

# Circular Economy and Waste Management in Europe

## The European Experience: Opportunities and Viability to Rio de Janeiro

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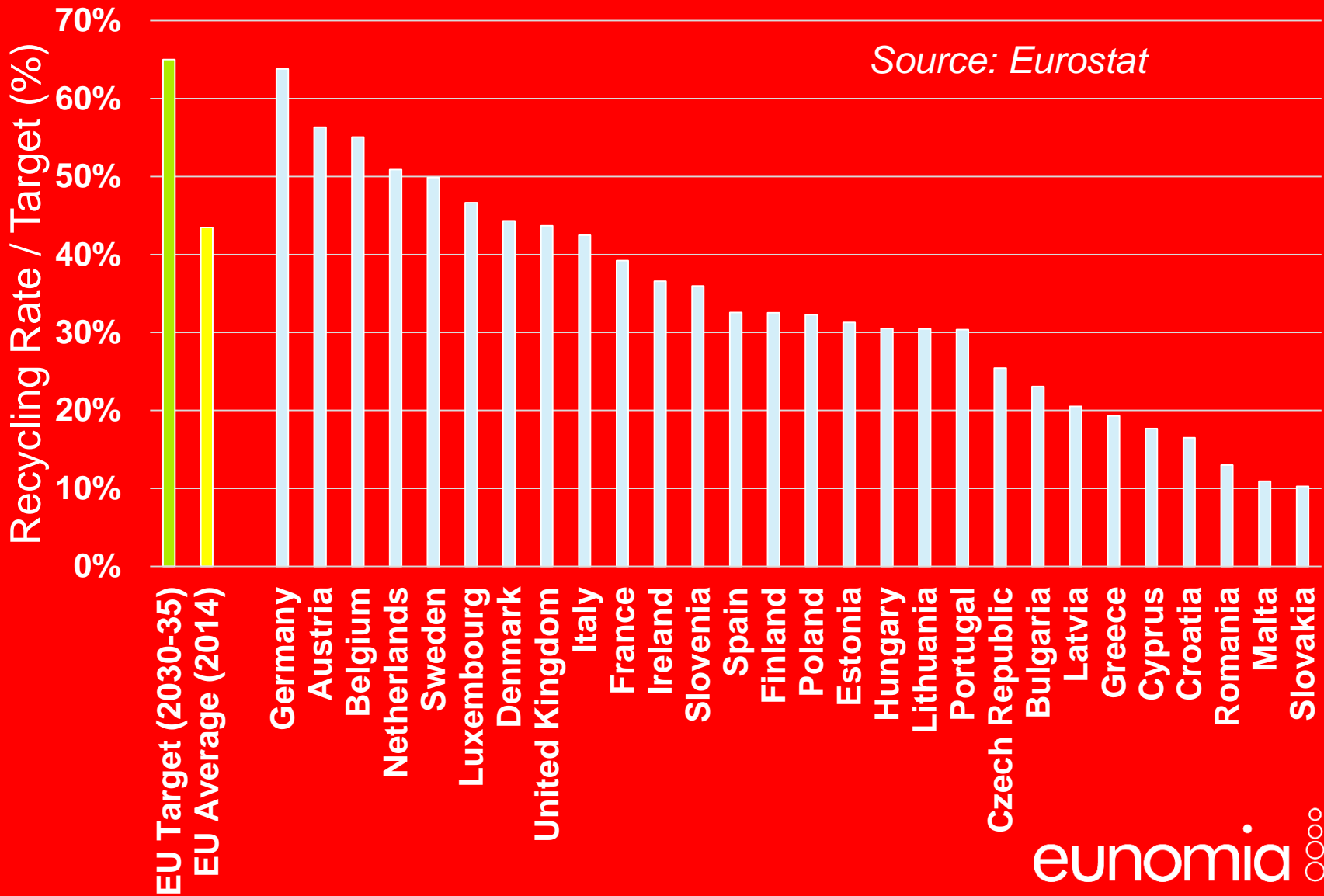
# Europe's Legislative Package

# Municipal Waste – Recycling Target

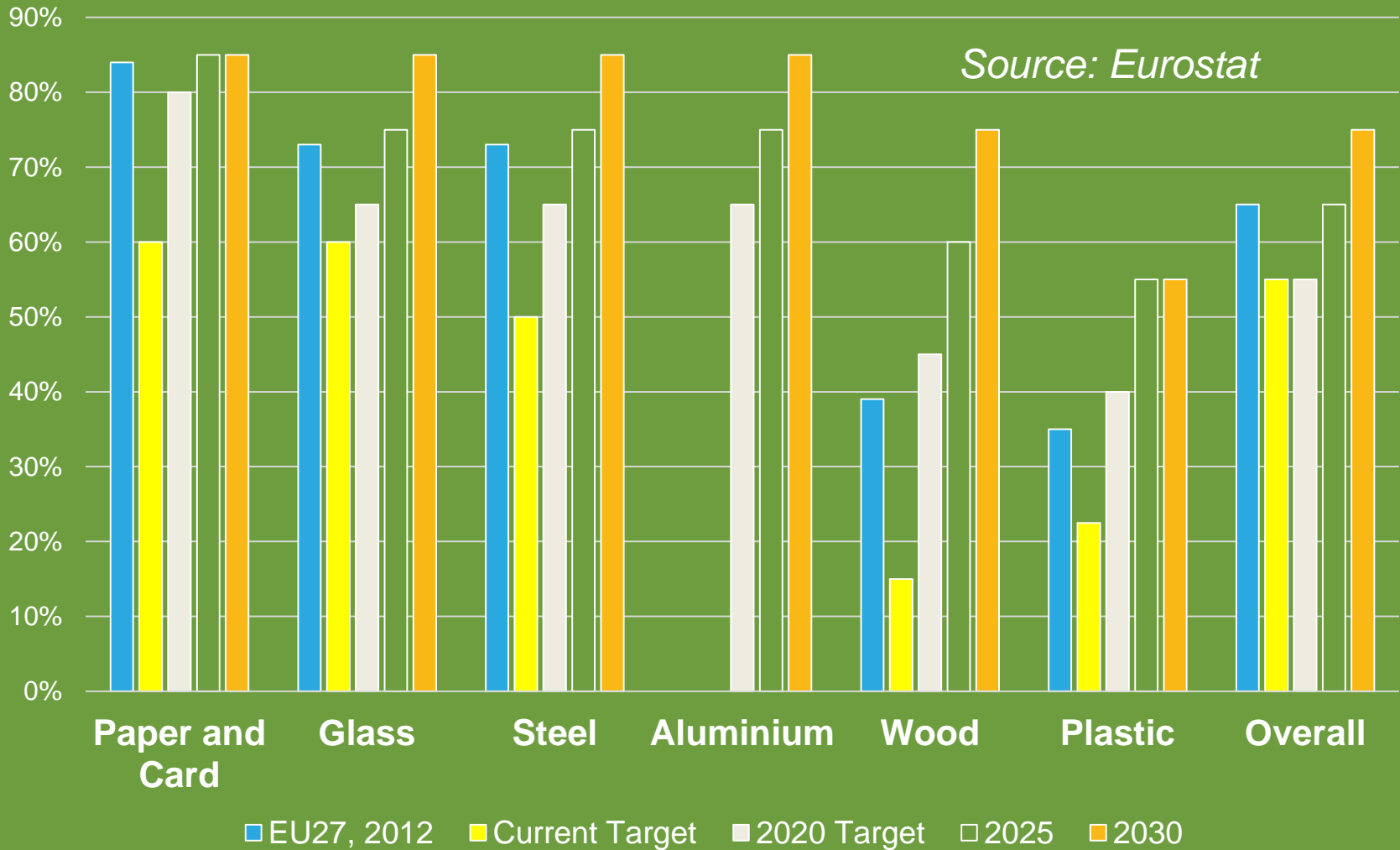


Note: for 'recycling and preparation for reuse'

# Targets / Performance, Municipal Waste



# Targets / Performance, Packaging

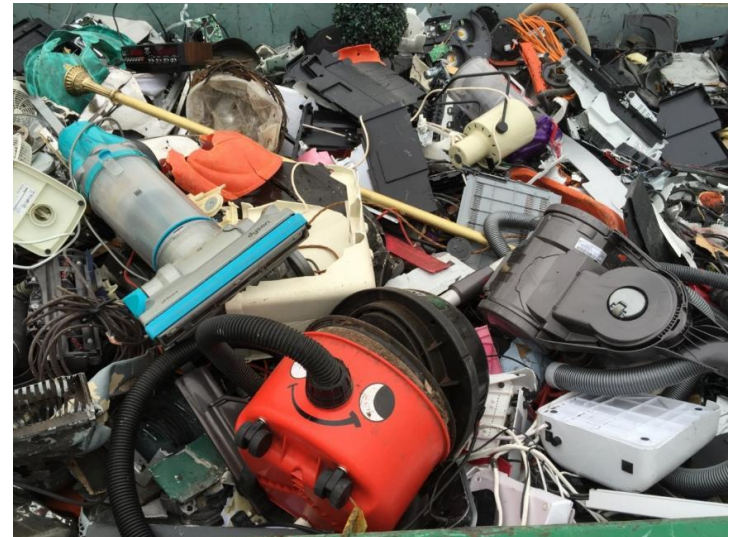




# Producer Responsibility

# 1. Financial contributions from producers:

- **Cover all costs of waste management**
- **Modulated on basis of end-of-life cost (reusability / recyclability)**



# Issues Linked to Europe's Work Programme

# Design for Repair / Recycling



Dell  
**XPS 10**  
2013

- + Easy to open. Easy to remove battery.
- + Color-coded screws and labeled cables inside.
- LCD is fused to the glass.

9



Amazon  
**Kindle 7th Generation**  
2014

- + Easy opening procedure.
- + Simple, modular design with few, distinct components that can be replaced independently.
- Battery adhesive is much stronger than necessary.

8



Apple  
**iPad 2**  
2011

- + LCD is easy to replace once the front panel is removed.
- Battery is difficult to remove and replace.
- High chance of cracking the glass during disassembly.

2



Microsoft  
**Surface Pro 3**  
2014

- + SSD can be replaced.
- Tons of adhesive hold everything in place.
- The fused display is very thin and fragile, and must be removed to access any other component.

1

*Source: iFixit*



# Specifications for Durability



## KETTLE

A high proportion of poorly designed kettles will fail within the warranty period. Kettles are not designed to be repaired. It is therefore preferable that they are reliable. From a WRAP survey, 22% of consumers check on-line reviews (Amazon, Revoo, etc.) before buying to avoid unreliable brands.

Durable kettles need attention to their overall **design, suitable good quality components and materials** and new designs should be assessed and tested for durability.

The cost estimates in this guide assume that **production costs to the brand of a PP concealed element kettle is typically £5.20.**

Download full specification

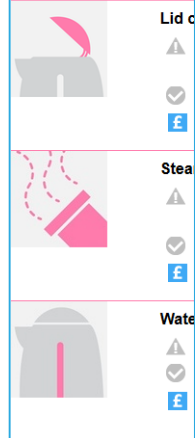
Download commercial summary



### Icon key

- Failure mode
- Durability feature

## Critical components



## MICROWAVE

Most early failures can be avoided by **simple design changes** and by ensuring that parts are tested to show they meet **minimum standards**. Some types of early failures will be prevented by provision of clear user instructions, which should have no added cost.

The cost estimates in this guide assume that **production costs to the manufacturer are £18.2 per microwave.**

Download full specification

Download commercial summary



### Icon key

- Failure mode
- Durability features
- Cost saving
- Low cost
- Cost neutral
- High cost

## Critical components



### High voltage components

- Defects can occur due to poor manufacturing quality.
- Use of certified and tested components to improve reliability.

£



### Door & safety interlocks switches

- Breakage of parts can occur if they are poorly attached or distorted.
- Use of simple door pull mechanisms and robust plastics can help prevent failure.

£



### Internal Surfaces

- Powder coated surfaces can become damaged if not cleaned.
- Coatings should be tested to prove resilience. Steel panels will be higher performance.

£



### Control panel

- Malfunction can occur due to dirt and moisture ingress.
- Use of minimum IP54 sealed touchpads or water proof IP55 sealed touchpads for better performance.

£



### Turntable

- Food ingress can prevent rotation and decrease performance.
- Turntables can be omitted but it is preferable to use a centrally rotating spindle and limit gaps to the base of the spindle.

£



### User guidance

- Inadequate instructions can lead to early failure and returns.
- User instructions on cleaning and ventilation

# Eco-design work (via WRAP)

**Major savings through: durability to reduce returns, direct material savings, design for assembly and repair:**

- **Television**: £180k / 600 t CO<sub>2</sub>eq
- **Microwave**: £320k / 300 t CO<sub>2</sub>eq
- **Washing machine**: £550k / 740 t CO<sub>2</sub>eq
- **Laptop**: £200k / 373 t CO<sub>2</sub>eq
- **Fridge Freezer**: £125k / 162 t CO<sub>2</sub>eq
- **Vacuum Cleaner**: £31k / 163 t CO<sub>2</sub>eq



**All savings per 100,000 units per annum**

# Greening Procurement / Eco-labels





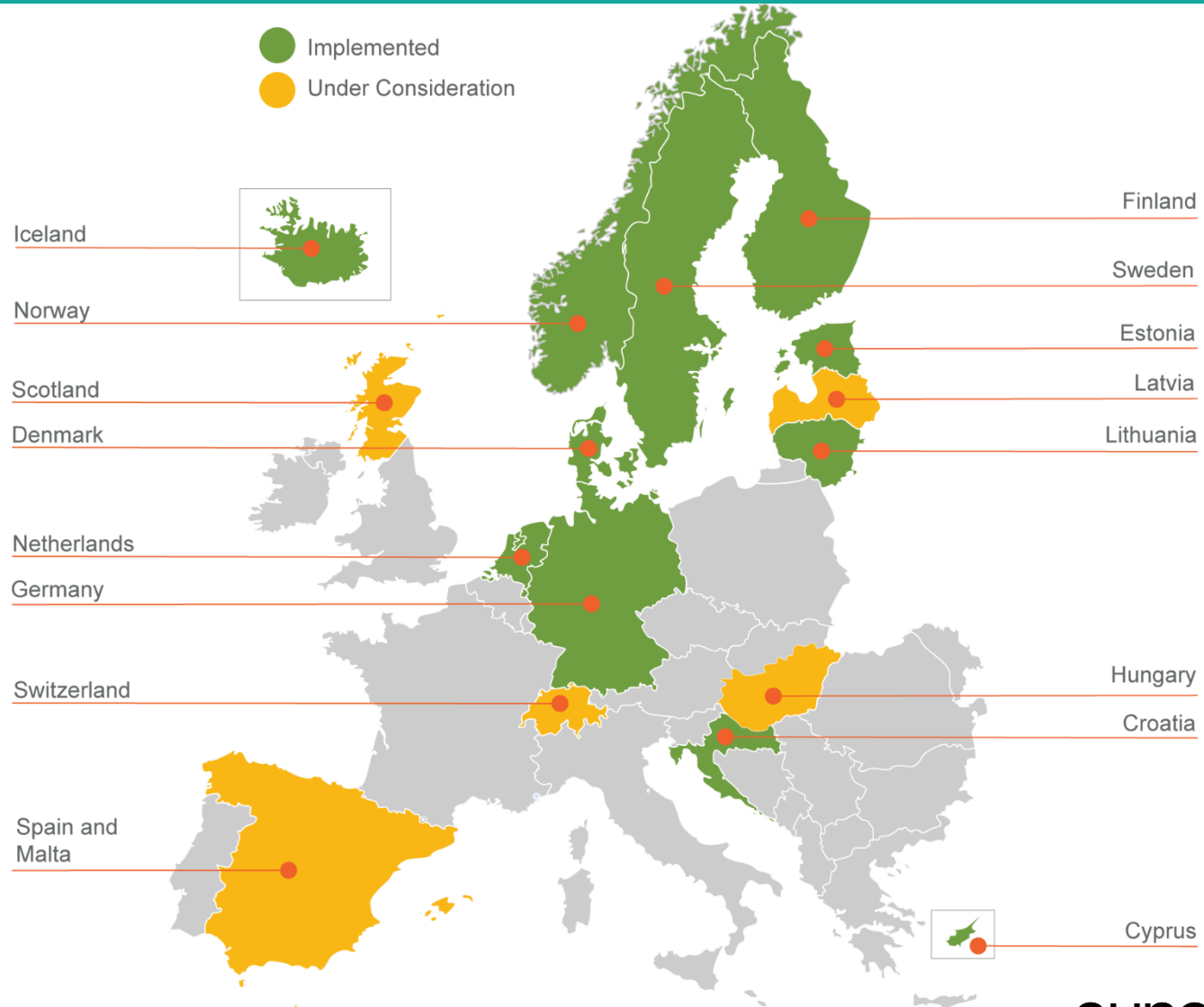






# Deposit Refund Schemes

# Deposit Refunds

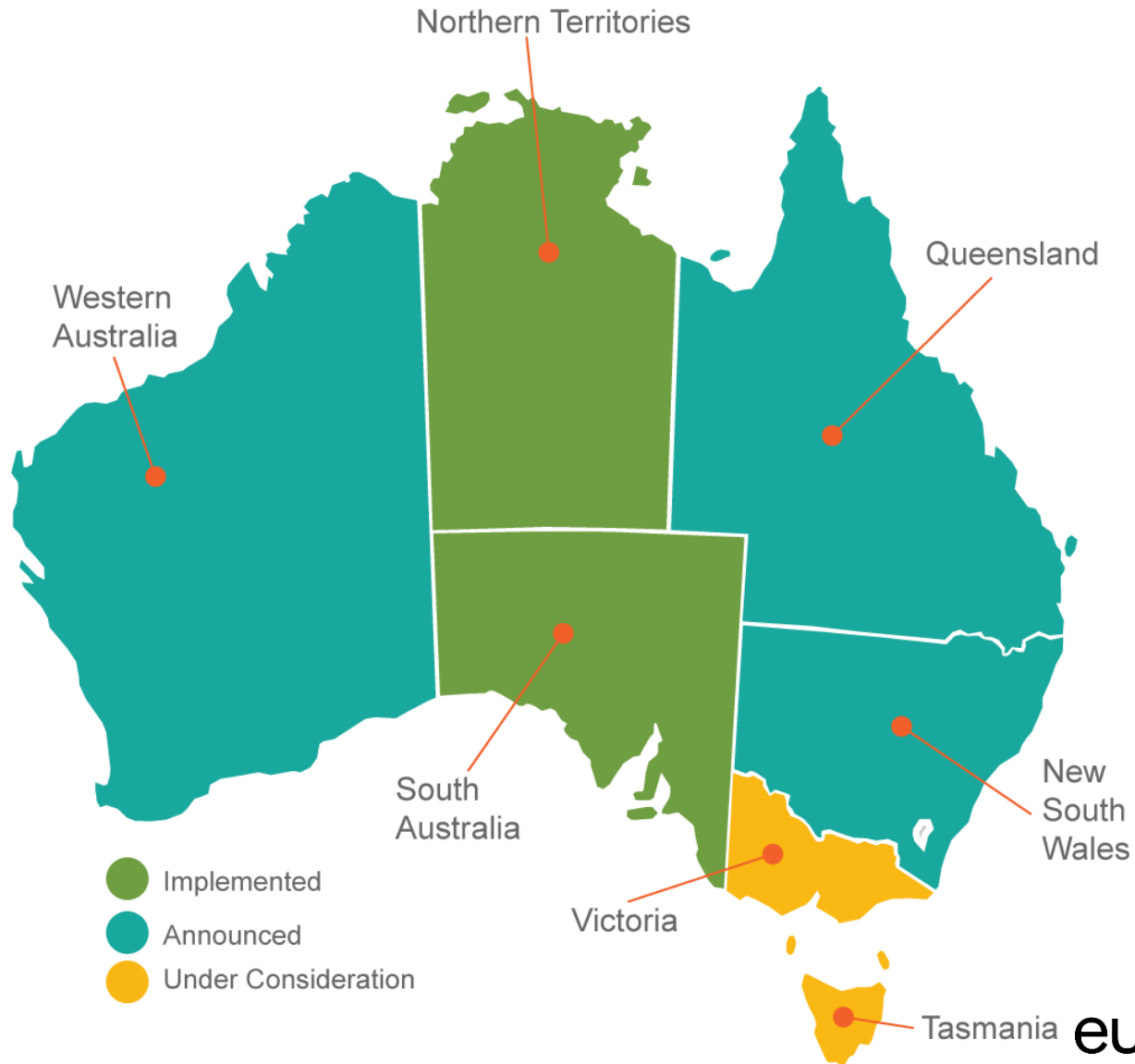




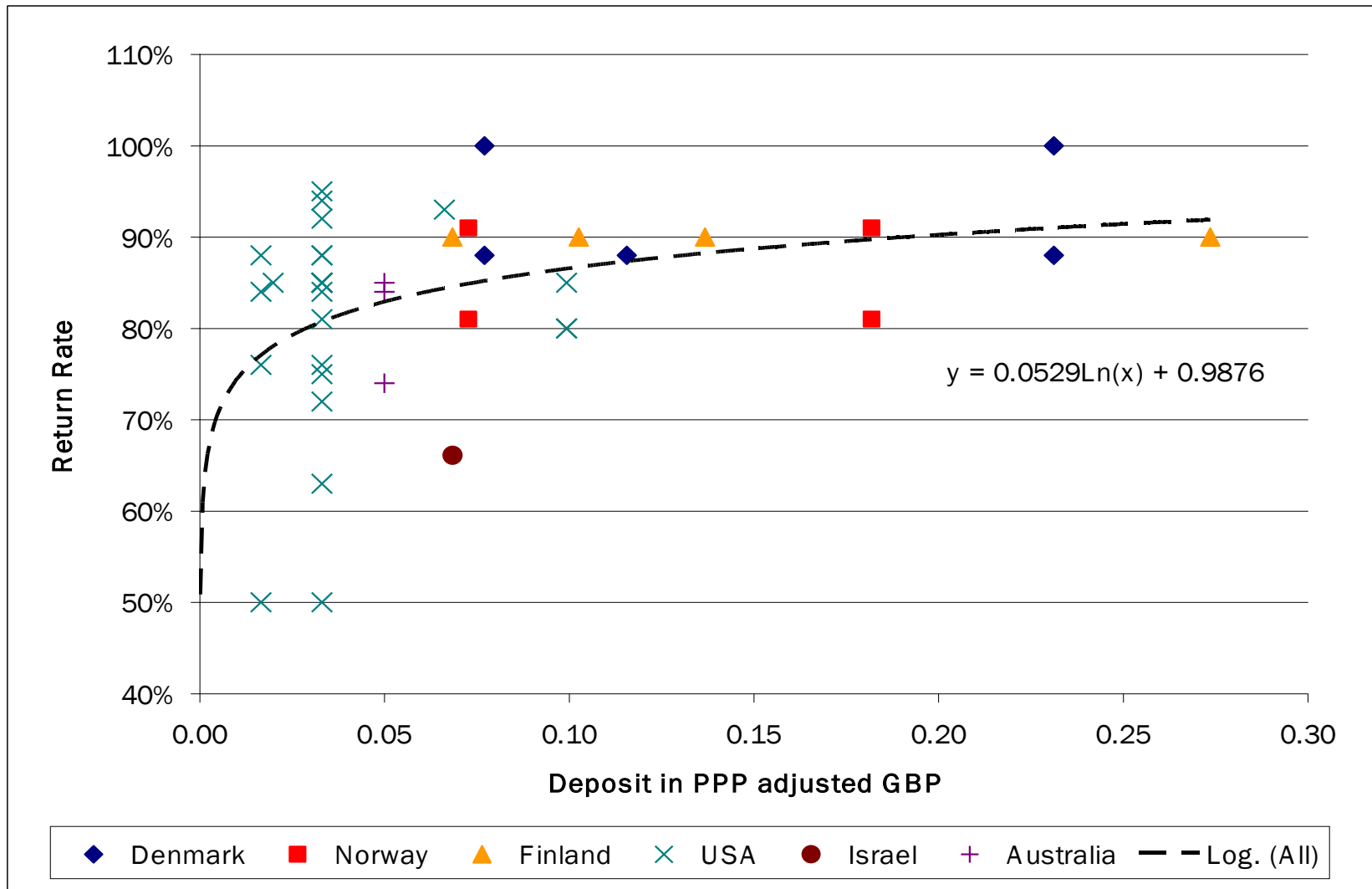
# Deposit Refunds



# Deposit Refunds

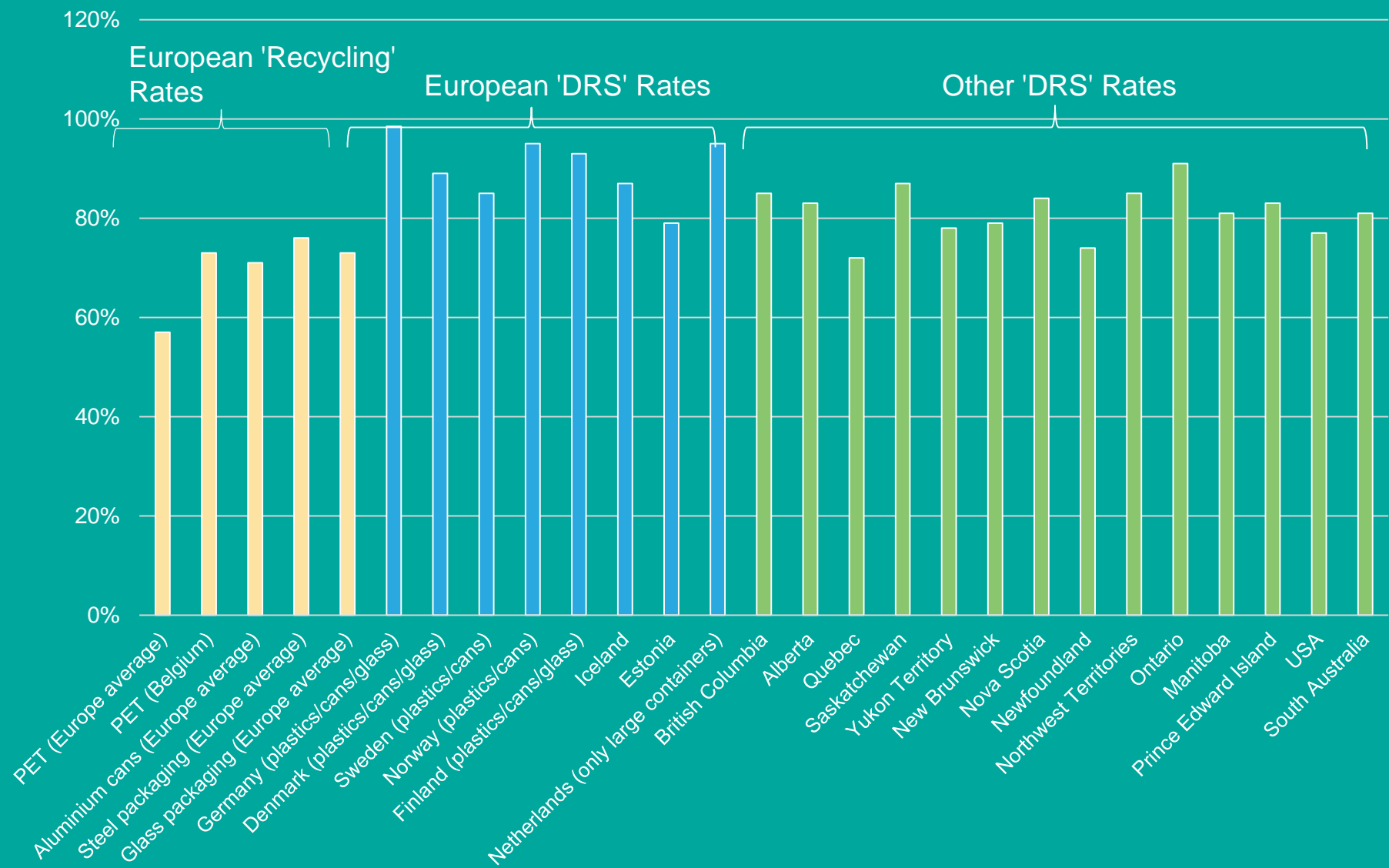


# Deposit Refunds



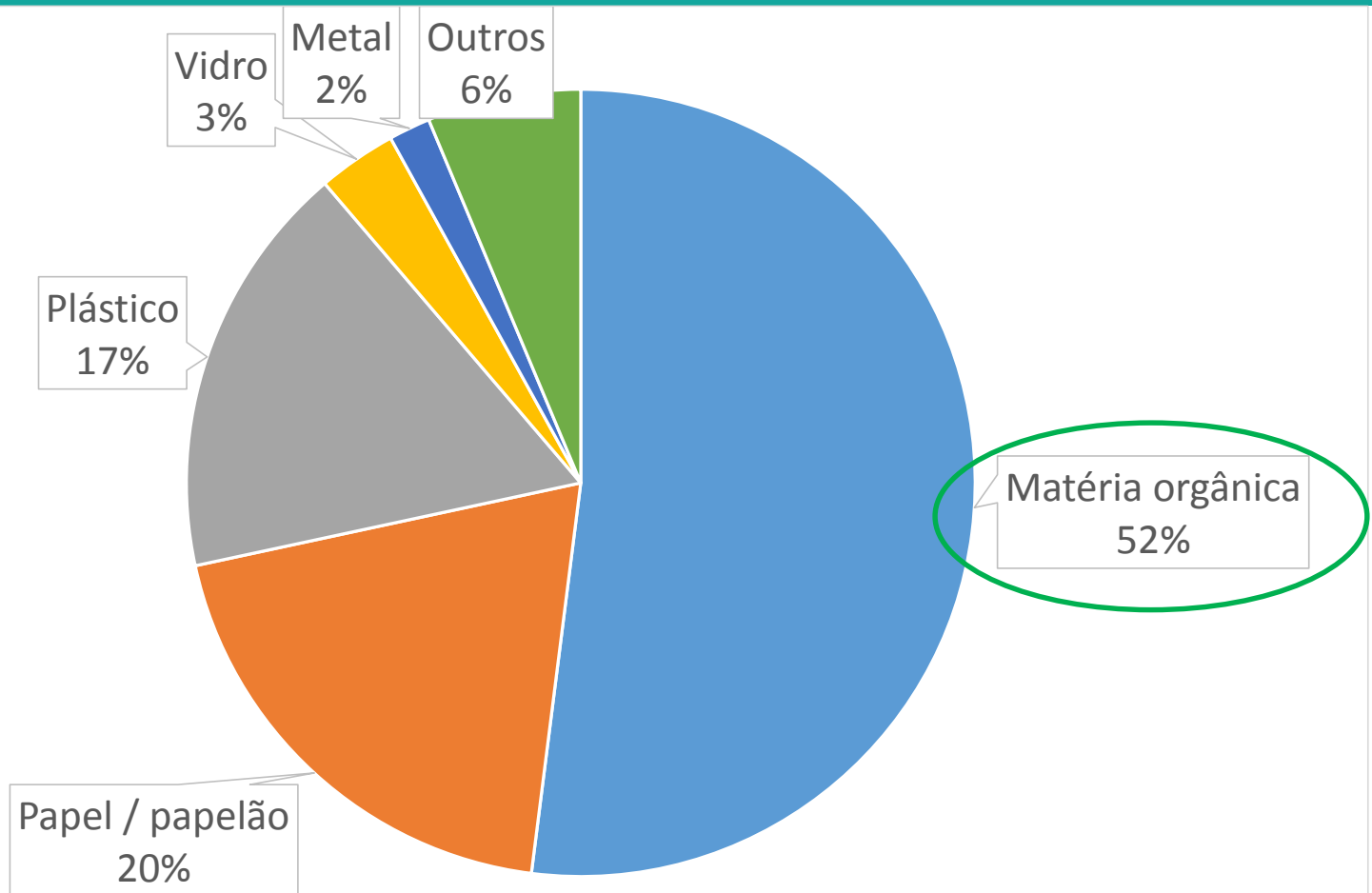
Source: Eunomia

# Recycling / Return Rates in Different Systems



Source: System Operators

# Household Waste Composition in Rio de Janeiro



■ Matéria orgânica ■ Papel / papelão ■ Plástico ■ Vidro ■ Metal ■ Outros

# Why Separate Collection of Food?

- **It creates odour, nuisance and vector-borne diseases**
- **Food waste is dense**
  - Does not compact (so can be collected cheaply)
- **Collect it often....**
  - ... reduce frequency for refuse collection
- **Collecting food also:**
  - Increases capture of dry recyclables
  - Makes people / businesses more aware of food waste
  - Can be used to generate energy / make quality compost



# Tools

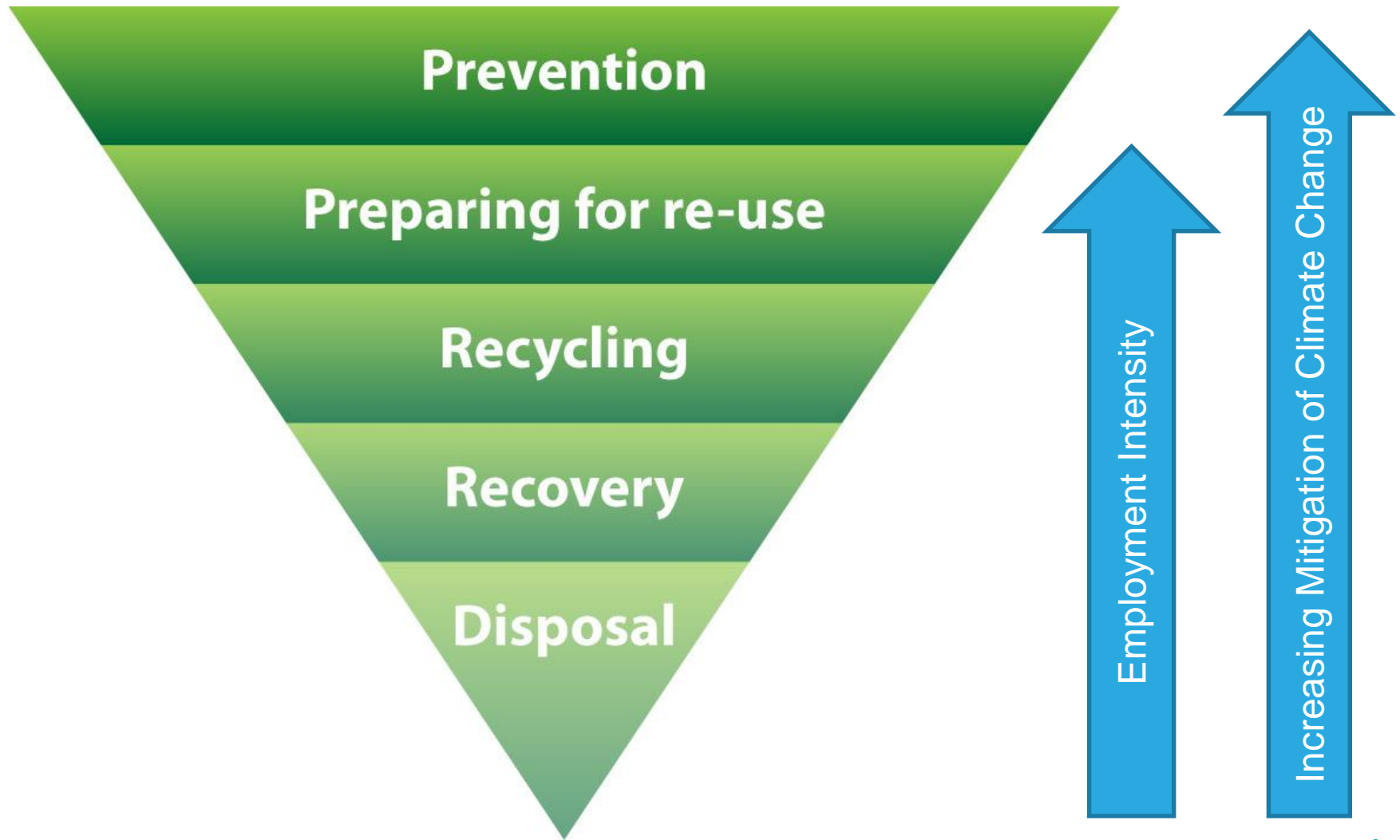




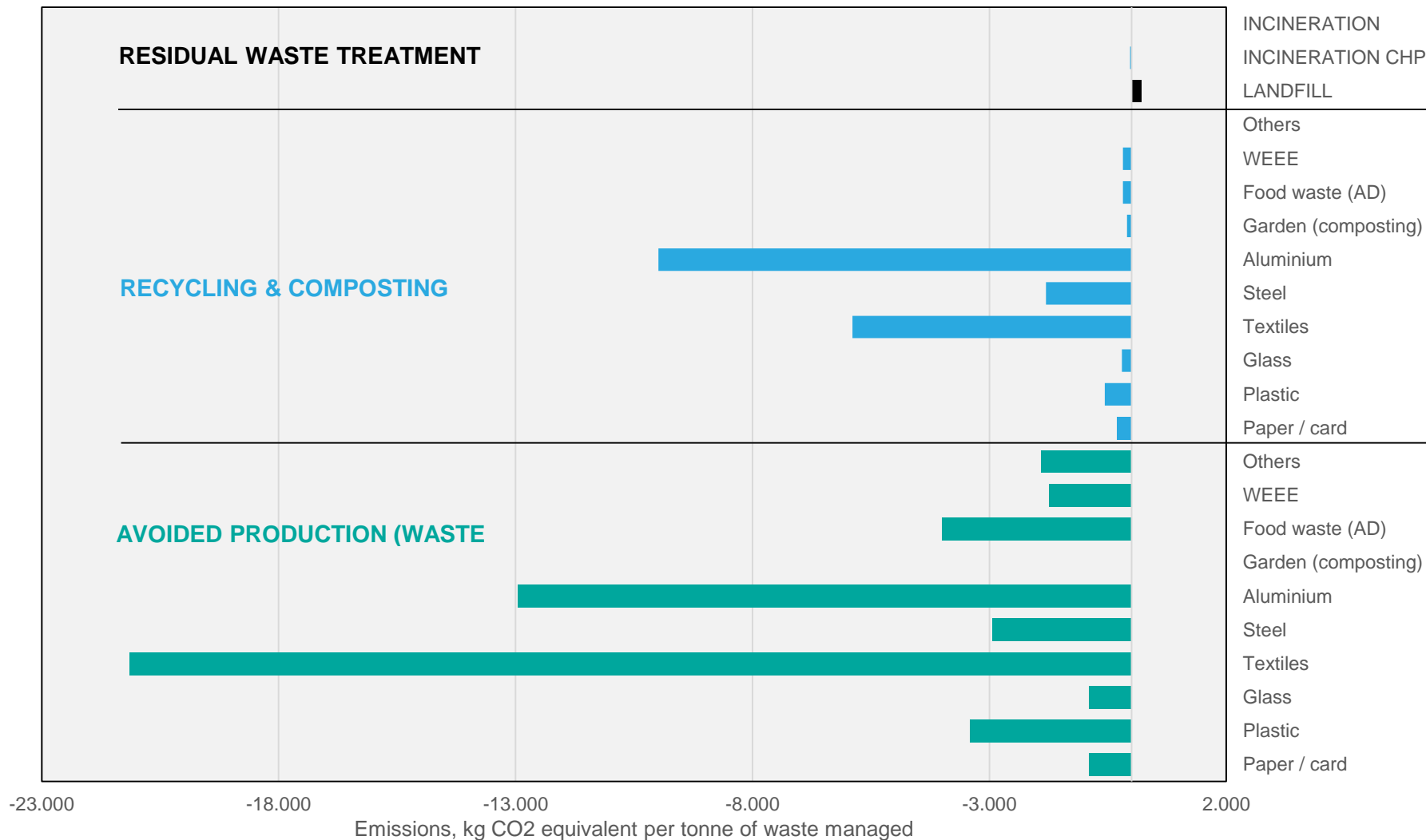
# Opportunities for Rio



# The Hierarchy



# GHG Impacts (negative = GHG reductions)



# Unemployment Rate, Brazil



Source: Instituto Brasileiro de Geografia e Estatística



# EU28, Jobs in Recycling, 2014

SCENARIO	Employment Effect
From Baseline to Full Implementation	<b>37,000 FTEs</b>
From Full Implementation to Preferred Option	<b>178,000 FTEs</b>
Total from Baseline to Preferred Option	<b>215,000 FTEs</b>
Total, Including Multiplier @1.75	<b>377,000 FTEs</b>

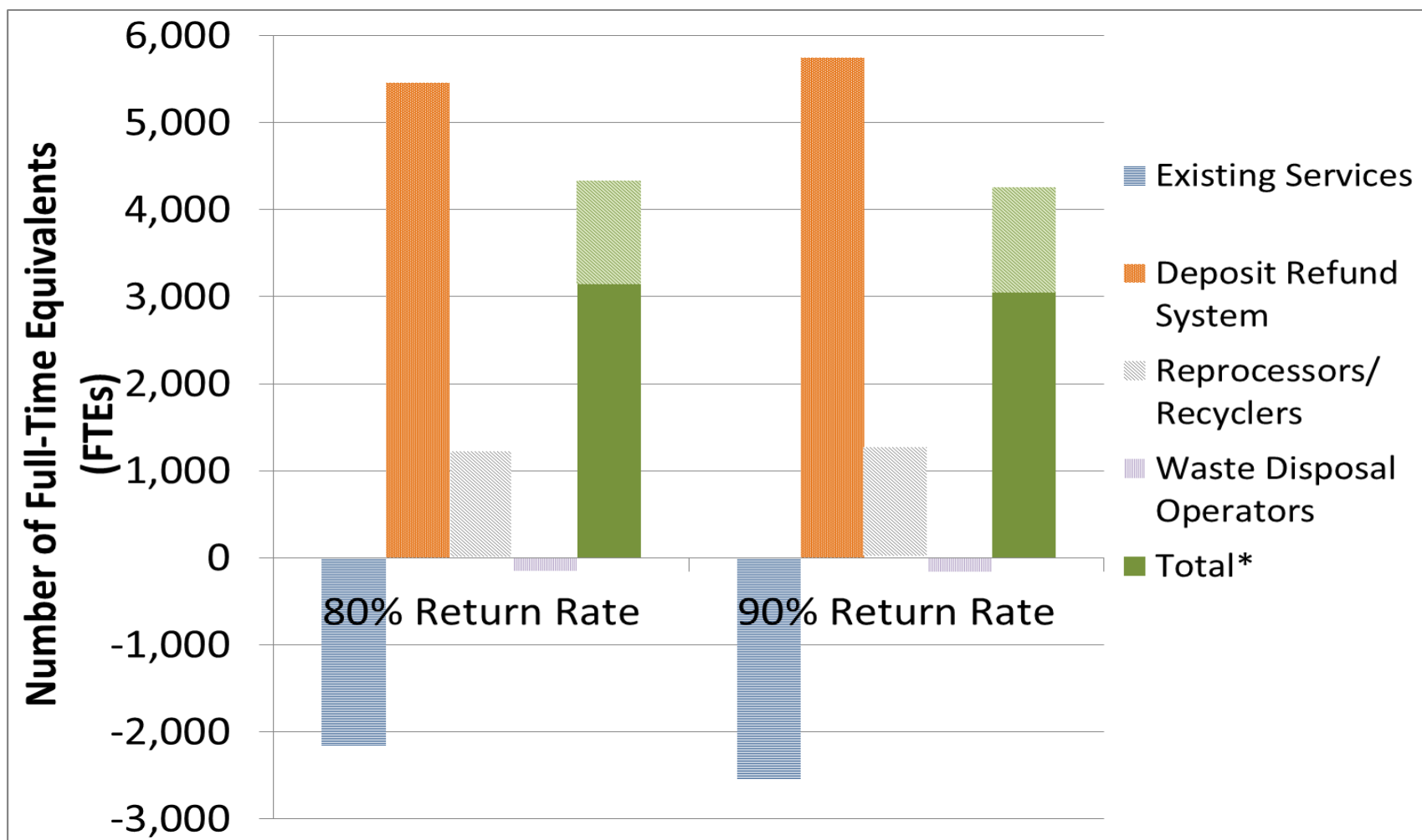
*Source: Adapted from Eunomia (2014) (Impact Assessment re CE package)*

# Re-use in Scotland

- **Current Situation**  
89,000 tonnes  
6,000 jobs  
3,000 volunteers
- **With 25% of potential**  
127,000 tonnes  
9,000 jobs  
4,000 volunteers



# Deposit Refunds (UK)



*\*Solid total bar = total FTEs without any job creation in the UK reprocessing sector. Shaded part of the bar illustrates the additional FTE posts that would be created if we assume all new reprocessing jobs are created in the UK.*

# Opportunities for Rio

- **Advanced economies heavily reliant on centralised logistics for products**
- **Future role of ‘conventional’ waste management?**
  - **Better ‘material streaming’**
  - **More take-back (role of retail, deposit refund systems)**
  - **Linking in to reuse networks**
- **Use existing re-use suppliers**

# Opportunities for Rio

- **Deposit refunds for high capture of beverage packaging**
  - High quality material for recycling
  - Reduced littering
- **Producer responsibility**
  - Ensure producers cover the cost of meeting their obligation (e.g. packaging)
  - Make their obligation challenging (do they want a Circular Economy?)
- **Food**
  - Central to optimisation of collection...
  - ... and achieving high recycling rates ...
  - ... and maintaining soil organic carbon



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