



III CONGRESO NACIONAL  
DE GESTIÓN DE RESIDUOS  
DE APARATOS ELÉCTRICOS Y ELECTRÓNICOS

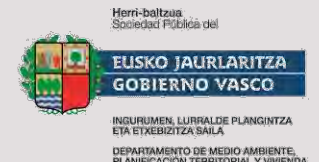
**RAEE**

# Tecnología para la Economía Circular: Ecodiseño, hacia un modelo productivo sin residuos

José María Fernández Alcalá (IHOBE)

**OfiRae**

Castilla-La Mancha









**2.854**

teléfonos móviles se fabrican cada  
minuto en el mundo

**1.500.000.000**

teléfonos/año





20 años



2 años

**Los productos cada vez son más complejos y además su vida útil es cada vez menor**



**El volumen total de productos  
en el mercado cada vez es  
mayor.**











POLYMERS

POLYMERS

POLYMERS

POLYMERS

Ideas Wall





¿Sabemos que hay detrás de los materiales que consumimos?

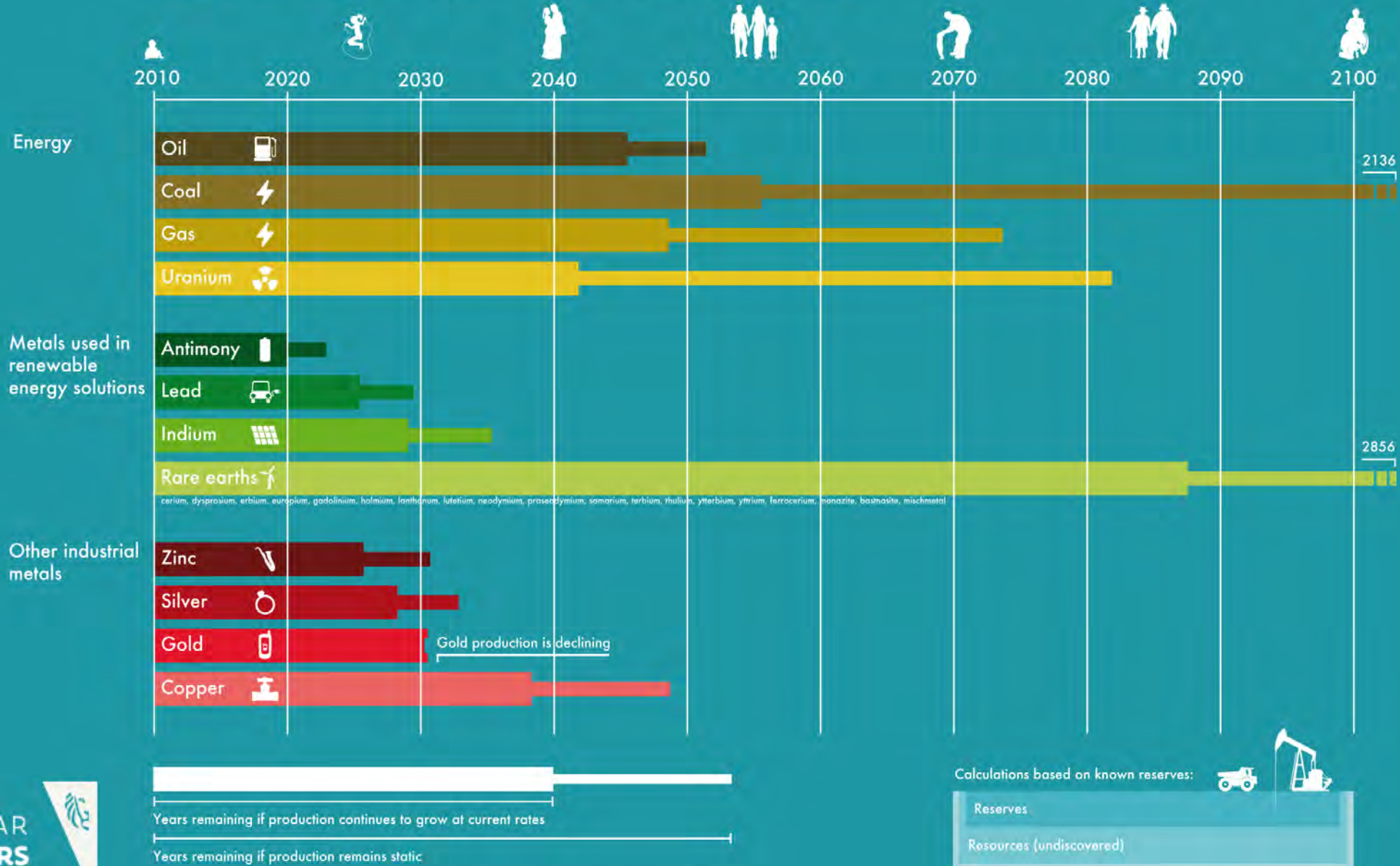




¿Sabemos que hay  
detrás de los  
materiales que  
consumimos?



# Born in 2010: How much is left for me?







United Nations  
Educational, Scientific and  
Cultural Organization

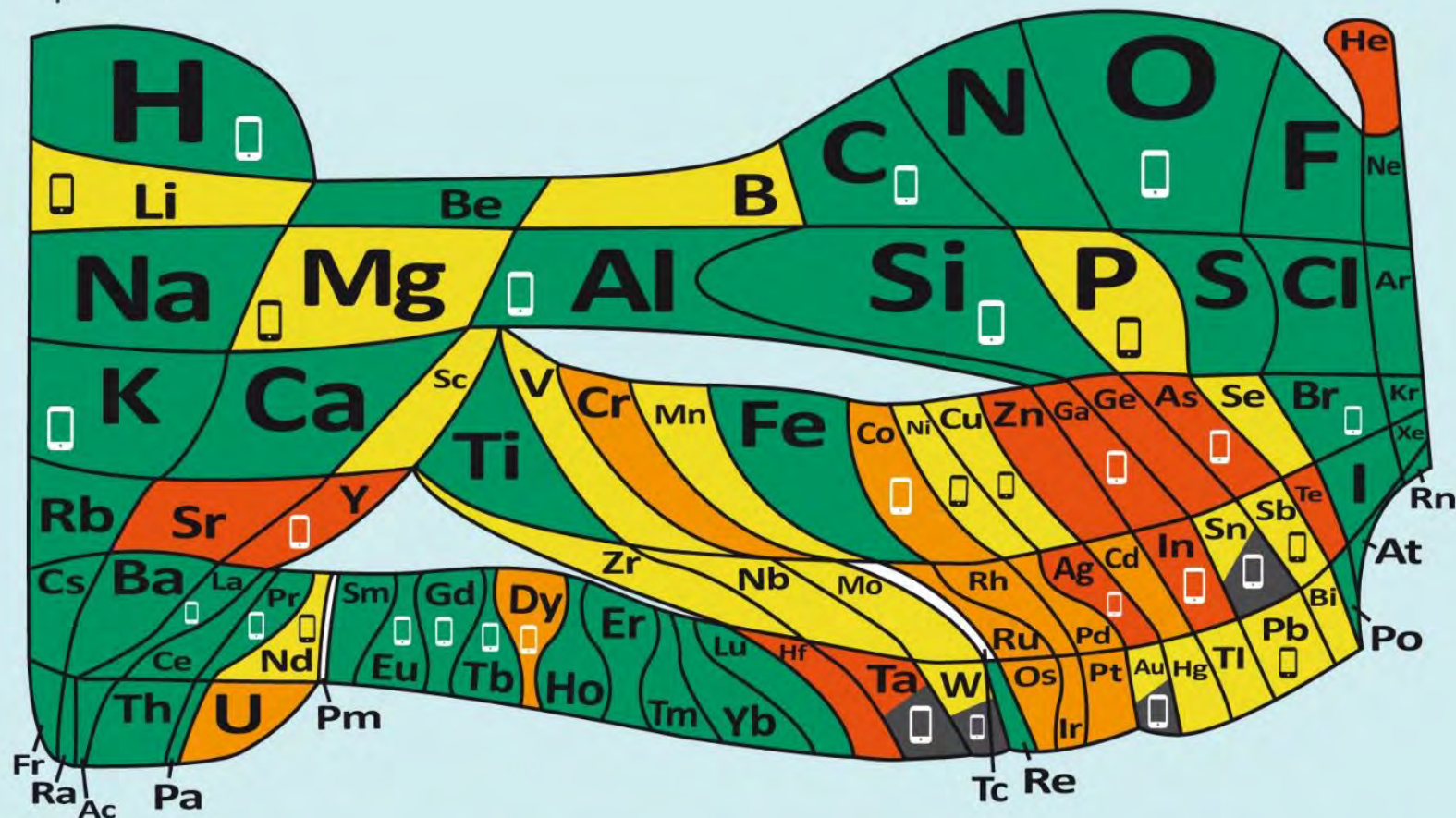
2019  
IYPT

International Year  
of the Periodic Table  
of Chemical Elements



# The 90 natural elements that make up everything

*How much is there? Is that enough?*



- Serious threat in the next 100 years
- Rising threat from increased use
- Limited availability, future risk to supply
- Plentiful Supply
- Synthetic
- From conflict minerals
- Elements used in a smart phone

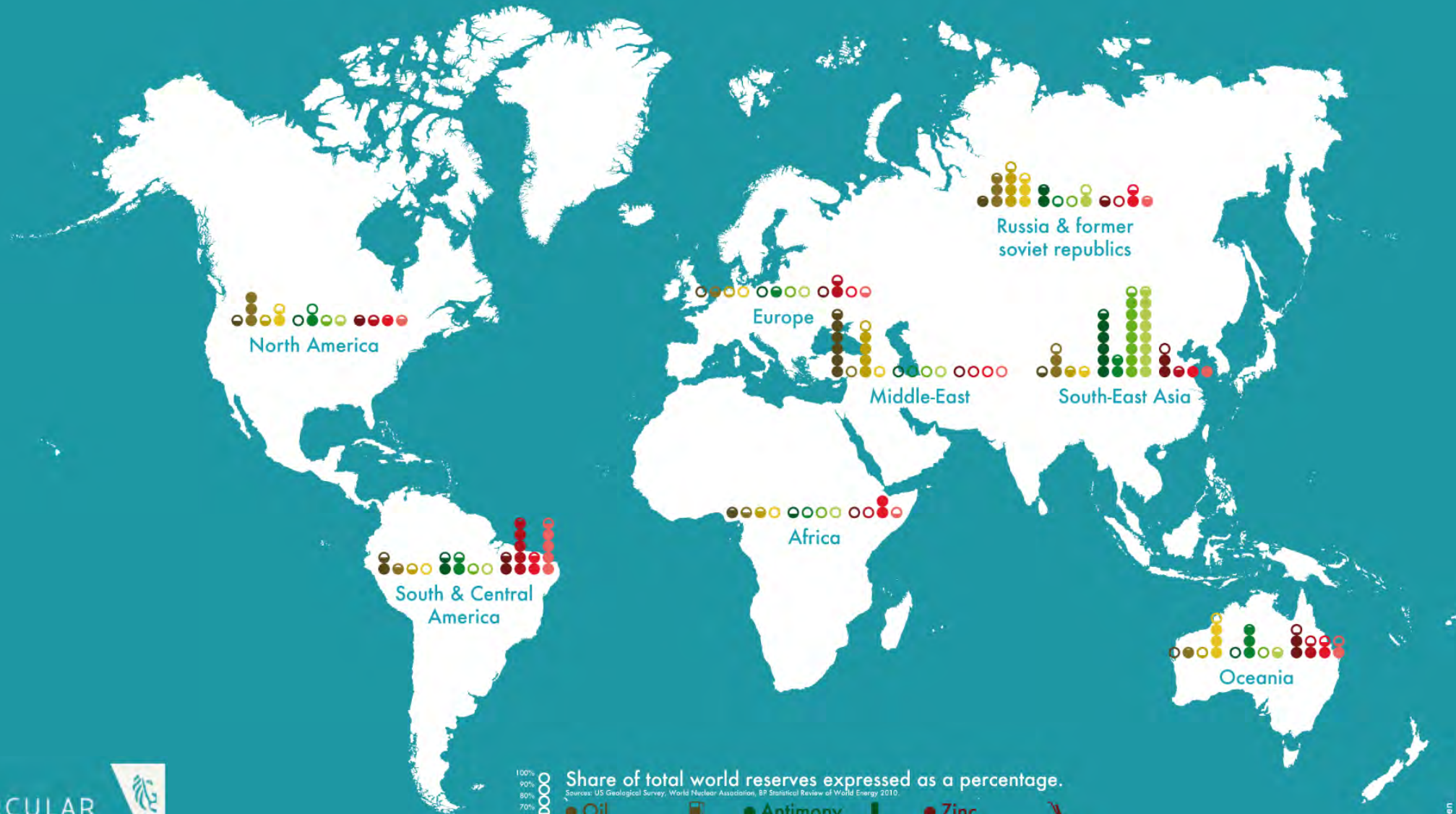
Read more and play the video game <http://bit.ly/euchems-pt>



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# Where to find the leftovers?







**Los productos se comercializan en todo el mundo.**

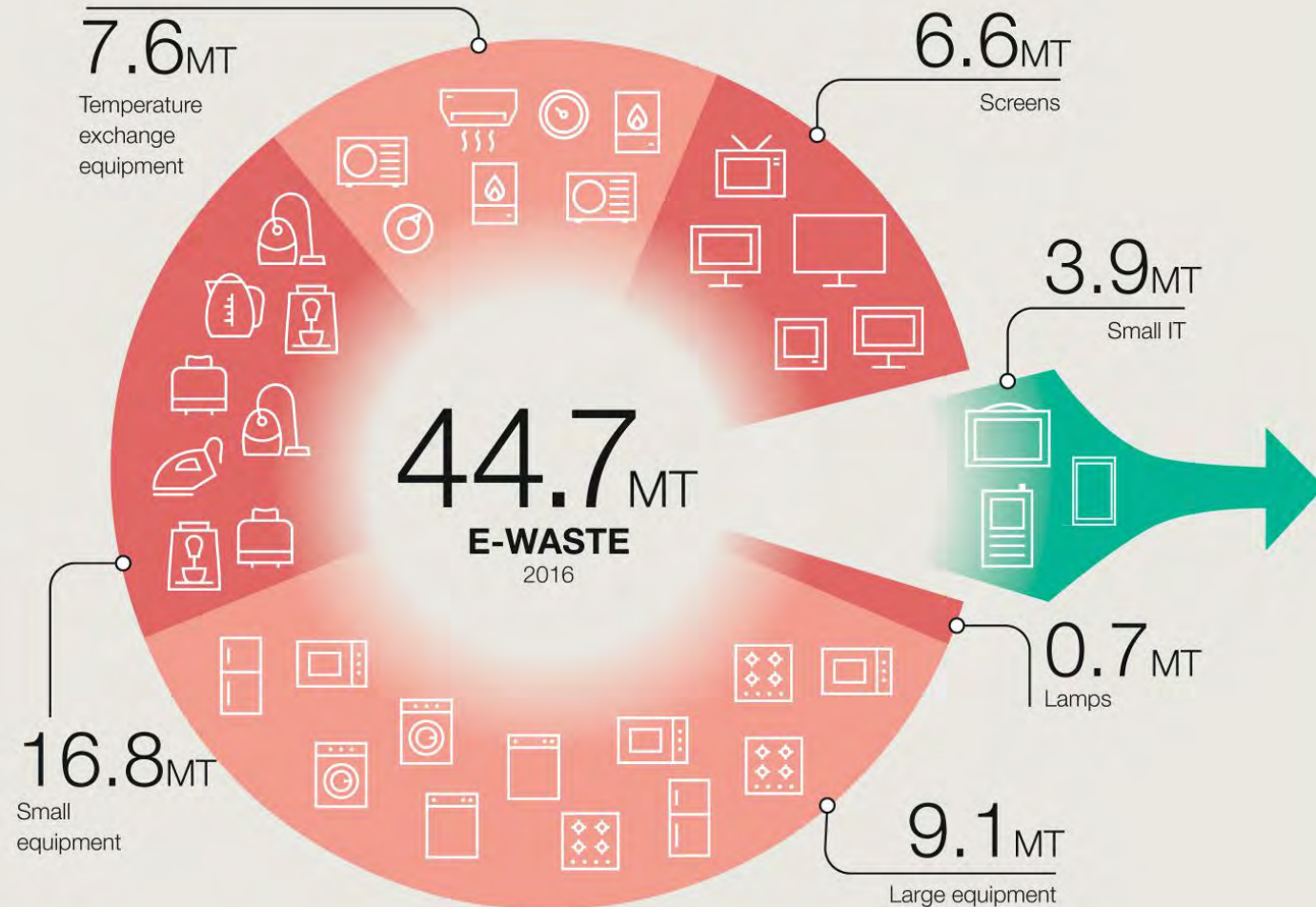




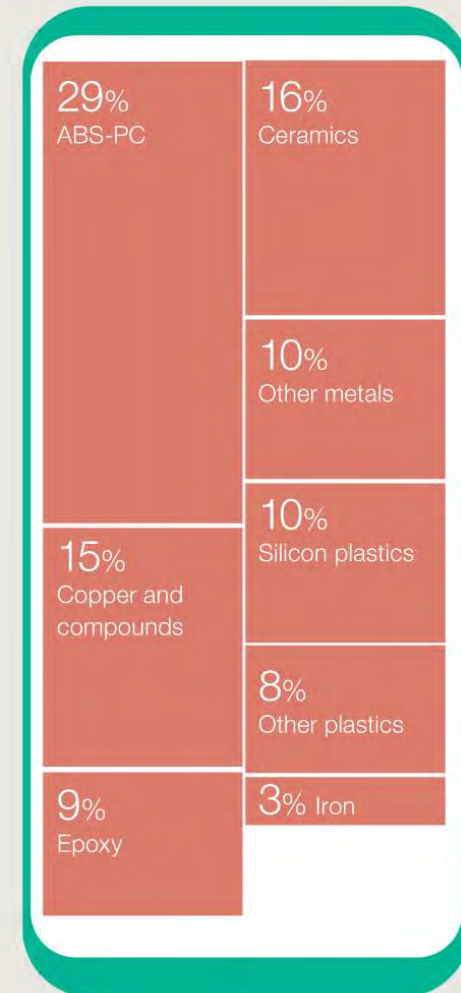
**El consumo eléctrico  
doméstico no para de  
crecer**



# WHAT IS E-WASTE?



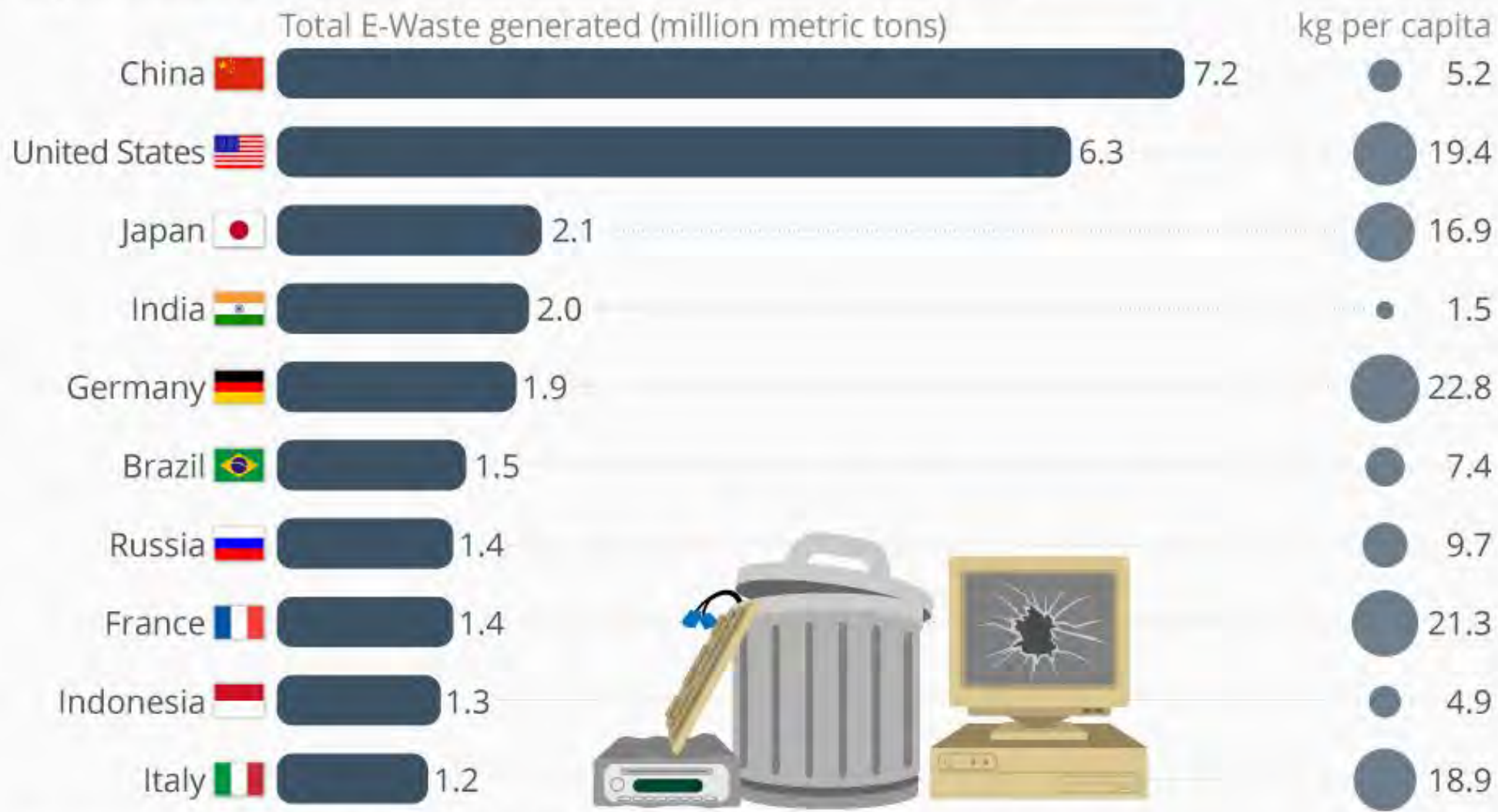
What's in a typical mobile phone?





# These Countries Generate the Most Electronic Waste

Top 10 countries by the amount of e-waste generated in 2016\*



\* includes discarded products with a battery or plug including mobile phones, laptops, televisions, refrigerators, electrical toys and other electronic equipment

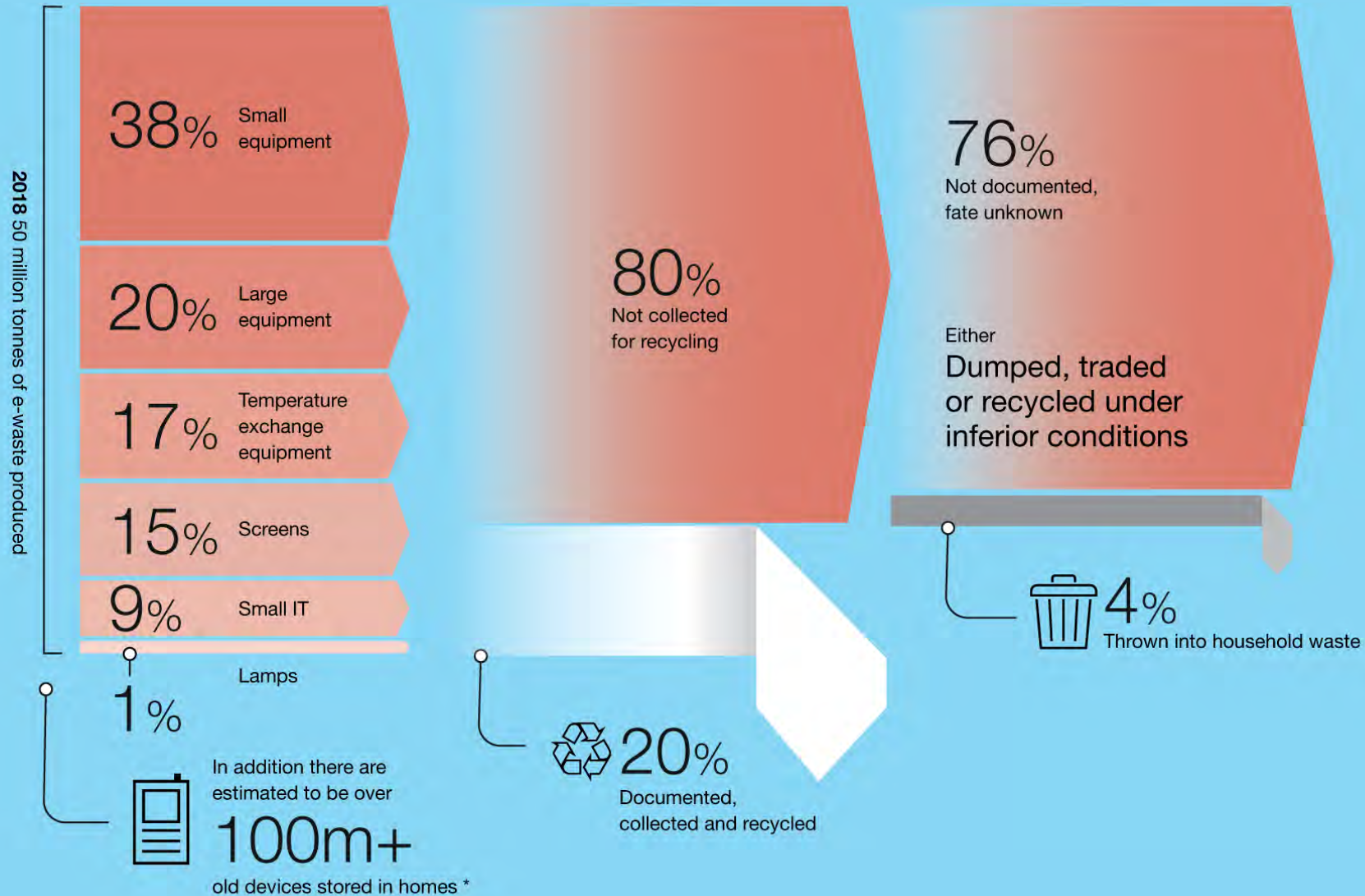


@StatistaCharts

Source: The Global E-waste Monitor 2017

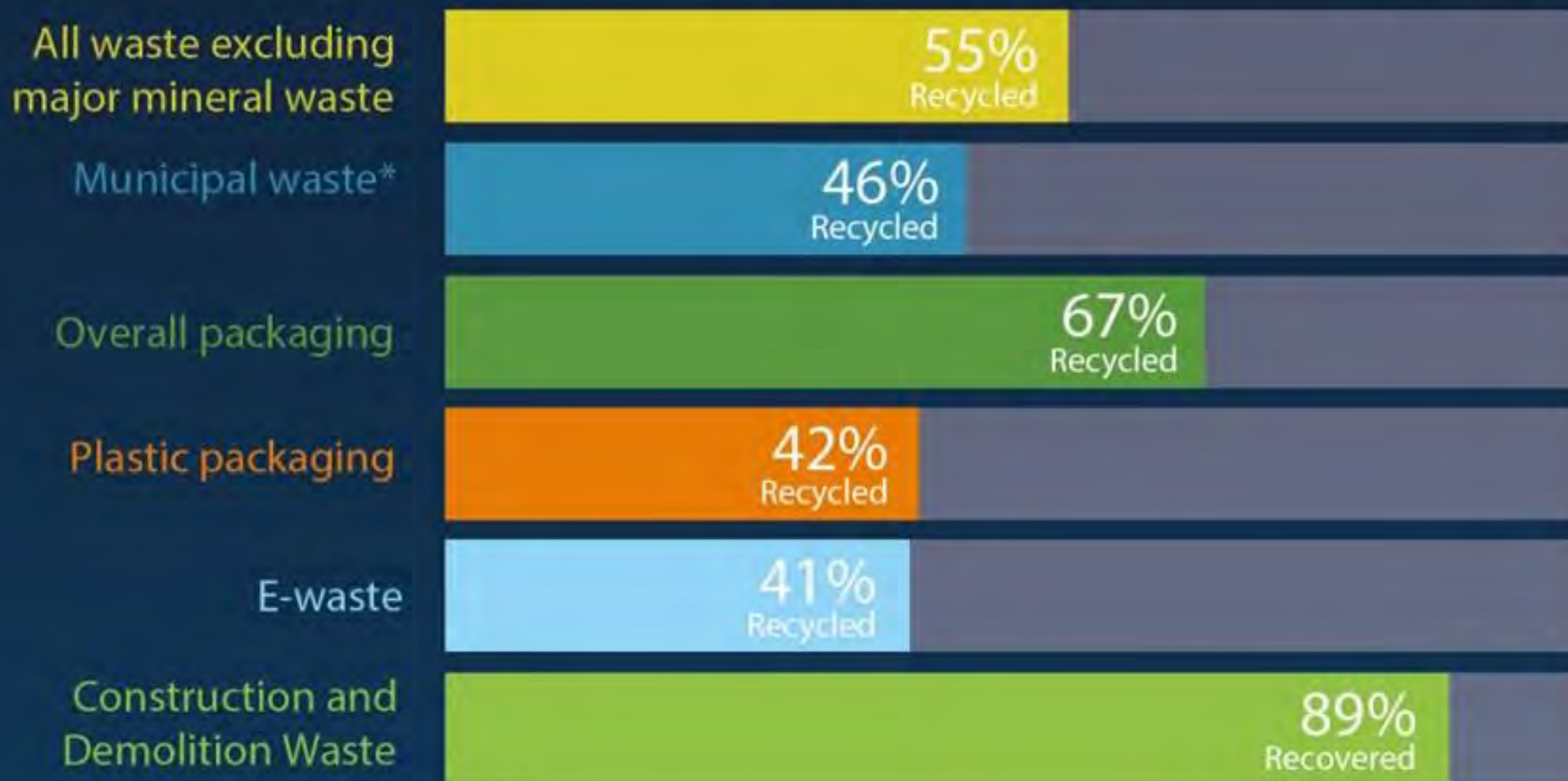


# GLOBAL E-WASTE FLOWS





## Overview of recycling rates of different waste streams (EU, 2016)



\*2017



# The world's e-waste is a huge problem. It's also a golden opportunity



There is \$62.5 billion-worth of value in our discarded electronic items worldwide.

Image: REUTERS/Tyrone Siu

24 Jan 2019

**Guy Ryder**

Director-General, International Labour  
Organization (ILO)

**Houlin Zhao**

Secretary-General, International  
Telecommunication Union (ITU)



This article is part of the [World Economic Forum Annual Meeting](#)

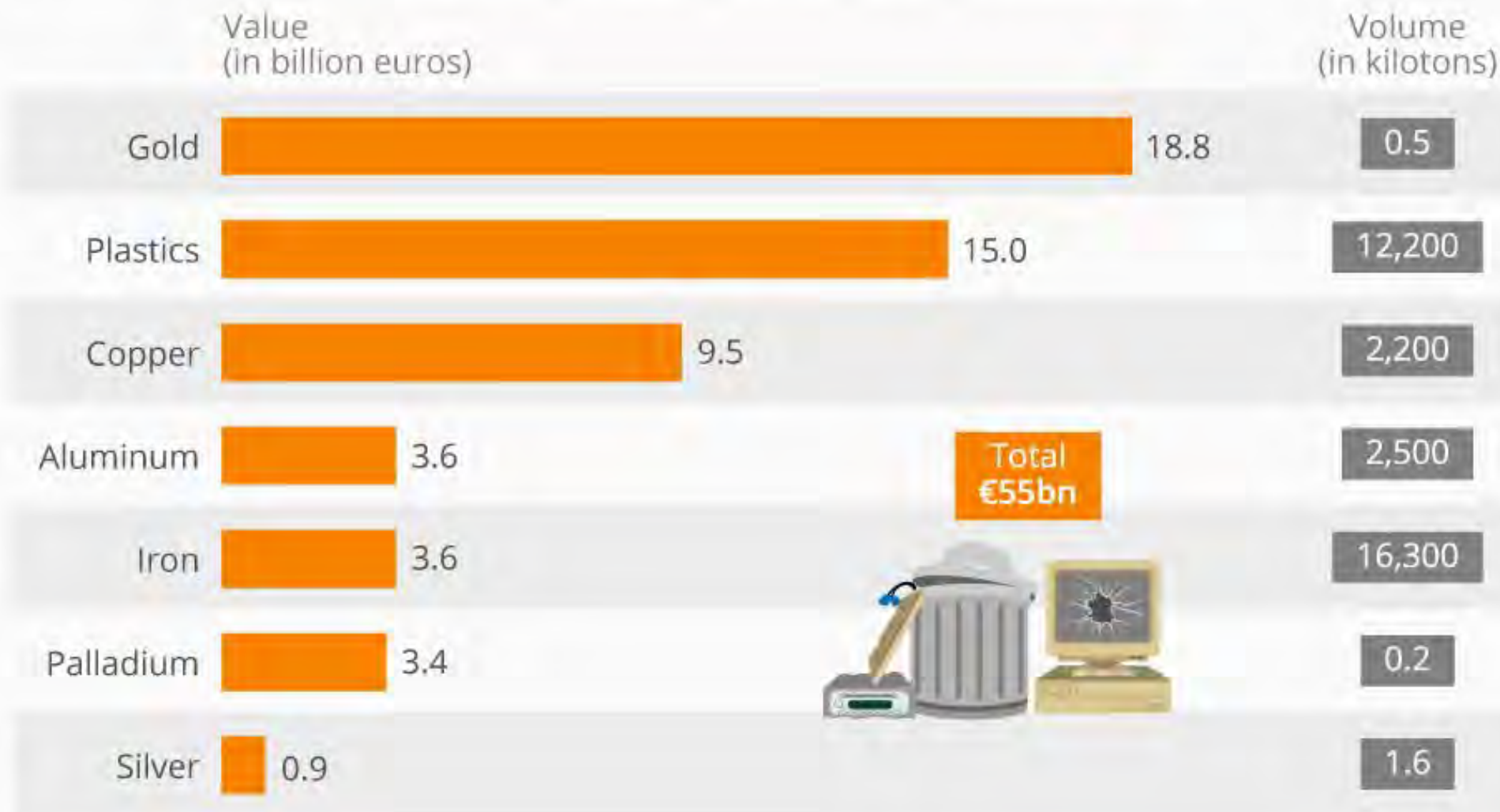
Humankind's insatiable demand for electronic devices is creating the world's fastest-growing waste stream. Some forms are growing exponentially. The United Nations calls it a [tsunami of e-waste](#).

While more electronic devices are part of the problem, they also can be a big part of the solution. A more digital and connected world will help us accelerate progress towards the United Nations [Sustainable Development Goals](#) (SDGs), offering unprecedented opportunities for emerging economies.



# Mining E-Waste Gold

Potential value and volume of raw materials in e-waste worldwide 2016



@StatistaCharts Source: ITU

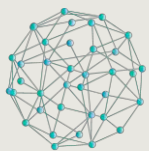
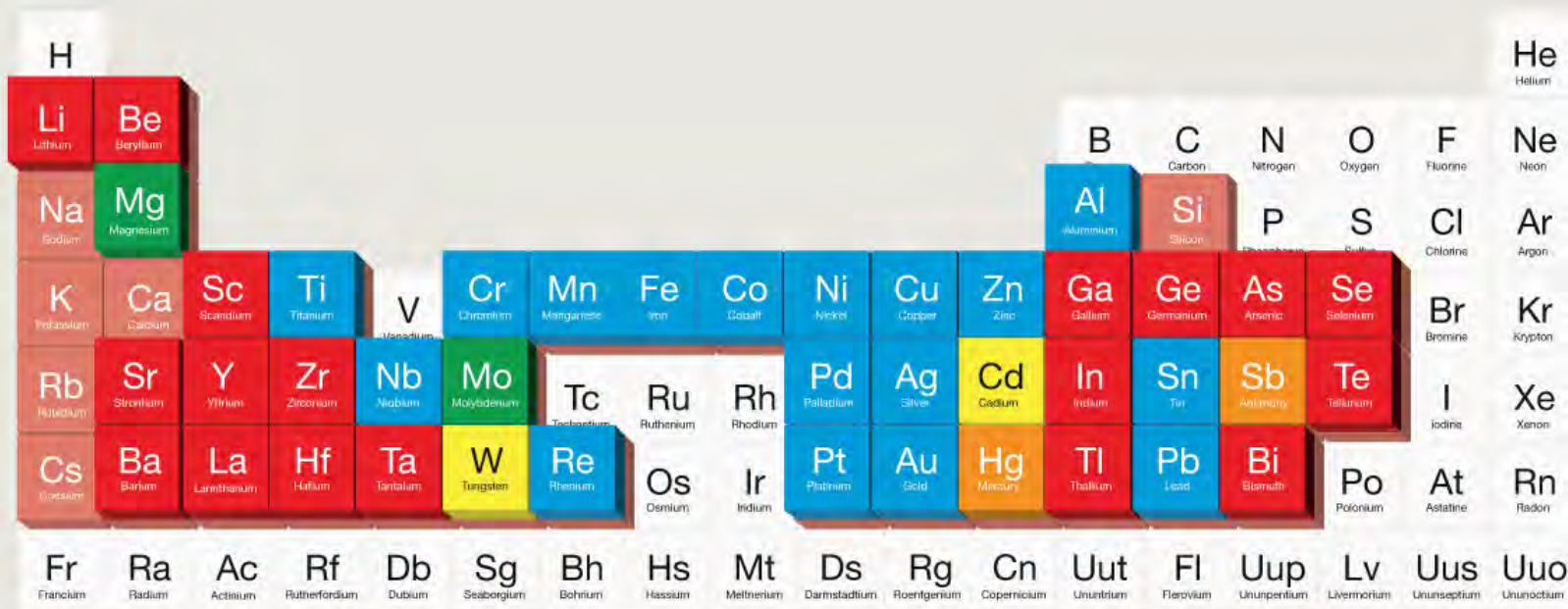
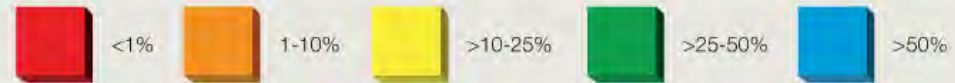


# A PERIODIC AND ELEMENTAL PROBLEM

He  
Helium  
Periodic table element

Elements found in e-waste

Recycling rates



**PACE**  
PLATFORM FOR ACCELERATING  
THE CIRCULAR ECONOMY



COMMITTED TO  
IMPROVING THE STATE  
OF THE WORLD





**Este es un sistema LINEAL que depende de los recursos naturales.**



**Our world is...**



**90%**

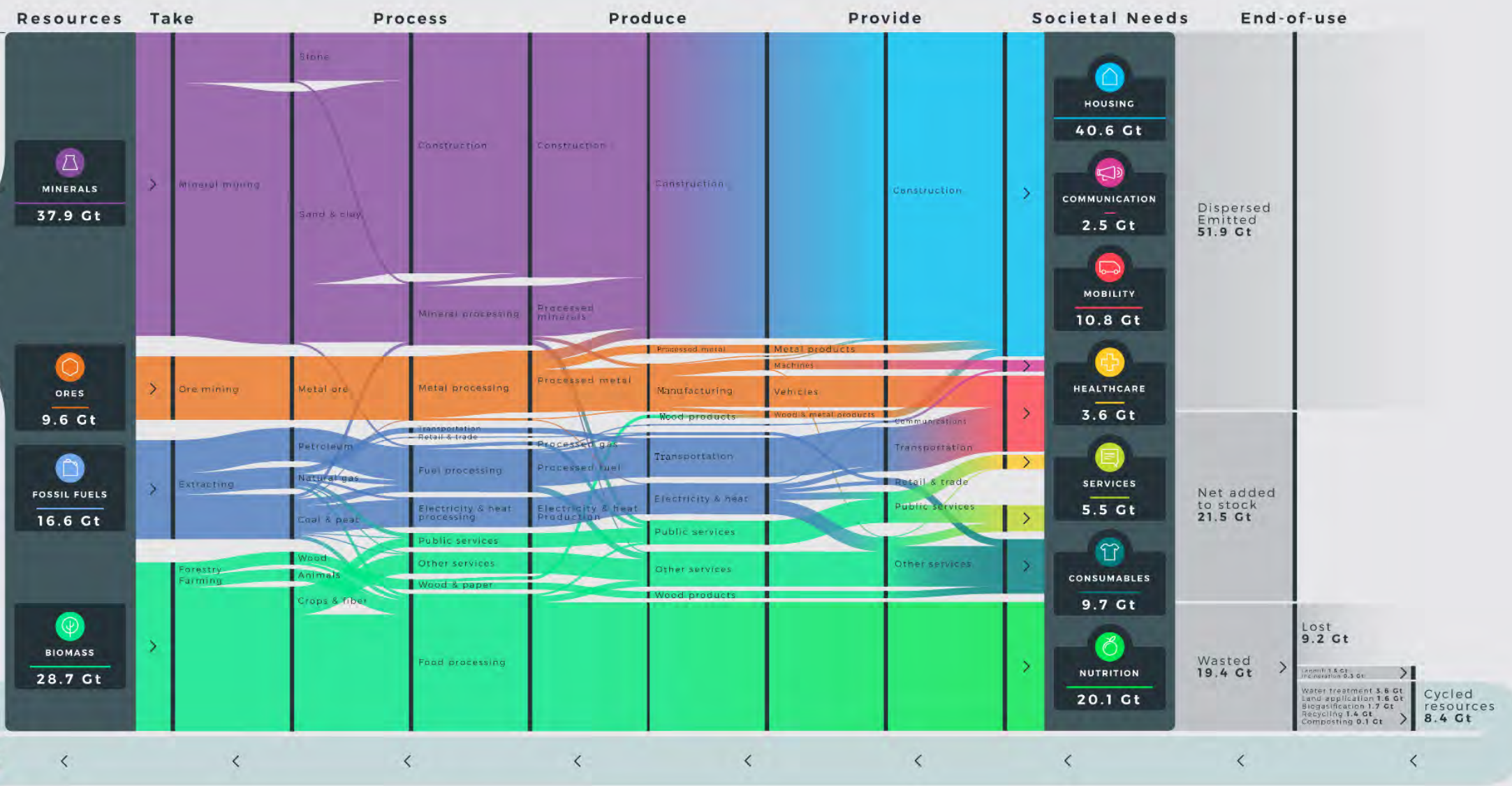
**circular**



Total resources entering the global economy **92.8 Gt**

Extracted resources **84.4 Gt**

Cycled resources **8.4 Gt**







**70.000**

**Ton CO<sub>2</sub> emitidas por minuto**







**Es necesario replantear  
nuestro modelo  
económico y el modo  
en que consumimos**





European  
Commission

# CIRCULAR ECONOMY





**PACE**  
PLATFORMS ACCELERATING  
THE CIRCULAR ECONOMY

**WORLD  
ECONOMIC  
FORUM**

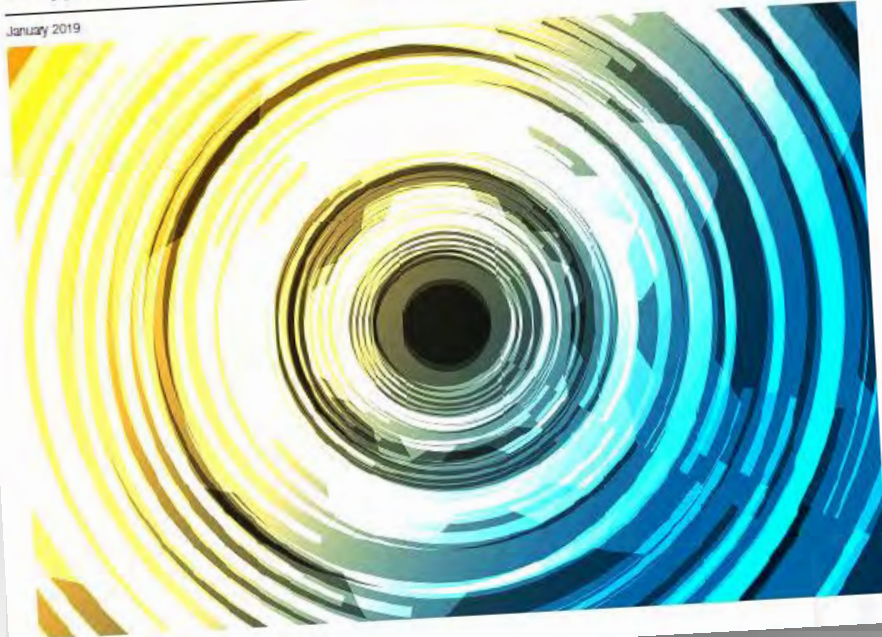
COMMITTED TO  
IMPROVING THE STATE  
OF THE WORLD

# A New Circular Vision for Electronics

## Time for a Global Reboot

In support of the United Nations E-waste Coalition

January 2019



**UNITED NATIONS  
UNIVERSITY**



**WORLD  
ECONOMIC  
FORUM**

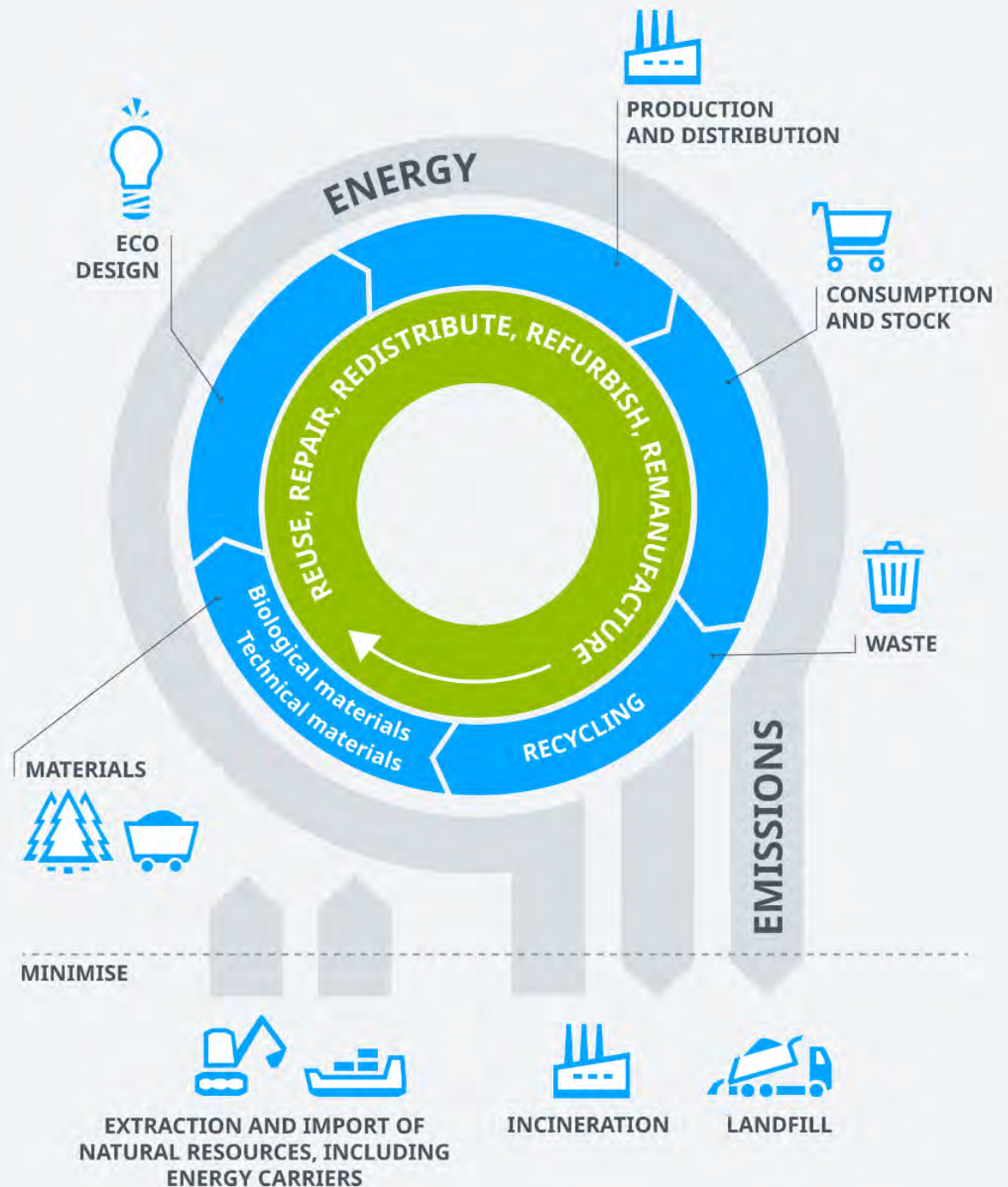


COMMITTED TO  
IMPROVING THE STATE  
OF THE WORLD



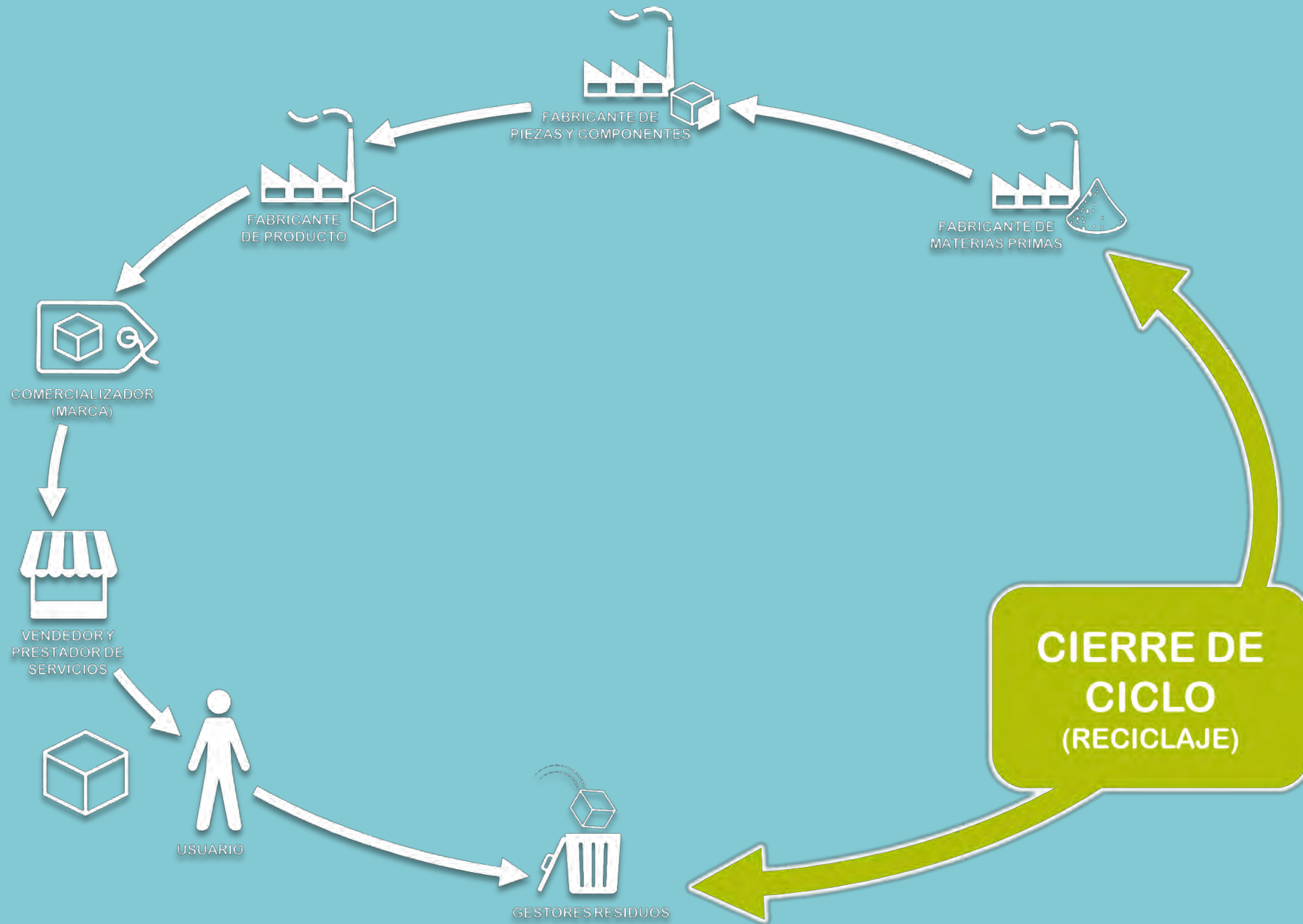


# ¿Qué es la ECONOMÍA CIRCULAR?









**Es mucho más fácil  
reciclar un producto  
que ha sido diseñado  
para ello, que uno  
que no.**





# Ecodiseño

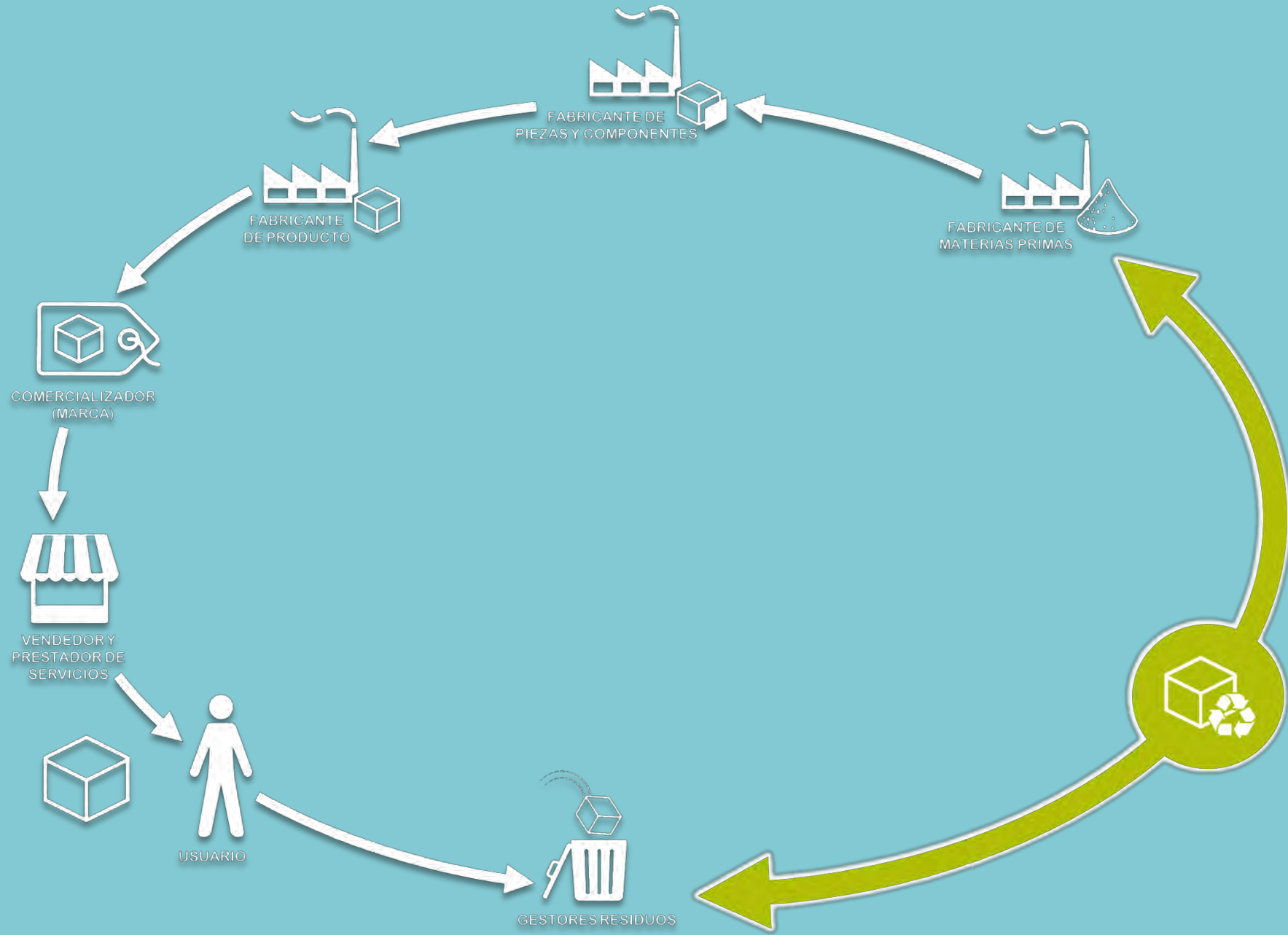
Proceso de diseño que, **además** de criterios técnicos, de usuario y de entorno, integra aquellos **requerimientos ambientales** durante el proceso técnico y creativo para definir y solucionar problemáticas concretas.



Ilustración: A perfect packaging doesn't involve destruction  
(Timofey Yuriev Voronin, 2011). Campaign for WWF

A perfect Packaging  
doesn't involve:







# Recycling Is Not The Answer To The E-Waste Crisis



Vianney Vaute Contributor

Green Tech

f

t

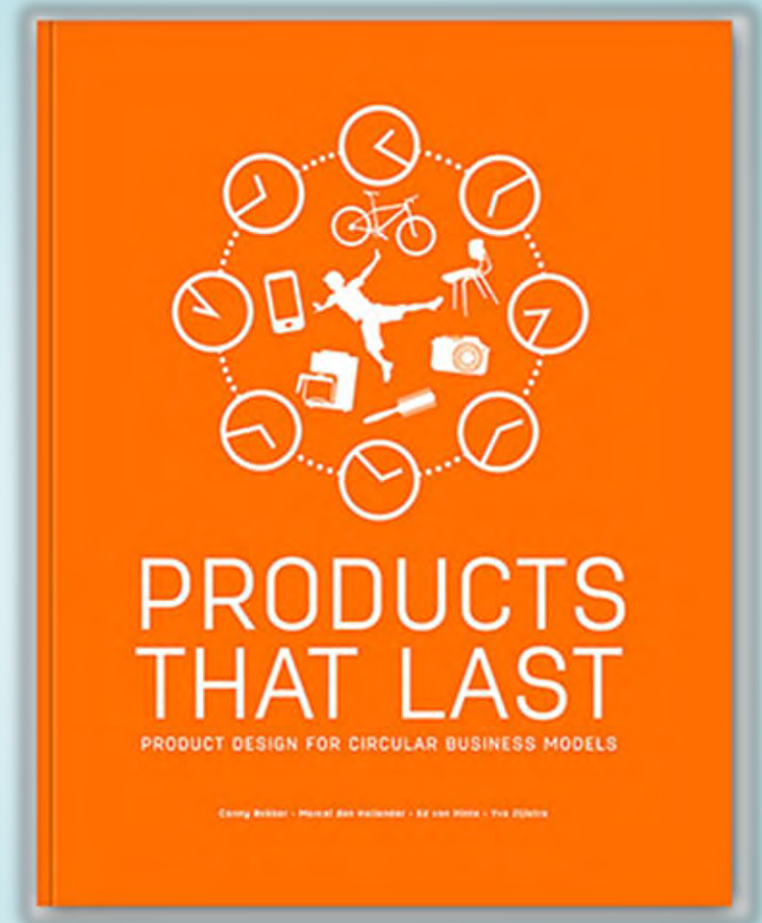
in



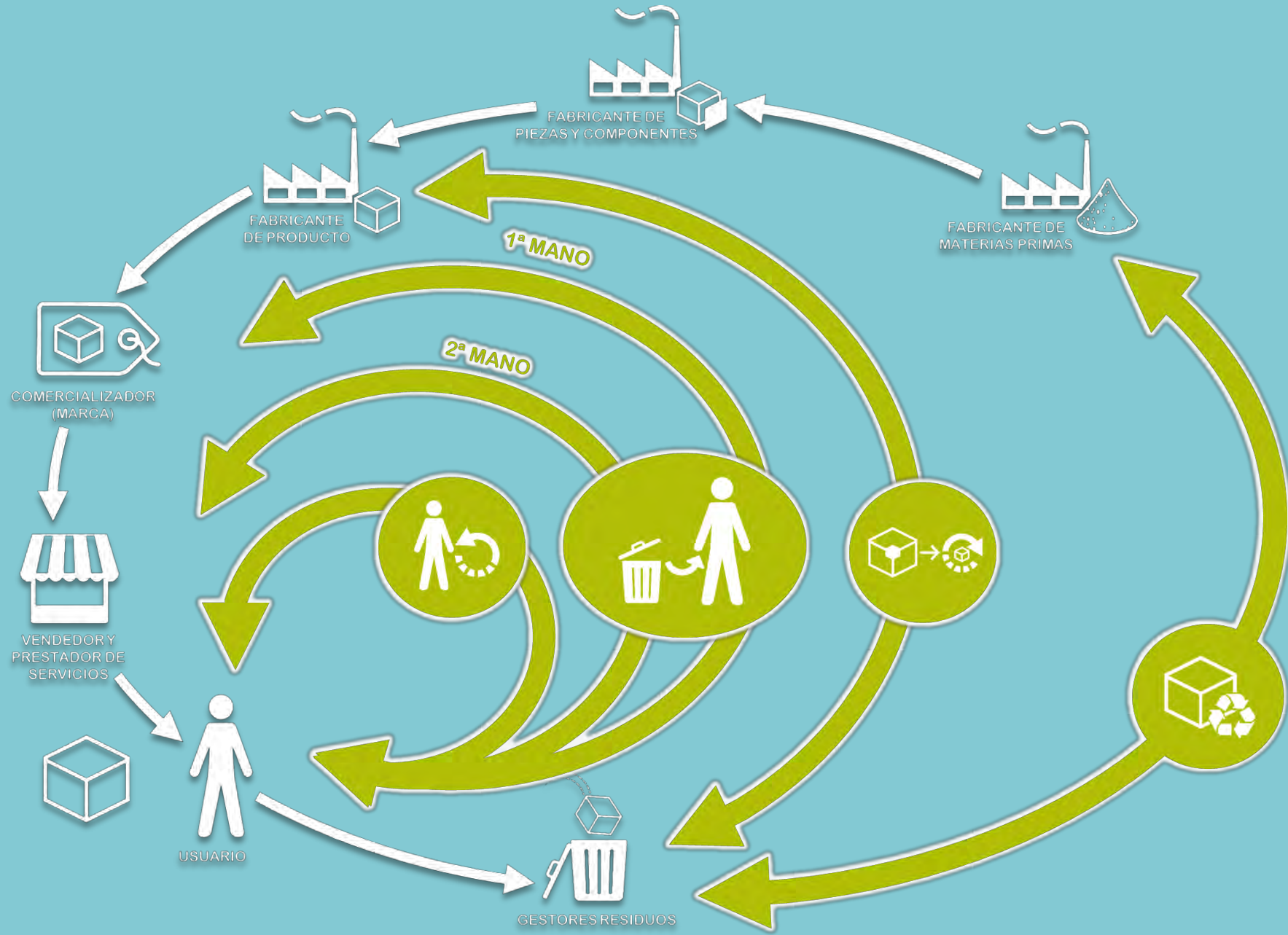
Time to go beyond recycling. PHOTO BY PAWEL CZERWIŃSKI ON UNSPLASH

People feel good about recycling, maybe even more so when it comes to electronics. Remembering to take your computer or smartphone and dropping it off to be recycled feels like an accomplishment in itself.

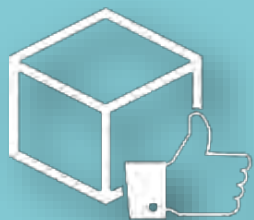
El mejor residuo es aquel que no se genera (o al menos aquel que se genera más tarde).



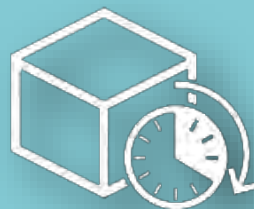




## ALARGAR LA VIDA DEL PRODUCTO:



### FIDELIZACIÓN

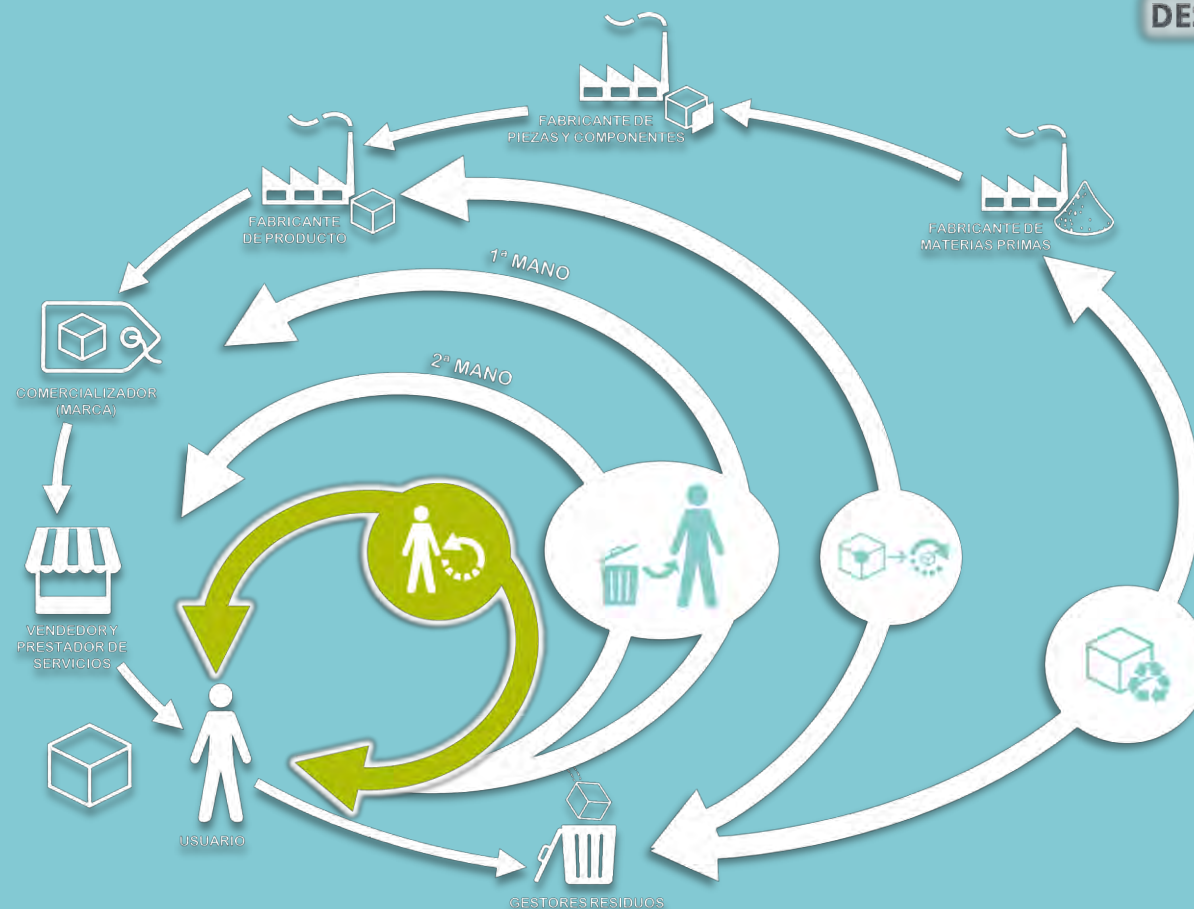


### DURABILIDAD

## MANTENIMIENTO Y REPARACIÓN:



### REPARABILIDAD





## REUTILIZACIÓN (2ª MANO):



# REUTILIZACIÓN

## RECUPERACIÓN DEL PRODUCTO:



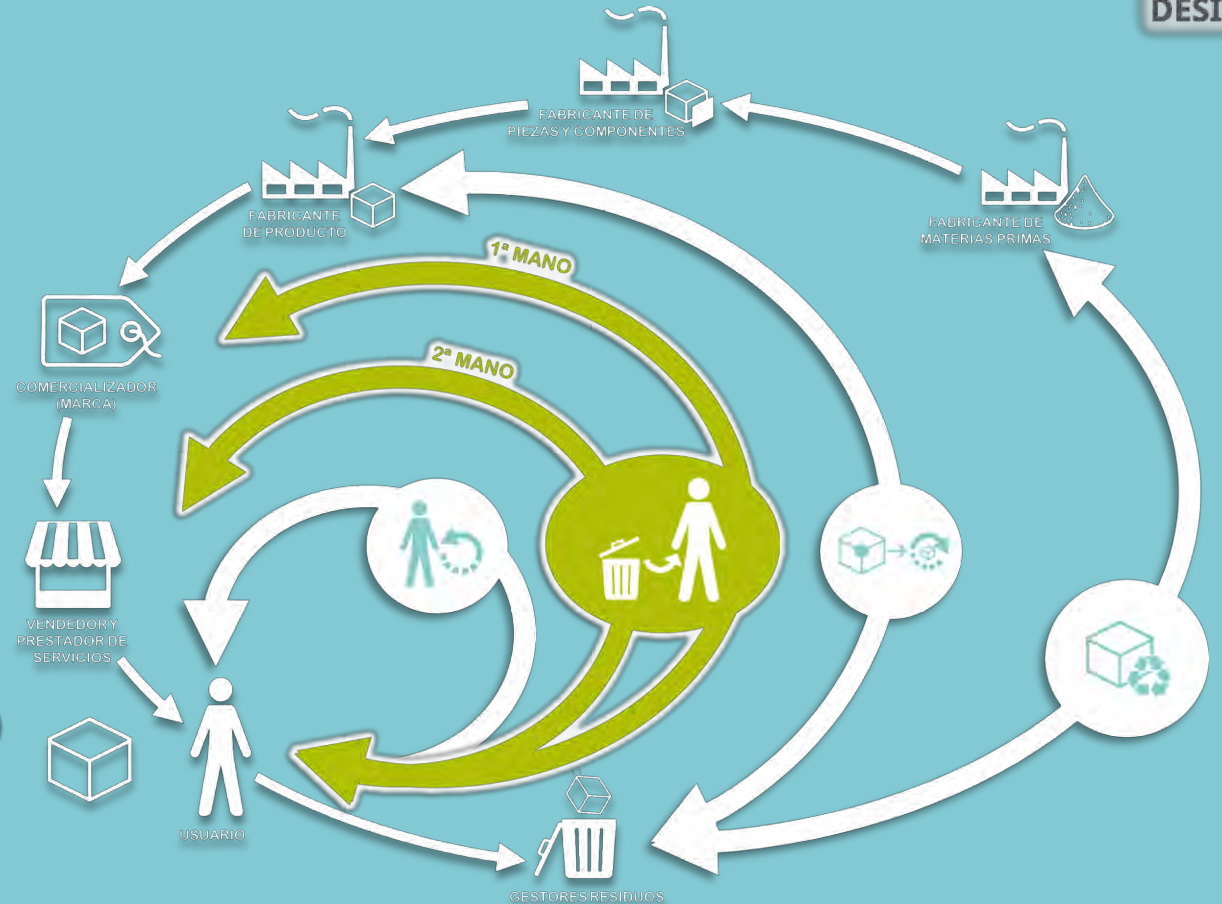
# RENOVACIÓN (2ª MANO)



# REACONDICIONAMIENTO (2ª MANO)



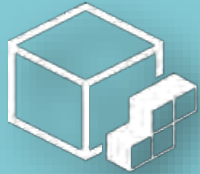
# REMANUFACTURA (1ª MANO)



## RECUPERACIÓN DE PIEZAS:



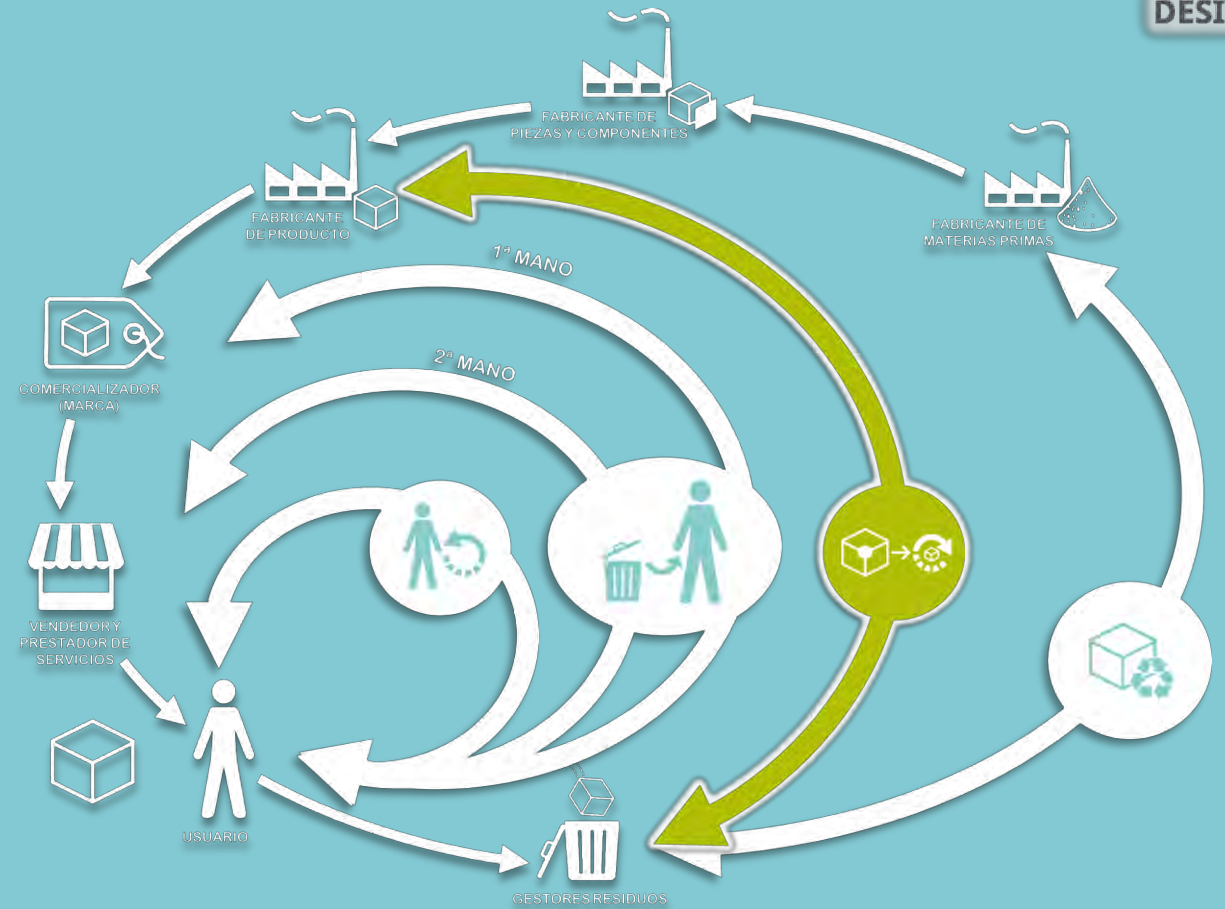
DESMONTAJE



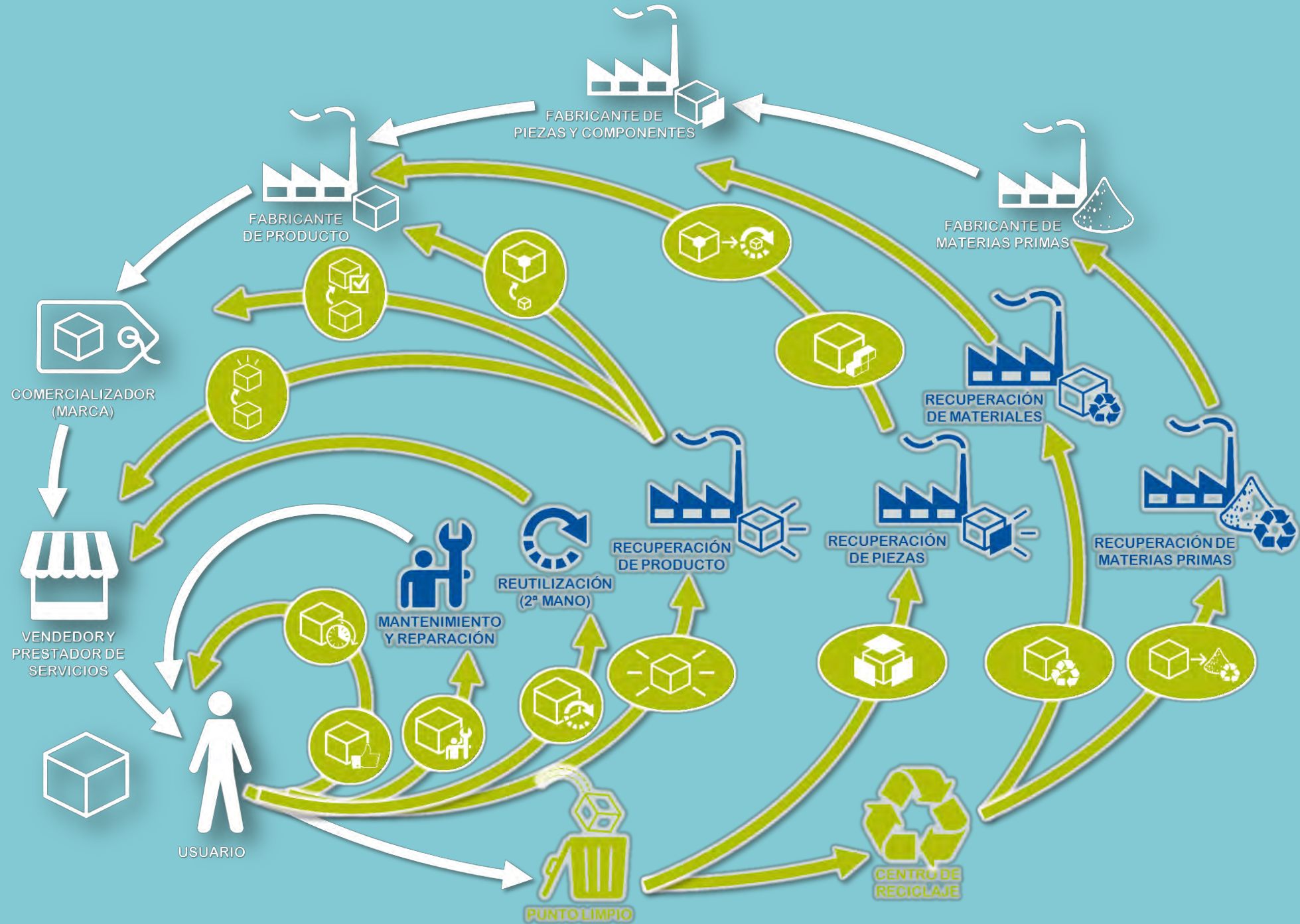
ESTANDARIZACIÓN

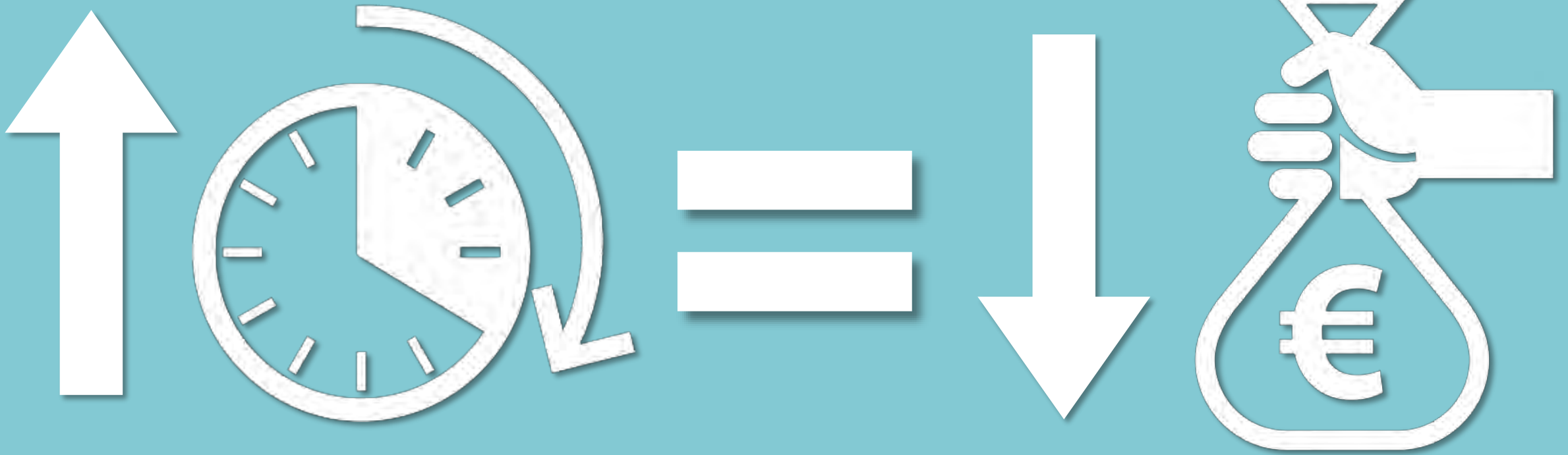


REUTILIZACIÓN  
(DE PIEZAS)



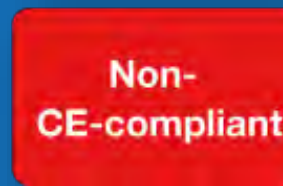
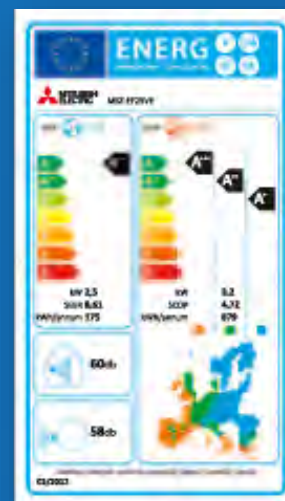








# Requisitos legales aplicable a los productos relacionados con la energía:



**Energy Labelling**

# Mandato 543 de la Comisión sobre eficiencia material:

 **basque ecodesign center**

**Mandato M/543 de la Comisión Europea**  
Estándares en apoyo de la Directiva de Ecodiseño (2009/125/EC) y a la transición hacia una economía más circular

**Economía Circular**  
**Eco-diseño**  
**Reciclado**  
**Remanufactura**  
**Vida útil**  
**EIP**

 **ihobe**  
ingurumen hobekuntza  
mejora ambiental

 **EUSKO JAURLARITZA**  
**GOBIERNO VASCO**  
INGURUMEN, LURRALDE PLANOKUNTZA  
ETA ETXERIKITZA SAIA  
DEPARTAMENTO DE MEDIO AMBIENTE,  
PLANIFICACIÓN TERRITORIAL Y VIVIENDA

EN 45552 - Durabilidad

EN 45553 - Capacidad de remanufactura

EN 45554 - Capacidad de reparación, reutilización y actualización

EN 45555 - Reciclabilidad y recuperabilidad

EN 45556 - Proporción de componentes reutilizados

EN 45557 - Proporción de contenido en material reciclado

EN 45558 - Uso de materias primas críticas

EN 45559 - Eficiencia material







© What I Eat: Around the World in 80 Diets



© What I Eat: Around the World in 80 Diets



## CONSUMPTION AND STOCK



© What I Eat: Around the World in 80 Diets



© What I Eat: Around the World in 80 Diets



A close-up photograph of a hand holding a bright red rectangular sign. The sign features white text in a bold, sans-serif font. The text is arranged in three lines: 'I shop' on the top line, 'therefore' in a smaller font size on the middle line, and 'I am' on the bottom line. The background is a dark, textured surface, possibly a piece of fabric or paper, with some shadows and highlights. The hand holding the sign is partially visible on the left and right sides.

**I shop**  
**therefore**  
**I am**



CHANGE THE  
POLITICS NOT THE  
CLIMATE







**CONSUMPTION  
AND STOCK**



**VENTA DE  
PRODUCTO**

☰ EL PAÍS 🔔 🔍

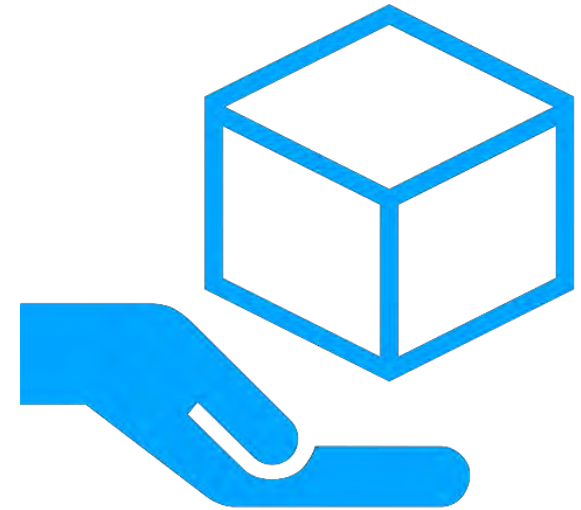
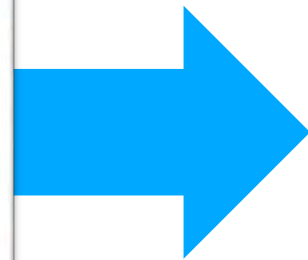
CONSUMO >

### La sociedad da la espalda a la propiedad: usuarios de todo; dueños de nada

Un cambio en los hábitos de consumo de los ciudadanos está transformando la economía y las empresas. Bien por necesidad bien por convencimiento, los ciudadanos relegan la adquisición de objetos en favor del arrendamiento de servicios.

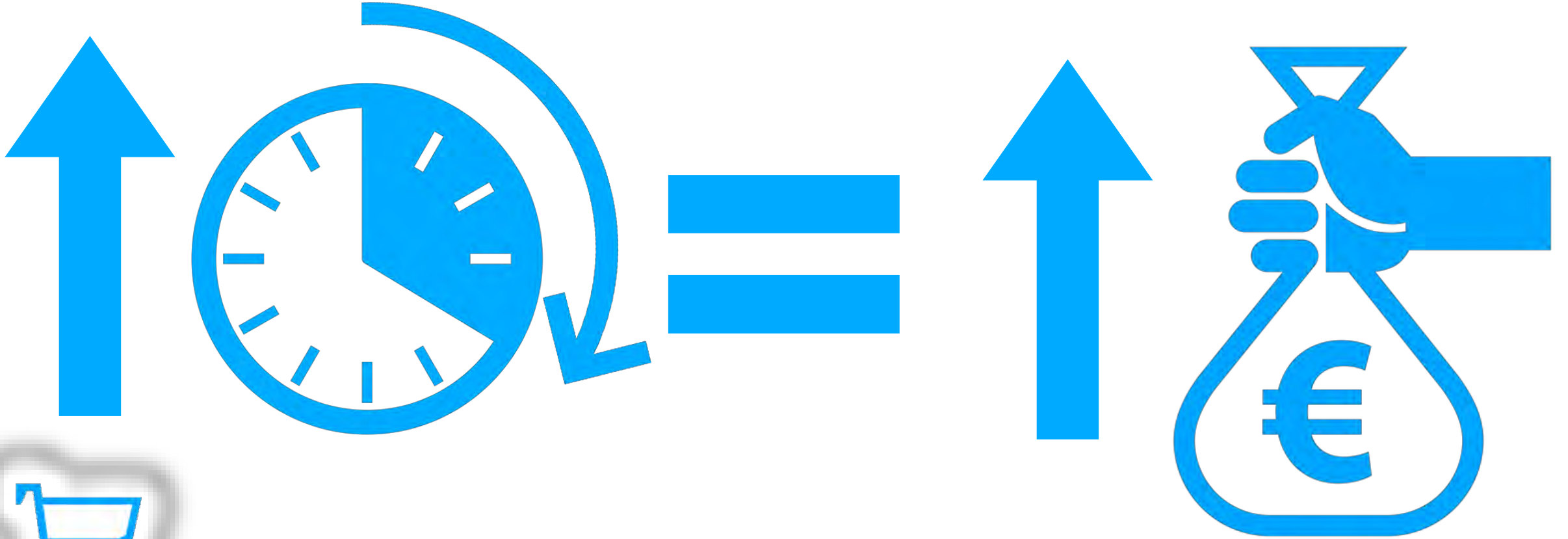
WhatsApp Facebook Twitter Share Comment Like Email

SANDRA LÓPEZ LETÓN  
Madrid - 6 OCT 2019 - 14:15 CEST



**ACCESO AL  
USO**



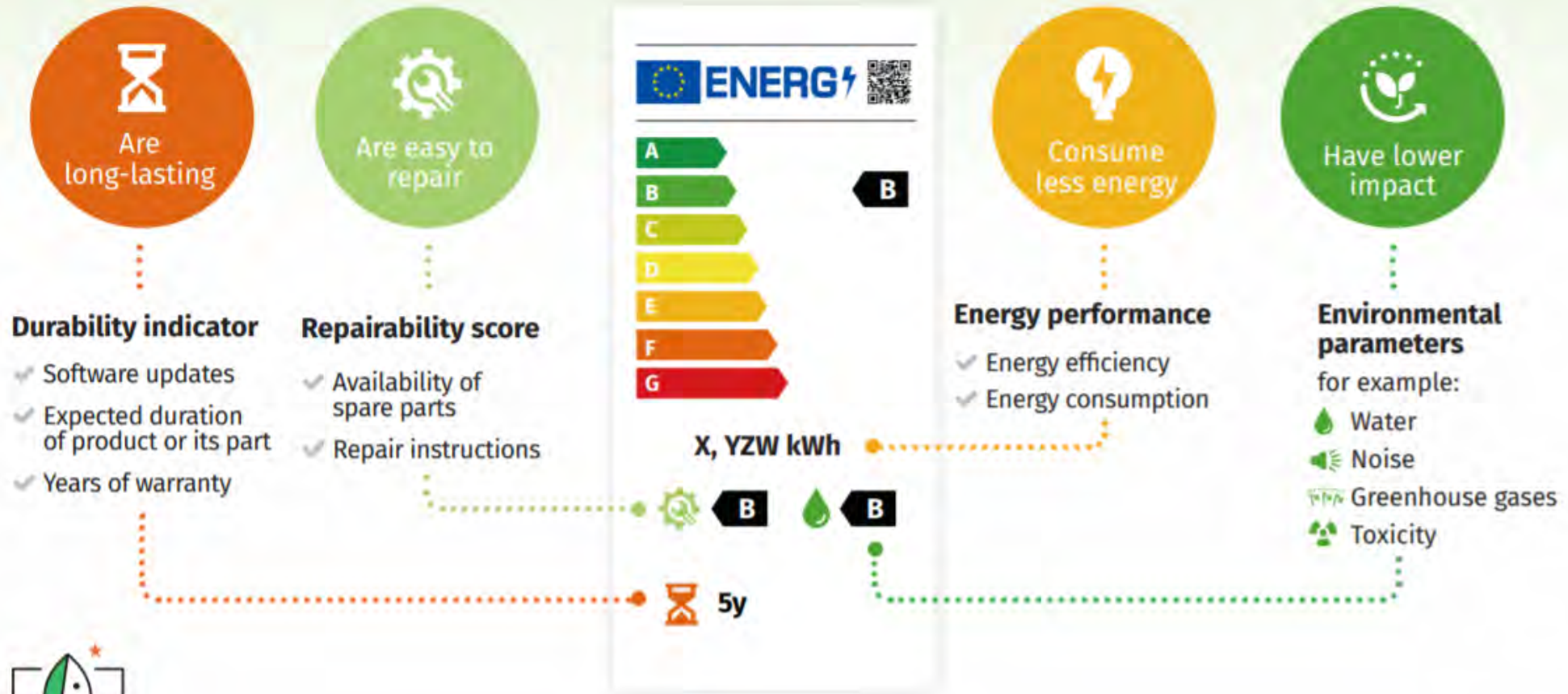


**CONSUMPTION  
AND STOCK**





# THE ENERGY LABEL SHOULD GO **CIRCULAR** AND HELP EUROPEANS PICK **PRODUCTS** WHICH...



The green line to standards

[www.ecostandard.org](http://www.ecostandard.org)

[@ECOS\\_Standard](https://twitter.com/ECOS_Standard)

[ECOS-EU](https://www.linkedin.com/company/ecos-eu)

# EU ENVIRONMENTAL FOOTPRINT




**ENVIRONMENTAL IMPACT**

**A B C D E**  
**BETTER AVERAGE WORSE**

*This rating has been verified by independent experts and is based on this product's contribution to:*

- Global warming **C**
- Air pollution **B**
- Water pollution **B**



[www.eco-impact.eu](http://www.eco-impact.eu)





# EU ENVIRONMENTAL FOOTPRINT



**A**



**D**



**E**



**B**



**C**

## Enfoque deseado con la Huella Ambiental.

(Información clara, multicategoría, comparabilidad).



**Reglas de Categoría de Huella Ambiental de Producto**  
(PEFCR.- Product Env. Footprint Category Rules)

## ENVIRONMENTAL IMPACT

**A B C D E**

**BETTER AVERAGE WORSE**

*This rating has been verified by independent experts and is based on this product's contribution to:*

- Global warming **C**
- Air pollution **B**
- Water pollution **B**



[www.eco-impact.eu](http://www.eco-impact.eu)





**ZERO  
WASTE  
SCOTLAND**

# **Business Models for a Circular Economy**







Aporte de valor a través  
del **PRODUCTO**

Aporte de valor a través  
del **SERVICIO**



Sólo PRODUCTO	Sistema PRODUCTO – SERVICIO (PSS – PRODUCT SERVICE SYSTEM)			Sólo SERVICIO
				
<b>VENTA DE PRODUCTO</b>	<b>SERVICIOS DE APOYO</b>	<b>ACCESO AL USO</b>	<b>ACCESO AL RESULTADO</b>	<b>SERVICIO SIN PRODUCTO</b>

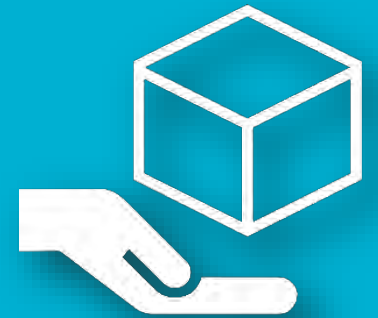
(Fuente: Arnold Tukker – 2004 - *Business Strategy and the Environment*)



**Rolls-Royce®**



Power by the hour



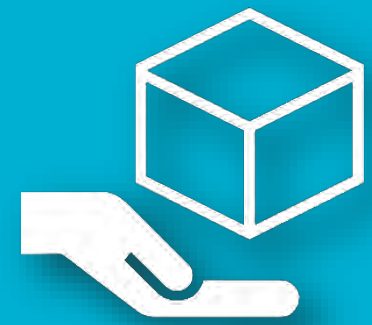
**SERVICIOS DE  
ACCESO AL  
USO**



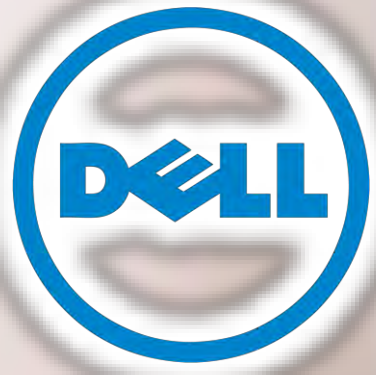
# FAIRPHONE

## THE CIRCULAR PHONE

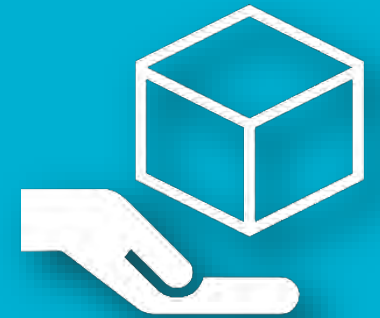
Legal, operational and financial solutions to unlock the potential of the 'Fairphone-as-a-Service' model



SERVICIOS DE  
ACCESO AL  
USO



PC as a Service (PCaaS)



SERVICIOS DE  
ACCESO AL  
USO



**PHILIPS**



Pay per lux



**SERVICIOS DE  
ACCESO AL  
RESULTADO**

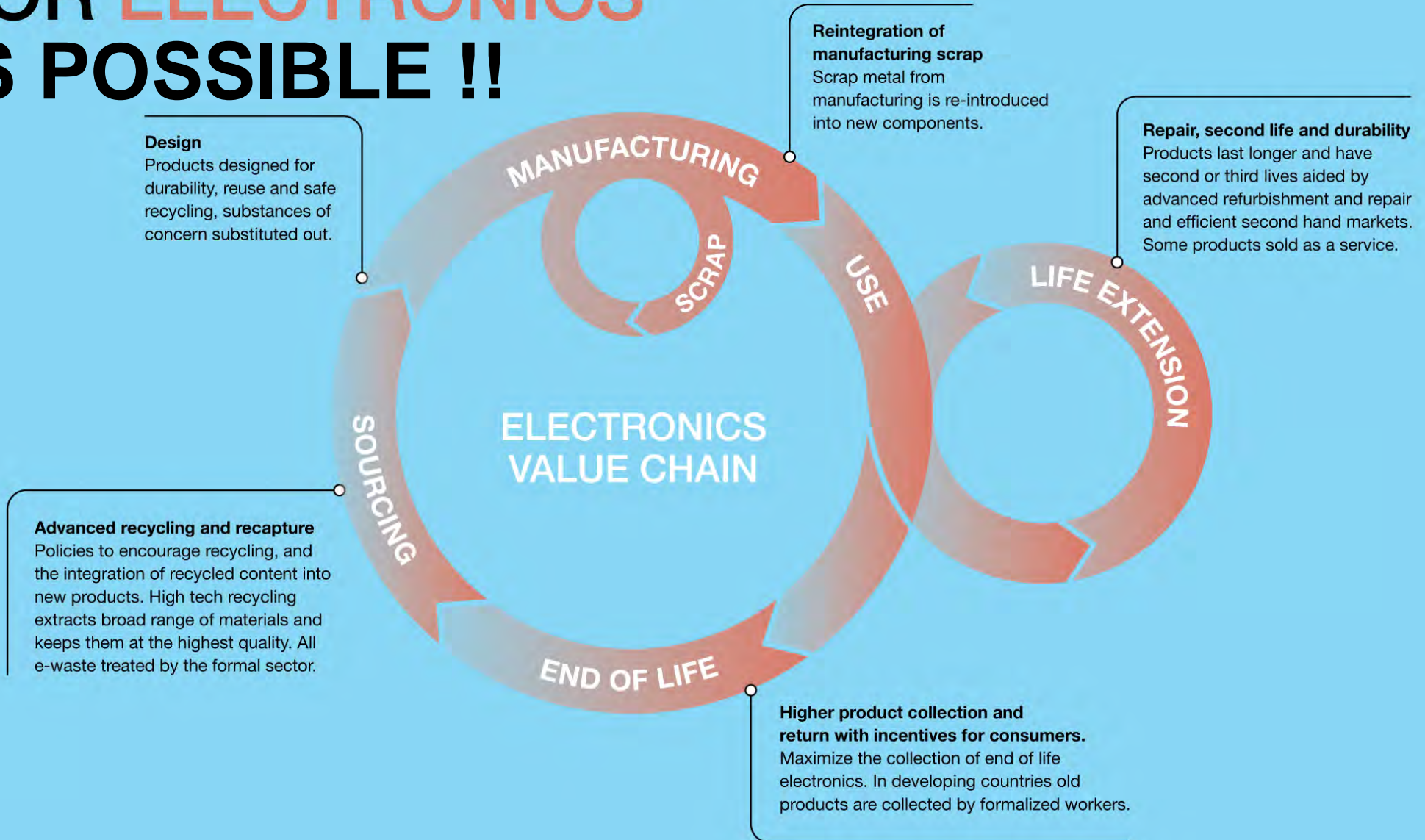


# The future is circular

#CircularEconomy



# A NEW CIRCULAR VISION FOR **ELECTRONICS** IS POSSIBLE !!



# Muchas gracias!!!

jose\_maria.fernandez@ihobe.eus

