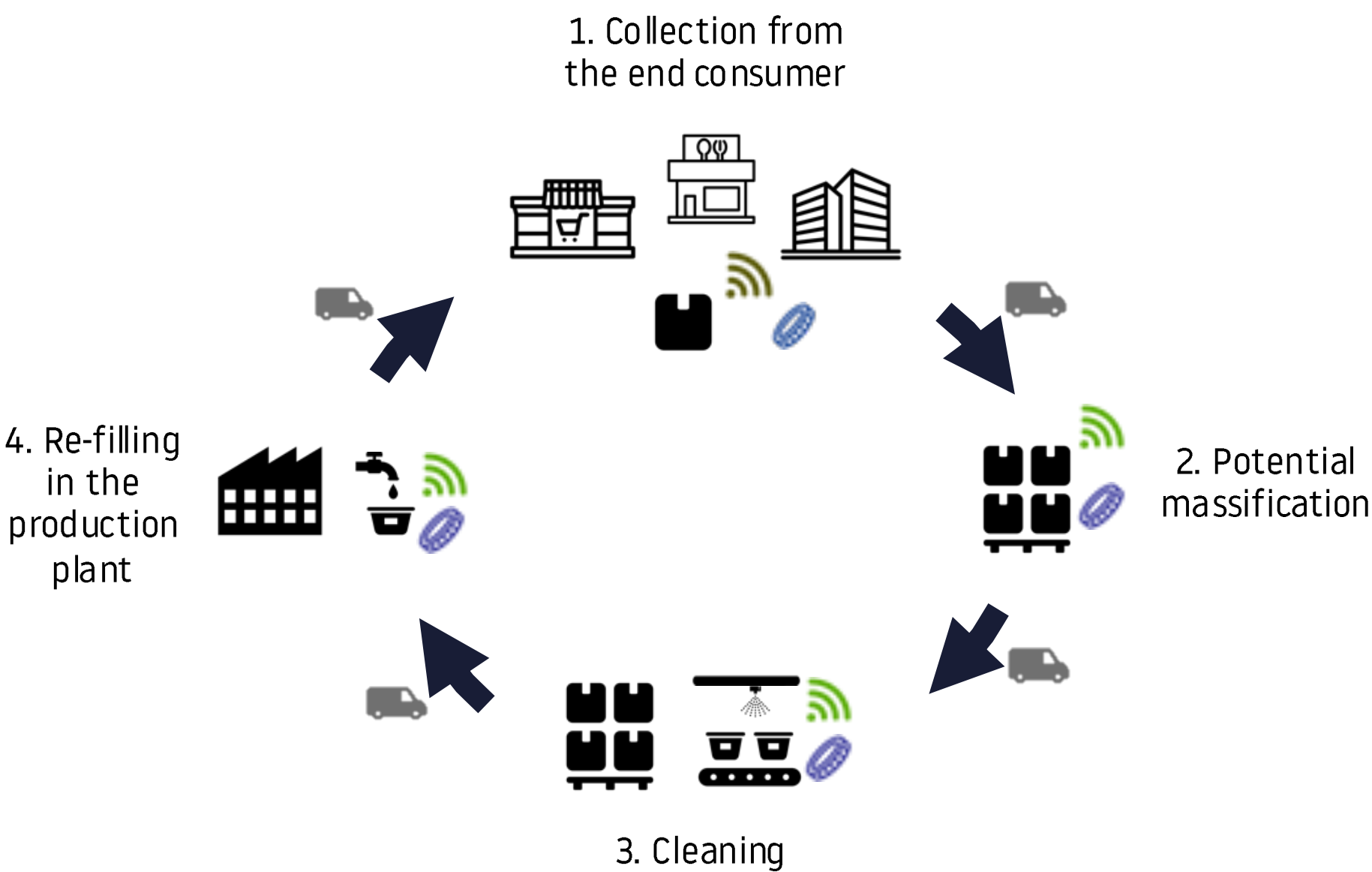
# OPERATIONS BEHIND A REUSE MODEL (2/2).





# MAIN ACTIVITIES BEHIND A REUSE MODEL.

Pooling: A managed network where reusable packaging items are shared, collected, cleaned, and reused across supply chains and users. These systems rely on centralised coordination, reverse logistics, and standardised packaging to ensure efficient reuse.

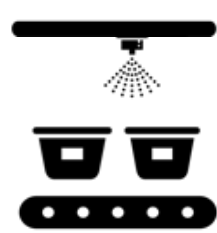


Design: Developing the material and visual elements of reusable packaging to ensure both aesthetic appeal and effectiveness.

Manufacturing: Process of producing reusable packaging and equipment such as washing lines or reverse vending machines, used in reuse and refill systems



Goods production: selling products in reusable packaging



Cleaning & Reconditioning: The process of sanitising reusable packaging with to remove bacteria and other contaminants, or repairing containers or equipment to make them suitable for reuse or redistribution.



Traceability: The ability to track the location of reusable packaging using data carriers such as barcodes, QR codes, RFID tags for automatic identification and data capture, or digital twins.



Software & Technology: Development of digital platforms to track, manage and facilitate the flow of reusable assets within a supply chain.



Collection: Management/provision of infrastructure for collecting and processing containers through bins, staffed locations, or automated machines (designing, producing, coordinating systems for collection, transport, recovery).



# ECONOMIC IMPACT

The background of the slide is a solid dark blue. It is decorated with several thin, flowing red lines that create a sense of movement and depth. These lines are concentrated in two main areas: a cluster of overlapping, wavy lines in the bottom left corner, and a series of more parallel, curved lines in the top right corner. A small, solid red horizontal bar is positioned directly beneath the text 'ECONOMIC IMPACT'.



# ECONOMIC IMPACT — GLOBAL OVERVIEW.

The systems change scenario is economically viable and creates immediate annual savings (reduced plastic production, increased revenues from recycled materials).

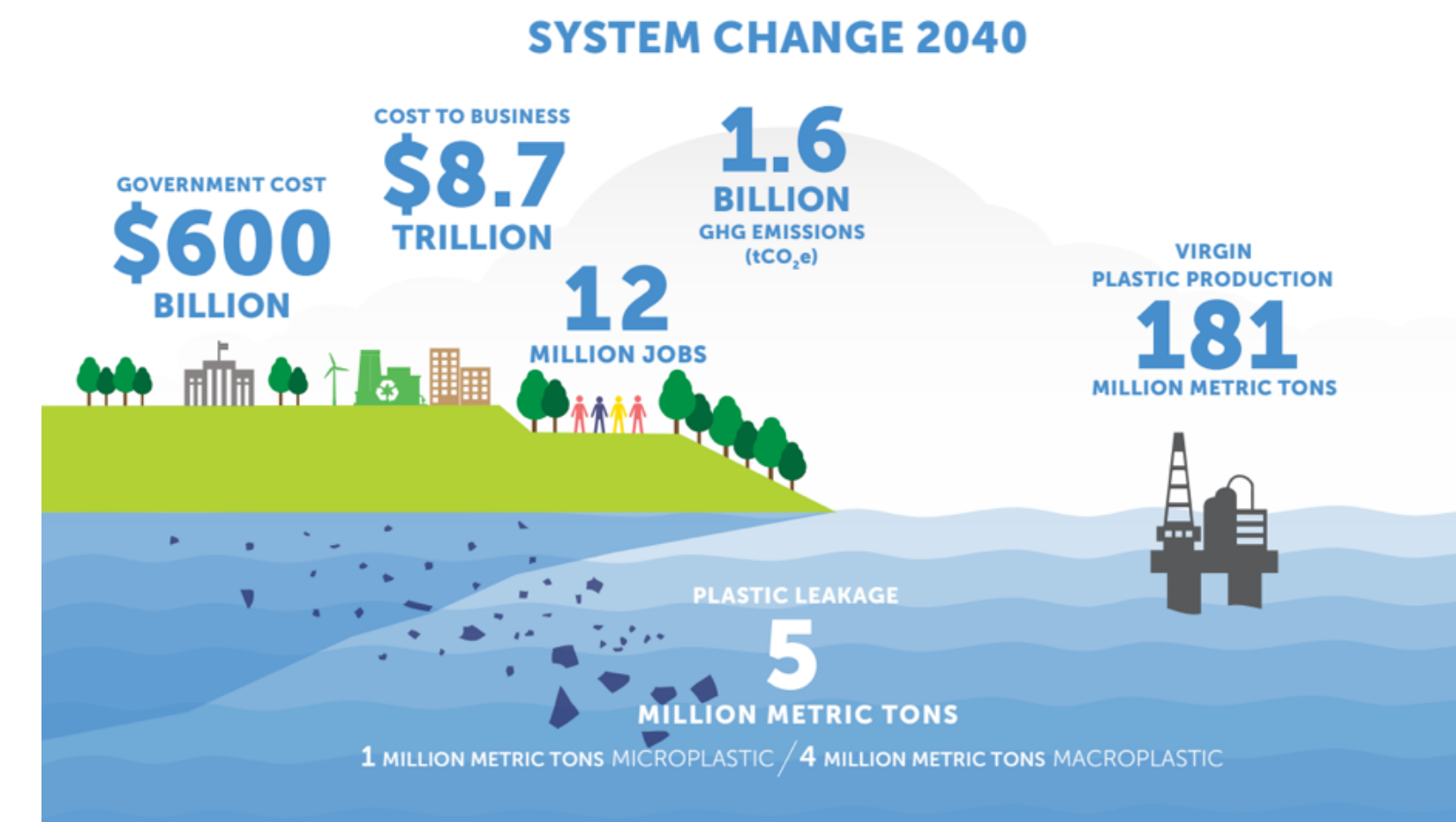
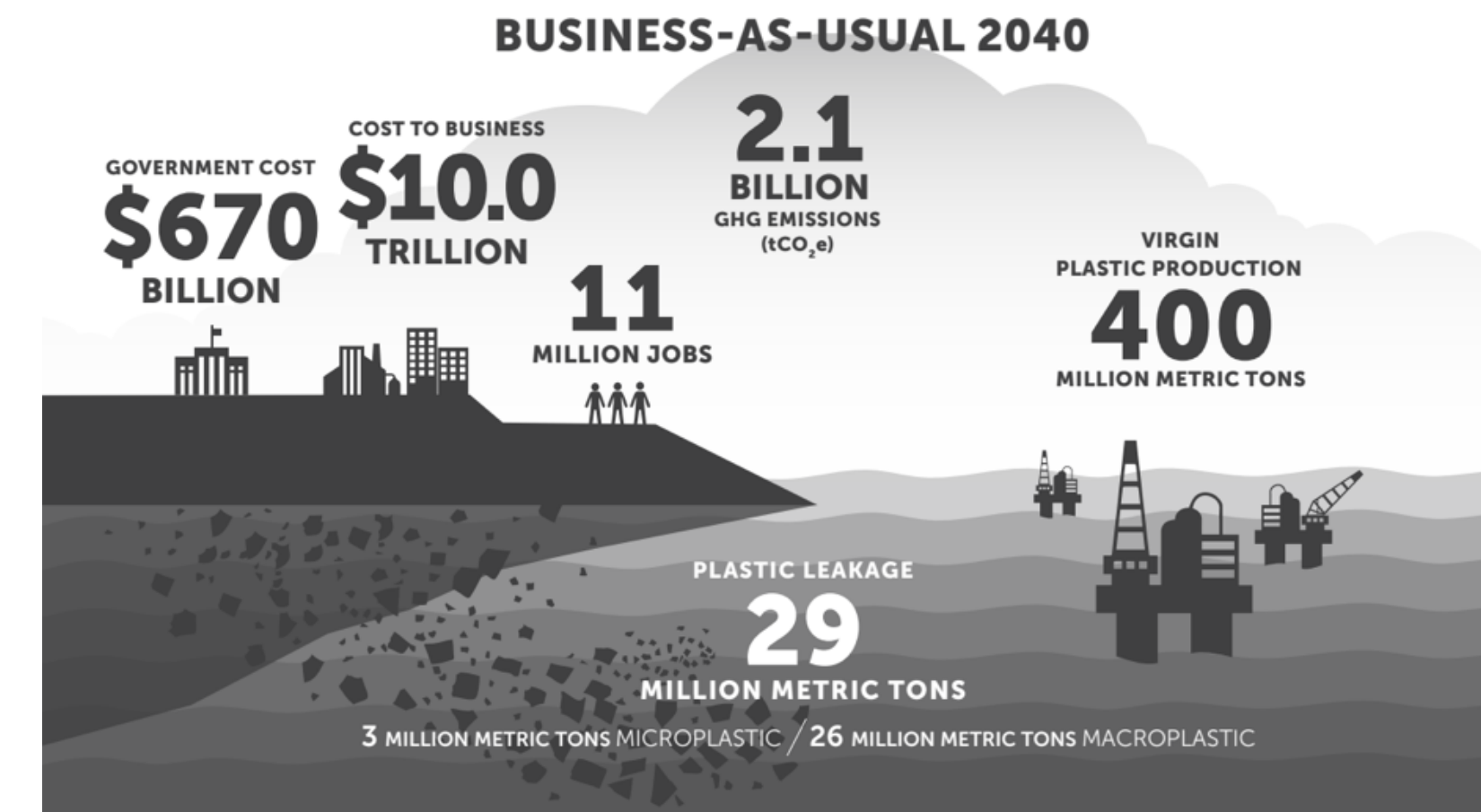
The systems change scenario results in USD 1.3 trillion in savings considering investment, operations and management costs and recycling revenues.

The System Change Scenario will require a substantial shift of investment away from the production and conversion of virgin plastic, which are mature technologies perceived as “safe” investments, to the production of new delivery models, plastic substitutes, recycling facilities, and collection infrastructure, some of which are less mature technologies and perceived as riskier. This shift will require government incentives and risk-taking by industry and investors.

**A further USD 3.3 trillion is saved from avoided externalities** (externalities such as health, climate, and the biodiversity impacts of plastics, were not quantified in these results)

These results point to a considerable societal value emerging from increasing the sustainability of the plastics economy: **for each dollar of conventional (direct) cost saved a further two dollars of societal damage (indirect cost) are also avoided.**

**System Change Scenario can divide the tonnage of plastic leaking into the ocean in 2040 by 3.**



Source: Report “Breaking the Plastic Wave”, The Pew Charitable Trusts and Systemiq, 2020



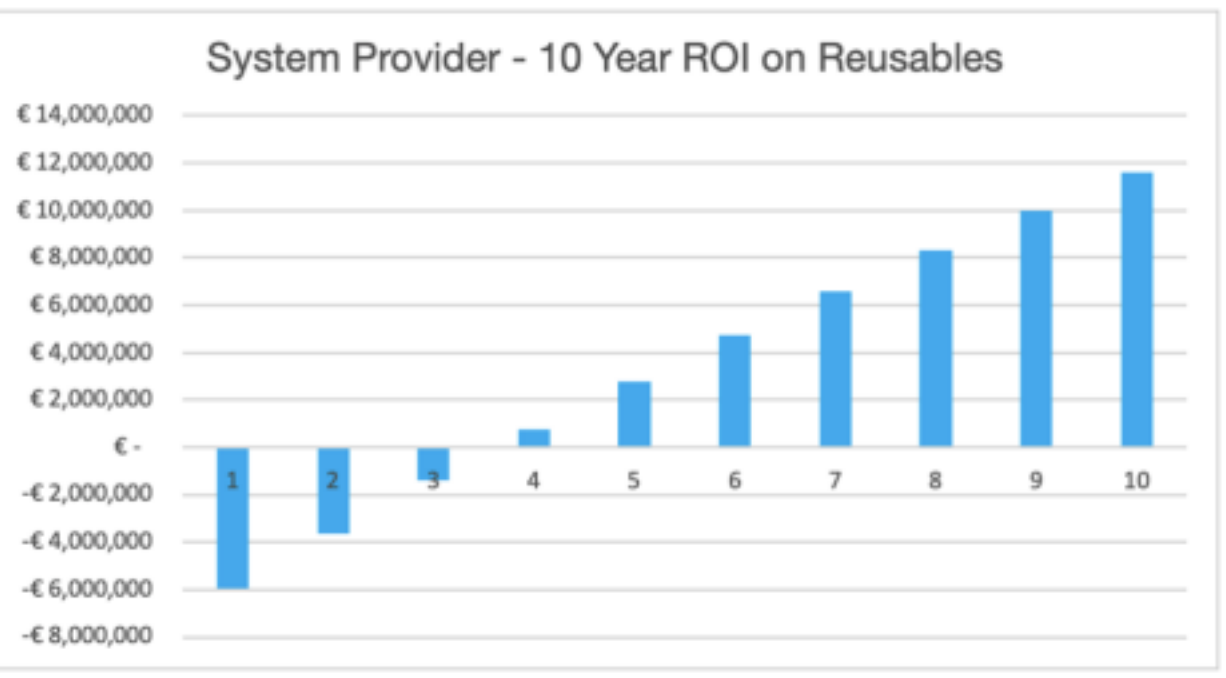
# ECONOMIC IMPACT – SECTORIAL ANALYSIS (1/2).

## Hospitality - Takeaway food containers, Spain

Advantages:

- The pay-per-use fee (0.17 €) is cheaper than purchasing a single-use plastic food container (0.20 €) per item.
- Reusable plastic packaging is "hassle-free": the user does not own the packaging (does not worry about taxes, collection and disposal regulations, or EPR fees that may affect them).
- No upfront investment is required, by i.e. restaurants, nor does it need complicated logistics and additional washing services to clean the containers.
- ROI of 17.9 % over a 10-year period (large investments costs in a fleet of more expensive reusable food containers).

Remark: A 98% return rate was considered. It is crucial to aim for a return rate as close to 100% as possible and to take measures to achieve this. Behavioral change aspects play a vital role (charging a fee upon non-return after 14 days, making return points easily accessible can heavily influence the return of food containers in time).



Costs of the packaging;

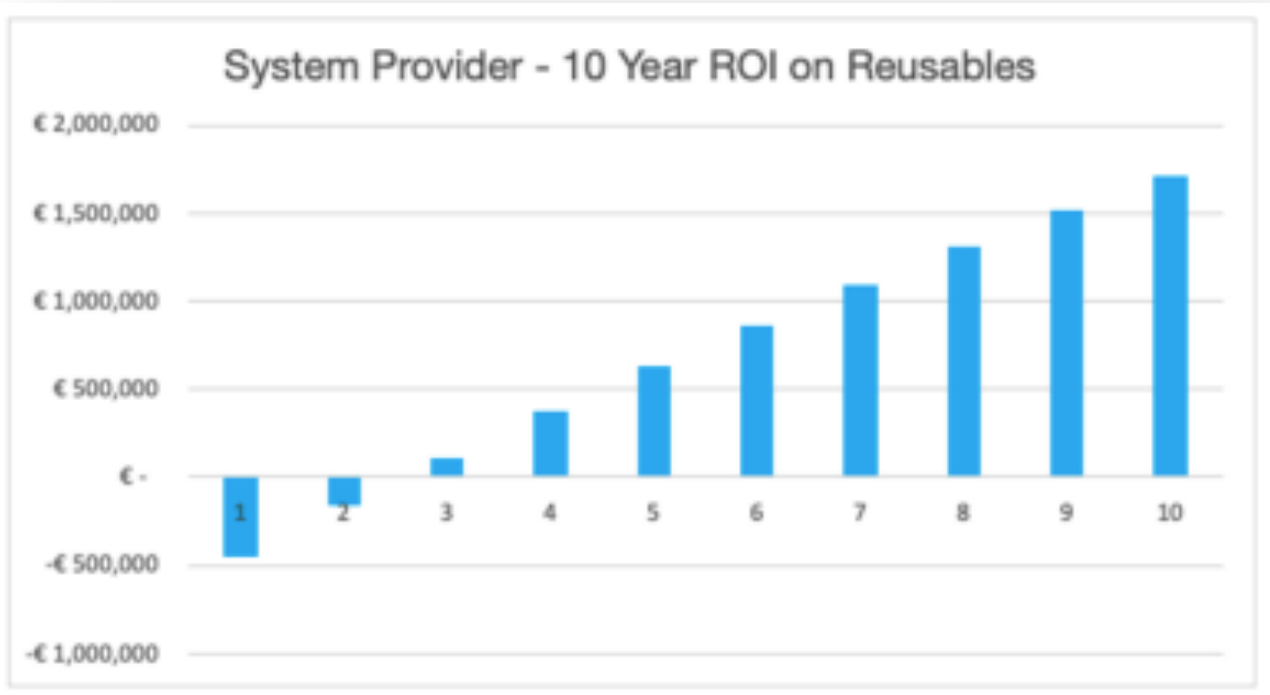
- Single-use: 0.20 €
- Reusable: 2.50 €

## Transport / Industrial - Reusable big bags, Italy

Advantages:

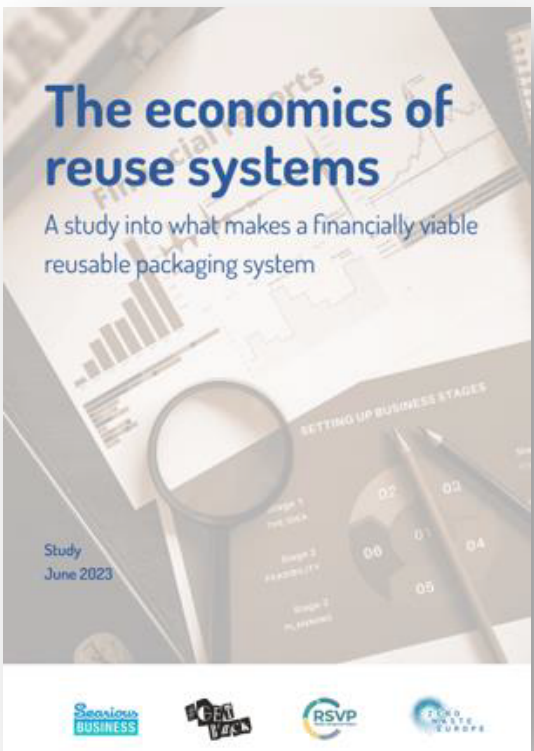
- If users return the bag, the pay-per-use fee (6 €) is the same than purchasing a single-use big bag (6 €)
- The big advantage for users of reusable transport packaging is that they do not have to organise the disposal of their packaging and can run these operations without creating waste.
- This model largely reduces the externalities created from the management of the big bag at the end of their life.
- ROI of 86 % over a 10-year period.

Remark: A 98% return rate was considered. It is crucial to aim for a return rate as close to 100% as possible and to take measures to achieve this. This is easier in a B2B environment as a contract can force clients to hand-back the packaging.



Costs of the packaging;

- Single-use: 6 €
- Reusable: 6 €



Source : Report “The economics of reuse systems”, Zero Waste Europe, 2023



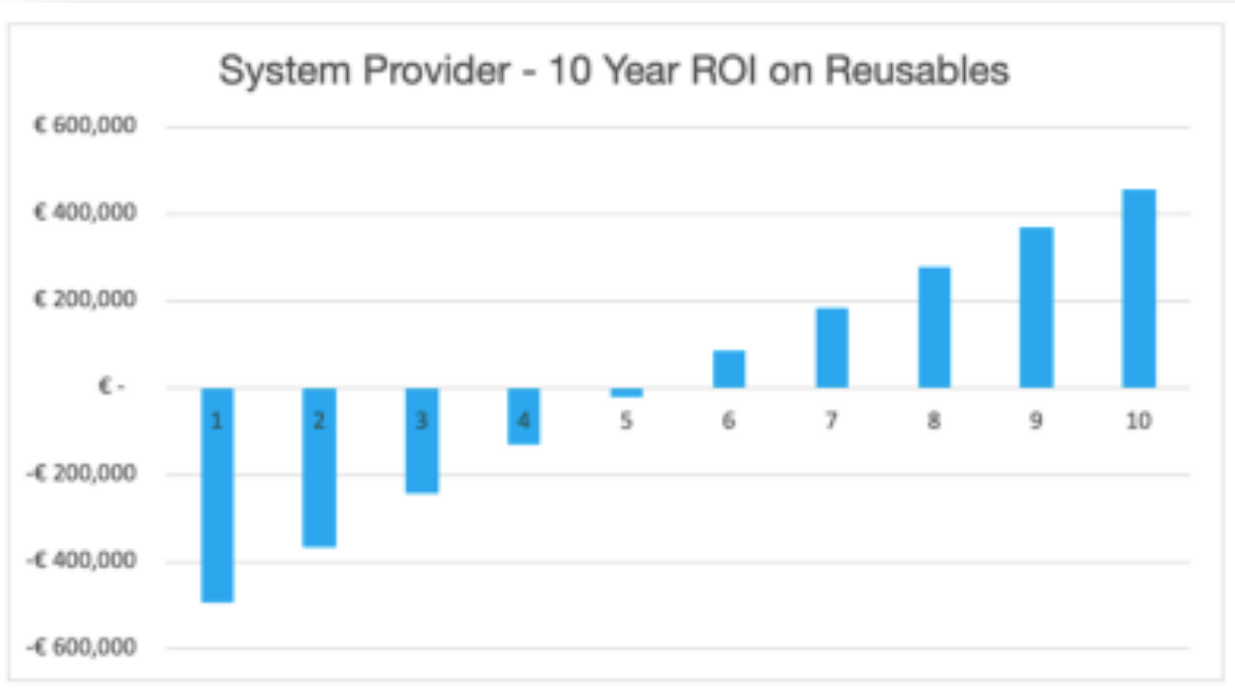
# ECONOMIC IMPACT – **SECTORIAL ANALYSIS** (2/2).

## Retail – Reusable PET bottles, Germany

### Advantages:

- PET bottles, as well as single-use PET bottles, are part of economically well-functioning systems in Germany. Reusable packaging has a slight advantage due to the lower deposit paid on the packaging. This also reflects in the prices for consumers, effectively helping bottlers to make their products more appealing on the shelf.
- ROI of 16.4 % over a 10-year period (large investments costs in a fleet of more expensive reusable PET bottles).

Remark: **A 98% return rate was considered** (aligned with Germany’s actual return rate).



### Costs of the packaging;

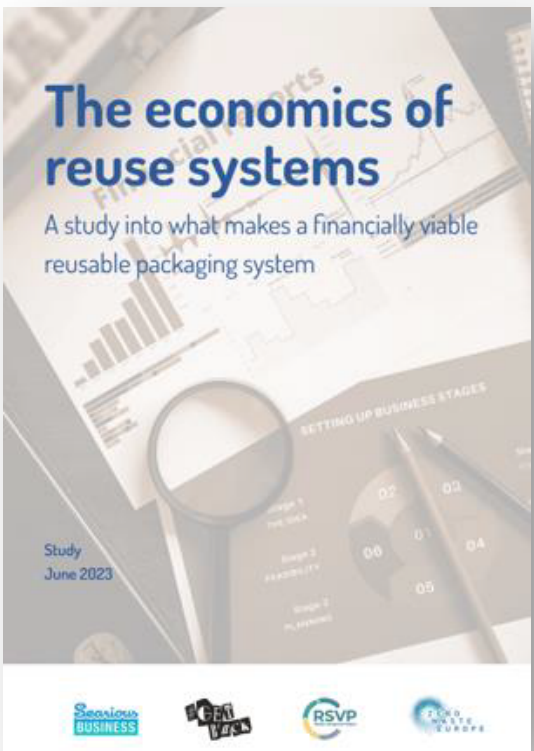
- Single-use: 0.05 €
- Reusable: 0.12 €

## Conclusion

Reusable plastic packaging can be a viable alternative to single-use plastic packaging if the right conditions apply. **When build and scaled, reuse systems, outperform single-use systems. This not only benefits businesses but also the environment as these models also significantly reduce the negative externalities generated by the managing the waste of single-use packaging.**

Numerous factors which will influence the success rate of any reuse system (e.g. packaging design, material choice, retention time, return rate, average number of rotations).

However, it is often assumed that reusable packaging needs the creation of a wide-scale supporting infrastructure for it to be financially viable, but **the use case studies show that even in isolation, there is a break-even point for all three packaging formats where investment is recovered and the system becomes profitable.** The development of collaborative pooling systems for logistics and cleaning services would only share the burden of investment and shorten this profitability threshold.



Source : Report “The economics of reuse systems”, Zero Waste Europe, 2023



# ECONOMIC IMPACT — ANALYSIS OF INDIVIDUAL SOLUTIONS.

## Transport / Industrial - Reusable kegs

Soofût (France) rents its reusable stainless-steel kegs at a cheaper price than the price of a single-use plastic keg. A brewery can use the reusable keg as easily as it would use a single-use keg: it fills the keg and can deliver it wherever in France. After it has been used, Soofût collects it, cleans it and rents it again.



ECONOMIC IMPACT



## Transport / Industrial - Reusable boxes

To reduce packaging costs and cardboard waste, Ghirardelli Chocolate (USA) switched from single-use cardboard to reusable boxes for internal distribution in 2003. The company made \$1.9 million of net savings and prevented 350 tons per year of cardboard going to landfill, resulting in additional savings from avoided disposal costs of \$USD 2,700 per year ([Morawski, 2017](#)).

## Retail – Glass bottles

Operators that have scaled their reusable bottle operations are able to sell their bottles at an equivalent or cheaper price than that of a single-use glass bottle (e.g. GDB in Germany, Bout à Bout in France). Concerning glass bottles, reusable 75cl formats remain more competitive than smaller 33cl formats.



## Retail – Food packaging

Circolution's main takeaway is that reuse needs to be convenient and affordable for both food manufacturers and end-consumers. Its products's price per kilo is equivalent to the price of the products sold in single-use packaging.

## Hospitality – Reusable cups

VasoVengo enables cafeterias to generate 2.000€ savings per year when they adopt reusable coffee cups.





# MARKET TRENDS ARE FAVORING REUSE OVER SINGLE-USE.

There are strong signals indicating the economic advantage of reusable packaging will be affected positively:

- **Price fluctuations** – Raw materials prices are increasingly volatile given political conflicts and supply chain disruptions caused by the covid pandemic. In France, in 2023, the price of glass of glass bottles increased by 60 % due to the war in Ukraine).
- **Resource availability** – The rise of packaging demand increased pressure on material availability. The need to recycle and reuse materials will increase. Although well-established for PET, recycling is still lagging for other plastic packaging groups, making reusable packaging particularly appropriate.
- **Governmental tariffs** - Recent developments in regulatory affairs also impact pricing. It is expected that additional single-use plastic taxes and eco-modulated EPR will be developed in the coming years, encouraging the use of reusable packaging.
- **Consumer behavior** - There is a growing demand for convenience putting pressure on packaging development and requiring innovative new solutions. At the same time, consumers are becoming more environmentally aware and educated about sustainability. Reusable packaging is increasingly recognised by the public as a strong, sustainable packaging solution.

## Remark for e-commerce reusable packaging

E-commerce reusable packaging does not yet compete with the prices of single-use packaging (e.g. polybags). This is mainly due to the costs of returning each packaging back to the washing / filling centre: this can cost online retailers around 2,43€ per packaging (this can be more than the cost of acquiring a new reusable packaging). Therefore, the model depends on the contribution of users or merchants.

22 to 42% of European shoppers indicate they are willing to pay extra for a sustainable delivery method. Praxpack, a pilot study from Tchibo in Germany concluded that 63% of users would be willing to contribute to these costs. On its current pilots, Amazon is paying for these additional costs, though this makes these types of projects quite unsustainable from a financial perspective.



# ENVIRONMENTAL IMPACT

The background is a solid dark blue. It features several thin, flowing red lines that create a sense of movement and depth. These lines are arranged in two main groups: one set of lines curves from the bottom left towards the center, and another set curves from the top right towards the center. A small, solid red horizontal line is positioned directly beneath the text.



# ENVIRONMENTAL IMPACT — GLOBAL OVERVIEW.

In a scenario where the share of reusable packaging increases by 20% to 50% in Europe (in 2027 and 2030 respectively) compared to that of SUP packaging, in three sectors (takeaway, e-commerce packaging and household packaging), this would lead to the following environmental savings:

By 2027 for an increase of 20%:

- Around 1.3 million tonnes of CO2 avoided
- Around 3.5 billion m3 of water saved
- 10 millions tons of plastic avoided

By 2030 for a 50% increase:

- Around 3.7 millions tonnes of CO2 avoided
- 10 billions m3 of water saved
- Around 28 millions tonnes of plastic avoided

Additional facts & figures on the environmental impact of reusable packaging on NewERA and Planet Reuse's report

A meta study shows that of the 32 LCAs analysed, 72% show positive results for the environmental impact of reusable packaging compared to single-use (16% negative and 12% mixed results).

Source: Report "Reusable vs single-use packaging", Reloop, 2020



Source: Report "Realising Reuse", Rethink Plastic & BFFP, 2021



Source: Report 'Give Reuse a Green Light', New ERA & Planet Reuse, 2023



# ENVIRONMENTAL IMPACT — SECTORIAL ANALYSIS.

| Sector                 | Scope  | Transport distance          | Results and number of cycles needed for the reusable packaging to have a better impact than the single-use packaging  | Source   |
|------------------------|--|-----------------------------|---|--|
| Transport / Industrial | RPCs used to distribute fruit and vegetables compared to SPCs (60% lighter).                         | 140 km                      | Starting from 3 deliveries, RPCs make environmental sense compared to SPCs for all indicators analysed (e.g. climate change, ozone depletion, freshwater eutrophication).   | <a href="#">LCA of Reusable Plastic Crates (RPCs), 2019</a>                    |
| Transport / Industrial | RPCs used to distribute fruits and veg compared to wood, plastic or cardboard SPCs                   | 440 km                      | Starting from 30 cycles, the environmental impact of the reuse model is at least twice as less as the linear model.   | <a href="#">RPC Economic and environmental assessment, 2014</a>                |
| Retail                 | Reusable beer glass bottles compared to SU beer glass bottles (18% lighter).                         | 260 km                      | Starting from 20 cycles the reusable bottle consumes 76% less energy, 33 % less water and emits 79% less GHG than the linear model.   | <a href="#">French environmental agency (ADEME), 2009</a>                      |
| Retail                 | Reusable water glass bottles compared to SU water glass bottle (same weight).                        | 200 to 800 km               | 200 km: from 2 cycles, the use of reusable bottles is by far preferable. 400km: at least 4 uses are required. 800 km+: the reusable bottles are not convenient even after 30 uses.  | <a href="#">Reusing glass bottles in Italy: LCA evaluation, 2020</a>           |
| Hospitality            | Reusable takeaway food container compared to a SU takeaway food container                            | 10 km                       | Starting from 6 cycles, the reusable container has a better GWP impact than the SU container. Though, due to the washing stage process. it had a higher impact on several other indicators (e.g. marine and freshwater eutrophication). | <a href="#">Life cycle assessment of reusable plastic food packaging, 2024</a> |
| E-commerce             | Reusable PP box (1,7 kg) compared to a SU carton. Reusable PP bag (100 g) compared to a SU LDPE bag. | Box: 600 km<br>Bag: 2000 km | The reusable PP box has lower CO2 emissions starting from 100 cycles (the 100% PCR reusable box from 20 to 50 cycles). The reusable PP bag has lower CO2 emissions from 5 cycles (the 100% PCR reusable bag from 3 cycles).             | <a href="#">SU vs. reusable packaging in e-commerce, 2020</a>                  |

SCP: Single-use plastic crates  
RCP: Reusable plastic crates

Climate: Greenhouse gas emissions to the environment  
GWP: Global Warming Potential

SU: single-use



# ENVIRONMENTAL IMPACT — ANALYSIS OF INDIVIDUAL SOLUTIONS (1/2).

## Hospitality - ReCircle

The reCIRCLE BOX must be used between 13-15 times depending on the type of washing to have less impact than the average disposable box. Overall, the reCIRCLE BOX stands out for its remarkable reusability, enduring up to 200 uses. With a notably low carbon footprint of just 19g CO<sub>2</sub>eq, it significantly reduces emissions compared to single-use takeaway containers (82g CO<sub>2</sub>eq).



## Hospitality - CLUBZERØ

Compared to disposable single-use coffee cups and a returnable ceramic cup, the 1.3+ million CupClub used saved:

- 2.6 million single-use plastic packaging items ending up in landfill and 22kg of waste (18kg of paper + 4kg of plastic) being discarded,
- 39 tonnes of CO<sub>2</sub> entering the atmosphere
- 260m<sup>3</sup> of water being used to manufacture new single-use packaging items

## E-commerce – Hipli

Hipli reusable packaging can reduce the carbon footprint by up to 80% compared to its single-use cardboard (100% recycled) equivalent and up to 30% compared to its single-use plastic pouch equivalent. The reverse logistics of the packaging generate 20g of CO<sub>2</sub>, which is 11 times lower than the emissions related to the production of a new single-use cardboard.



## E-commerce – Movopack

Compared to a single-use cardboard packaging (70 % recycled raw material, recycled at 87 %), Movopack reusable packaging reduces CO<sub>2</sub> emissions by 75 %, energy by 72 % and water by 75 %. Improvements are already significant after the third use, with a CO<sub>2</sub> reduction of 53 %, energy saving of 51 % and water saving of 58 %. Managing around 50.000 packaging units led to a decreased waste production by 12.000 kg, CO<sub>2</sub> emissions by 1.000kg and saved 50.000 litres of water. Implementing Movopack's reusable packaging solution as a checkout option on its partners' website led to a 10 % increase in conversion rate and an 11 % increase in average order value.

## E-commerce – RE-ZIP

Reused on average four times, RE-ZIP packaging enabled a CO<sub>2</sub>e reduction of 2,73 tonnes over three-years and avoided:

- 2,73 tonnes of cardboard waste compared to the use of single-use cardboard packaging of 212g,
- 0,22 tonnes of plastic waste reduction compared to the use of a single-use plastic packaging of 16g.



# ENVIRONMENTAL IMPACT — ANALYSIS OF INDIVIDUAL SOLUTIONS (2/2).

LCAs from individual reusable packaging solutions operating in the retail industry are missing. However, this graph gives a good understanding of the GHG emissions of the different packaging options for selling beverage:



\* Public figures from Pernod Ricard's Blender's Pride and Imperial Blue reuse model in India : In 2019, 60 million bottles reused lead to a reduction of 21K tons of CO<sub>2</sub> emissions. With x the number reusable bottle emission per litter:  $(675 - x) \times 60 \text{ million} \times 0,75 = 21 \text{K tons}$

\*\* Estimated figure. According to the ADEME, CO<sub>2</sub> emissions are reduced by 79% when a glass bottle is reused 20 times and that the reverse logistic does not exceed 250km.

\*\*\* Estimated figure. 87% reduction in CO<sub>2</sub> emissions associated with packaging and distribution per bottle for FAIR Vodka for ecoTOTE distribution in Paris vs. single use glass bottles. 550g emissions saved per bottle. Both figures show an initial assumption of a 632g CO<sub>2</sub> e/L for a 0,75 L bottle: 82 g CO<sub>2</sub> e/L considering that a 0,75 L bottle emits 632 g CO<sub>2</sub> e/L and 125 g CO<sub>2</sub> e/L with the assumption of a 0,75 L emitting 675 g CO<sub>2</sub> e/L..

\*\*\*\* 6 o'clock gin's public figures based on Finland's 2018 national alcohol retailer analysis.



**GOING FURTHER**

The image features a dark blue background with abstract, flowing red lines that create a sense of movement and depth. These lines are concentrated in the lower-left and upper-right corners, framing the central text. A small, solid red horizontal bar is positioned directly beneath the text "GOING FURTHER".

# ENSURING ECONOMICAL AND ENVIRONMENTAL **SOUNDNESS.**

There are several parameters that can influence the economic and environmental soundness of reuse models:

- **Standardisation & Design:** Uniform, stackable, and durable packaging lowers costs, simplifies logistics, and reduces emissions while ensuring safety and hygiene.
- **Transport & Infrastructure:** Shorter transport distances and shared reverse logistics systems greatly enhance both environmental and economic efficiency.
- **Reuse Frequency:** The number of rotations is critical—more reuses per item increase sustainability and cost-effectiveness, depending on the break-even point.
- **System Support:** Deposit return schemes, digital tracking, and strong policies (e.g. bans, incentives) are vital for encouraging adoption and maintaining system performance (such as return rates).
- **Consumer Engagement:** Public acceptance hinges on convenience, affordability, and behavioral shifts away from disposability, supported by clear communication and collaboration across sectors.

## Remark when reusing plastic packaging

Although plastic packaging is light, cheap, resistant to breakage and can be designed in various ways, reusing plastic packaging can pose several health risks due to the breakdown of plastic materials over time. With repeated use, especially when exposed to heat or physical stress, plastics can become very permeable. They can leach harmful chemicals like bisphenol A (BPA), phthalates and other additives into food and beverages. These chemicals have been linked to hormonal disruptions, developmental problems, and an increased risk of certain cancers. Additionally, reused plastic containers can harbor bacteria in scratches and crevices, absorb chemicals used during the cleaning process that will then be released in the food and beverage items. For these reasons, it's important to use food-safe, reusable alternatives and avoid repurposing single-use plastics.



# FINDING **ADDITIONAL** INFORMATION.

Please reach out if if you need any additional information!



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