



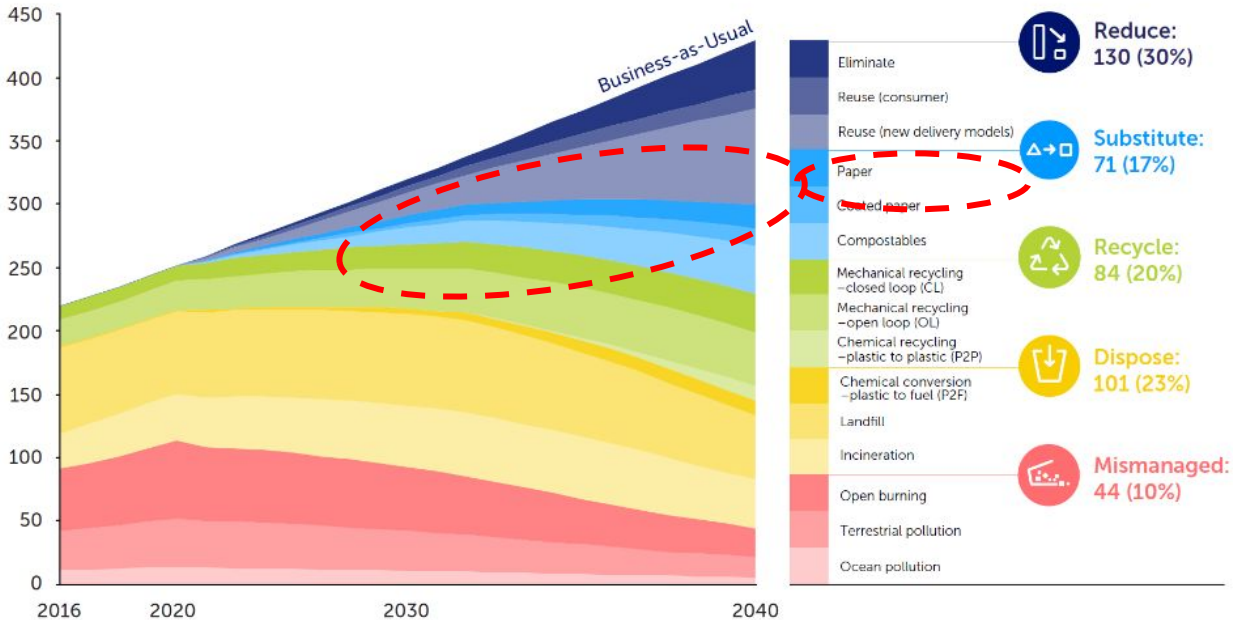
# Setting the Scene For Reuse:

## Opportunities & Challenges

**Dagny Tucker, Ph.D.**  
**Perpetual | Vessel Works**  
**Food Packaging Forum 2023**

# Reuse is a critical solution to plastic waste and pollution

Million metric tons per year



This "wedges" figure shows the share of treatment options for the plastic that enters the system over time under the System Change Scenario. Any plastic that enters the system has a single fate, or a single "wedge." The numbers include macroplastic and microplastic.

Reuse is the largest lever for reducing plastic waste and pollution

# Opportunity

Reuse systems have the greatest potential to reduce plastic pollution compared to source reduction, material substitution, mechanical and advanced recycling and managed disposal.

**PEW CHARITABLE TRUSTS**  
**2019**



Established history  
of reuse.





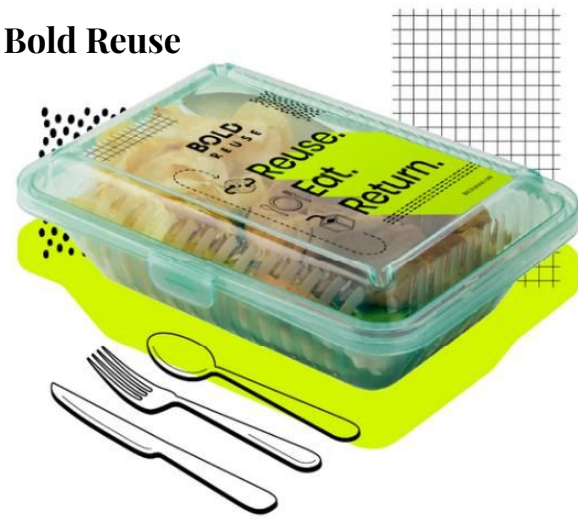


Loop



Kooky

### Bold Reuse

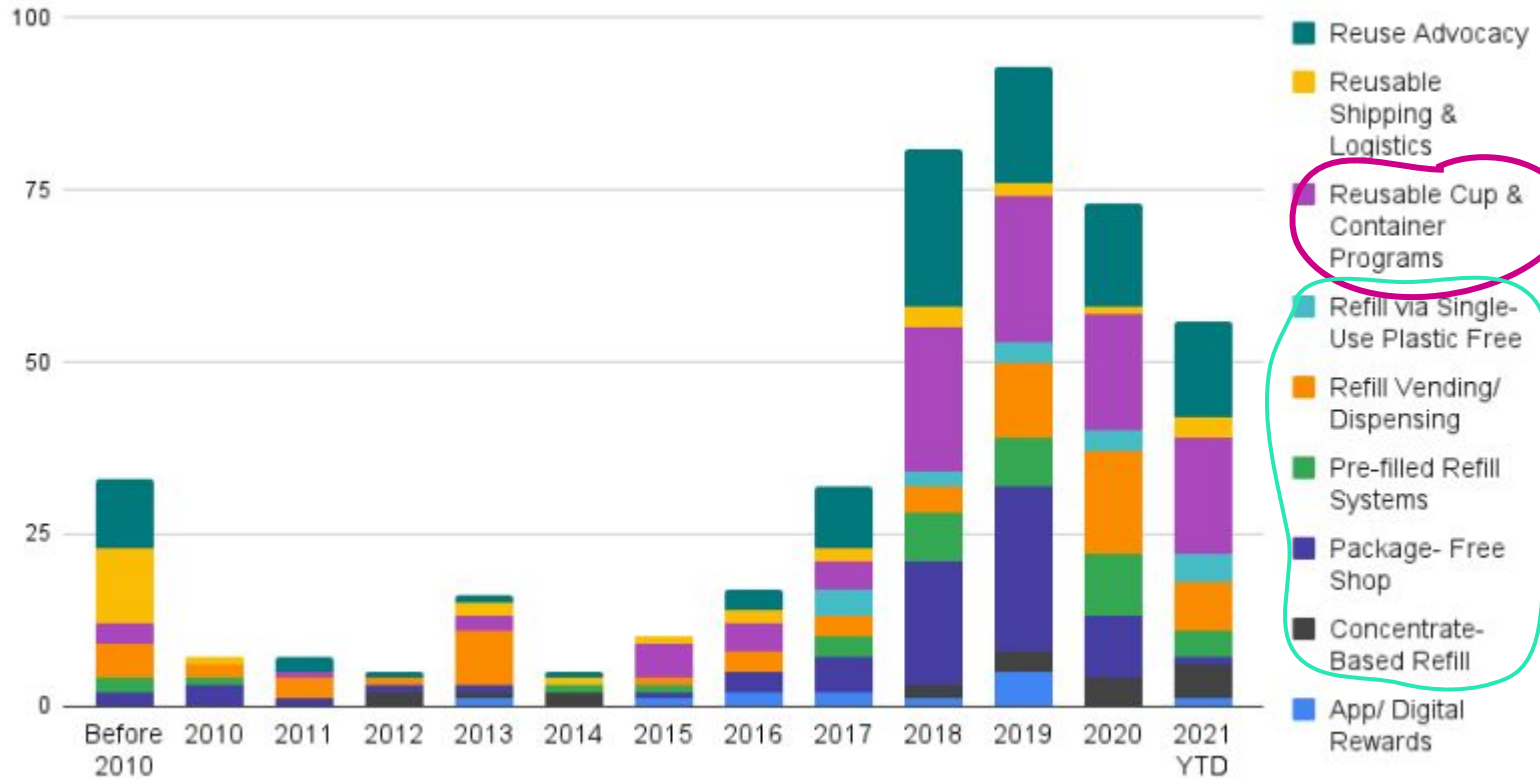


Reinvented for modern contexts and lifestyles.

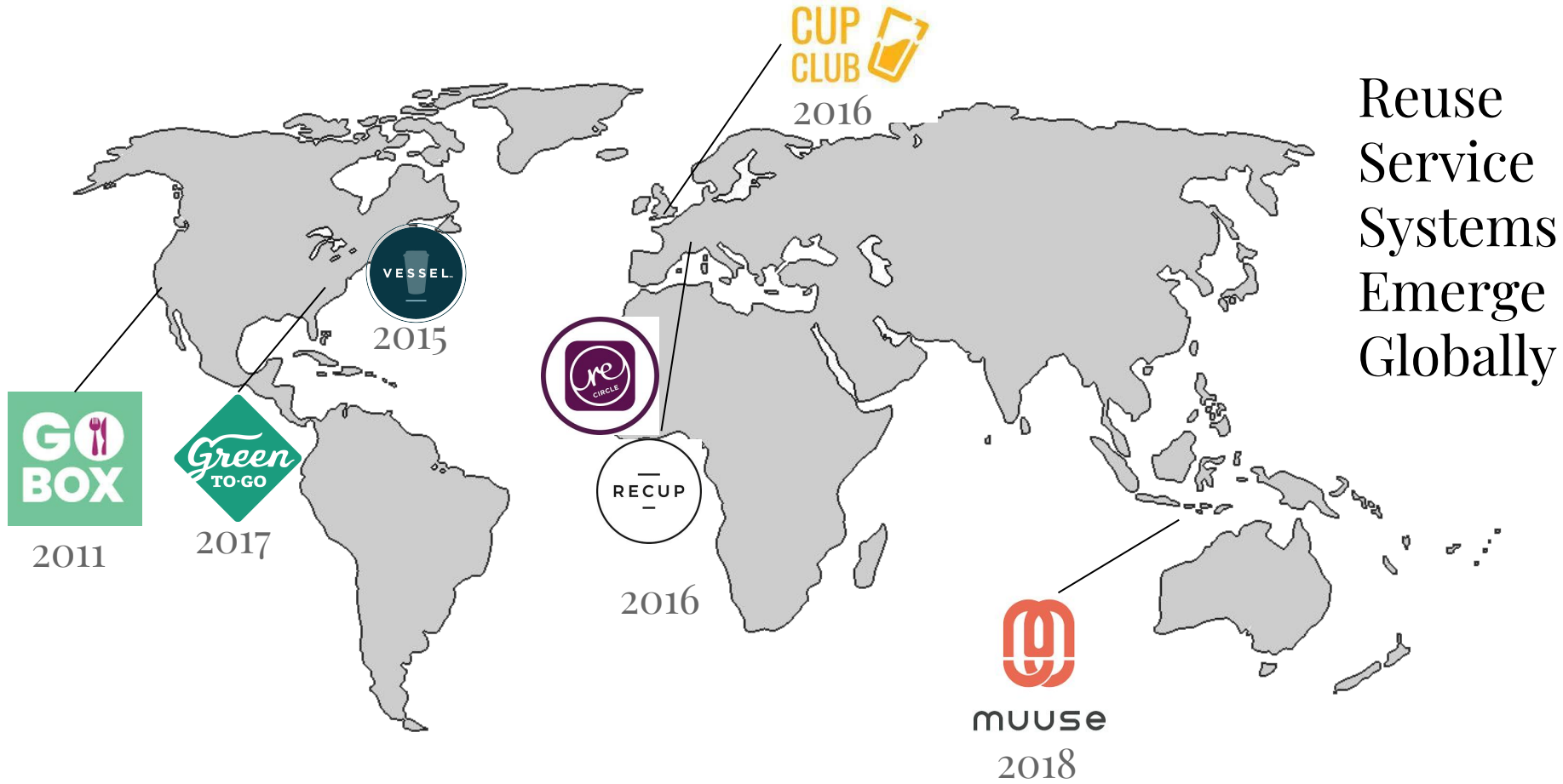
### Dispatch Goods



## Type of Reuse Solution by Launch Year - Global



Source: ReuseLandscape.org



2011



2017



2015



2016



2016



MUUSE

2018

Reuse Service Systems Emerge Globally

00 0000

# NATIONAL GEOGRAPHIC



PLANET OR PLASTIC?

4 billion pounds  
of plastic waste  
are dumped in  
the ocean each  
year. Another  
100 million are  
left behind.

NATIONAL  
GEOGRAPHIC



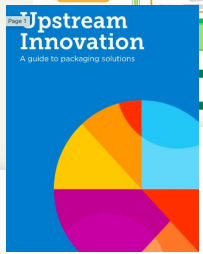






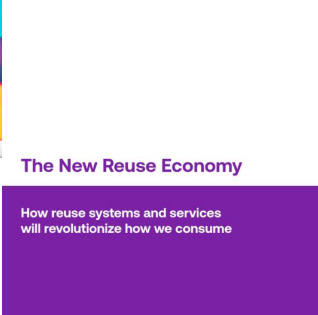
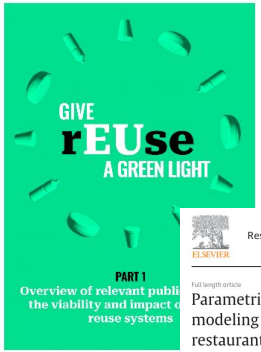
# Publications & Reports

2020



2021

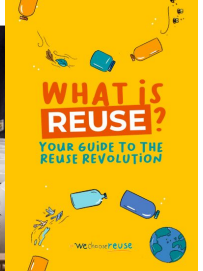
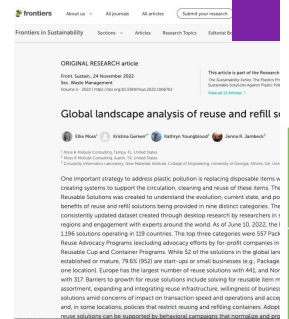
2023



2019

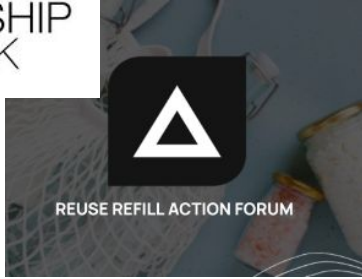


2022



[\\*Reuse Landscape Publications List](#)  
[\\*New Era Resources](#)   [\\*Zero Waste Europe](#)

OCEAN  
PLASTICS  
LEADERSHIP  
NETWORK



SUSTAINABLE PACKAGING  
COALITION®

A Project of  
GREENBLUE™

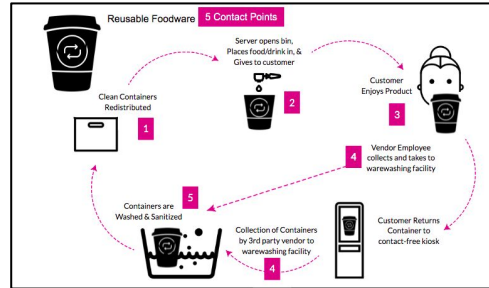
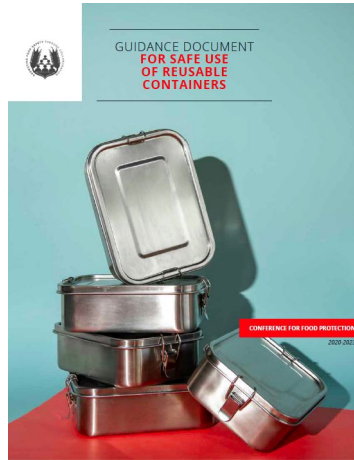
## REUSABLE PACKAGING COLLABORATIVE

Discussing reusable packaging fundamentals and challenges, while identifying opportunities where reusable packaging fits in the sustainable packaging space.

# Reuse Working Groups & Collaborations



# Policy



# Regulatory

# LCA Wars



## Comparative life cycle analysis of disposable and reusable tableware: The role of bioplastics

A. Genovesi<sup>a</sup>, C. Aversa<sup>a</sup>, M. Borletta<sup>a</sup>, A. Esposito<sup>a</sup>, G. Cioppella<sup>a</sup>, A. Siorino<sup>a</sup>

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<https://doi.org/10.1016/j.clet.2022.100419>

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### Abstract

Annually, 115,000 tons of plastic tableware are used in Italy. The end of life of these

**SINGLE-USE AND REUSABLE PACKAGING FOR TAKEAWAY IN QUICK-SERVICE RESTAURANTS**

Single-use paper-based packaging scores better in every impact category analyzed in a new comparative life cycle assessment (LCA study). From CO<sub>2</sub> equivalent emissions, water consumption and more resource depletion we saw that the negative effects of switching to compulsory reuse system for delivery and takeaway meals.

Overall, reusable packaging was found to:

- +64% Freshwater use
- +91% CO<sub>2</sub>-equivalent emissions
- +129% Fine particulate matter
- +85% Fossil depletion
- +433% Metal depletion

Our conclusion is that the transport back from the restaurants as well as the washing and drying of the containers, were the most important stages of environmental burden for multi-use and the reason for their larger environmental impact. Due to its inherent nature, single-use paper-based packaging does not require transport back to the restaurants for additional washing. It can be easily recycled and turned into high-quality secondary products.

The study, peer-reviewed by a panel of international specialists, confirms that switching to a reuse system for single-use packaging comes before, and is by far the most effective packaging solution overall. The three independent review reports part of the reuse panel cycle have been prepared, providing useful and reliable information for stakeholders interested in this topic.

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# Industry Groups & (Harmonization) Standards



PR3 *Partnership to Reuse, Refill, Replace Single-Use Packaging*

## Objectives

**01.**

To speak with one voice and influence legislative, infrastructure and financial developments so as to achieve our shared vision

**02.**

To raise awareness on what constitute efficient, convenient and sustainable reuse systems

**03.**

To provide a space for actors in the reuse packaging world to meet, exchange and build synergies

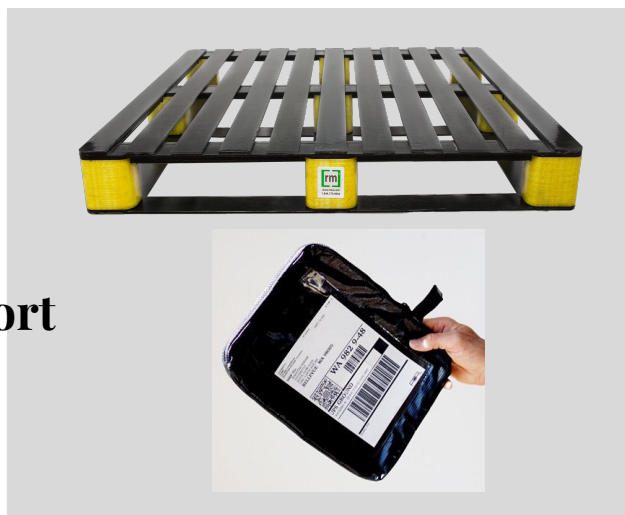
 Reusable Packaging System Design Standards

Title	Description	KEY AUDIENCE								Links
		Collection Point Designer	Container Designer	Retailer/Venue	City/Government	Logistics Provider	Washing Provider	System Administrator		
Part 1: Collection points	Collection point requirements, including machine and bin design, labeling and digital requirements, and guidance for collection point placement.									<a href="#">Full document</a> <a href="#">Summary document</a>
Part 2: Containers	Container design requirements, including minimum return and use cycles, materials, shape, durability, labeling and digital tagging.									<a href="#">Full document</a> <a href="#">Summary document</a>
Part 3: Digital	Digital requirements for containers and collection points, including the basic data elements that must be included in QR codes or other digital tags.									<a href="#">Full document</a> <a href="#">Summary document</a>
Part 4: Return incentives	Requirements for establishing and administering deposit systems and other incentives that encourage consumers to return containers.									<a href="#">Full document</a> <a href="#">Summary document</a>
Part 5: Labeling	Requirements for labeling reusable containers and collection points and for signage at participating venues. Includes the reuse symbol, colors, fonts, etc.									<a href="#">Full document</a> <a href="#">Summary document</a>
Part 6: Reverse logistics	Requirements for the proper and safe handling of containers from pickup at a collection point through redistributed for refilling.									<a href="#">Full document</a> <a href="#">Summary document</a>
Part 7: Washing	Requirements for washing, sanitizing, and handling of foodware containers, including cups and take-away food packaging.									<a href="#">Full document</a> <a href="#">Summary document</a>

ON #REUSEREVOLUTION #REUSER



**Primary**



**Transport**

**Secondary**



**Packaging**



# Grocery and Vending

Day-by-Day



Fresh Bowl



Cleen Kilo



“Consumer packaged goods” (**CPG**) or “fast moving consumer packaged goods” (**FMCG**) are items used daily by average consumers that require routine replacement or replenishment, such as food, beverages, clothes, makeup, and household products.

Bold Reuse



Suppli



Muuse



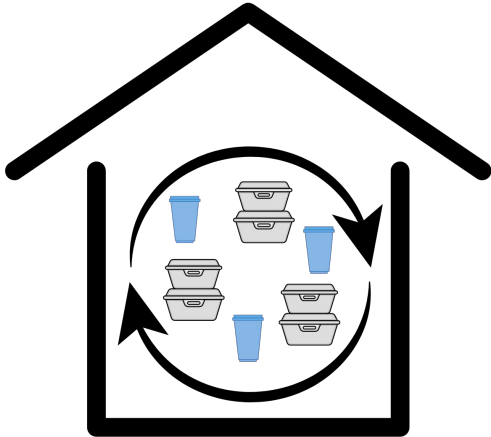
# Delivery and Takeout Foodware

# Reusable foodware is happening - but at small scale

## Single-site:

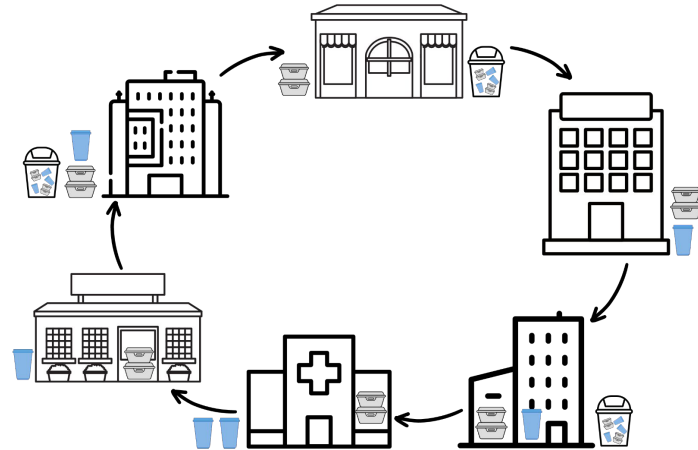
Reusable items circulate within a single location

Status today:  
Success stories at institutional and event scale



## Open Network

Reusable items circulate within a neighborhood or city



Status today:  
75+ programs in US & Europe currently, proven tech for tracking, logistics, washing



PERPETUAL

# How It Works





# SPOT THE REUSABLE!

**LOVE coffee, HATE the waste?**

It just got easier to skip the single-use habit. ❤️

**DOWNLOAD app**



okapi-reusables.com

\$10 one-time membership fee. Free to borrow.

1- Tap **BORROW** on app.  
SCAN code at counter

2- **SHOW BARISTA** app confirmation screen as you order your usual drink

Return to any cafe in network within 2 weeks

**Borrow an OKAPI cup to-go**



okapi-reusables.com

**Ready to borrow a reusable cup?**

1- Tap **BORROW** on OKAPI Reusables app.  
SCAN QR code below

2- **SHOW BARISTA** app confirmation screen before ordering

Repeat if borrowing a second cup.  
Return cup to any cafe in network within 2 weeks.



**OKAPI REUSABLES**

Skip the single-use waste!  
Download app at okapi-reusables.com

**RETURNABLE TO-GO CUPS**  
okapi-reusables.com  
8, 12, 16 oz sizes

Take me with you!

Download app to start borrowing



**RETURNABLE cups inside!**



**OKAPI REUSABLES**

okapi-reusables.com



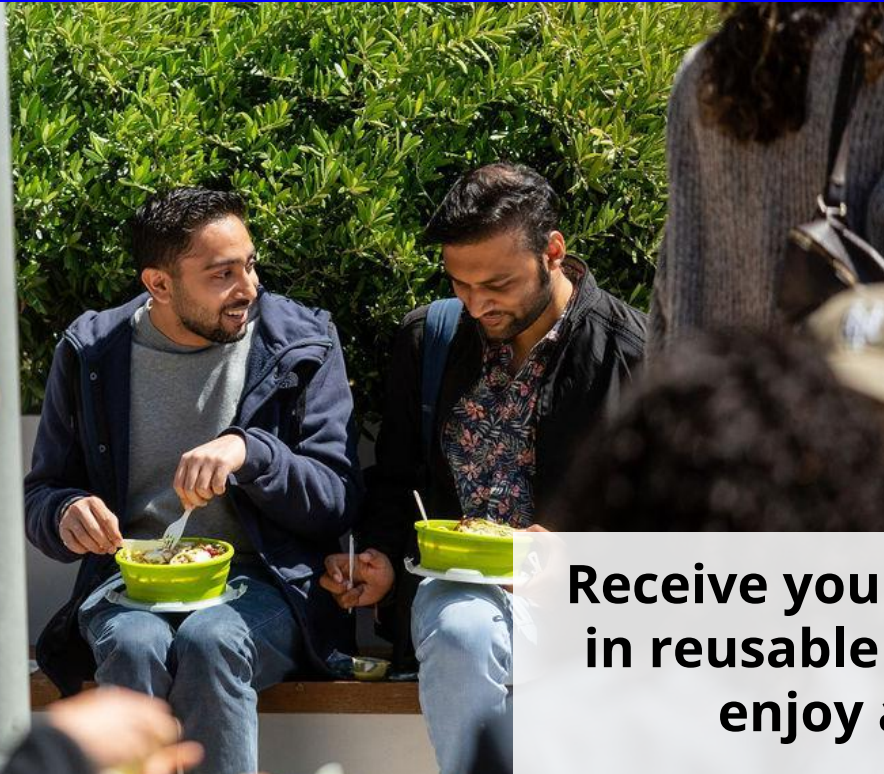
# CHECK OUT A CONTAINER

---



# ENJOY YOUR FOOD & DRINK!

---



**Receive your food and drink  
in reusable containers and  
enjoy anywhere!**



# DROP OFF YOUR CONTAINER



**Return your containers to drop off bins conveniently located all over town!**



# CONTAINERS ARE COLLECTED

---



**Containers are collected and transported to a cleaning facility in town**





# CONTAINERS ARE WASHED

---



**Containers are washed and  
sanitized in a commercial  
health dept approved facility**

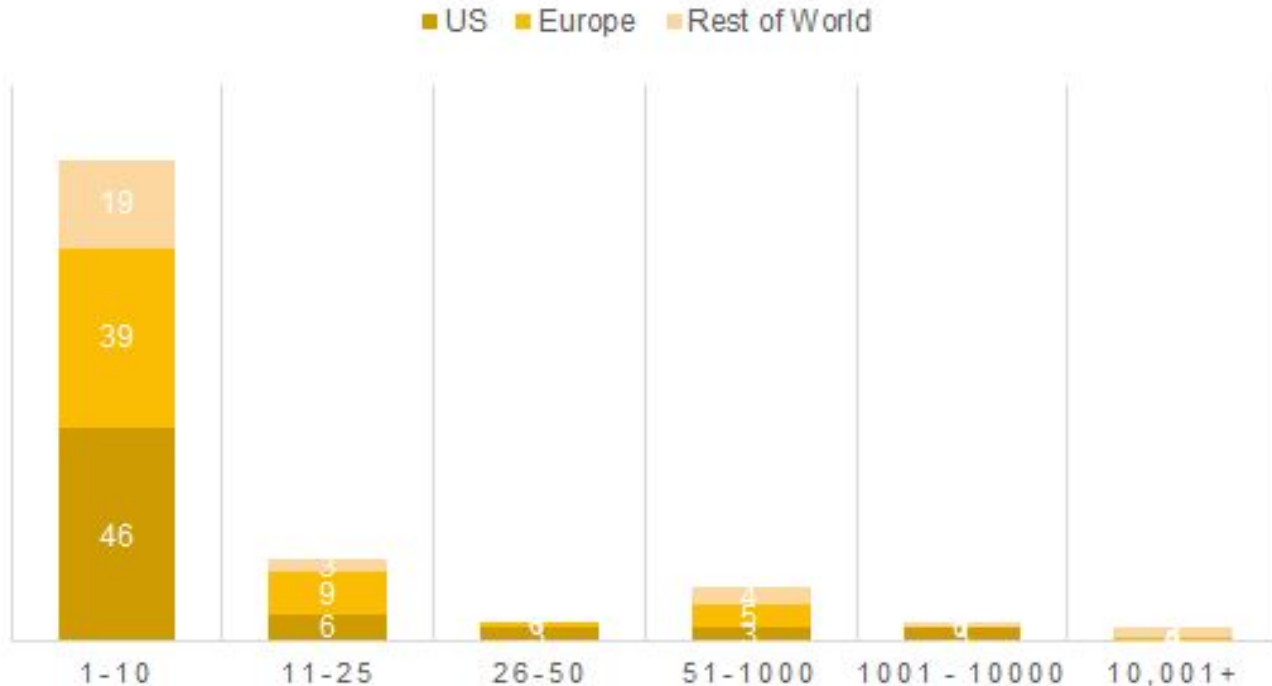


# CONTAINERS REDISTRIBUTED



**Containers are redistributed  
at participating restaurants  
and cafes around town!**

# Dozens of reuse systems are operating around the world, some for over 10 years



- The vast majority of reusable cup & container programs today are small startups and pilots
- Startups and pilots are delivering learnings but they have not had the resources to create the full ecosystem needed for success
- Large company pilots, e.g. KFC China and Starbucks and Costa Coffee in Europe, are confirming that reuse requires scale to work

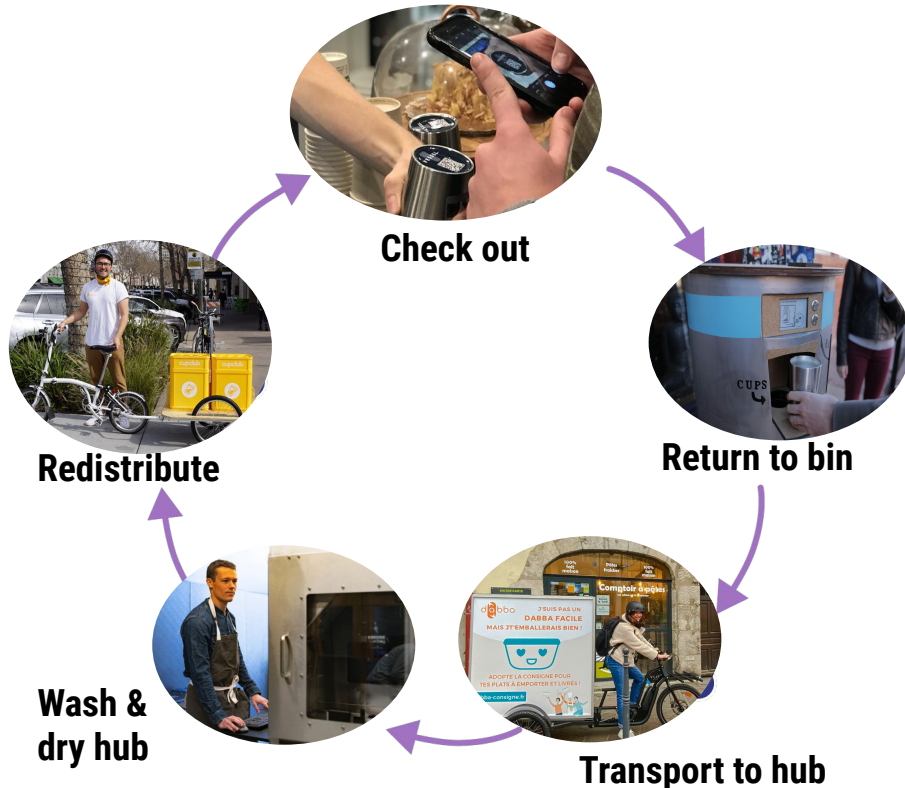


**SINGLE USE  
PACKAGING  
BENEFITS FROM  
PUBLIC  
INFRASTRUCTURE**





# Challenges for Open Loop Reuse Systems



**Difficult to achieve convenience & affordability** for customers and businesses unless the system is interoperable across a geographic area.

**Can only unlock environmental benefits when** there is a holistic design with shared infrastructure, high return rates and efficient washing.

**There are no established governance models** to define the roles cities and service providers play and how they work together.







# Immersive Scale is Key

**Reuse works best when the whole ecosystem is in place**

- Many - ideally most - restaurants offer at least one reusable item, ideally as the default option
- Collection bins, washing infrastructure and logistics in place
- Clear and consistent signage and behavioral cues for users
- High volumes of items keep per use costs low and increase environmental benefits of system

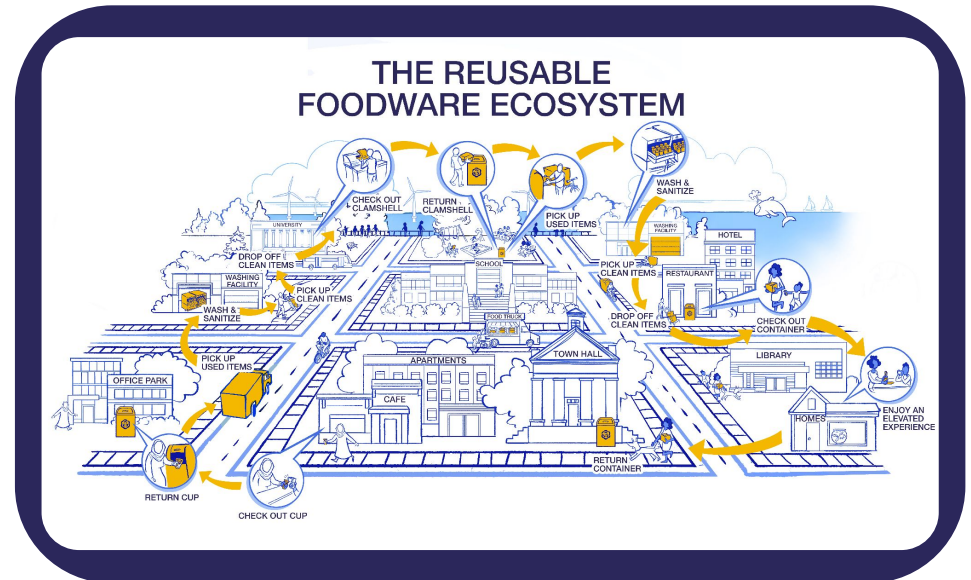




The **Reuse Vanguard Project (RSVP)** is a project aiming to put reusable systems in the center of the solutions agenda and **create the conditions for these systems to get to scale in Europe.**



An NGO partnering at the city level to design and support reuse system implementation – **starting with foodware**





## **Building the system conditions needed to scale up require coordination and harmonisation across Europe.**

There are many businesses interested in reuse, but they have to create their own infrastructure, because of a lack of support.

**We believe reuse infrastructure should be provided as a public good,** so that consumers and business owners find it easier and cheaper to reuse packaging as opposed to disposable ones.

# European Blueprint

Scaling and replicating in a harmonised way

## The goal

Elaborate, test and spread a blueprint that supports and harmonises the **creation of a performant and resilient reuse infrastructure development model** across Europe and its scaling up until 2025.

We start with the key sectors of **take-away food and drink** while preparing the ground for other sectors.

7 essential criteria were identified:

- (1) Recognisable;
- (2) Interoperable;
- (3) Inclusive;
- (4) Replicable;
- (5) Effective;
- (6) Guaranteed Safety;
- (7) Simplicity





# Perpetual's role in the process

**Support cities, community groups and members, and businesses** to design the reuse system & governance model that will work best for them using a community-driven design process.

**Bring technical expertise** to optimize reuse system design.

**Mobilize funding** for infrastructure and transition costs.

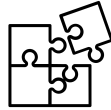
**Facilitate the selection of reuse service providers** to play a role in operating the system.

**Provide on-the-ground support** for system set up and launch.

**Share best practices** and provide tools and templates for other communities to guide the creation of their own systems.



# Perpetual's approach



## MAPPING & ENGAGEMENT

Is there interest?

Local partners

Circularity  
Assessment  
Protocol

## DESIGN PHASE

Community  
Design  
Workshops

Identify  
community  
assets

Life Cycle  
Assessment

## SYSTEM SETUP

Establish local  
entity

Secure  
providers,  
equipment,  
space, permits

Enroll  
businesses

## PRE-LAUNCH

Outreach and  
education  
campaigns

Install and test  
all equipment

Get ready!

## LAUNCH

All systems  
go!

Lots of  
hands-on  
support for  
first several  
weeks +

## SYSTEM IMPROVEMENTS

Monitor  
system  
performance

Make changes  
to help the system  
work better and  
better over time

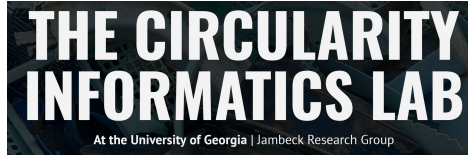
## Local Partners



**ZEROWASTE.ORG**



## Academic Partners



## Program Partners



**Perpetual's Partners**



# Perpetual's collaboration model

## WORKING ACROSS CITIES

**Perpetual**  
Project management  
Technical & system design expertise  
Cross-city learning group

**Academic Partners**  
Circular Assessment Protocol  
LCA parametric modeling  
GIS volume modeling & optimization

**Corporate Partners**  
Engage in design process  
Share data on packaging volume & packaging assortment

**Behavioral Science Advisors**  
Education & communication expertise  
Messaging campaigns



## WITHIN EACH CITY

**Lead Local Partner**  
Main point of contact in community  
Business engagement  
Volunteer management

**City Governments**  
Champion the program & build support  
Inform governance model  
Potential to invest in / own infrastructure

**Reuse Service Providers (TBD)**  
Assets & asset management  
Washing & sortation  
Forward/reverse logistics



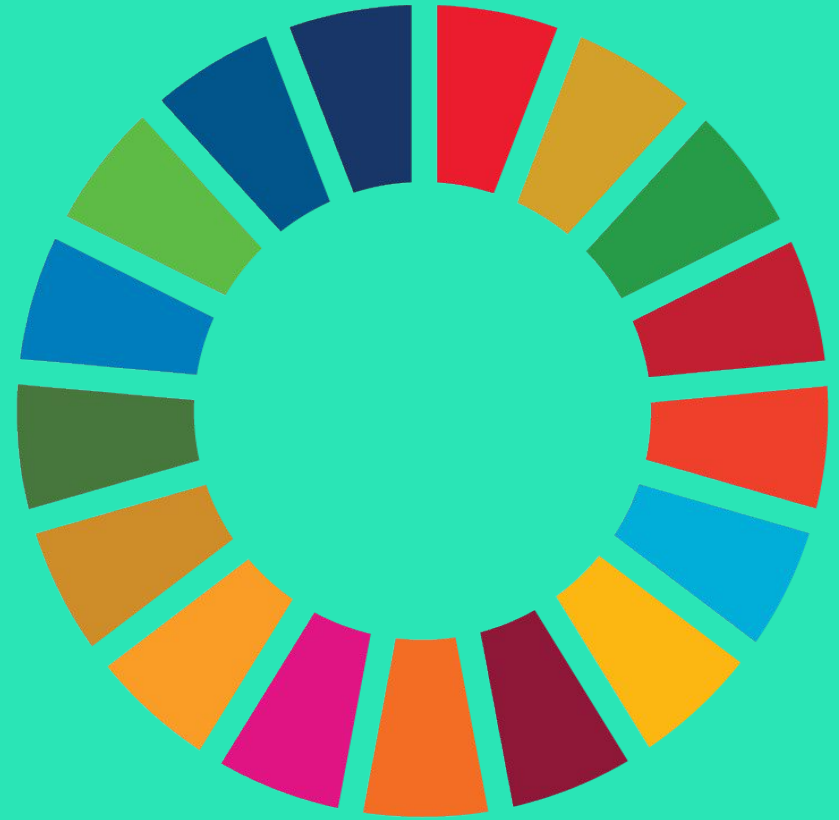
# Critical Needs from food packaging & extended community

1.

Ensure **policy, legislation, and treaties** etc. prioritize a **systems approach** to reuse system design with governance to assure;

**shared infrastructure as a public good, interoperability & safe materials.**

**Funding schemes** like EPR **should support reuse** system design, stakeholder engagement, transition costs and capex costs for reuse infrastructure.





# Opportunity

**prevent unintentional and detrimental impacts on human health and...**

Reuse systems have the greatest potential to ^ reduce plastic pollution compared to source reduction, material substitution, mechanical and advanced recycling and managed disposal.

**PEW CHARITABLE TRUSTS  
2019**

2.

Provide the **tools (science & storytelling)** to make healthy, safe, sustainable material choices.



# Engage



 [perpetualuse.org](https://perpetualuse.org)

 [@perpetualuse](https://www.linkedin.com/company/perpetualuse)

Reach out at [hello@perpetualuse.org](mailto:hello@perpetualuse.org)

# Thank you!