

# THE CHALLENGES AND OPPORTUNITIES AHEAD



BEL-EVENT  
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# THE CHALLENGES AND OPPORTUNITIES AHEAD

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# WBGU

German Advisory Council on Global Change

## How can digitalisation support more sustainable, resource efficient economies and societies?

### Insights from the WBGU Flagship Report, 'Towards our Common Digital Future'

- **Martina Fromhold-Eisebith**

Professor of Economic Geography,

RWTH Aachen University, Germany

- EREK International Conference,

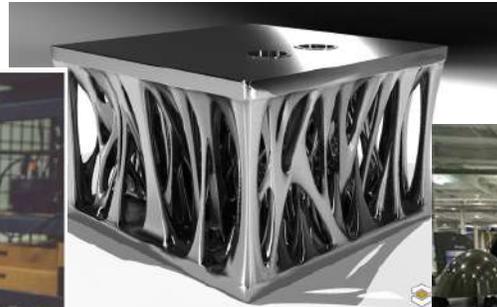
- Brussels, Sept. 26, 2019



**RWTH AACHEN**  
UNIVERSITY

# Presentation Outline

- Introduction:  
What is 'WBGU' and its 'Flagship Report'?
- Overarching objectives and messages
- Focus on resource efficiency:  
How digital technologies ('Industry 4.0') can improve industrial metabolism and the circular economy
- Conclusions: What could/ should be done?





## What is ,WBGU‘?

German Advisory Council  
on Global Change

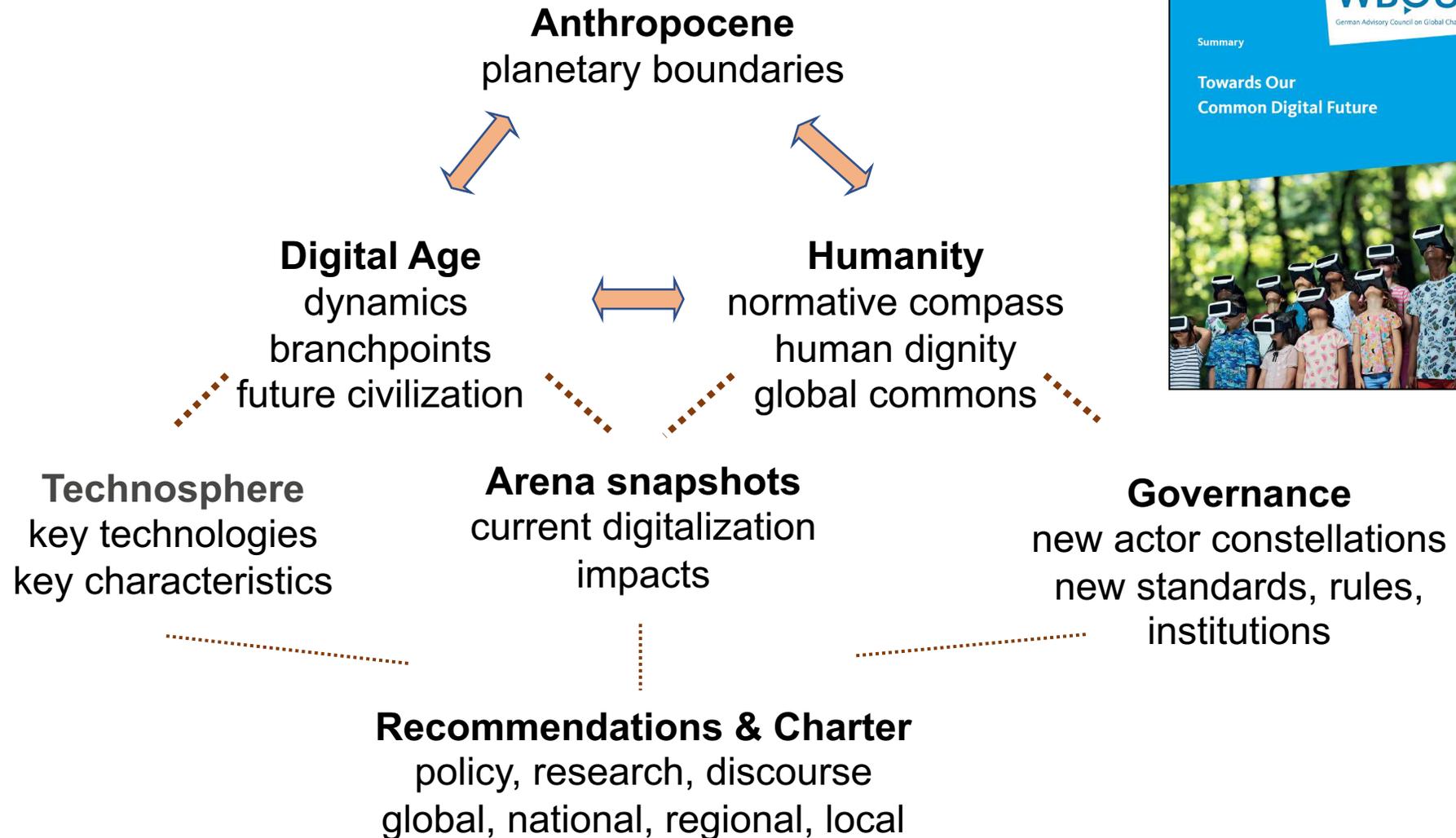
## What is this ,Flagship Report‘?

Summary download under

[https://www.wbgu.de/fileadmin/user\\_upload/wbgu/publikationen/hauptgutachten/hg2019/pdf/WBGU\\_HGD2019\\_S.pdf](https://www.wbgu.de/fileadmin/user_upload/wbgu/publikationen/hauptgutachten/hg2019/pdf/WBGU_HGD2019_S.pdf)

**Main message:**  
**Expediently (mutually) combine**  
**digitalisation and**  
**global sustainability goals**

# Overarching objectives and messages: The report at a glance

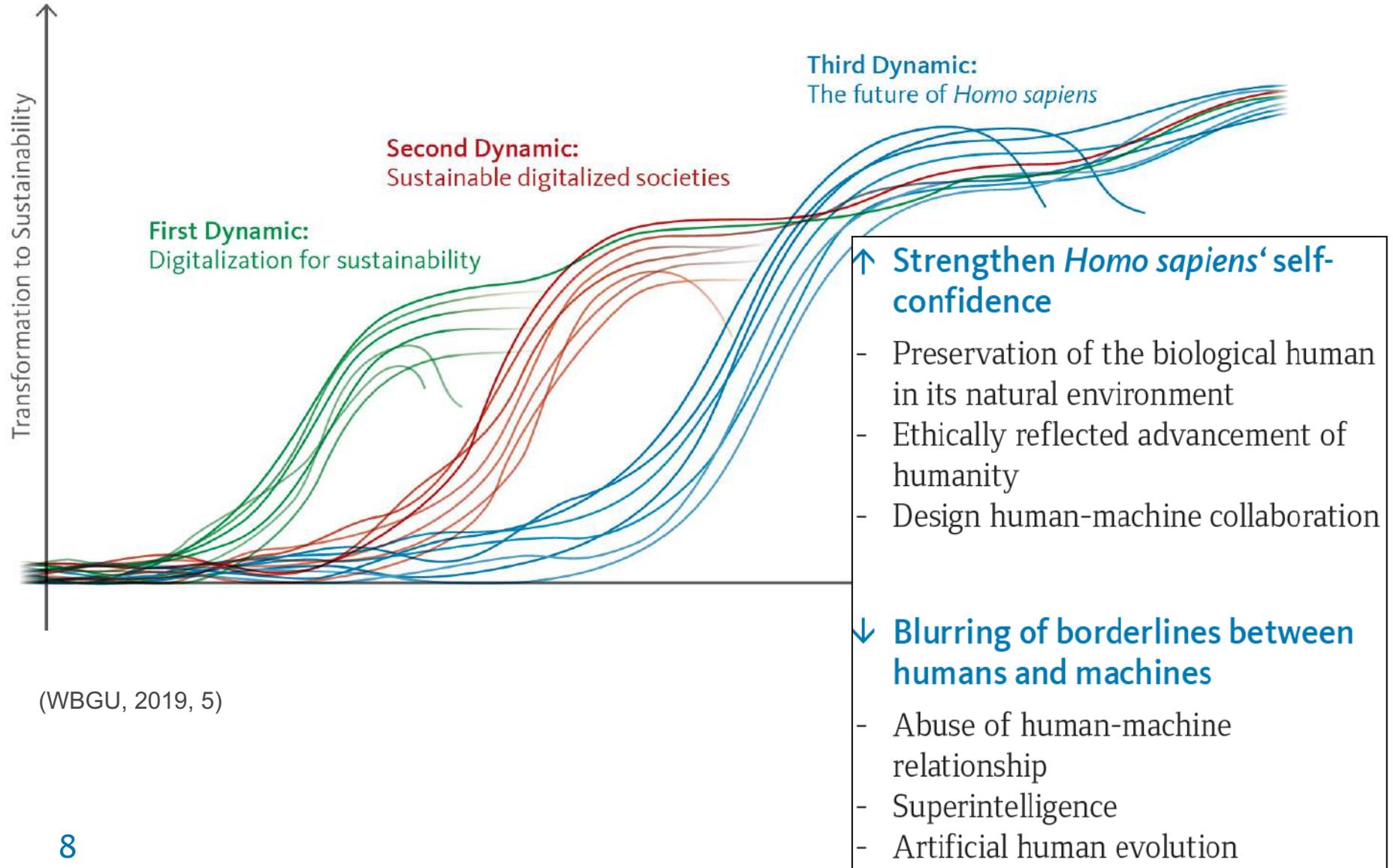


# Overarching objectives and messages: Key characteristics of the Digital Age

1. Connectivity, networking  
(Internet of Things/ IoT)
2. Cognition and learning capabilities  
(Artificial Intelligence, algorithms)
3. Autonomy  
(robots/ co-bots; decision making systems)
4. Virtuality  
(Virtual / Augmented Reality)
5. Knowledge explosion  
(eSciences, Big Data etc.)



# Overarching objectives and messages: Three major dynamics



# Focus on resource efficiency: How digital technologies ('Industry 4.0') can improve industrial metabolism and the circular economy

- IoT and Cyber Physical Systems → better coordination, process optimization in industrial value chains
- Additive manufacturing AF (3D printing) → new materials, designs



# Focus on resource efficiency: How digital technologies ('Industry 4.0') can improve industrial metabolism and the circular economy

## Threats & risks

- Growing numbers of digital devices and infrastructure increase demand for (rare) metals, composite materials, and energy  
(Baldé et al. 2015; Bekaroo et al., 2016; Heacock et al. 2016)
- Aggravating e-waste problems (51 mio. t. by 2021; Baldé et al. 2015; Kumar et al. 2017)

## Opportunities

- More resource-efficient, low-waste and low-emission production, characterized by eco-industrial networks and synergies throughout the entire supplier network (Higon et al., 2017; Neligan & Schmitz, 2017)
- Better monitoring and disassembly technologies support circular economy (EEA, 2017; Pagoropoulos et al., 2017)
- AF may reduce material inputs, transport needs through optimized product designs, on-demand production (Kellens et al., 2017)

## Conclusions:

### What could/ should be done?

Monitor and limit the material and energy consumption caused by digitalization

Expand additive manufacturing as a driver of a digitally enhanced circular economy

Support sustainable digital production in developing and emerging economies

Research offensive on sustainability impacts of Industry 4.0 and additive manufacturing

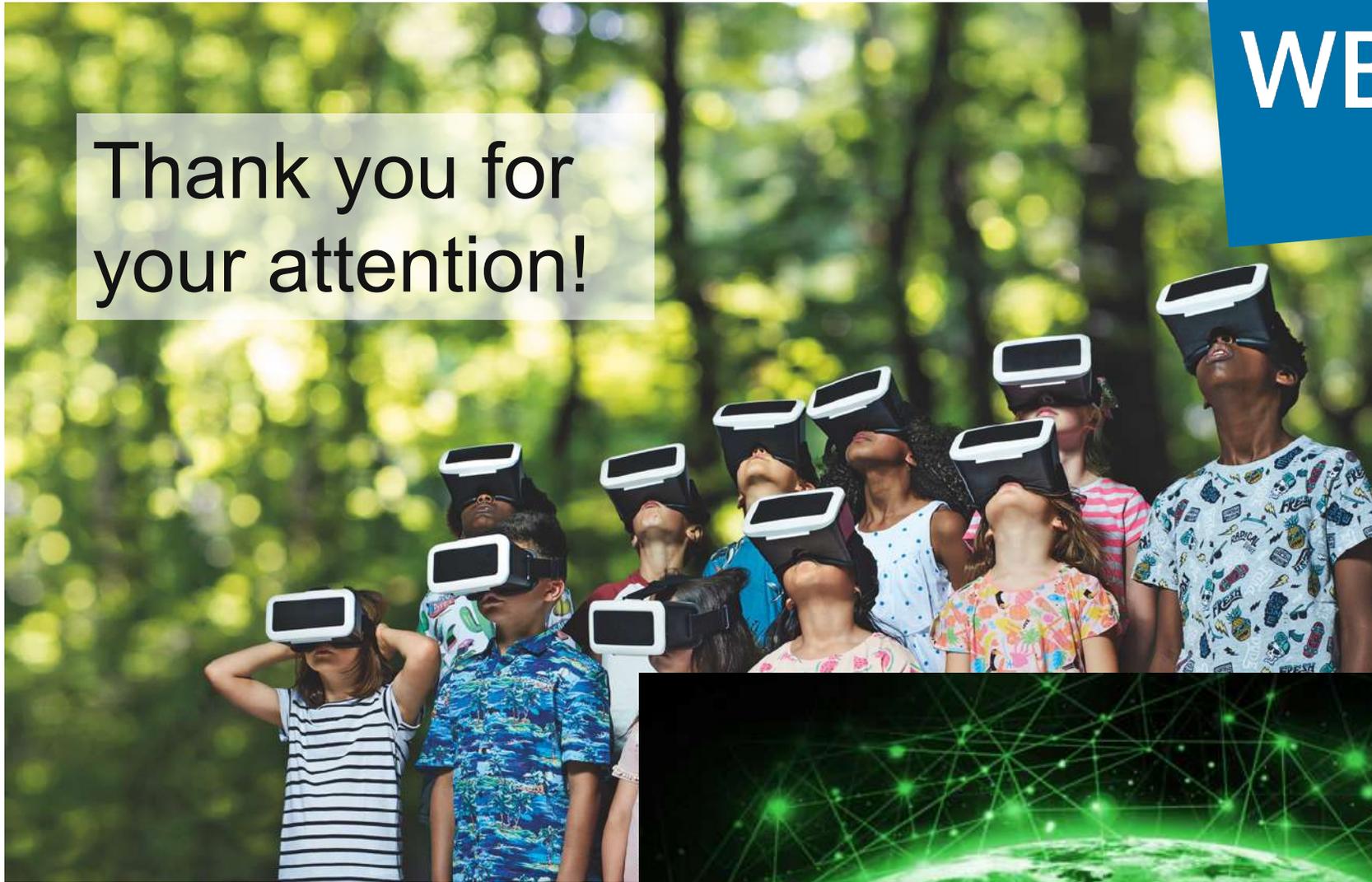
Strengthen and reward corporate responsibility

Study the potential of digital technologies for improved industrial metabolism and industrial symbiosis, and establish them on markets

Create real-world laboratories for a digitally enhanced circular economy in an urban context

....

Thank you for  
your attention!



<https://www.code-n.org/blog/digitalization-new-digital-technologies-improve-sustainability-future-trends/>

[www.wbgu.de](http://www.wbgu.de)  
[@wbgu\\_Council](https://twitter.com/wbgu_Council)  
[#SustainableDigitalAge](https://twitter.com/SustainableDigitalAge)



# THE CHALLENGES AND OPPORTUNITIES AHEAD

Thomas de Romagnoli

*Project Manager Circular  
Economy at Bruxelles  
Environment*





# Circular Economy: challenges and opportunities

Thomas De Romagnoli

Brussels Environment, Dpt Economy in Transition





Brussels, 7/07/2019, Team Time Trial *Tour de France*

(Le Soir)

# Challenges: climate change

## 65,000 march for climate in Brussels

by Flanders Today. Editorial team at Flanders Today  
Recent articles: Photo of the week: King of the castle, Zeebrugge port sees 12.5% growth in first half of year.  
Pret à Manger opens first sandwich shop in Brussels

### SUMMARY

Three times the number of people expected marched in favour of a national climate policy yesterday on the eve of the COP24 summit in Poland



Brussels, 2/12/2018

## Record breaking temperature reached in Uccle, national record continues to rise

Thursday, 25 July 2019

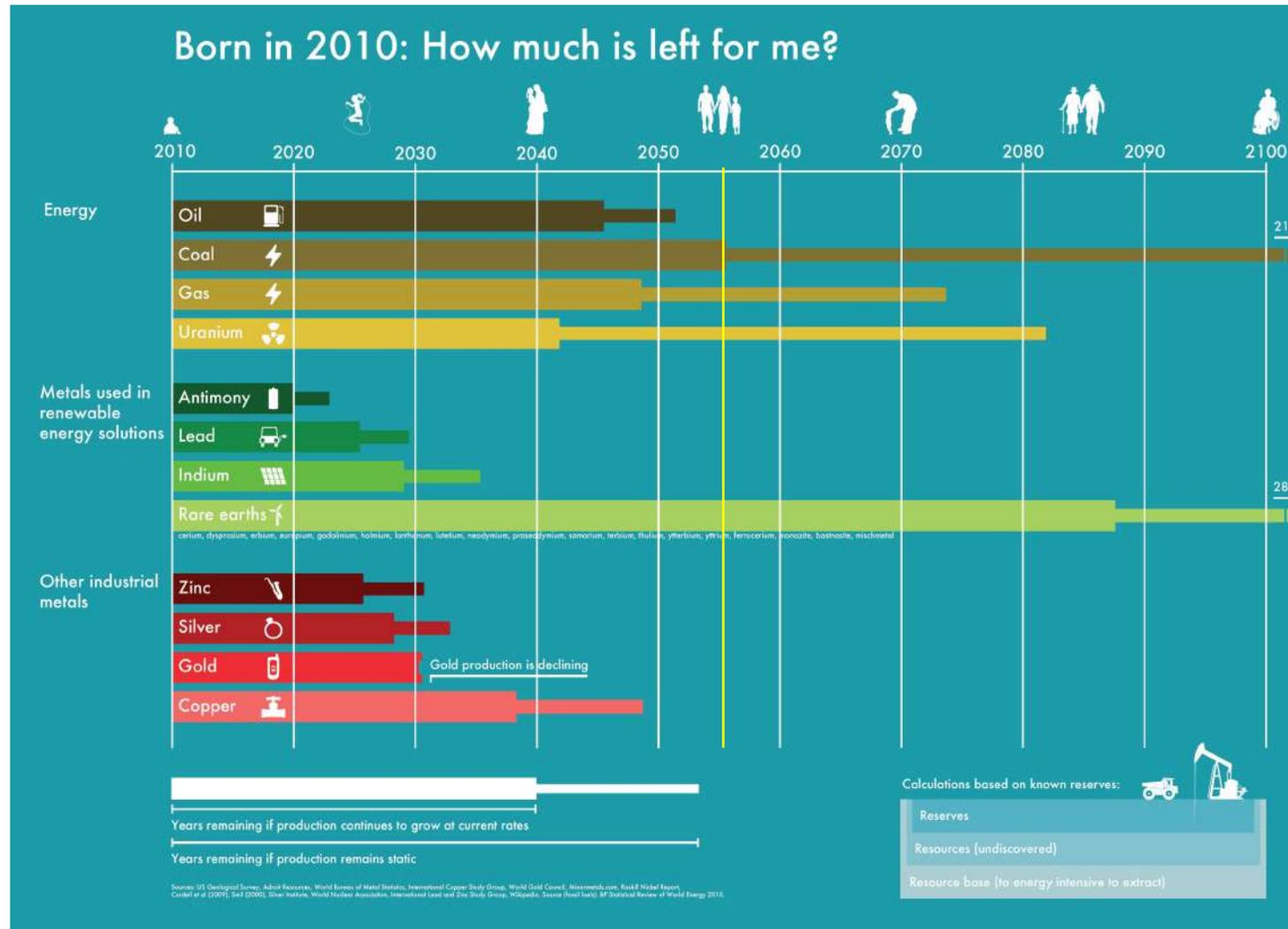


Brussels, 25/07/2019

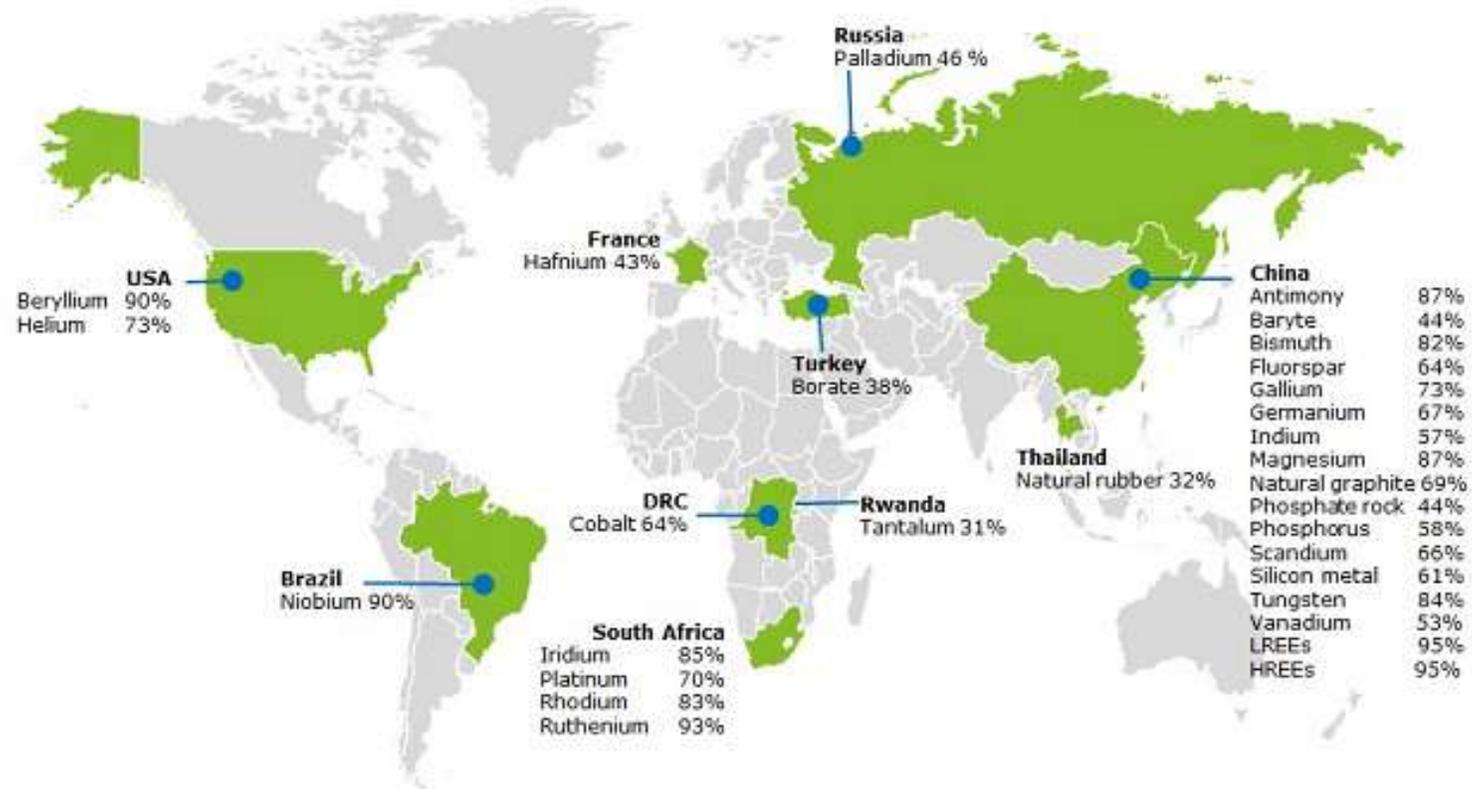
# Challenges: climate change

	1.5°C	2°C	2°C IMPACTS
<b>EXTREME HEAT</b> Global population exposed to severe heat at least once every five years	 14%	 37%	<b>2.6x</b> WORSE
<b>SEA-ICE-FREE ARCTIC</b> Number of ice-free summers	AT LEAST 1 EVERY <b>100 YEARS</b>	AT LEAST 1 EVERY <b>10 YEARS</b>	<b>10x</b> WORSE
<b>SEA LEVEL RISE</b> Amount of sea level rise by 2100	 0.40	 0.46	<b>.06M</b> MORE
<b>CORAL REEFS</b> Further decline in coral reefs	 70-90%	 99%	UP TO <b>29%</b> WORSE
<b>ECOSYSTEMS</b> Amount of Earth's land area where ecosystems will shift to a new biome	 7%	 13%	<b>1.86x</b> WORSE
<b>CROP YIELDS</b> Reduction in maize harvests in tropics	 3%	 7%	<b>2.3x</b> WORSE

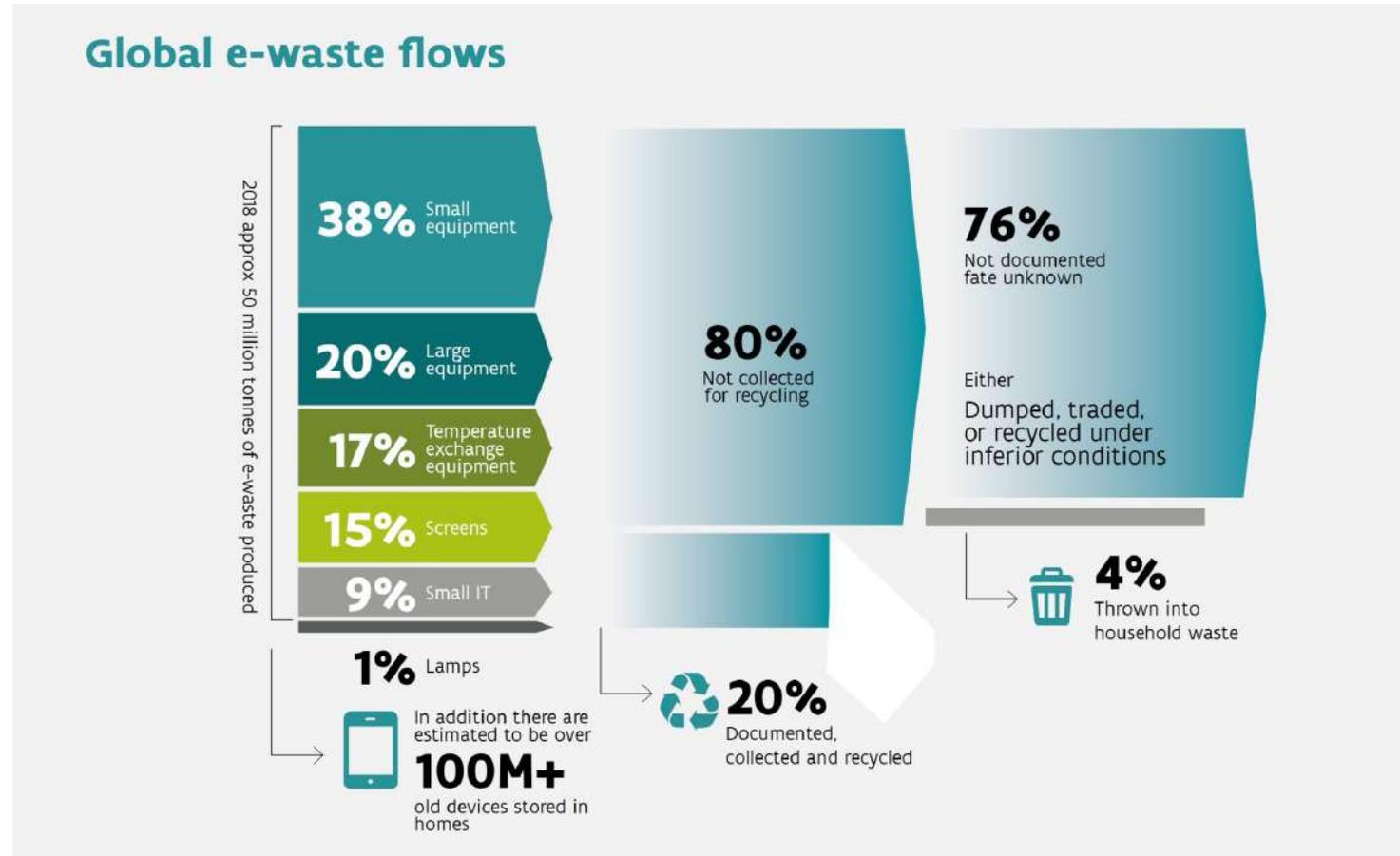
# CHALLENGES: LIMITED STOCK RESOURCES



# CHALLENGES: DISTRIBUTION OF RESOURCES



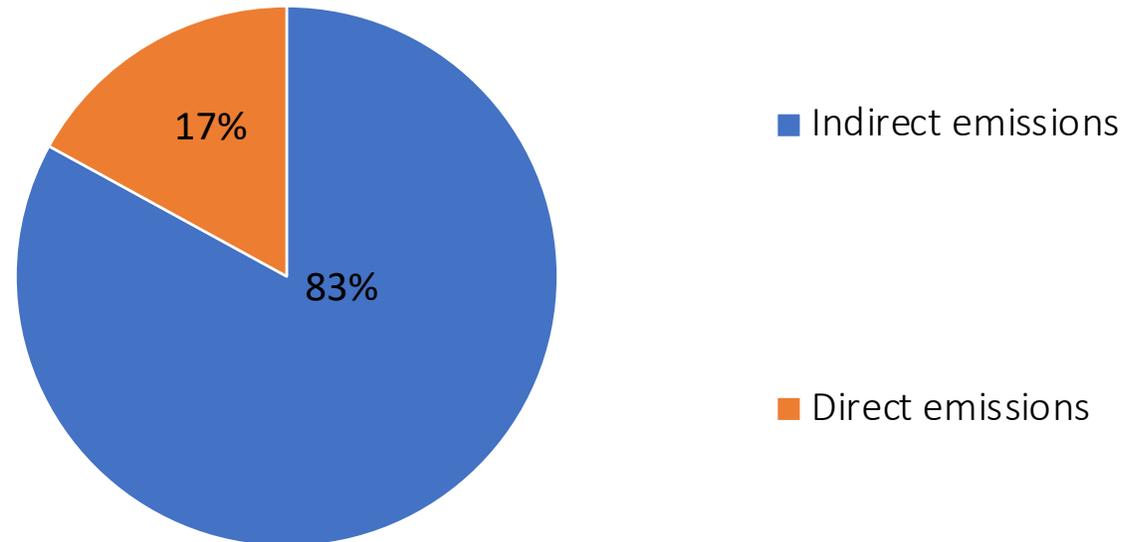
# CHALLENGES: WASTE GENERATION



(Data: UNU, Global E-waste monitor 2017)

# AND THE IMPORTANCE OF CIRCULAR ECONOMY FOR THESE CHALLENGES?

Composition of the Brussels carbon footprint



**➔ The fight against climate change cannot be separated from an ambitious resource management policy**

# AND THE IMPORTANCE OF CIRCULAR ECONOMY FOR THESE CHALLENGES?

LINEAR ECONOMY

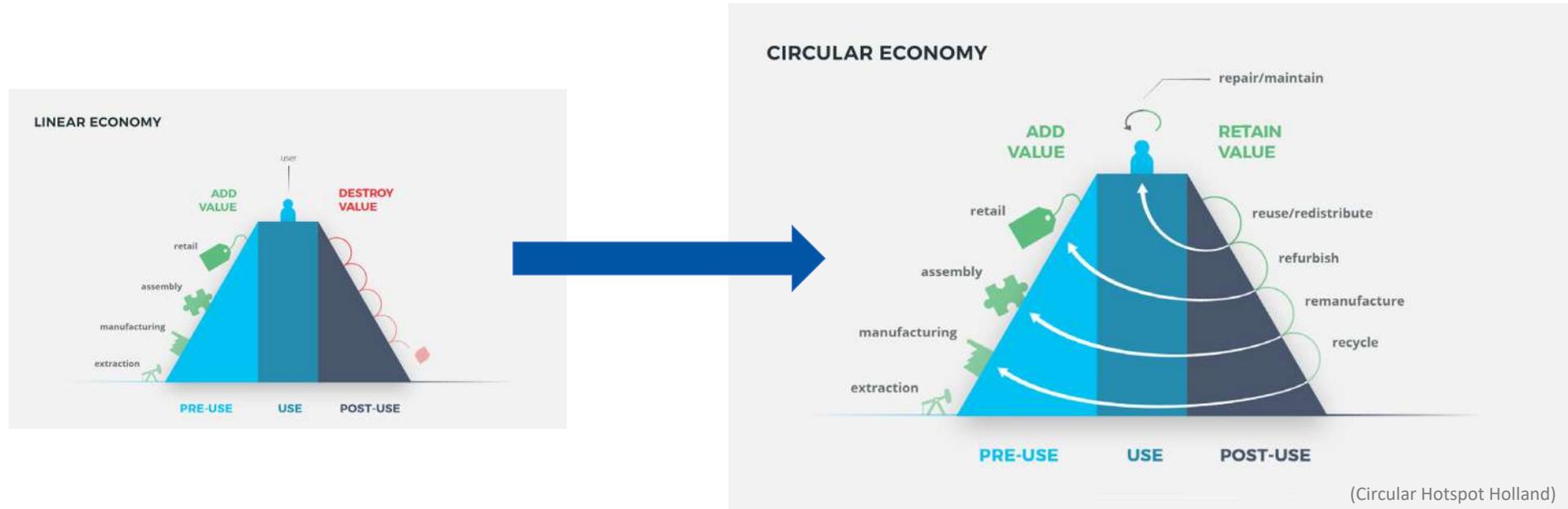


CIRCULAR ECONOMY



CC by Circular Flanders

# AND THE IMPORTANCE OF CIRCULAR ECONOMY FOR THESE CHALLENGES?



- Use fewer resources
- Shift to renewable resources
- Replace primary raw materials by secondary materials
- Take responsibility for after-sales
- Make sure that products last longer and are used better

# IMPORTANCE OF CITIES FOR CE

- In 2017, **54% of the world's population lived in urban areas** (60% by 2030), and **cities accounted for 85% of global GDP generation**.
- Cities account for **75% of natural resource consumption**, **50% of global waste production**, and **60- 80% of greenhouse gas emissions**.



**Concentration of  
small geographic**

Cities are **uniquely positioned** to drive a global  
towards a circular economy, with  
**resources, capital, data, and  
territory**

# IMPORTANCE OF CE FOR CITIES

- **Growth of the local economy** by boosting **local loops of repair, refurbishment and recycling**
- Creation of **local jobs** and especially for people with a long distance to the labour market
- **Sharing** of products, space and transport **connects people** to their neighbours and communities creating **a common project**.
- **Local ingenuity and skill levels increase** as focus is put on a **local decentralised production within the cities**.
  - **The air gets cleaner** as vehicles switch to **zero-emission engines** and **congestion reduces** as shared transit increases.



Cities that embed circular economy principles  
more **attractive**, **liveable**, and

# Brussels Regional Program for a Circular Economy

**FOCUS ON 5 SECTORS**

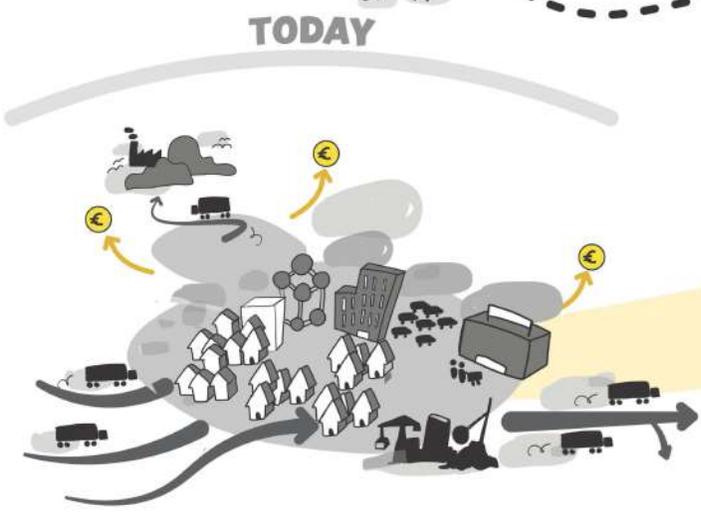
**2025**

**GOVERNANCE**

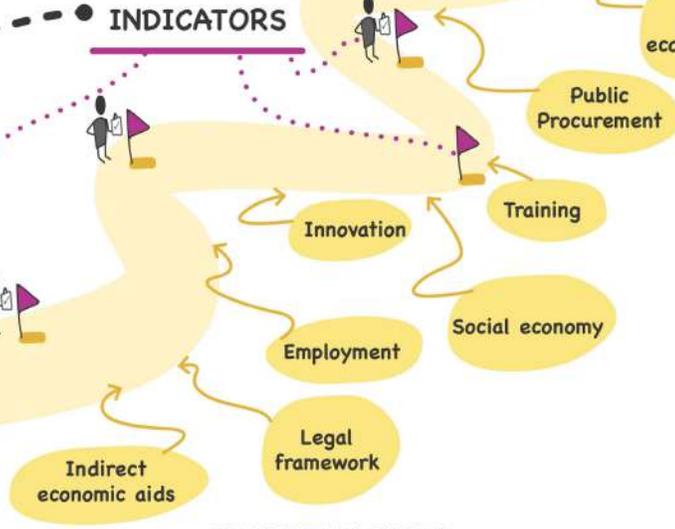
4 ADMINS
   
 3 MINISTERS
   
 1 STRATEGY 2025

**3 OBJECTIVES**

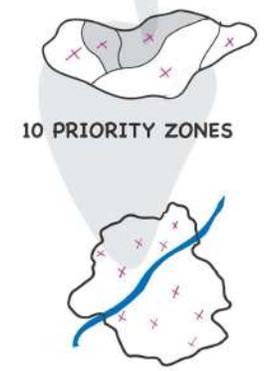
- Environmental objectives
- Economic opportunities
- Relocate economy in Brussels
- Contribute to job creation



**INDICATORS**



**CROSS SECTORIAL MEASURES**



**A TERRITORY**

# Regional Program Circular economy (RPCE)

- Since 2016...
  - **A collaboration between 91 organisations** (public, private and federations)
  - **207** workshops with a total of **5486 participants**
  - **194** circular projects received financed support for **€ 11,5 million**
  - **319** organisations received non-financial support
  - **3000** persons have received training in the circular economy
  - **2017 Eurocities award for Innovation**
  - ...

More information: [circulareconomy.brussels](http://circulareconomy.brussels)

**EUROCITIES 2017**  
**L J U B L J A N A**  
**CIRCULAR CITIES**  
15 - 17 NOVEMBER



# OPPORTUNITIES OF CE FOR SME'S

- Enabling **new USPs** that attracts customers and responds to **social trends**
- **Deepening existing relationships** with both clients and suppliers
- Reduction of **production costs** (energy, water, resources)
- Reducing cost for **waste handling**
- A **smaller dependence on inputs**, anticipating:
  - Price increases & volatility;
  - Weather changes;
  - Resource constraints on production
- Generation of **new revenue streams**
- **Inspire your employees** around a shared vision

# CHALLENGES

- How to translate the circular principles into **concrete action**?
- **Legal and administrative barriers**
- Sufficient **demand**?
- Reuse/redistribution/... requires **space**
- **Fiscal framework** insufficiently support repair nor manual labor
- A **new way of collaborating** with clients and suppliers

# CHALLENGES

- How to translate the circular principles into **concrete action**?

Acceleration program 

Transition support for SME's 

Project call 

Financing 

Searching synergies 

# CHALLENGES

- How to translate the circular principles into **concrete action**?
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Salon Zero Waste B2B 14/11



# CHALLENGES

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- **Legal and administrative barriers**
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Circular Incubator



Spaces for circular experimentation



Temporary occupation of spaces

Creation of fablabs



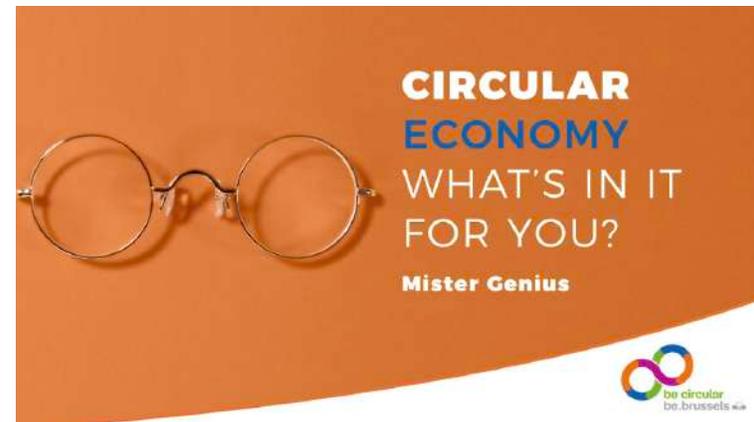
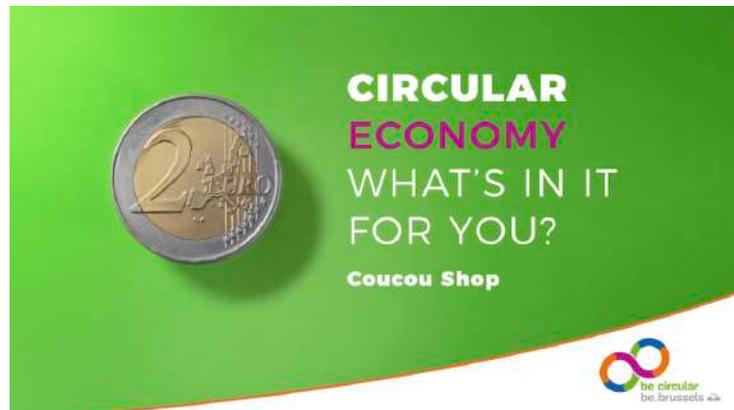
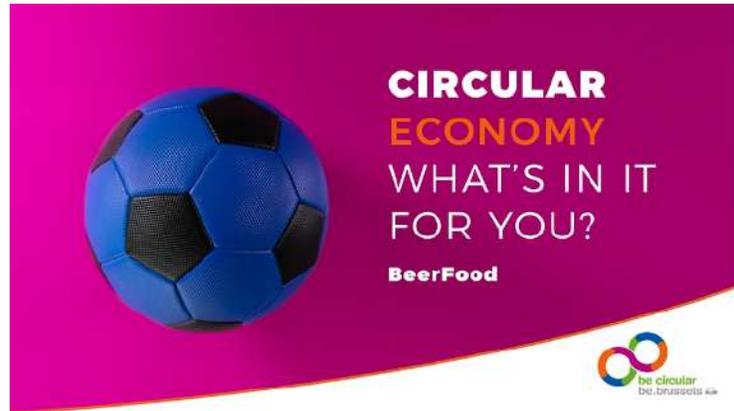
# CHALLENGES

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- **Fiscal framework** insufficiently support repair nor manual labor
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A circular economy can only be successful if all economic actors (private, public and non-profit) closely work together.

# Thank you for your attention!



More information on [www.circulareconomy.brussels](http://www.circulareconomy.brussels)

# QUESTION TIME



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