



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







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.**





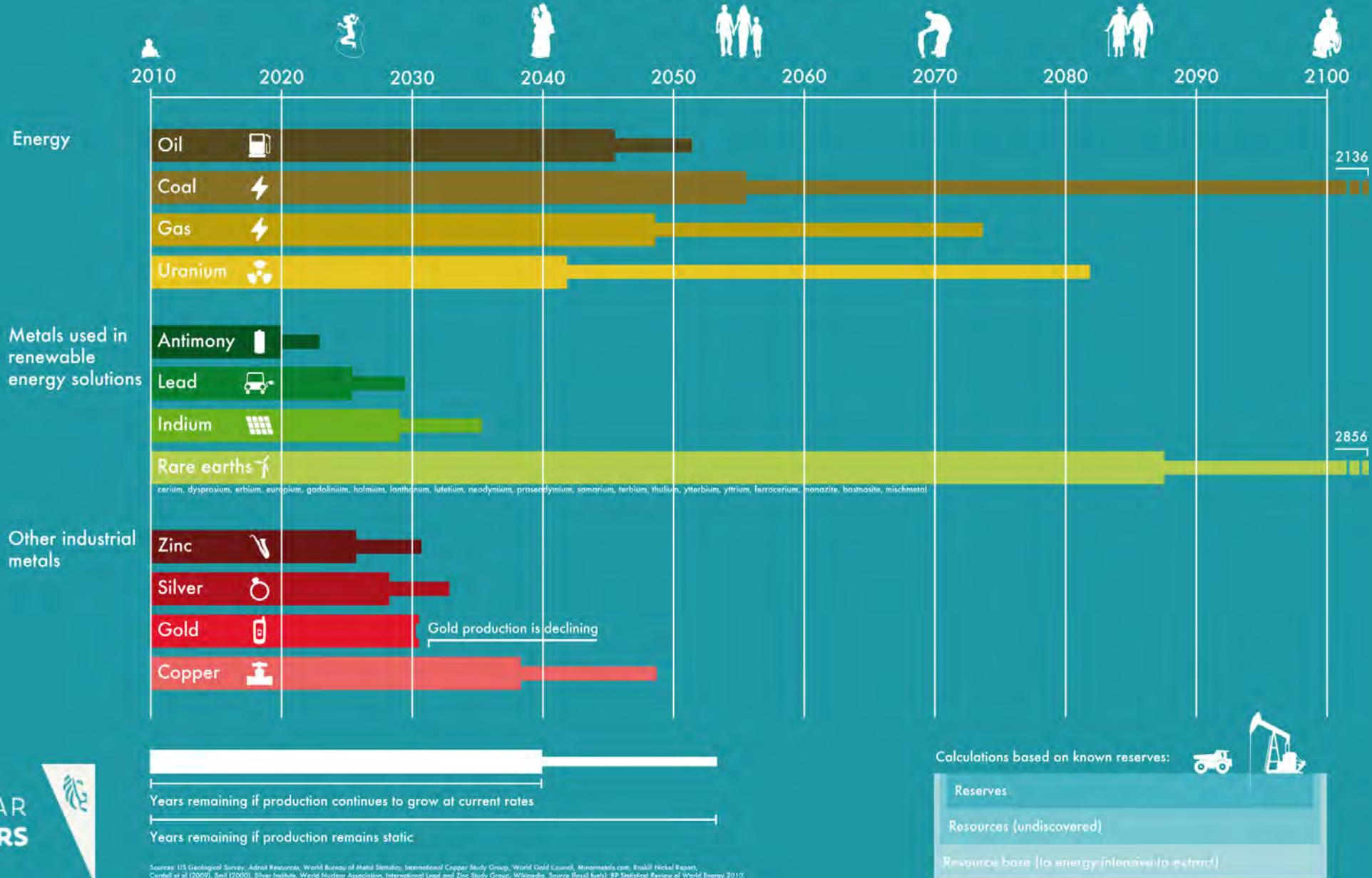


¿Sabemos que hay detrás de los materiales que consumimos?



**¿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

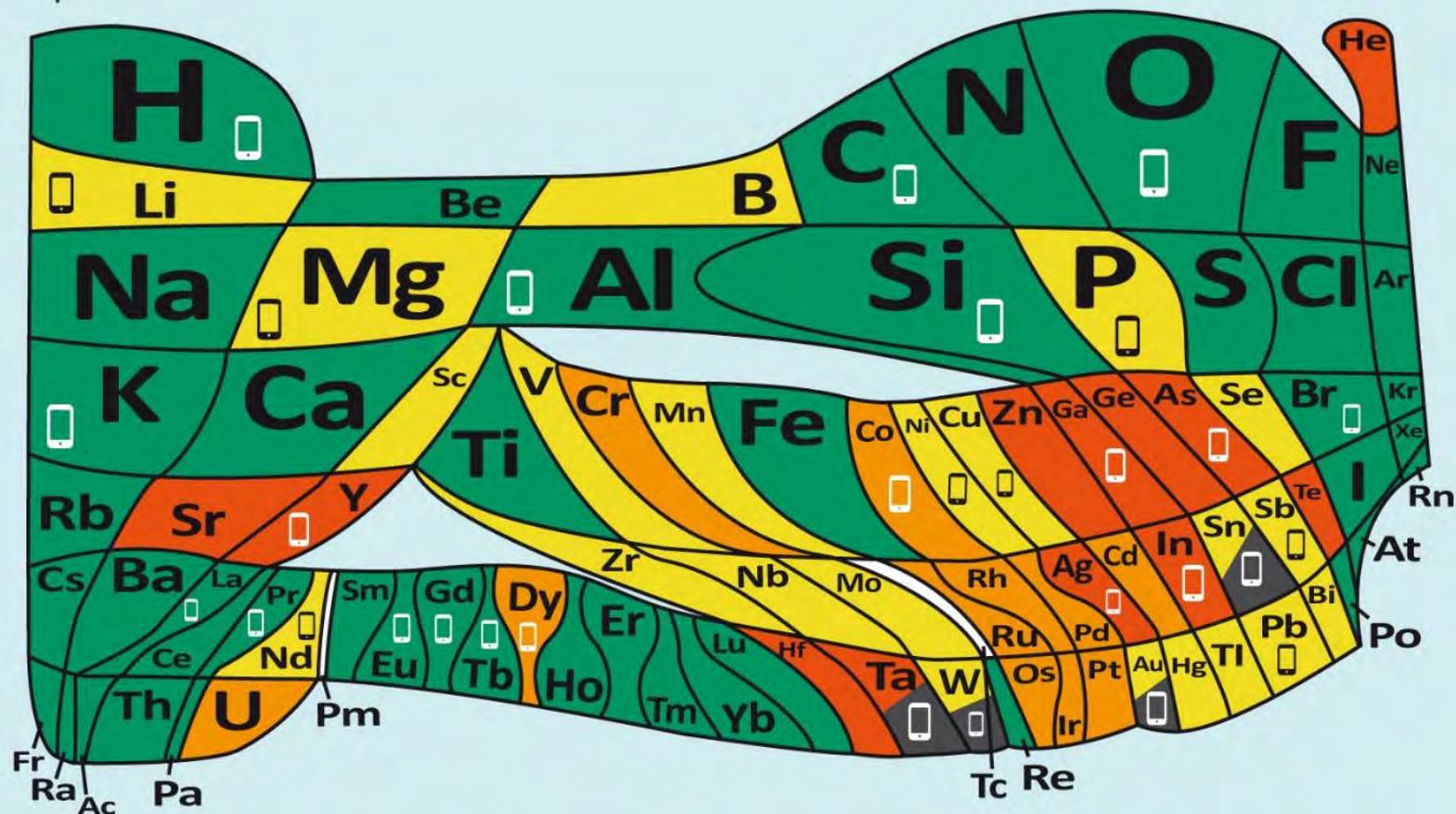
2019
IYPT

International Year
of the Periodic Table
of Chemical Elements



The 90 natural elements that make up everything

How much is there? Is that enough?



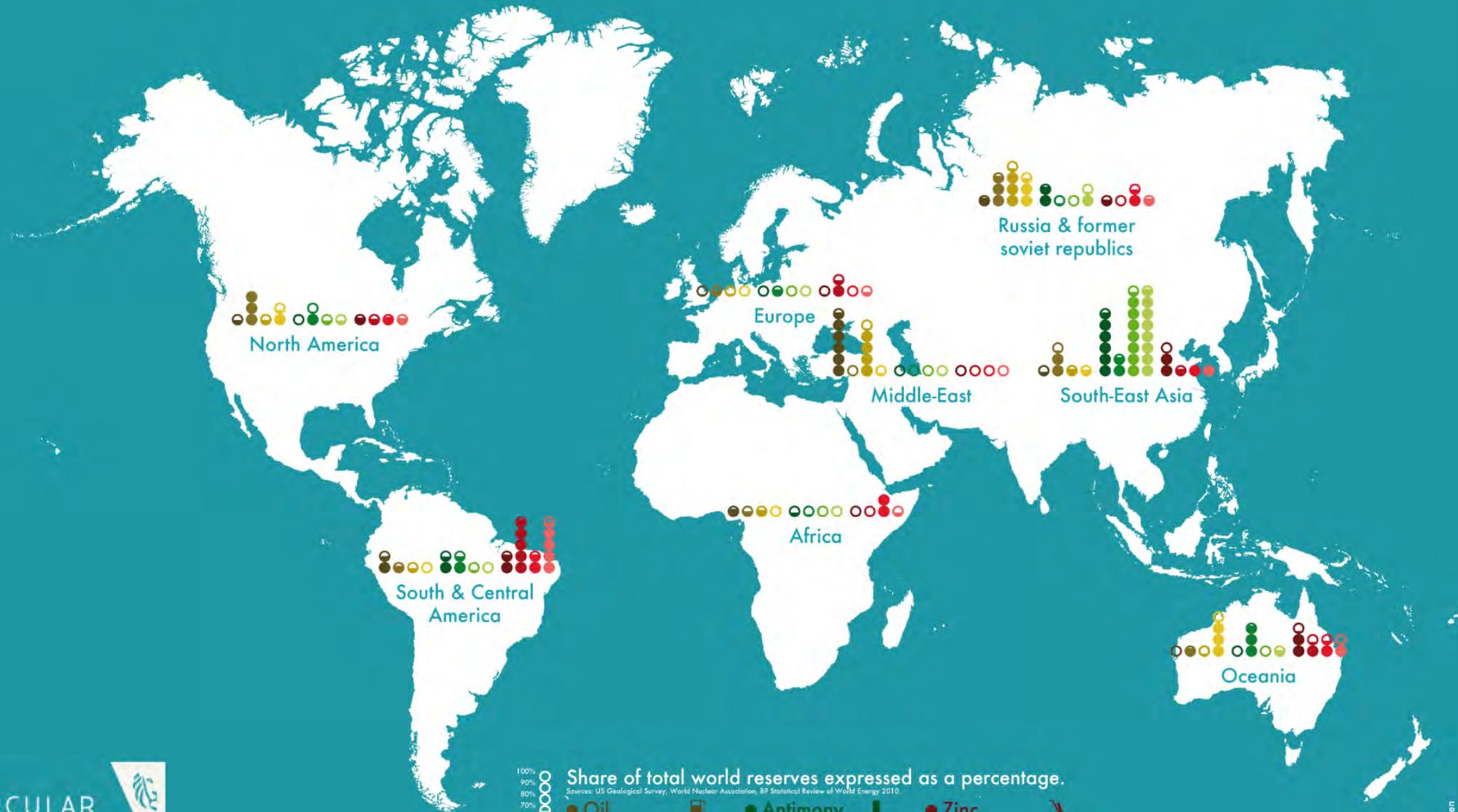
- Serious threat in the next 100 years
- Rising threat from increased use
- Limited availability, future risk to supply
- Plentiful Supply
- Synthetic
- From conflict minerals
- Elements used in a smart phone

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



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Where to find the leftovers?



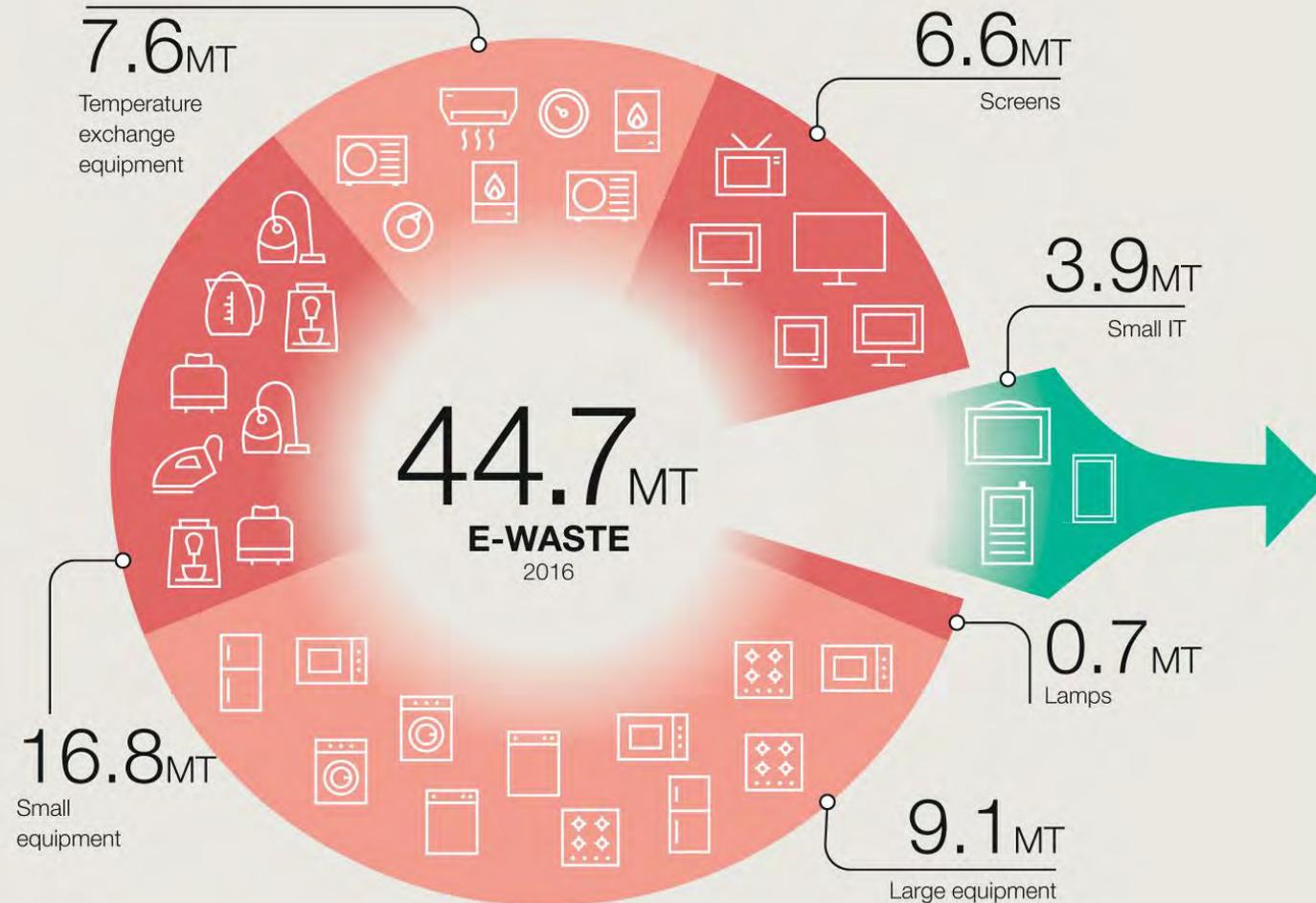


Los productos se comercializan en todo el mundo.

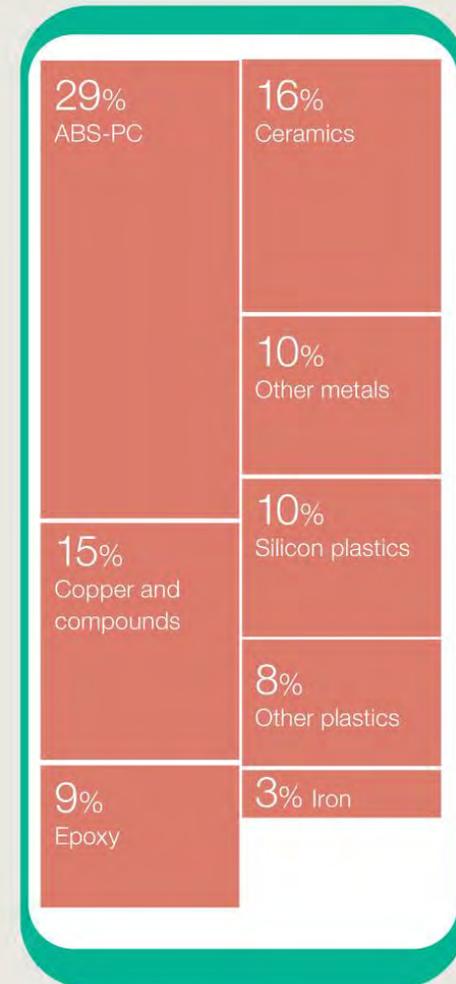


**El consumo eléctrico
doméstico no para de
crecer**

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*



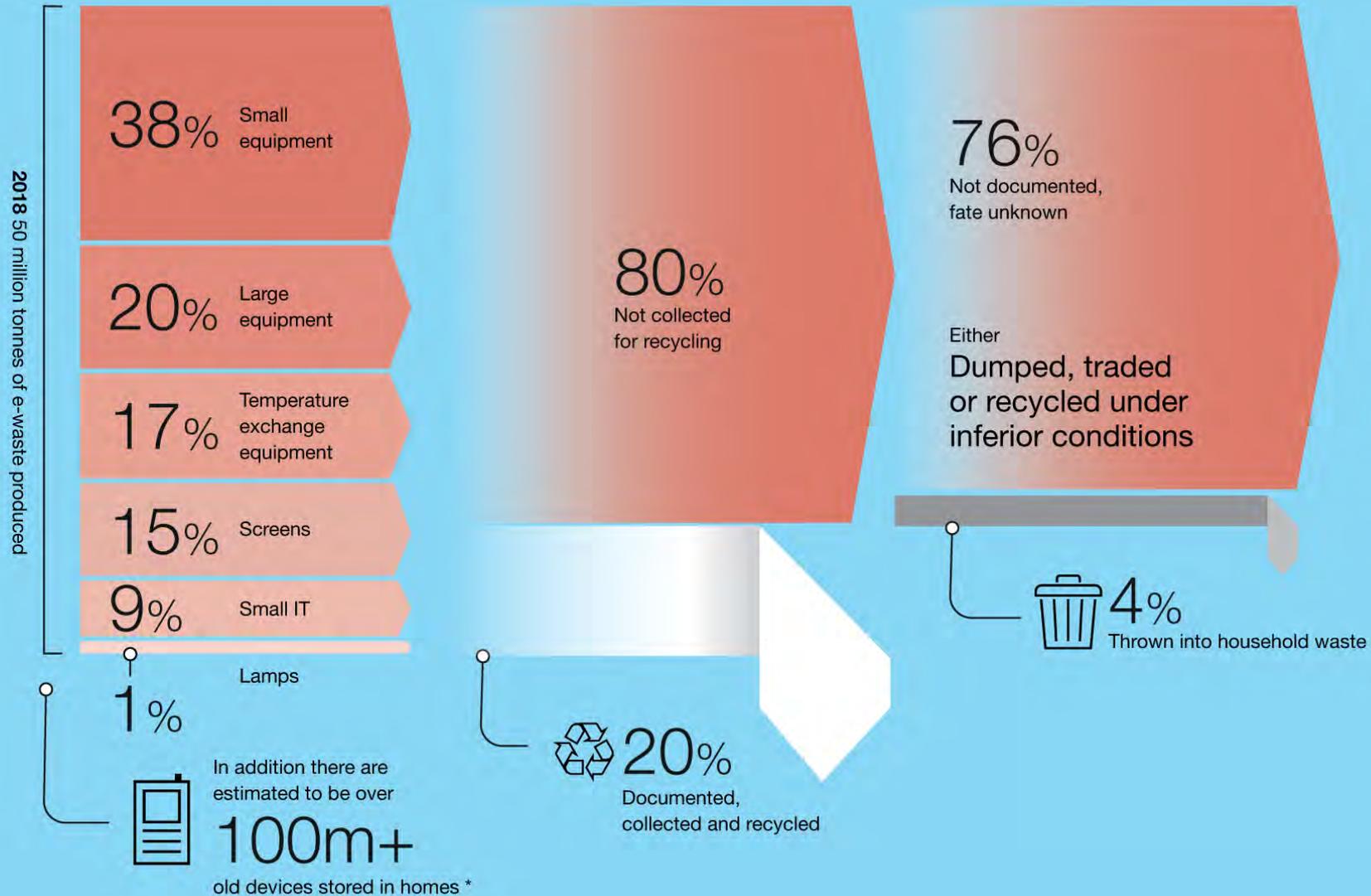
* includes discarded products with a battery or plug including mobile phones, laptops, televisions, refrigerators, electrical toys and other electronic equipment



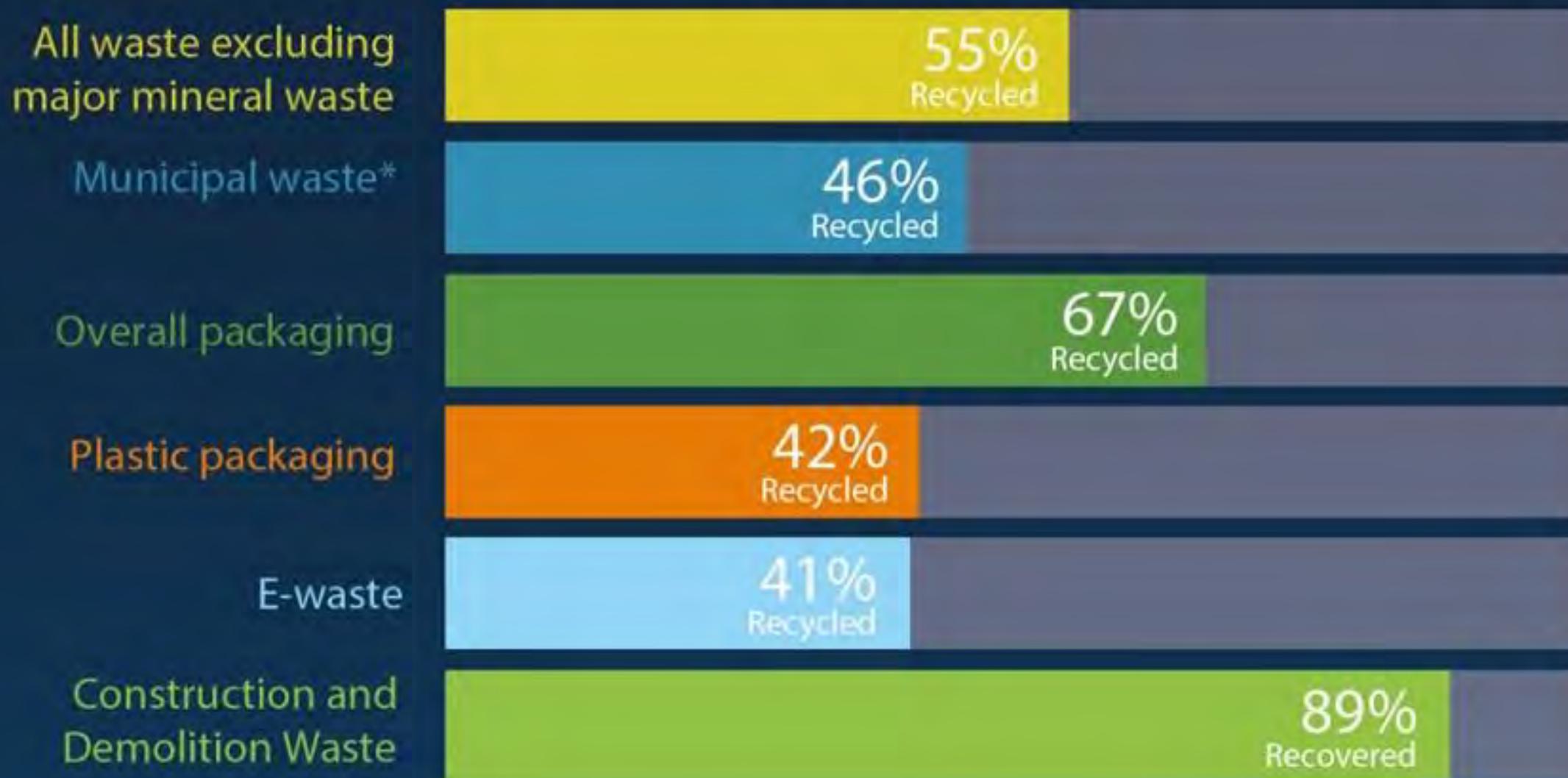
@StatistaCharts

Source: The Global E-waste Monitor 2017

GLOBAL E-WASTE FLOWS



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



*2017

[Global Agenda](#) | [Circular Economy](#) | [Electronics](#) | [Digital Economy and Society](#)

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)



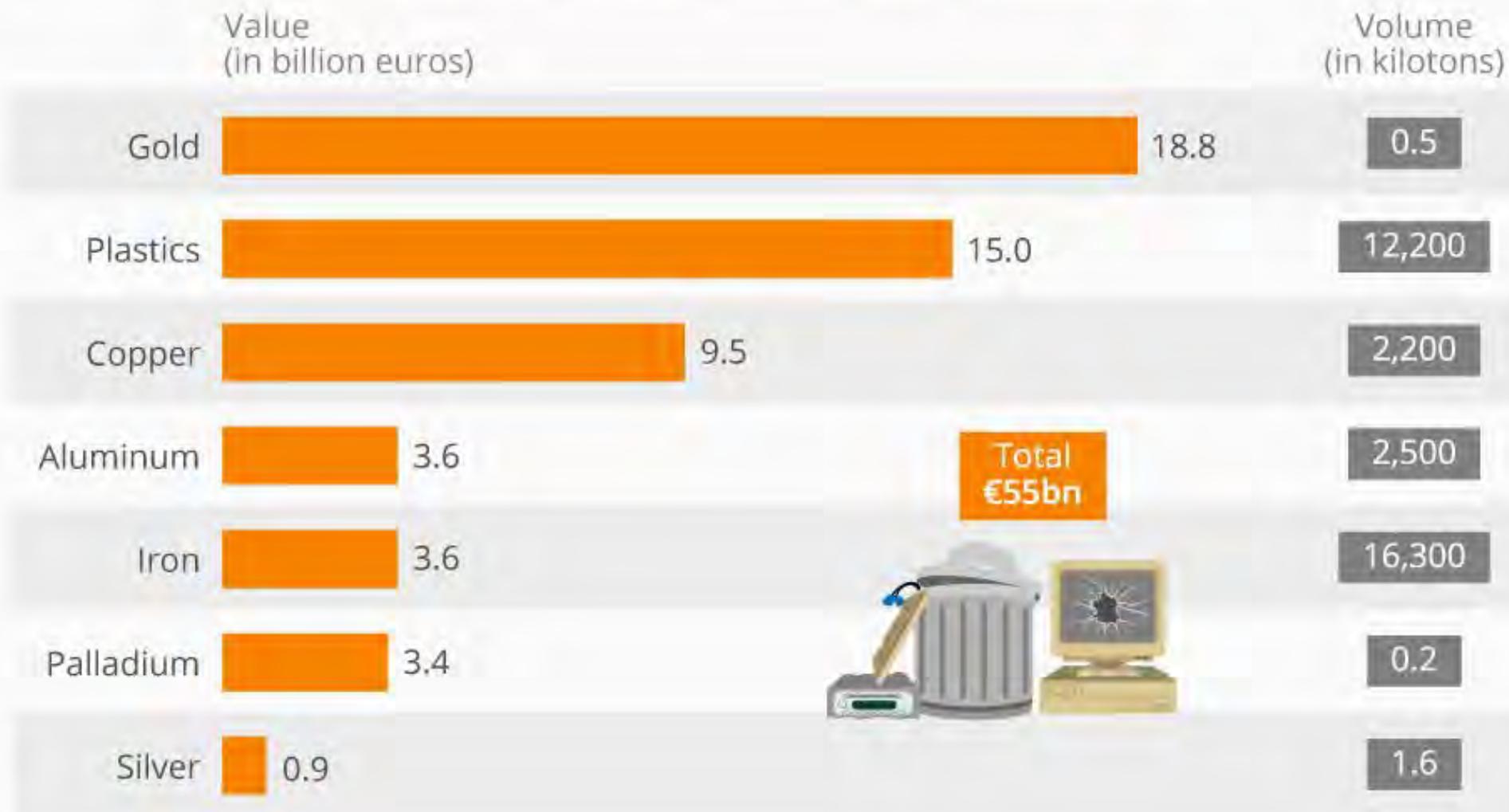
This article is part of the [World Economic Forum Annual Meeting](#)

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



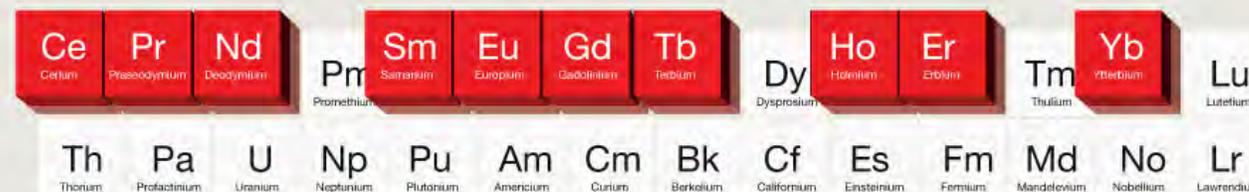
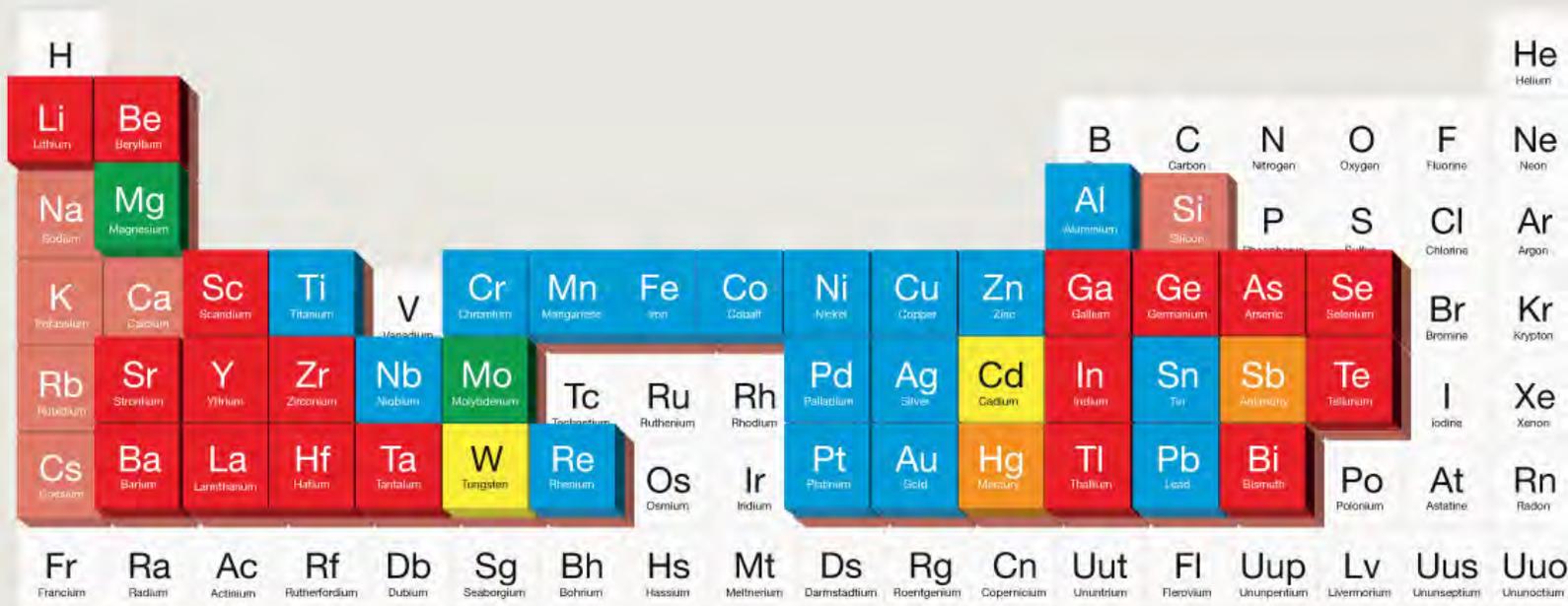
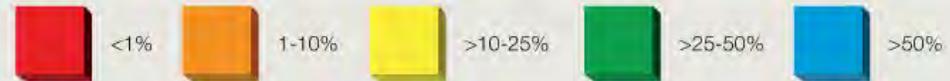
@StatistaCharts Source: ITU

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...



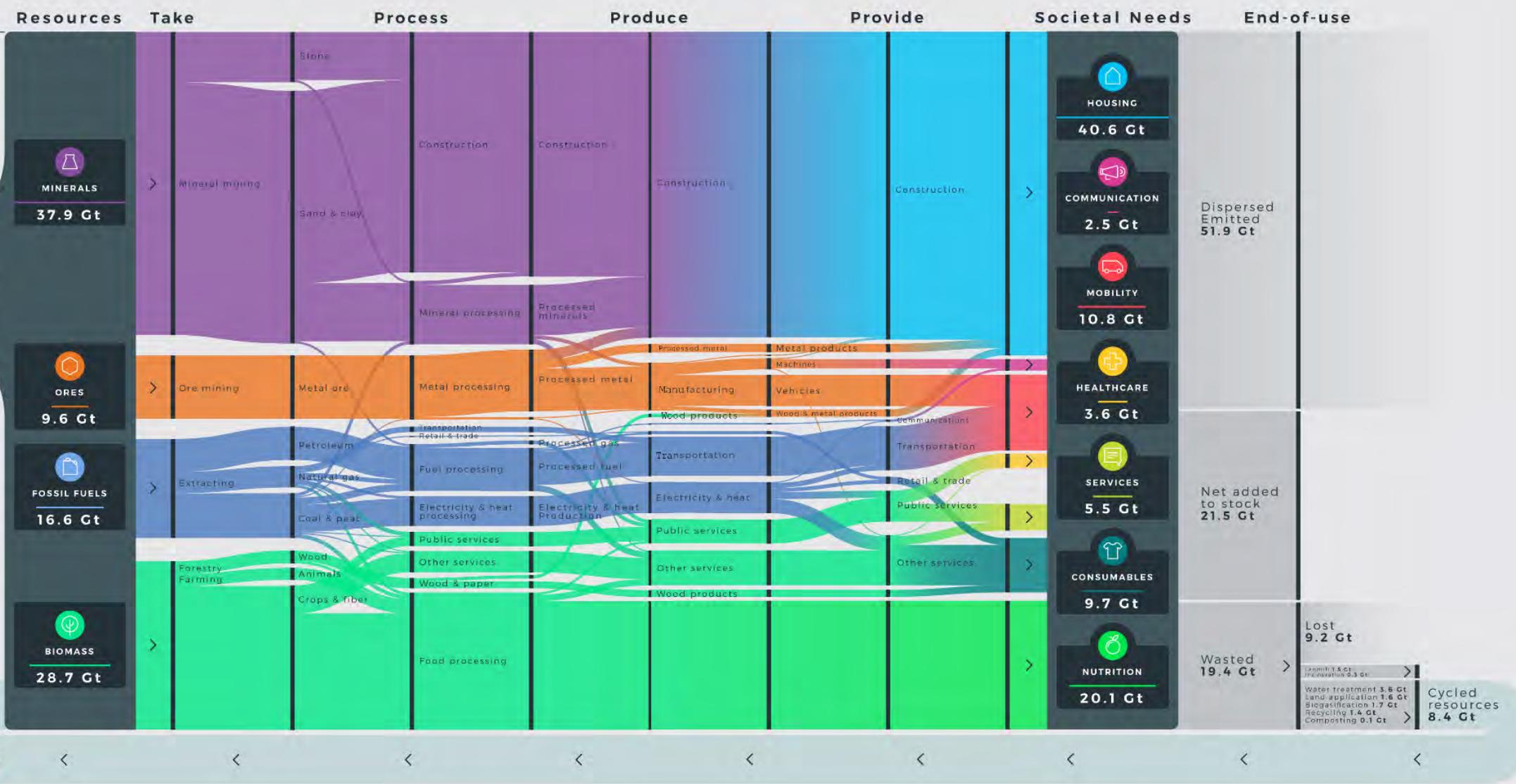
90%

circular

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

Extracted resources **84.4 Gt**

Cycled resources **8.4 Gt**





70.000

Ton CO₂ emitidas por minuto



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





European
Commission |

CIRCULAR ECONOMY



PACE
PARTNERSHIP ACCELERATING
THE CIRCULAR ECONOMY

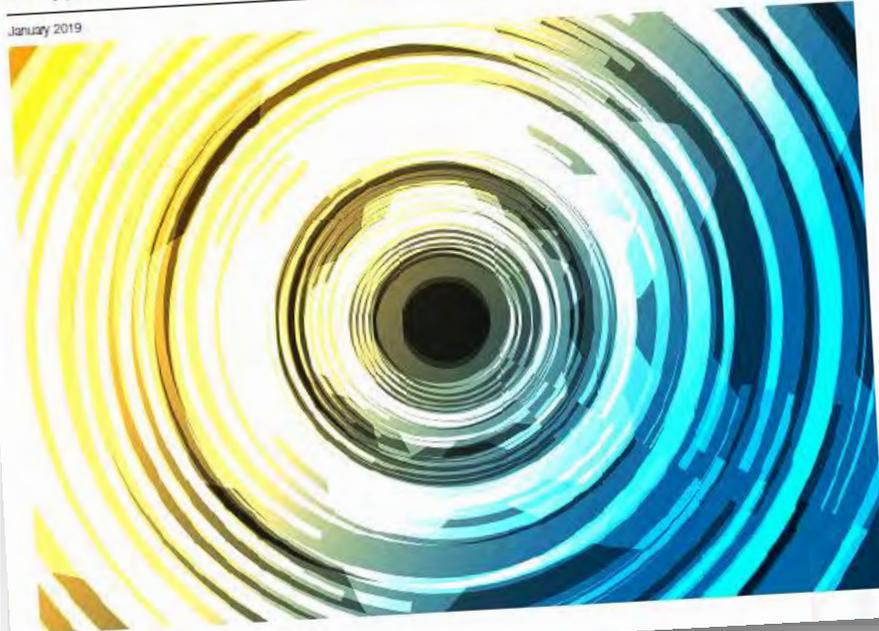
WORLD
ECONOMIC
FORUM

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



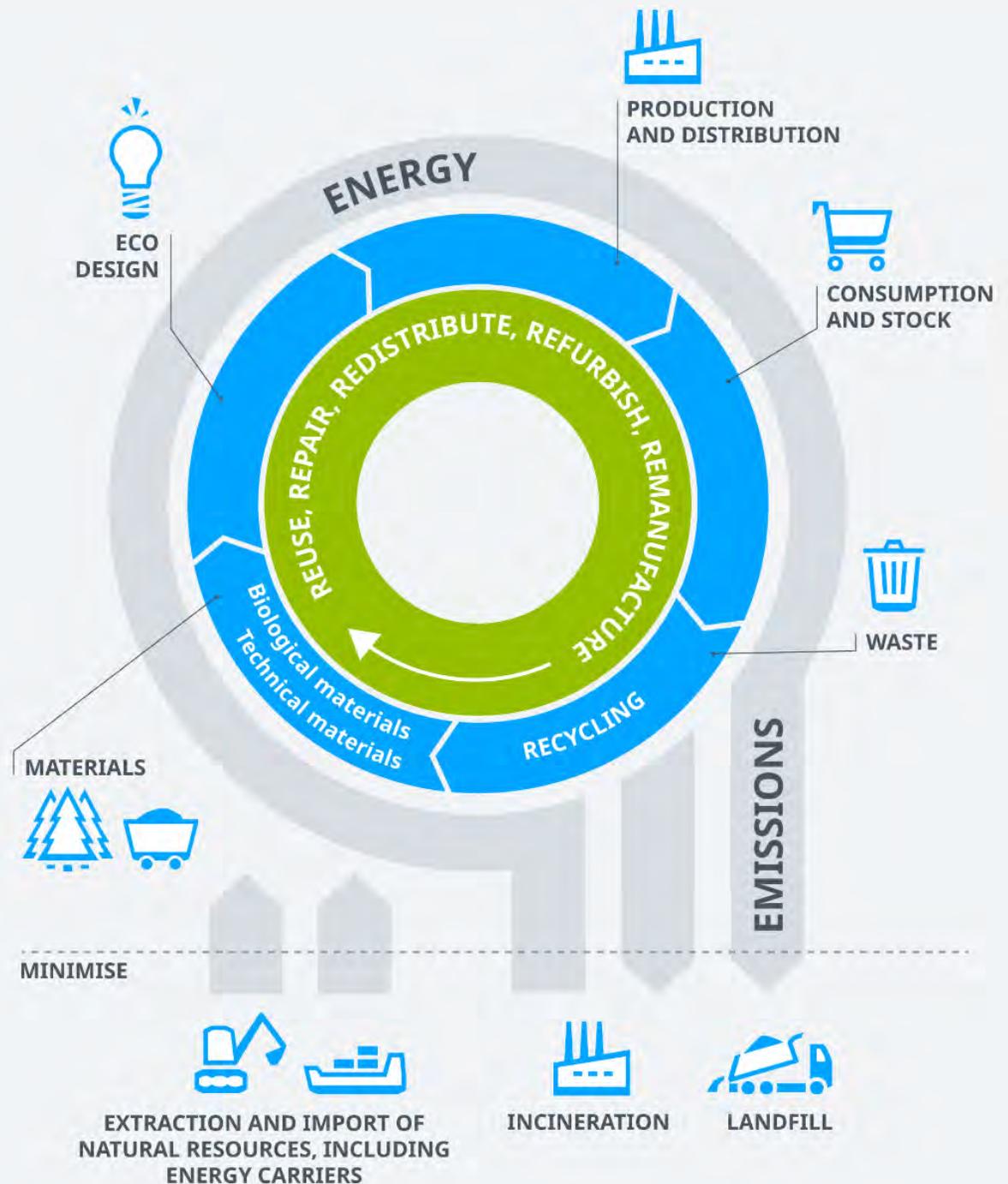
WORLD
ECONOMIC
FORUM



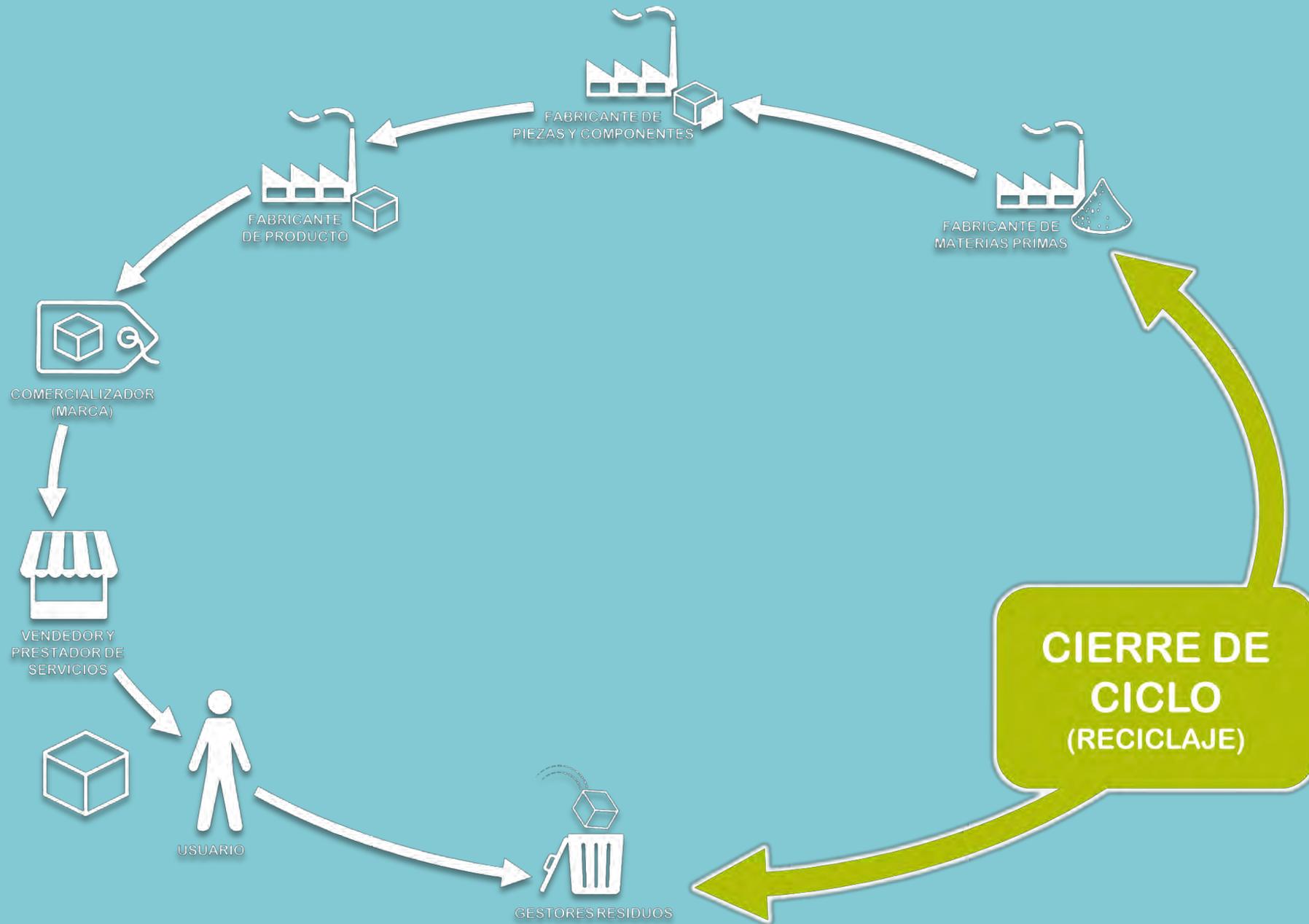
COMMITTED TO
IMPROVING THE STATE
OF THE WORLD



¿Qué es la ECONOMÍA CIRCULAR?

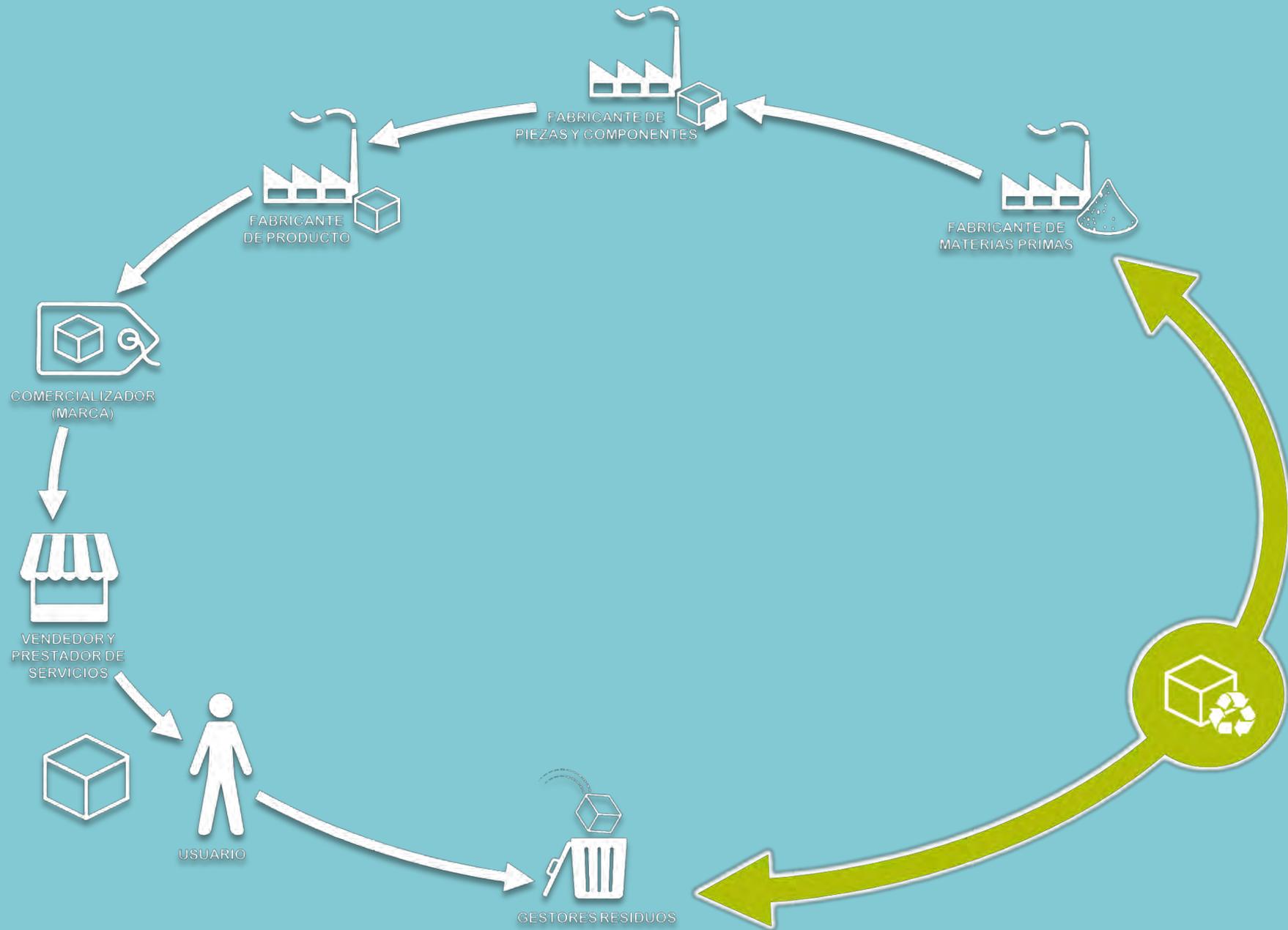






**Es mucho más fácil
reciclar un producto
que ha sido diseñado
para ello, que uno
que no.**





Recycling Is Not The Answer To The E-Waste Crisis



Vianney Vaute Contributor 
Green Tech

f

t

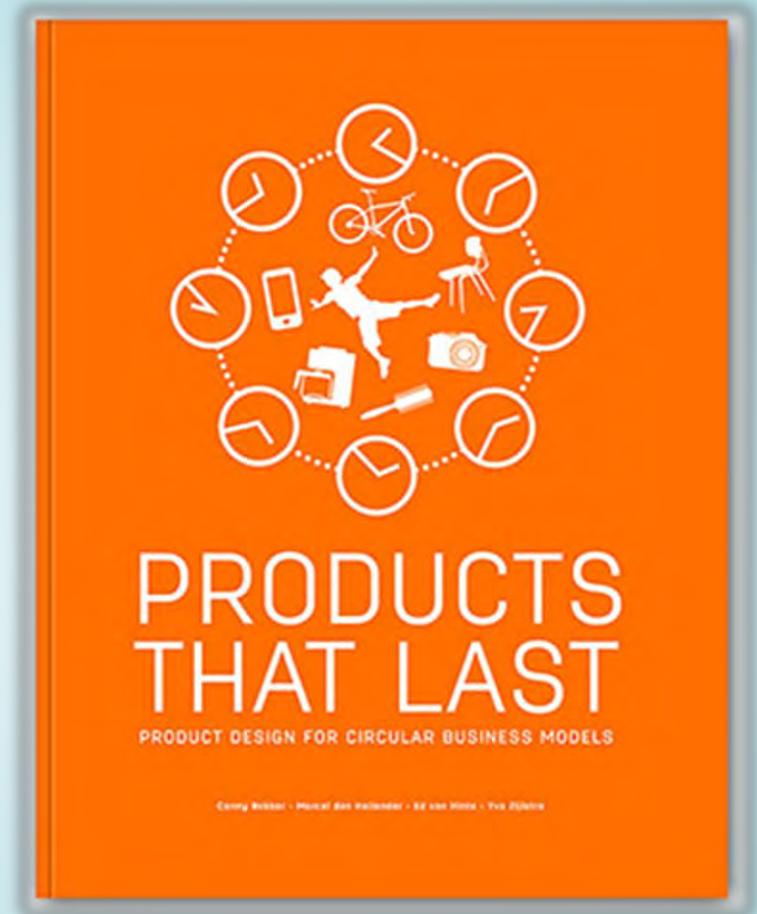
in

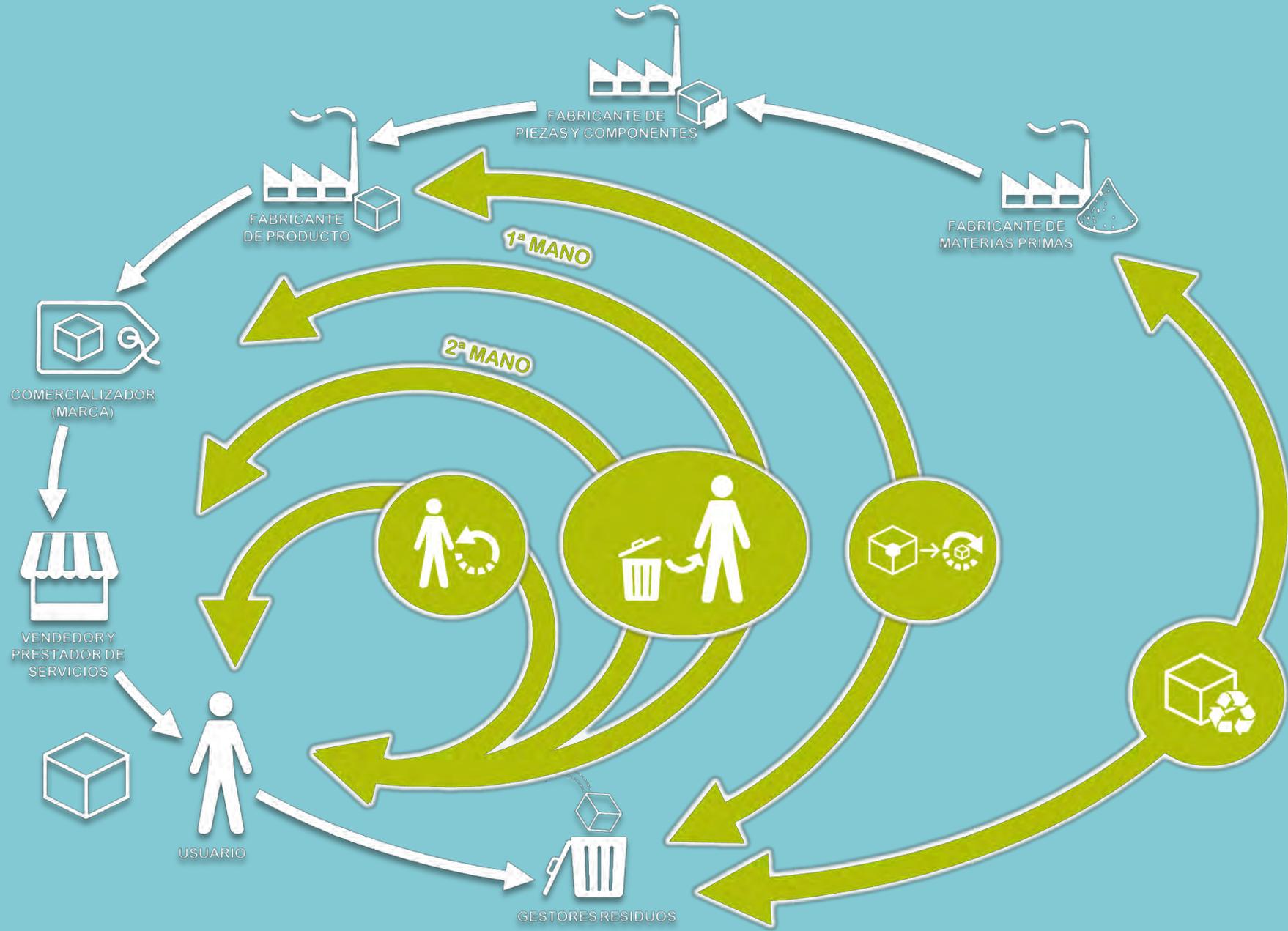


Time to go beyond recycling. PHOTO BY PAWEL CZERWIŃSKI ON UNSPLASH

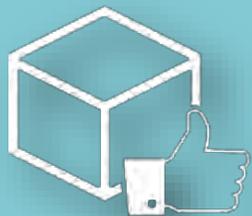
People feel good about recycling, maybe even more so when it comes to electronics. Remembering to take your computer or smartphone and dropping it off to be recycled feels like an accomplishment in itself.

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

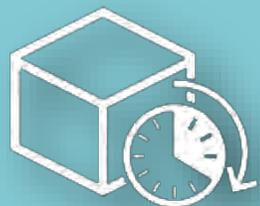




ALARGAR LA VIDA DEL PRODUCTO:

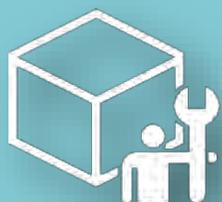


FIDELIZACIÓN

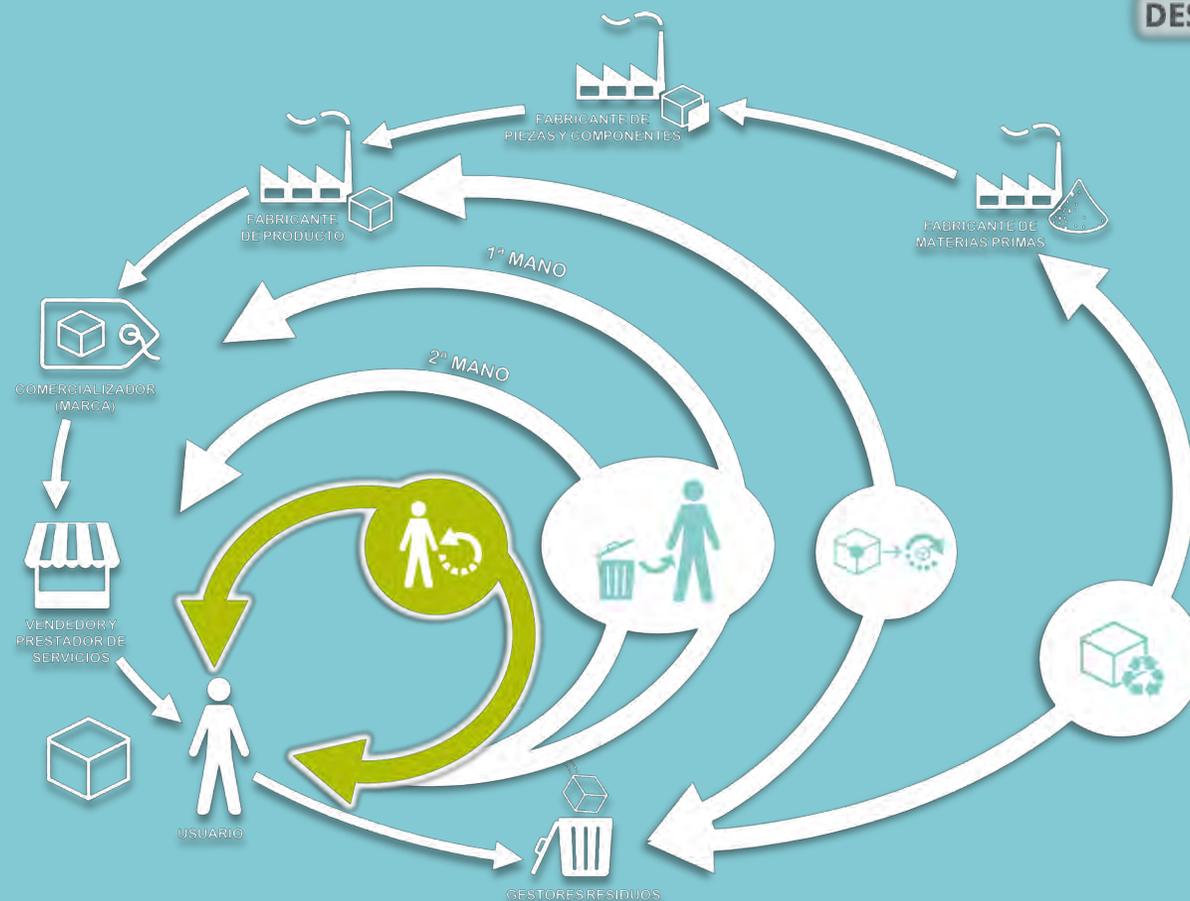


DURABILIDAD

MANTENIMIENTO Y REPARACIÓN:

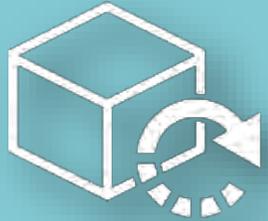


REPARABILIDAD





REUTILIZACIÓN (2ª MANO):



REUTILIZACIÓN

RECUPERACIÓN DEL PRODUCTO:



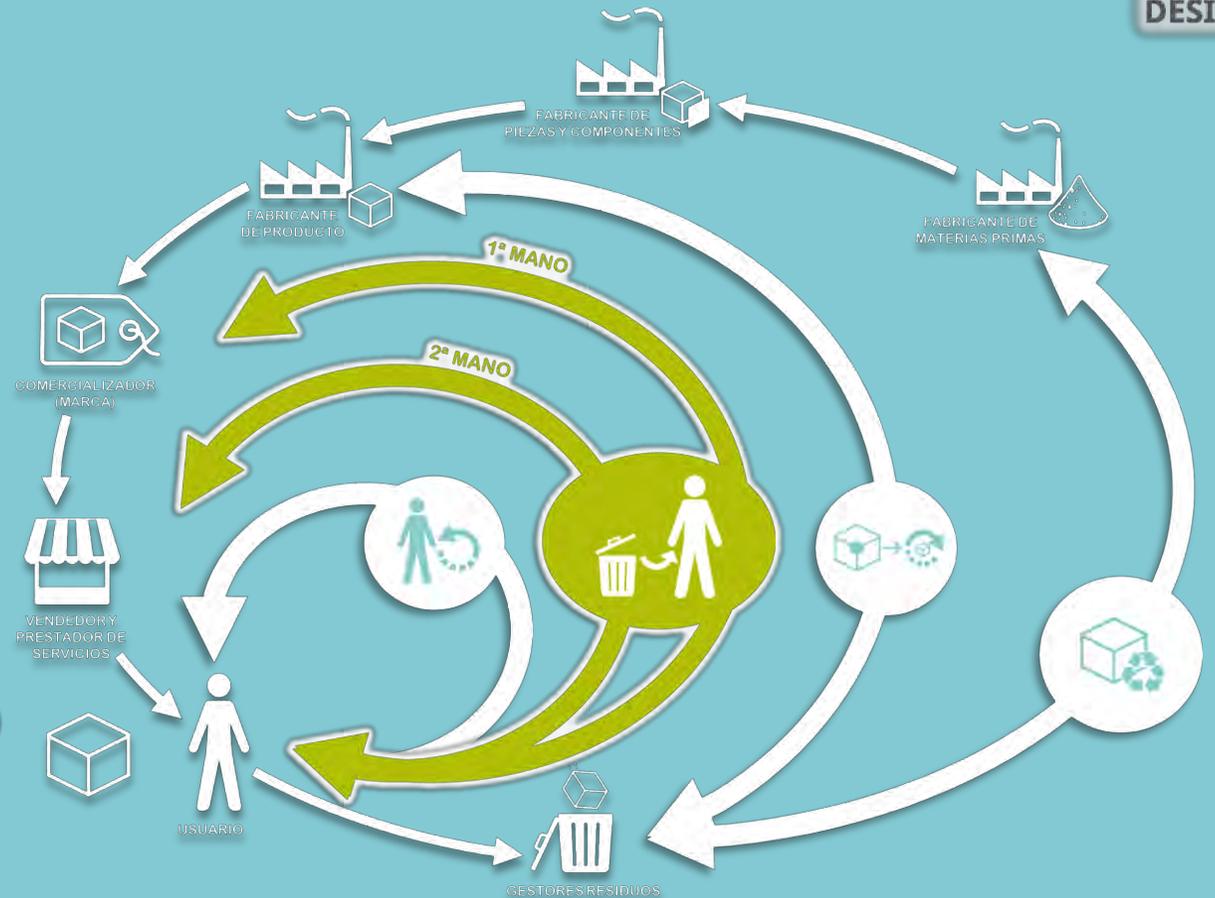
RENOVACIÓN (2ª MANO)



REACONDICIONAMIENTO (2ª MANO)



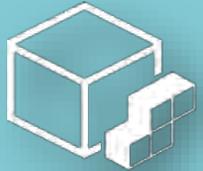
REMANUFACTURA (1ª MANO)



RECUPERACIÓN DE PIEZAS:



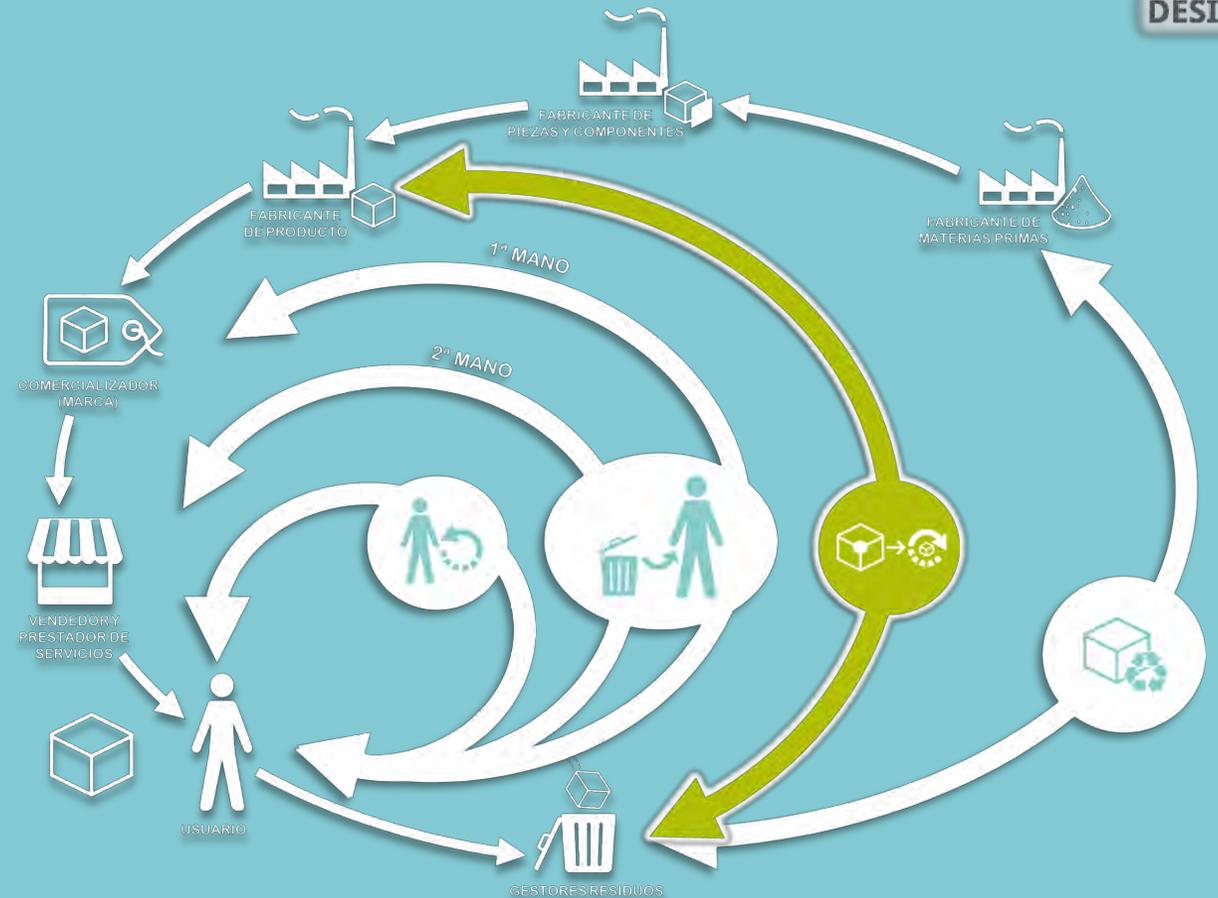
DESMONTAJE

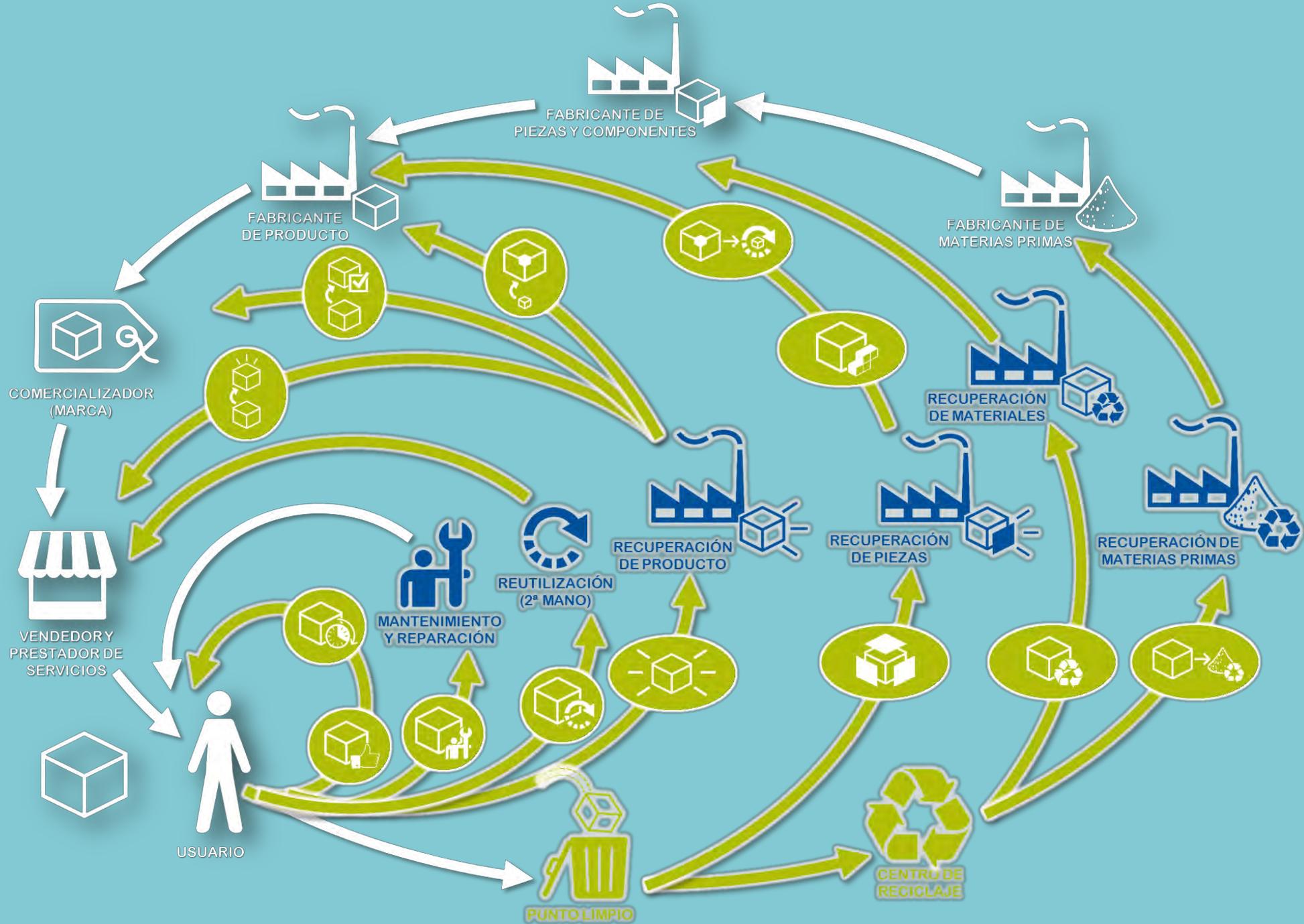


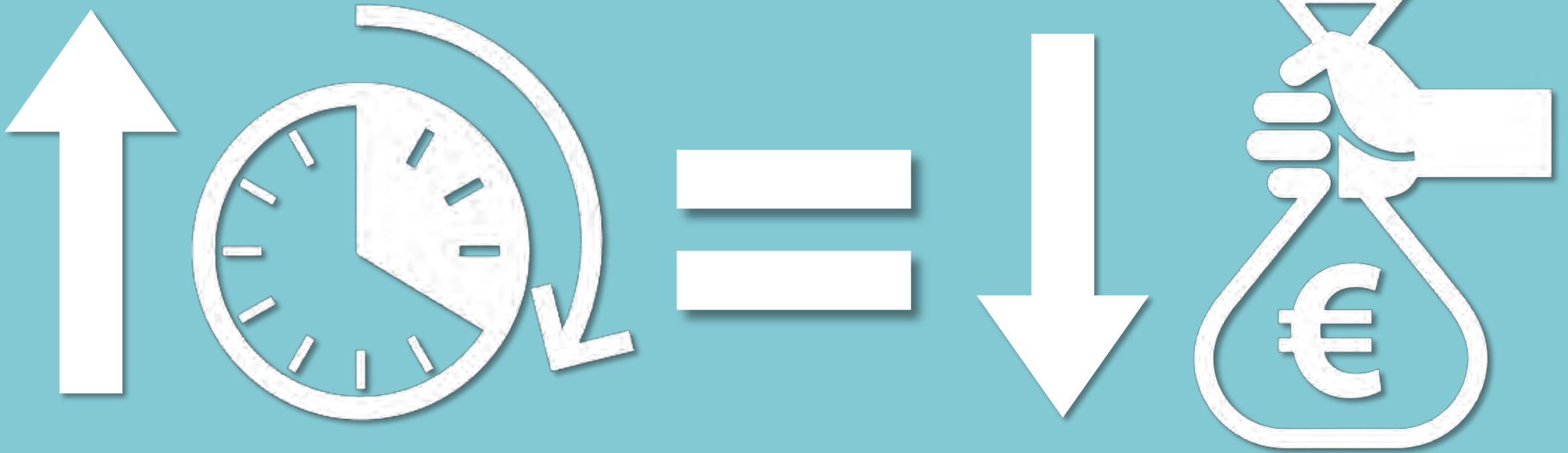
ESTANDARIZACIÓN



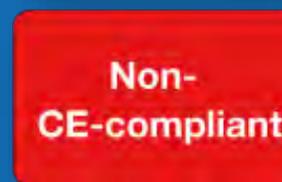
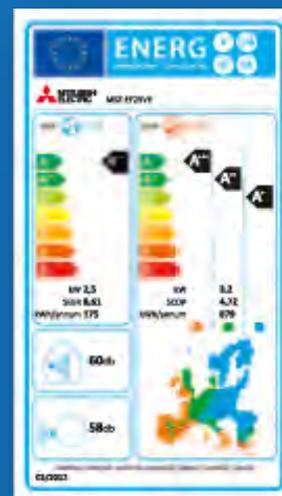
REUTILIZACIÓN
(DE PIEZAS)







Requisitos legales aplicable a los productos relacionados con la energía:



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

EiP
Economía Circular
Eco-diseño
Reciclado
Remanufactura
Vida útil

 **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 red rectangular sign. The sign features white text in a bold, sans-serif font. The background is a dark, textured surface, possibly a piece of fabric or paper, with some shadows and highlights. The hand is visible on the left side, with fingers gripping the edge of the sign.

I shop
therefore
I am

CHANGE THE
POLITICS NOT THE
CLIMATE

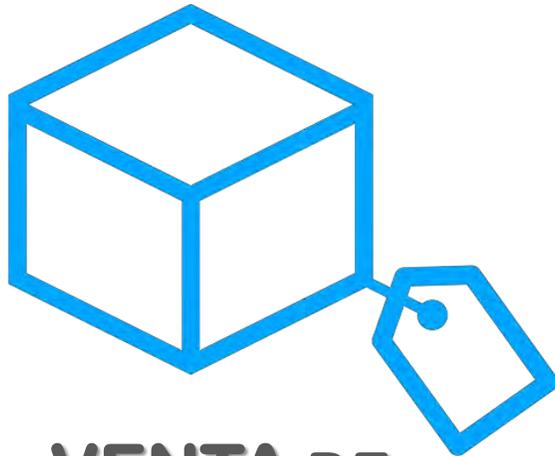


ENDLICH WA
REGEN





**CONSUMPTION
AND STOCK**



**VENTA DE
PRODUCTO**

☰ **EL PAÍS** 🔔 🔍

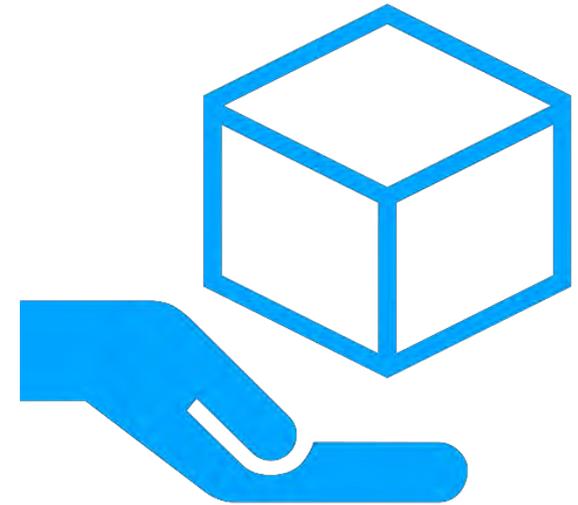
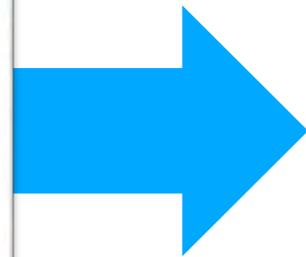
CONSUMO >

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

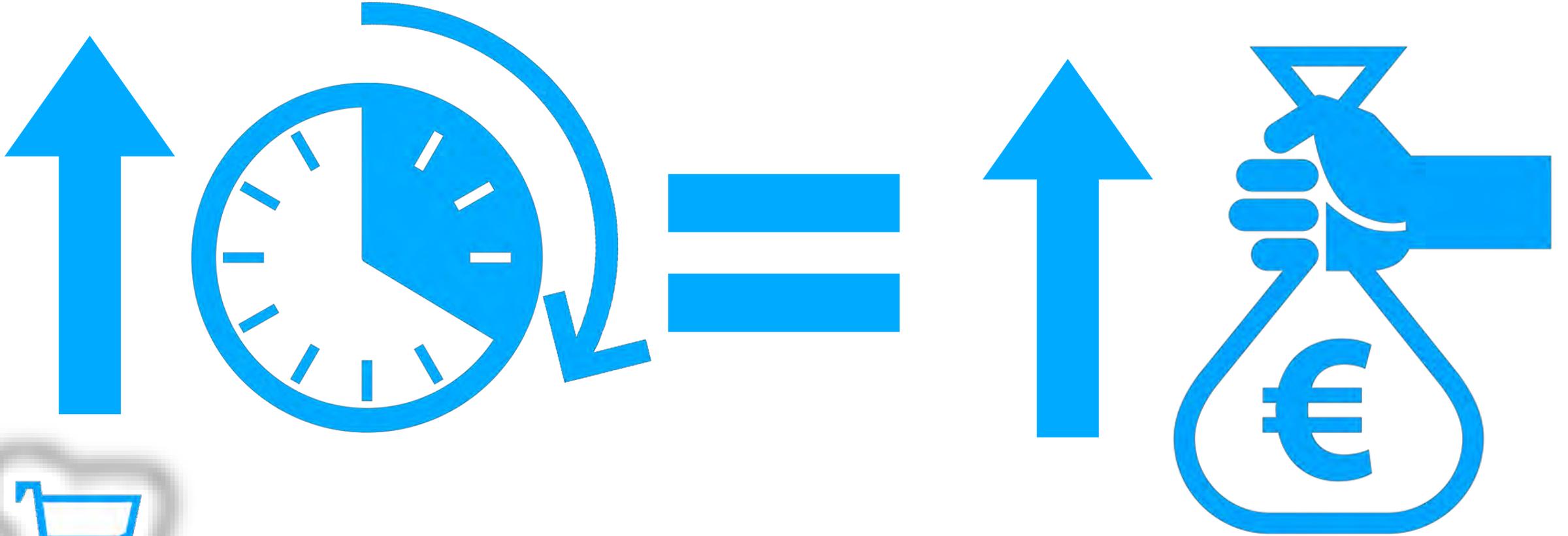
Un cambio en los hábitos de consumo de los ciudadanos está transformando la economía y las empresas. Bien por necesidad bien por convencimiento, los ciudadanos relegan la adquisición de objetos en favor del arrendamiento de servicios.

WhatsApp Facebook Twitter Share Comment Like Email

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



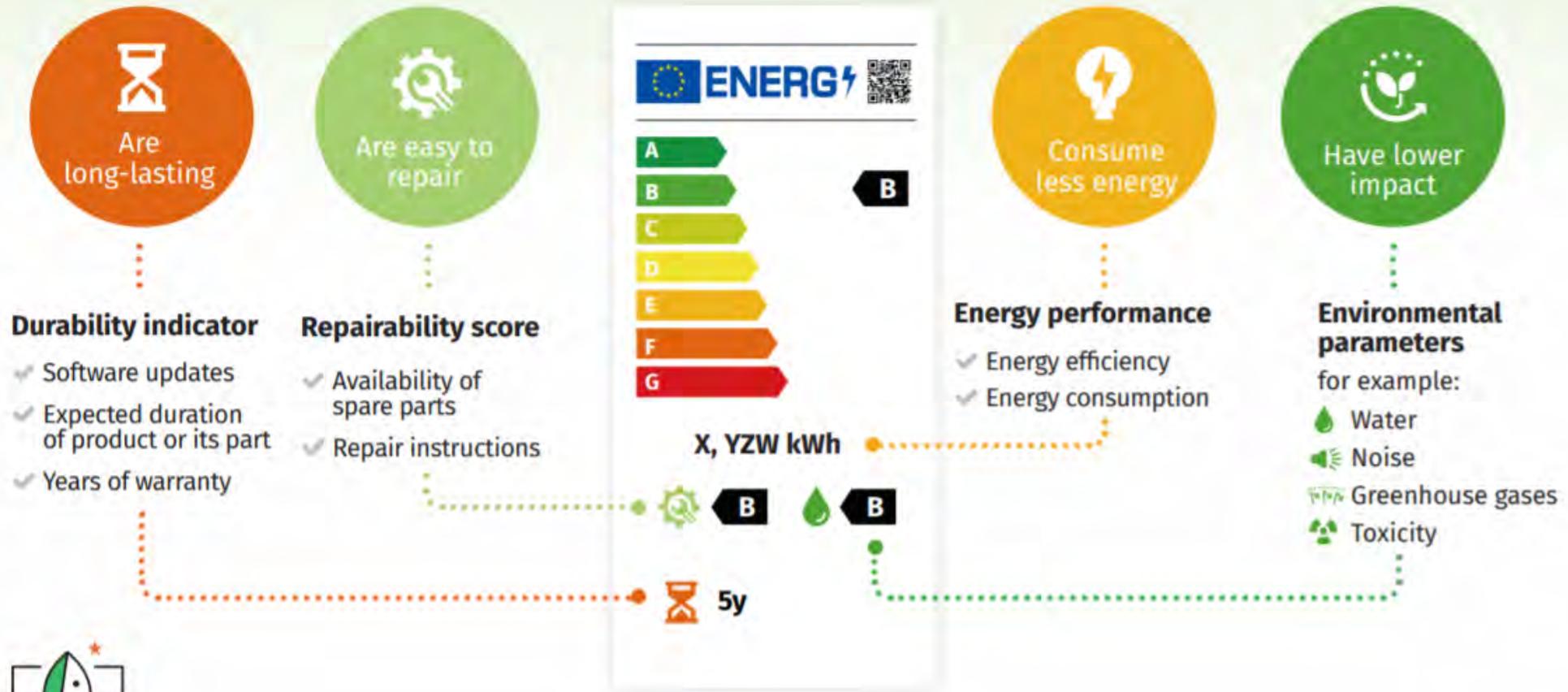
**ACCESO AL
USO**



**CONSUMPTION
AND STOCK**



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



The green line to standards

www.ecostandard.org

[@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



climate change



water scarcity



land use



acidification



ozone depletion



human toxicity
non cancer effects
health risk



marine eutrophication



eco-toxicity
freshwater



terrestrial eutrophication



particulate matter
respiratory inorganics



resource use
mineral



resource use
energy carriers



aquatic freshwater eutrophication



human toxicity
cancer effects



ionising radiation



photochemicals
ozone formation



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

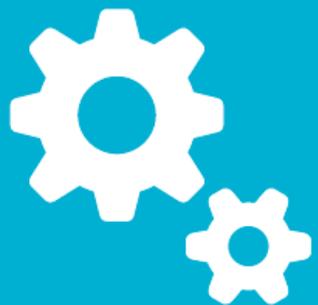
This rating has been verified by independent experts and is based on this product's contribution to:

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



www.eco-impact.eu





**ZERO
WASTE
SCOTLAND**

Business Models for a Circular Economy

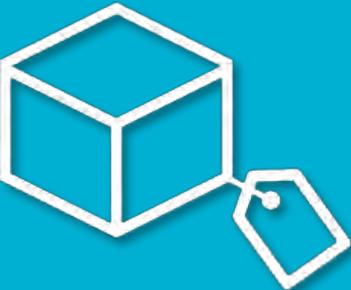
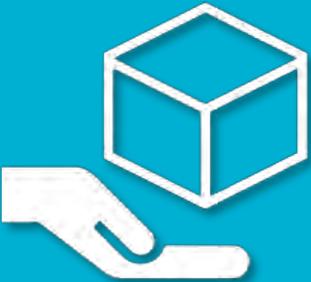




Aporte de valor a través
del **PRODUCTO**

Aporte de valor a través
del **SERVICIO**



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

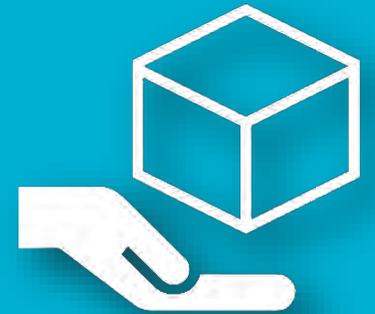
(Fuente: Arnold Tukker – 2004 - *Business Strategy and the Environment*)



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



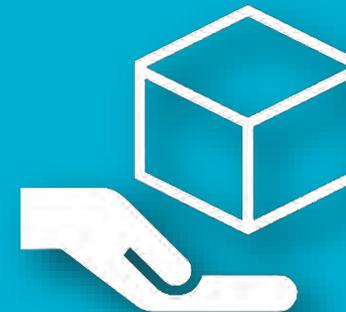
FAIRPHONE



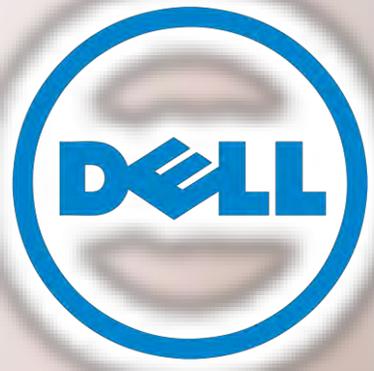
CIRCLE ECONOMY



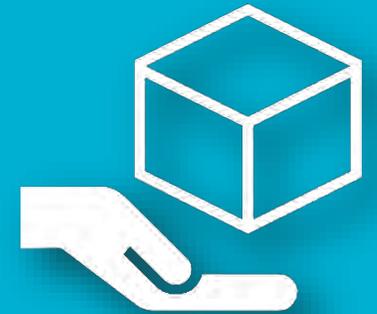
ALLEN & OVERY



SERVICIOS DE
ACCESO AL
USO



PC as a Service (PCaaS)



SERVICIOS DE
ACCESO AL
USO

PHILIPS



Pay per lux



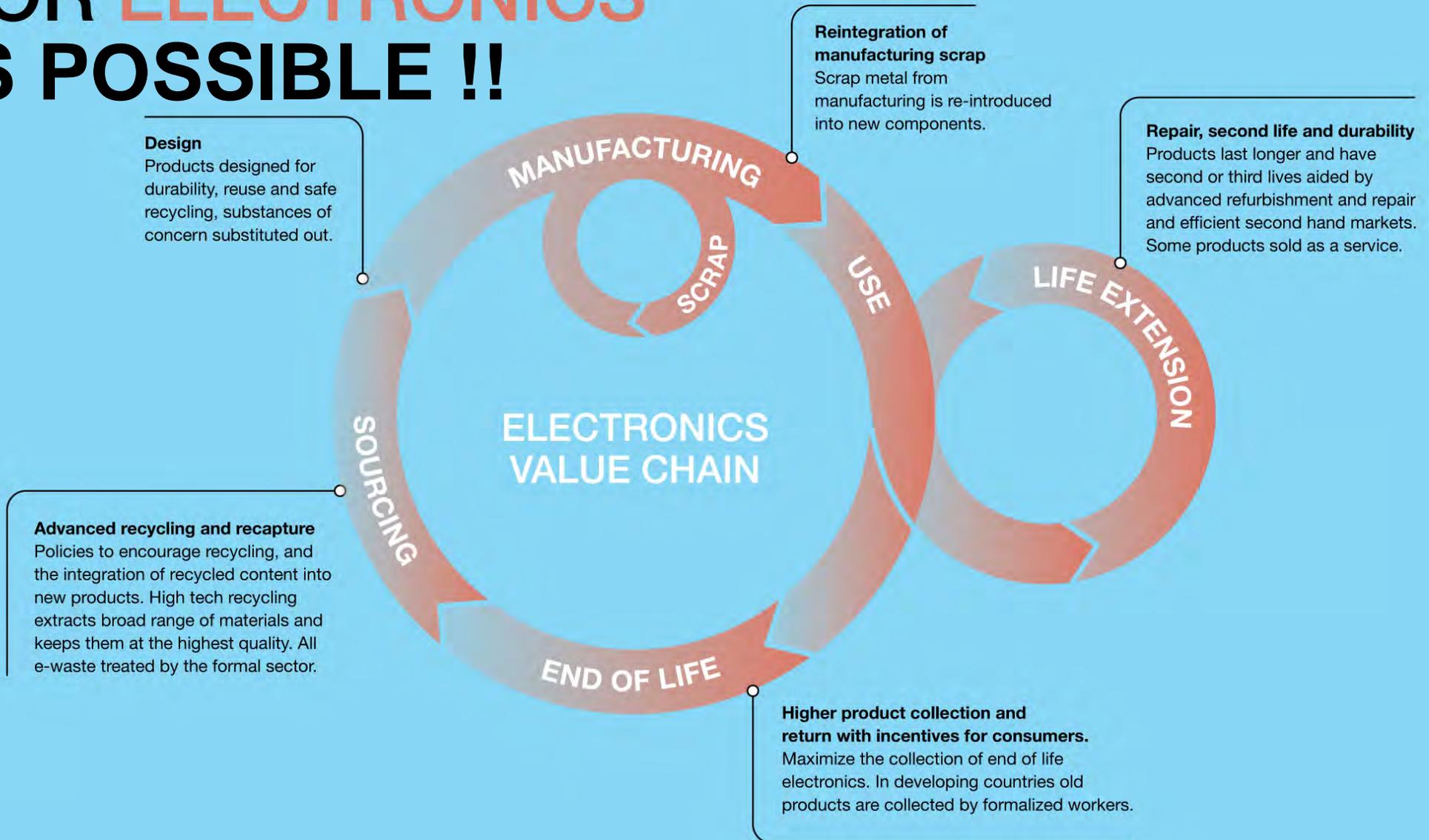
SERVICIOS DE
ACCESO AL
RESULTADO



The future is circular

#CircularEconomy

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



Muchas gracias!!!

jose_maria.fernandez@ihobe.eus

