

**Global Conversation, University Roma Tor Vergata**  
**January 13, 2022**

# **Circular Economy and Bioeconomy for a greener and healthier Planet**

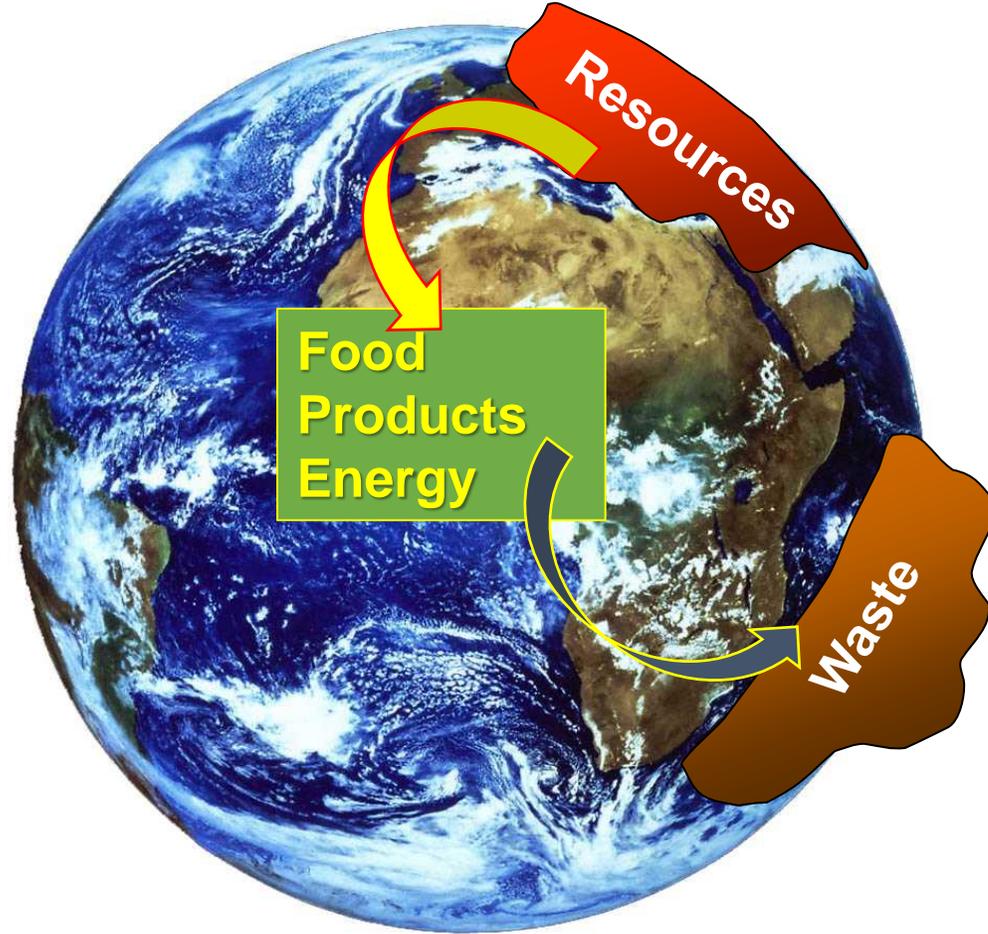
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# **Our space-ship Earth**

# Space-ship Earth (a)



Passengers: 7.7 billions

but.....

they will be 8 billions in 2025  
and 9 billions in 2050

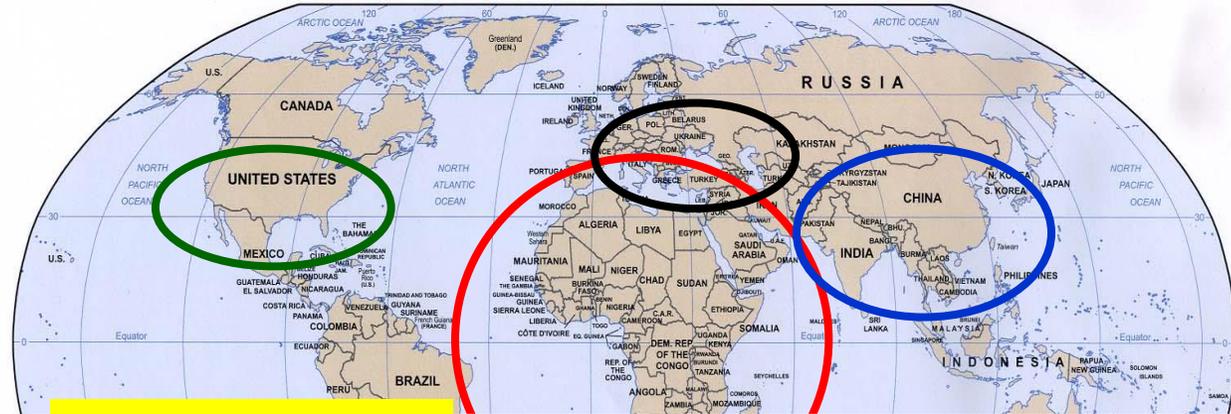
*(UN World Food Programme, 2012)*

The Earth is only one and has a finite amount of resources and a confined space for storing waste.....

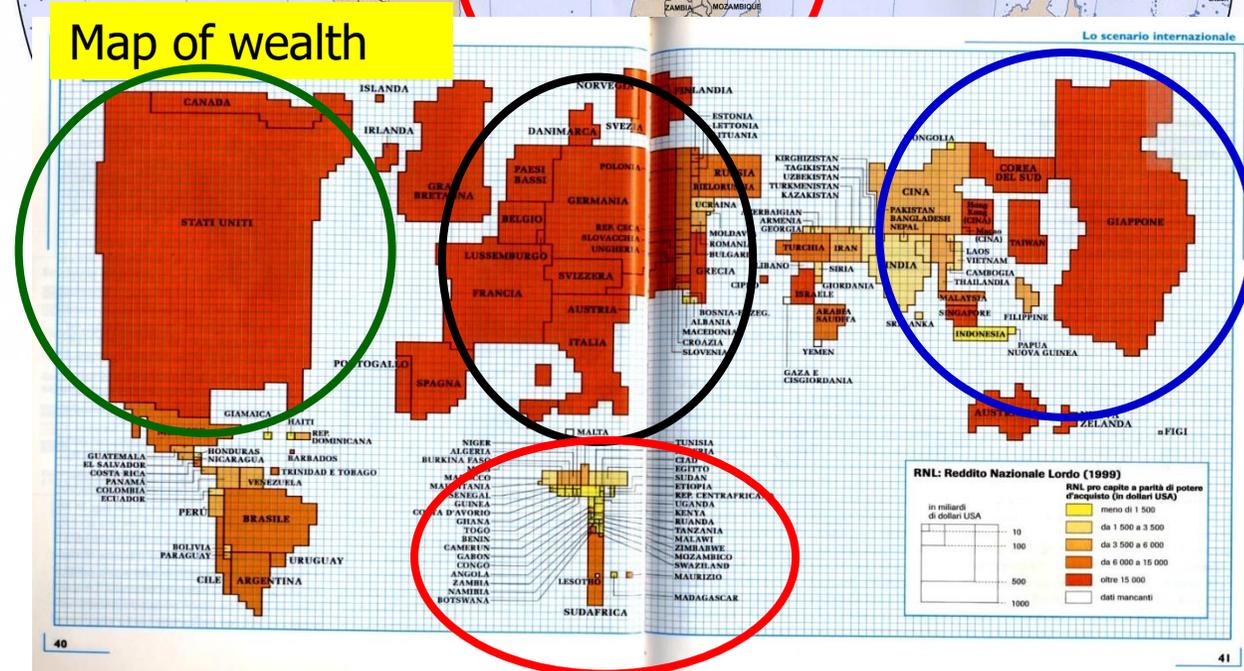
...and the resource availability and use, population growth and consumption habits are different upon the continents

*After Vincenzo Balzani, 2016*

# Space-ship Earth (b)



Map of wealth



After Vincenzo Balzani, 2016

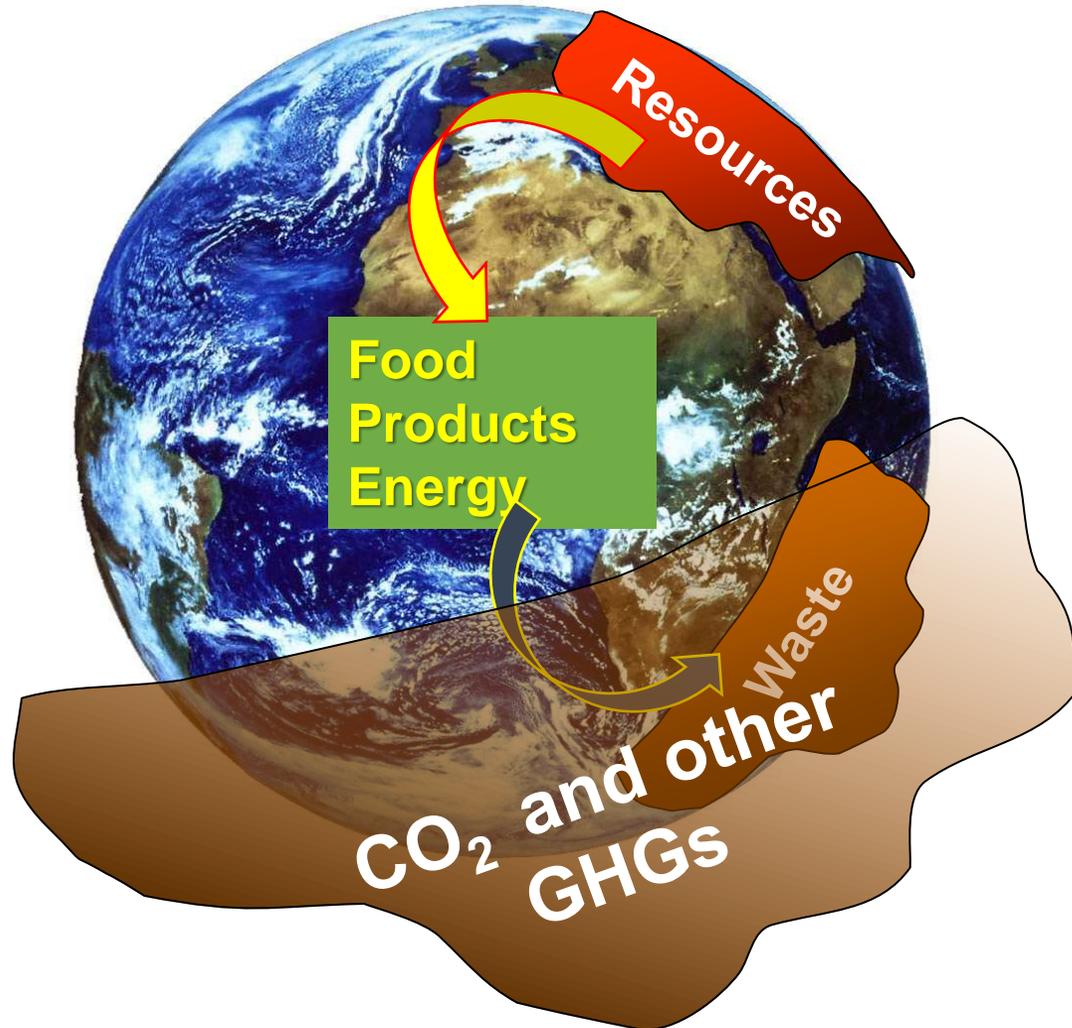
# Space-ship Earth (c)



**Dump site/waste discharges**

*After Vincenzo Balzani, 2016*

# Space-ship Earth (d)



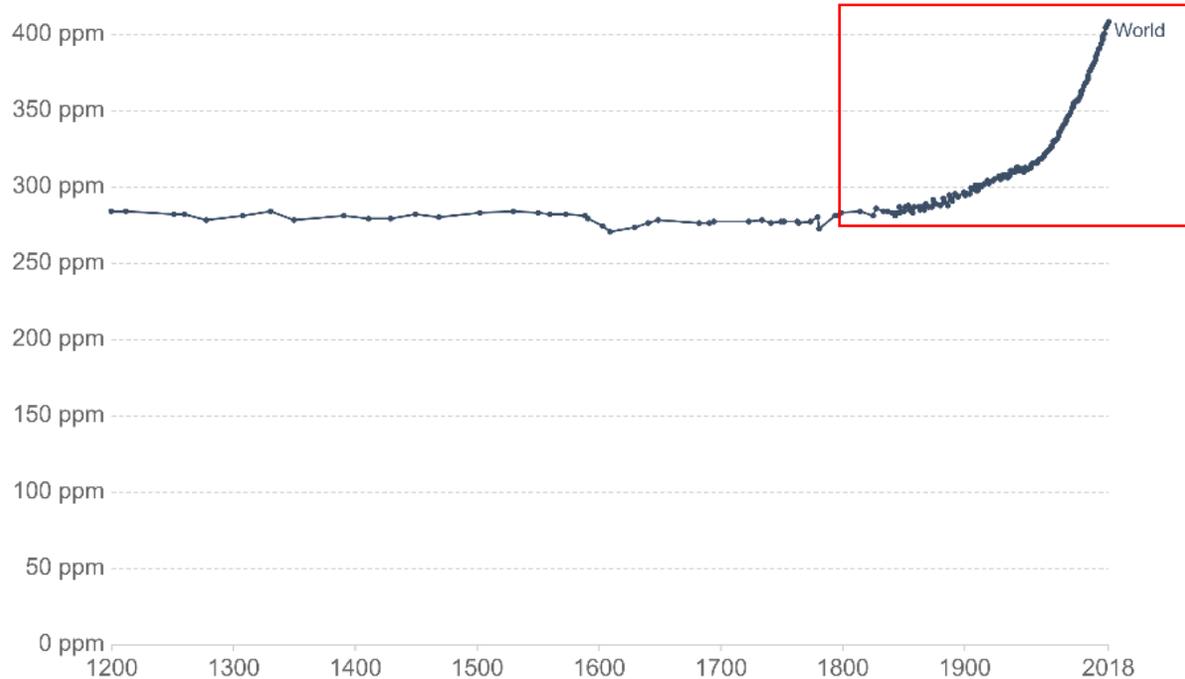
*After Vincenzo Balzani, 2016*

# Space-ship Earth (e)

## Atmospheric CO<sub>2</sub> concentration

Global average long-term atmospheric concentration of carbon dioxide (CO<sub>2</sub>), measured in parts per million (ppm). Long-term trends in CO<sub>2</sub> concentrations can be measured at high-resolution using preserved air samples from ice cores.

Our World in Data



Source: EPICA Dome C CO<sub>2</sub> record (2015) & NOAA (2018)

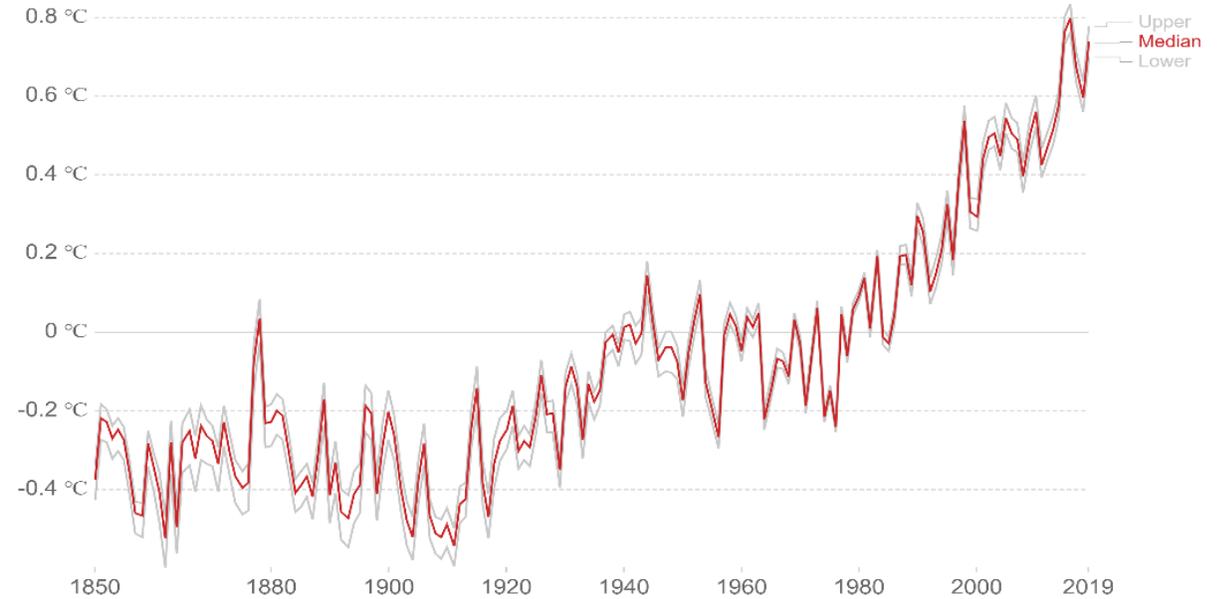
OurWorldInData.org/co2-and-other-greenhouse-gas-emissions • CC BY

<https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions>

## Average temperature anomaly, Global

Global average land-sea temperature anomaly relative to the 1961-1990 average temperature.

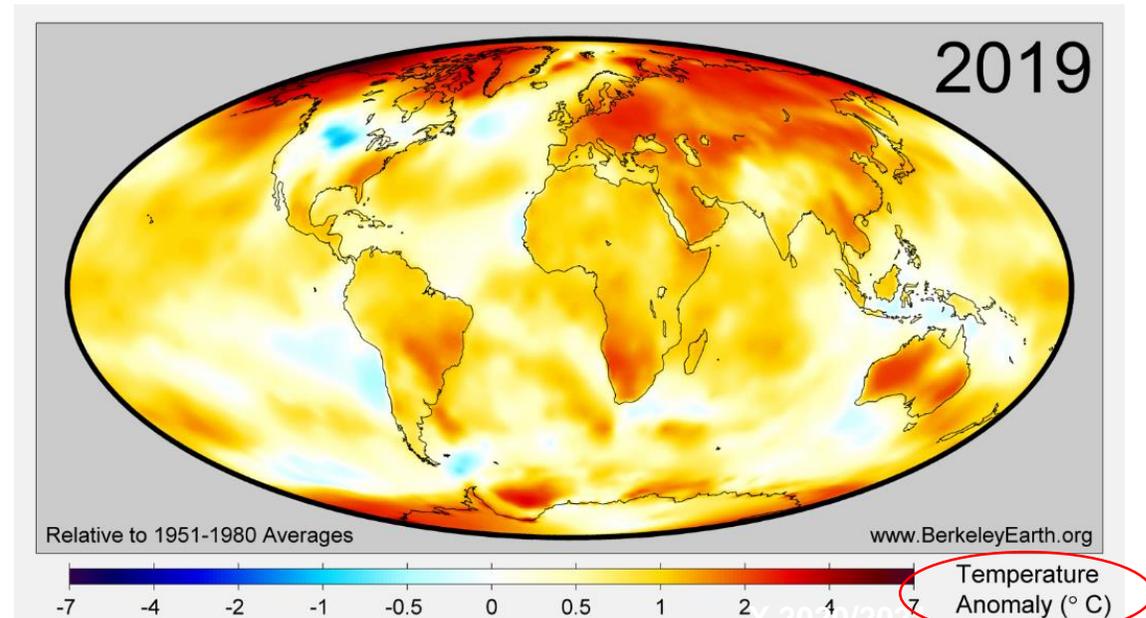
Our World in Data



Source: Hadley Centre (HadCRUT4)

OurWorldInData.org/co2-and-other-greenhouse-gas-emissions • CC BY

Note: The red line represents the median average temperature change, and grey lines represent the upper and lower 95% confidence intervals.



Relative to 1951-1980 Averages

www.BerkeleyEarth.org

Temperature Anomaly (°C)

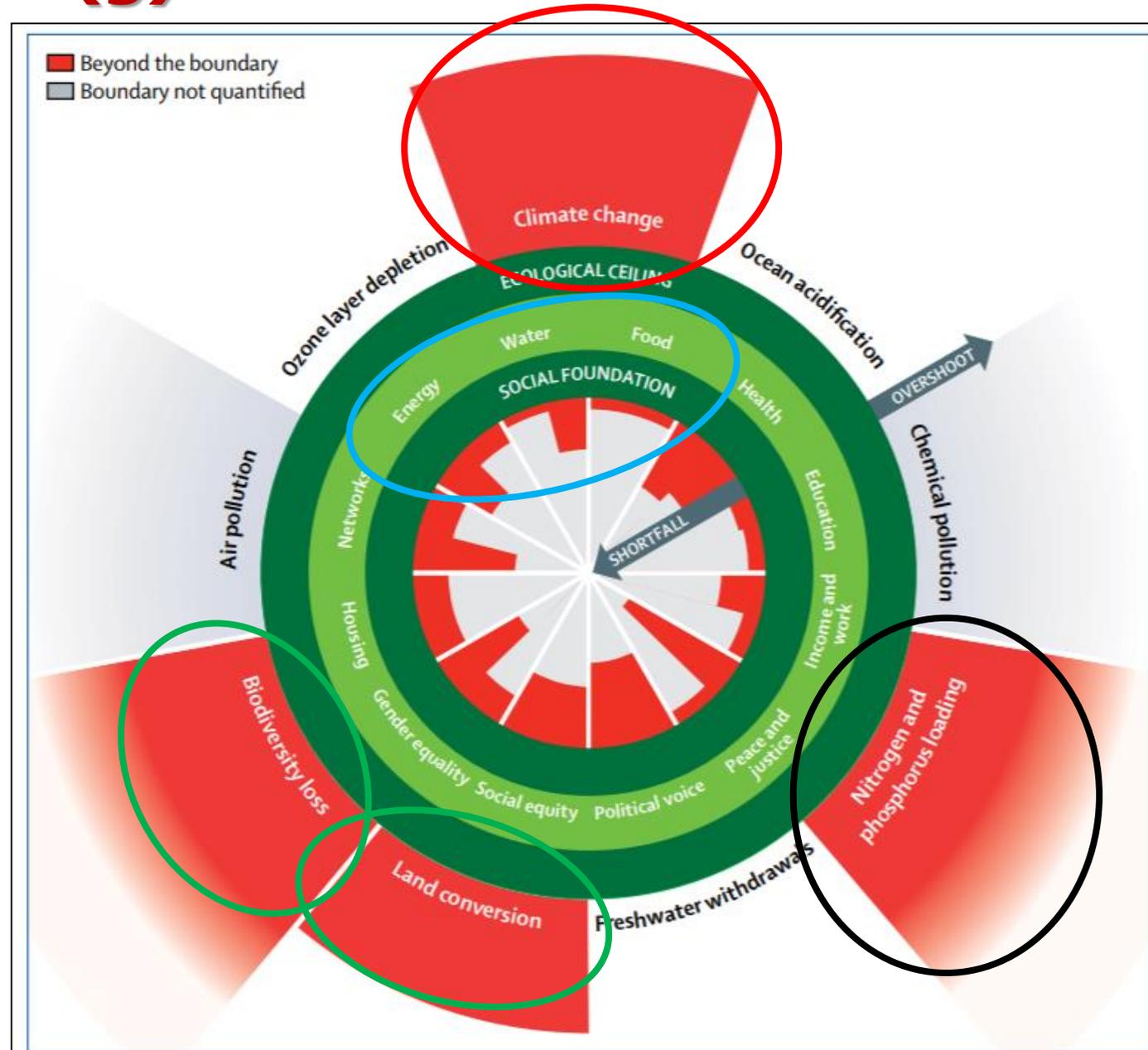
# Space-ship Earth (f)



*After Vincenzo Balzani, 2016*

# Space-ship Earth (g)

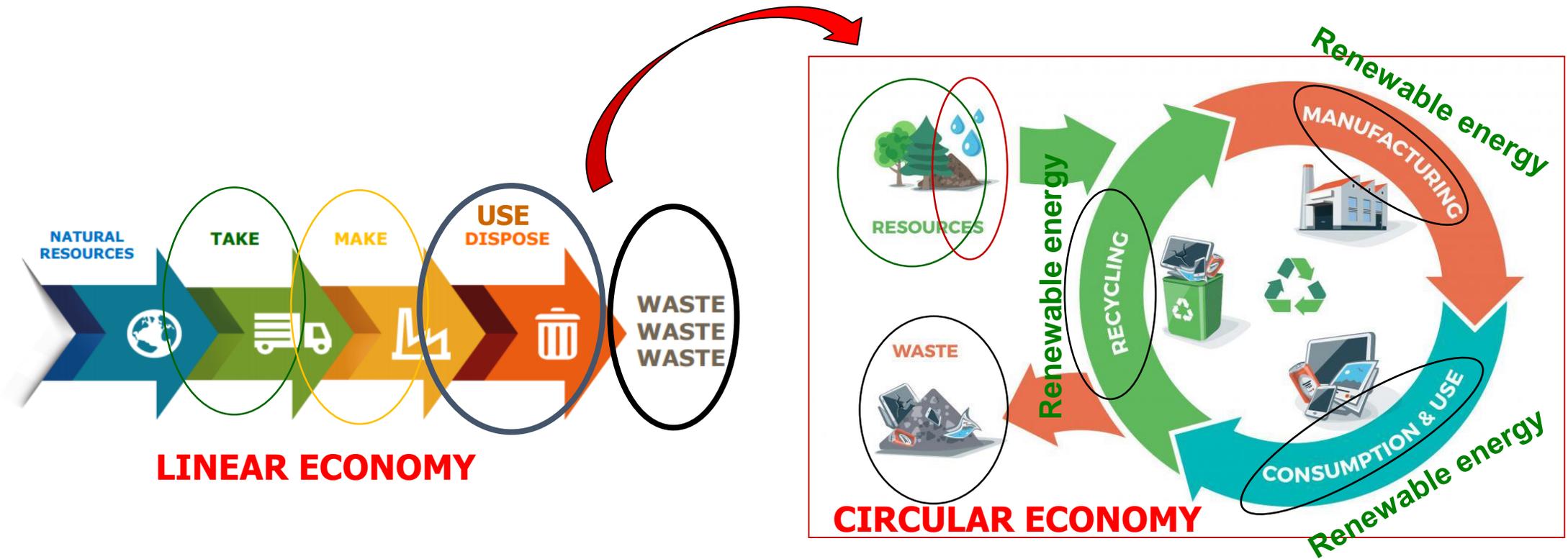
Global consumption of materials such as biomass, fossil fuels, metals and minerals is expected to double in the next forty years, while annual waste generation is projected to increase by 70% by 2050. Half of total greenhouse gas emissions and more than 90% of biodiversity loss and water stress come from resource extraction and processing.



K.Raworth.  
*A Doughnut for the Anthropocene: humanity's compass in the 21st century*, 2017.  
[www.thelancet.com/pdfs/journals/lanplh/PIIS2542-5196\(17\)30028-1.pdf](http://www.thelancet.com/pdfs/journals/lanplh/PIIS2542-5196(17)30028-1.pdf)

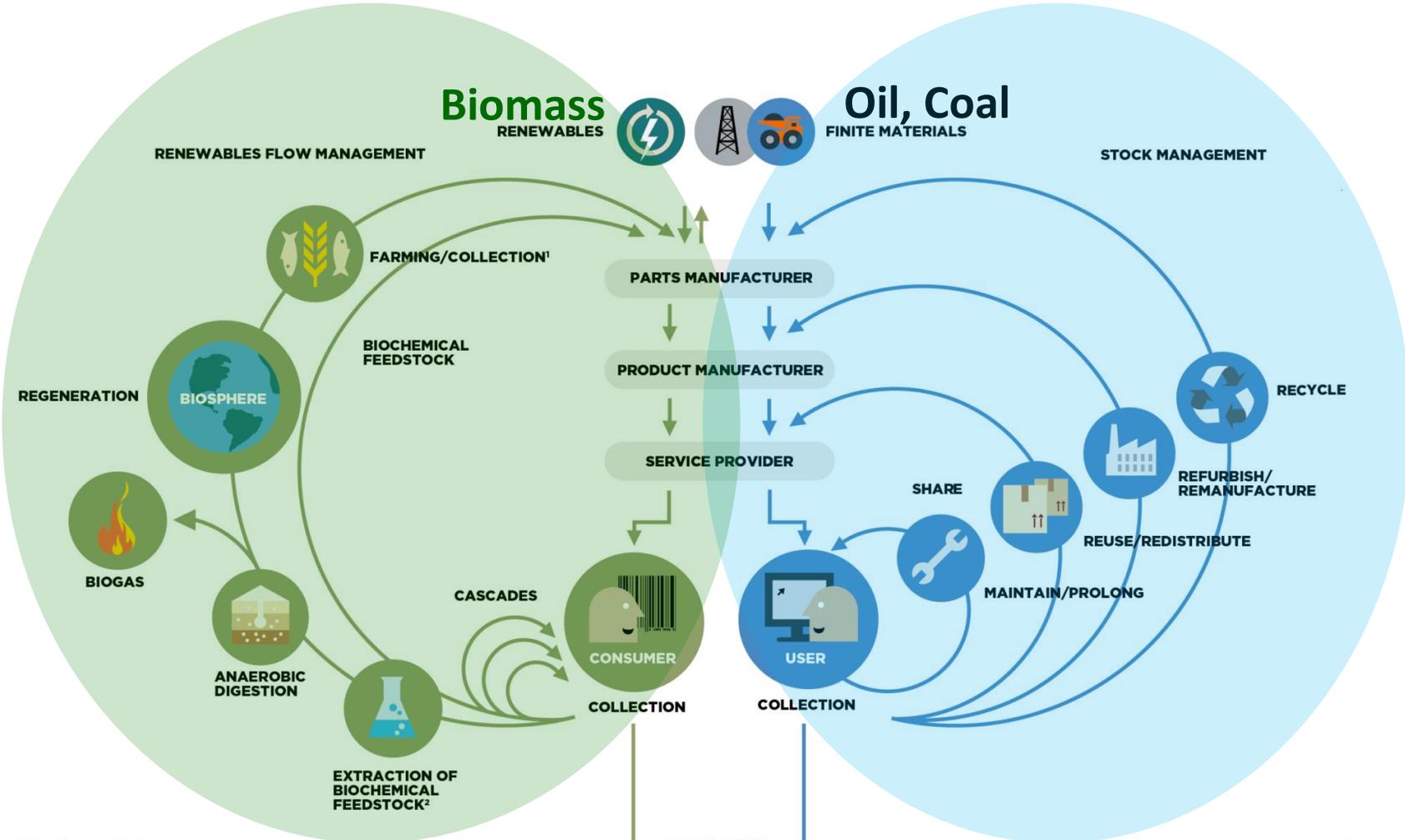
# A first urgent action: make the Economy more circular

Improve resource efficiency, the production and use of renewable raw materials/energy & the use of waste → implement Circular Economy



# **Circular (Bio)Economy: main priorities and expected impacts**

# Industrial Circular Economy: bio and non-bio value chains



1 Hunting and fishing  
2 Can take both post-harvest and post-consumer waste as an input

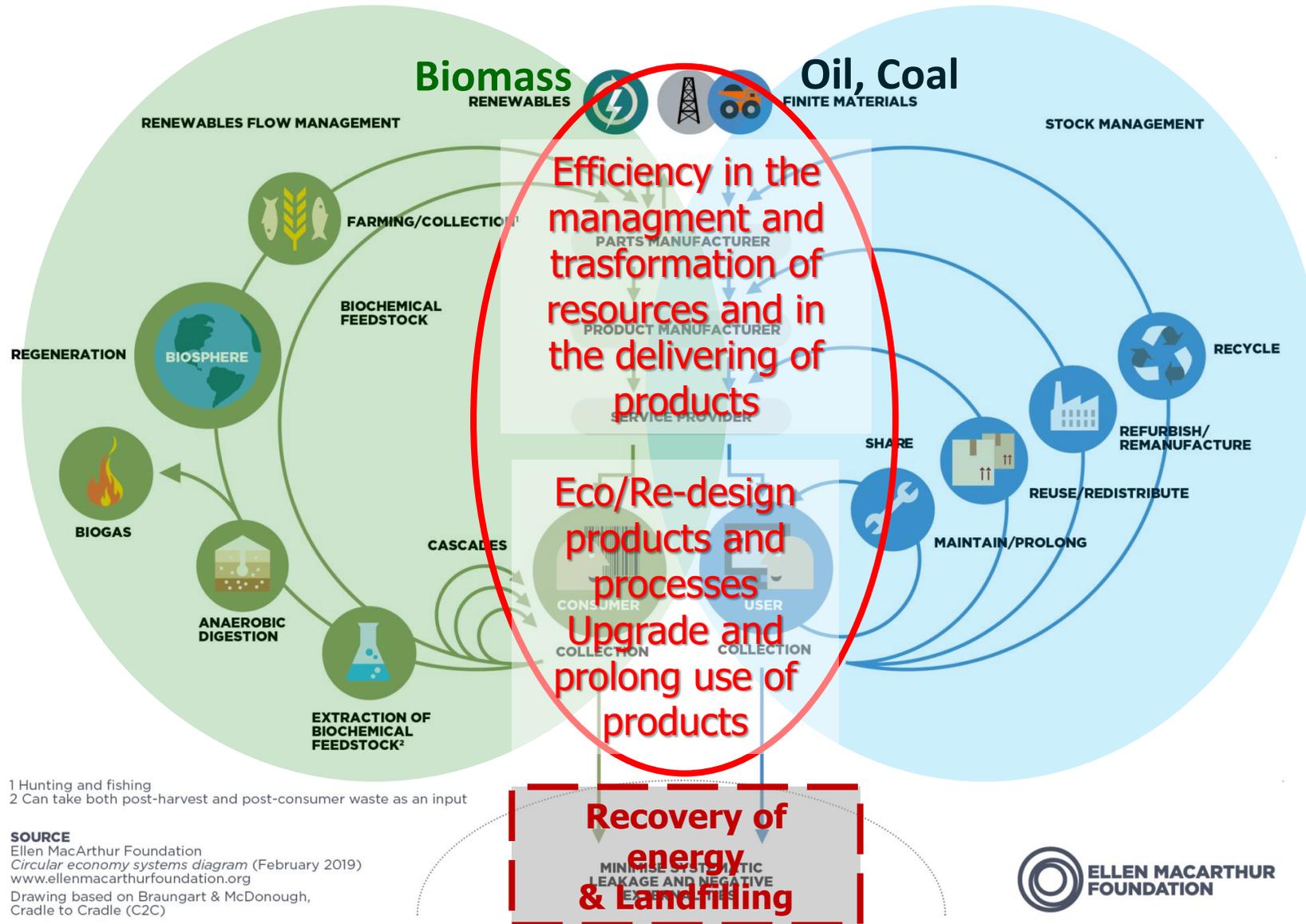
**SOURCE**  
Ellen MacArthur Foundation  
*Circular economy systems diagram* (February 2019)  
www.ellenmacarthurfoundation.org  
Drawing based on Braungart & McDonough,  
Cradle to Cradle (C2C)

**Recovery of energy & Landfilling**

MINIMIZE SYSTEMIC LEAKAGE AND NEGATIVE EMISSIONS



# Industrial Circular Economy: efficiency



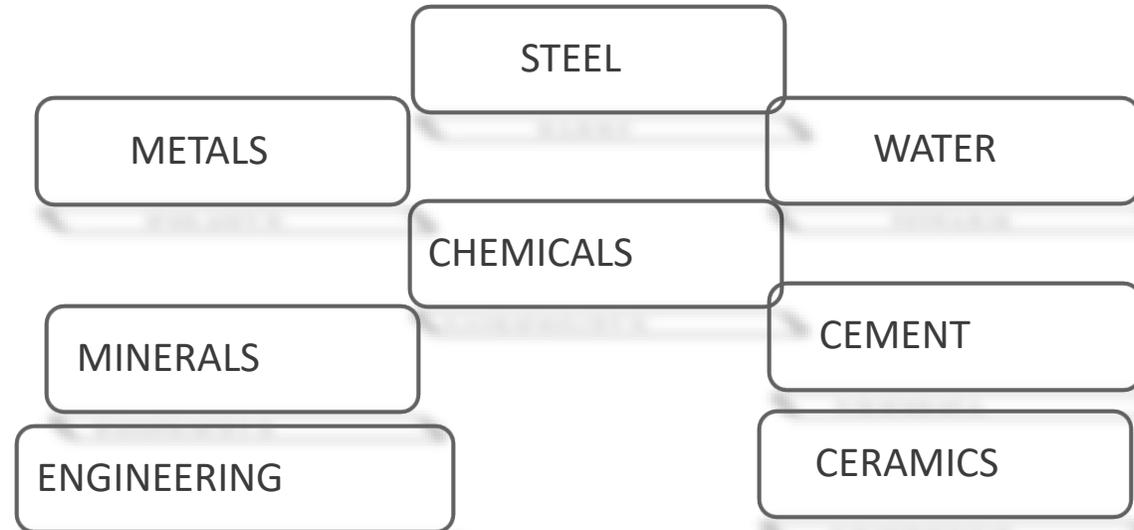


# Industrial Circular Economy: technical waste exploitation(b)

**6.8M** employees  
**450,000** enterprises (+ SMEs)

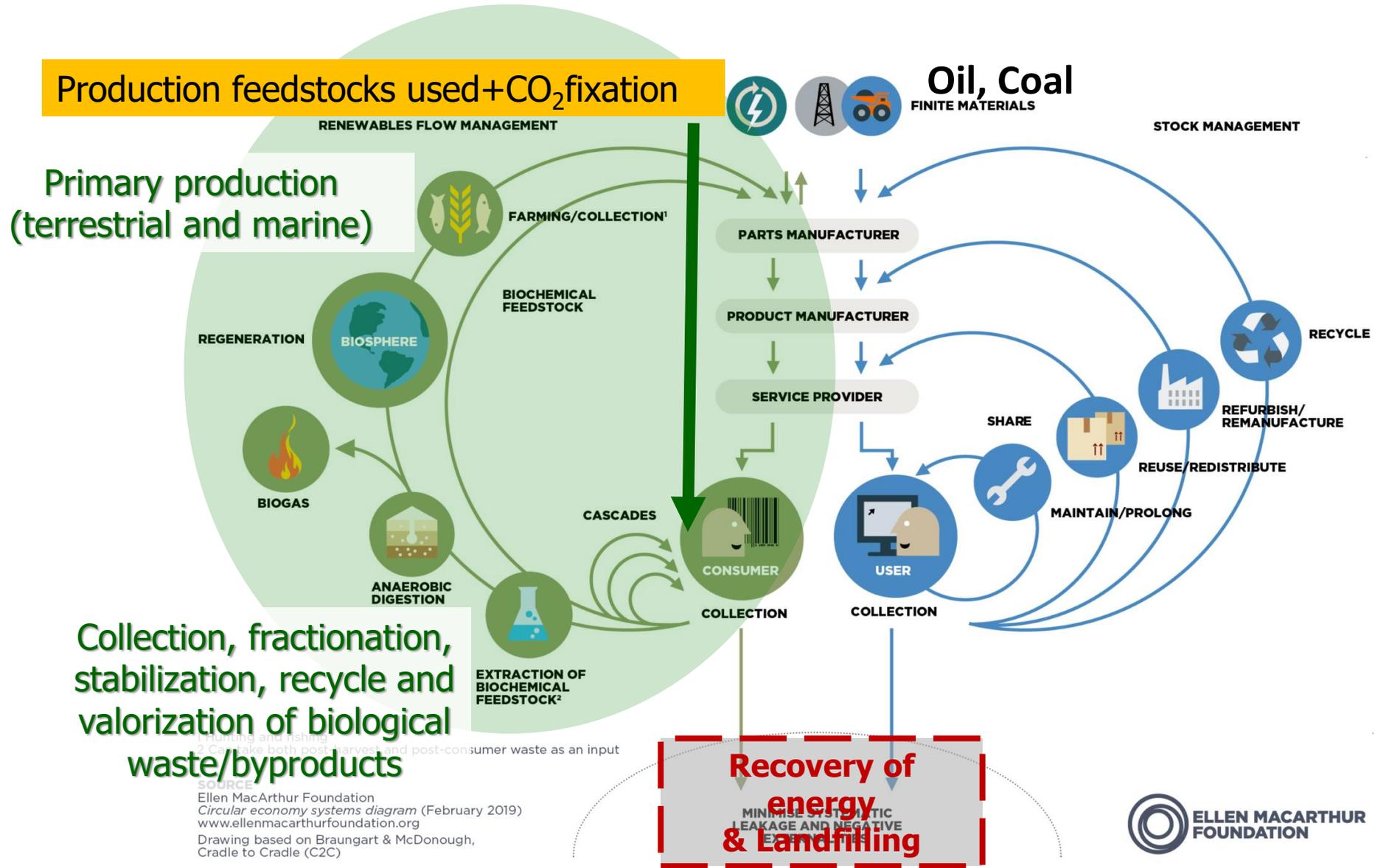
**1,600bn €** turnover  
**1.5bn €** company investments

**20%**  
EU economy



The European process industry is uniquely interested in the transition. It brings together cement, ceramics, chemicals (and plastics), engineering, minerals and ores, non-ferrous metals, steel and water, that all have high dependence on resources (energy, utilities and raw materials) in their production. They have an urgent need of improving efficiency and circularity.

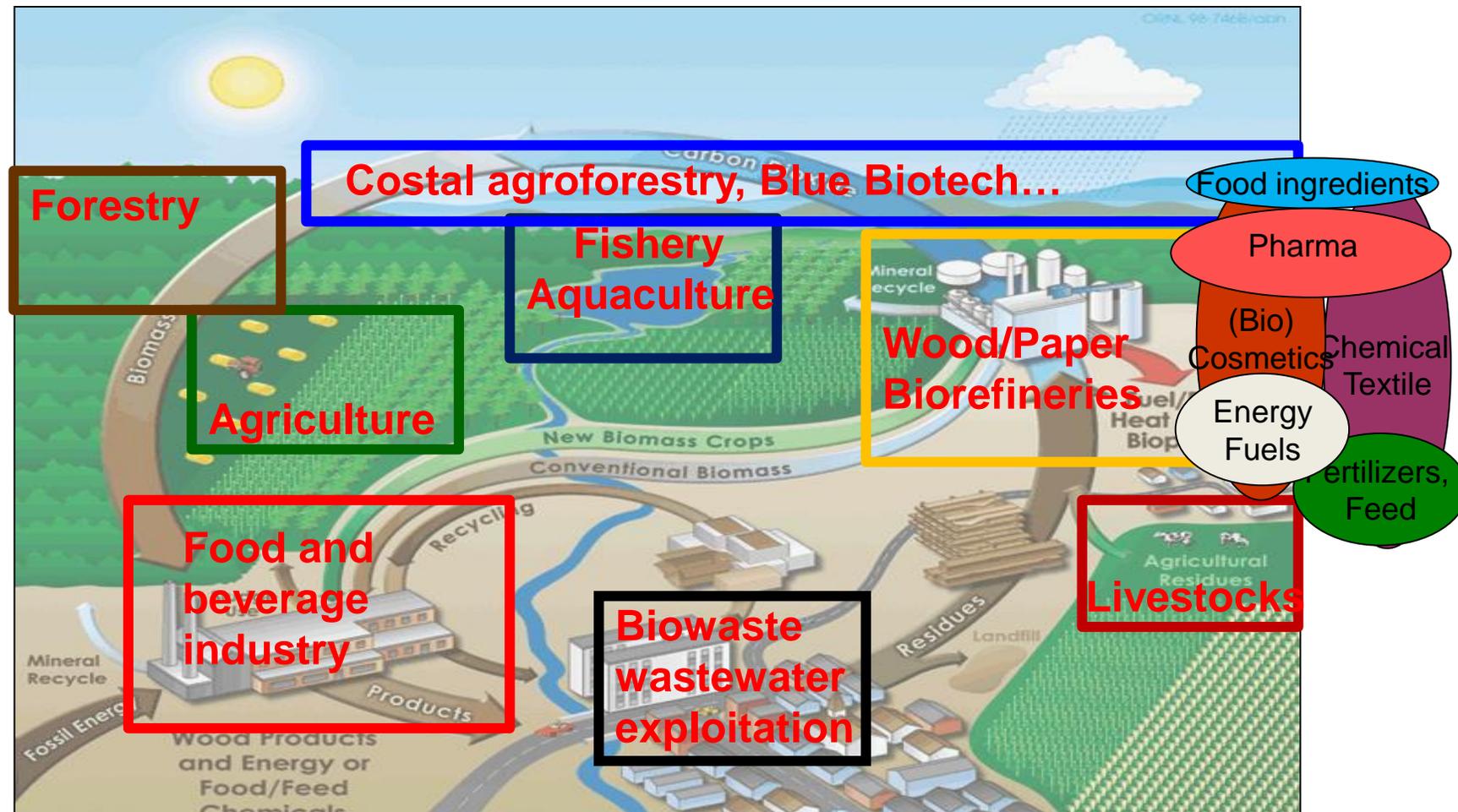
# Industrial Circular Economy: biological waste exploitation(a)



<sup>1</sup> Hunting and fishing  
<sup>2</sup> Can take both post-harvest and post-consumer waste as an input

SOURCE  
 Ellen MacArthur Foundation  
 Circular economy systems diagram (February 2019)  
 www.ellenmacarthurfoundation.org  
 Drawing based on Braungart & McDonough,  
 Cradle to Cradle (C2C)

# Industrial Circular Economy: biological waste exploitation(b)



**In Europe: about 2,400 Bil €/y and 18,5 Mil of jobs (2019)**

# Industrial Circular Economy: biological waste exploitation(c)

## Environmental benefits

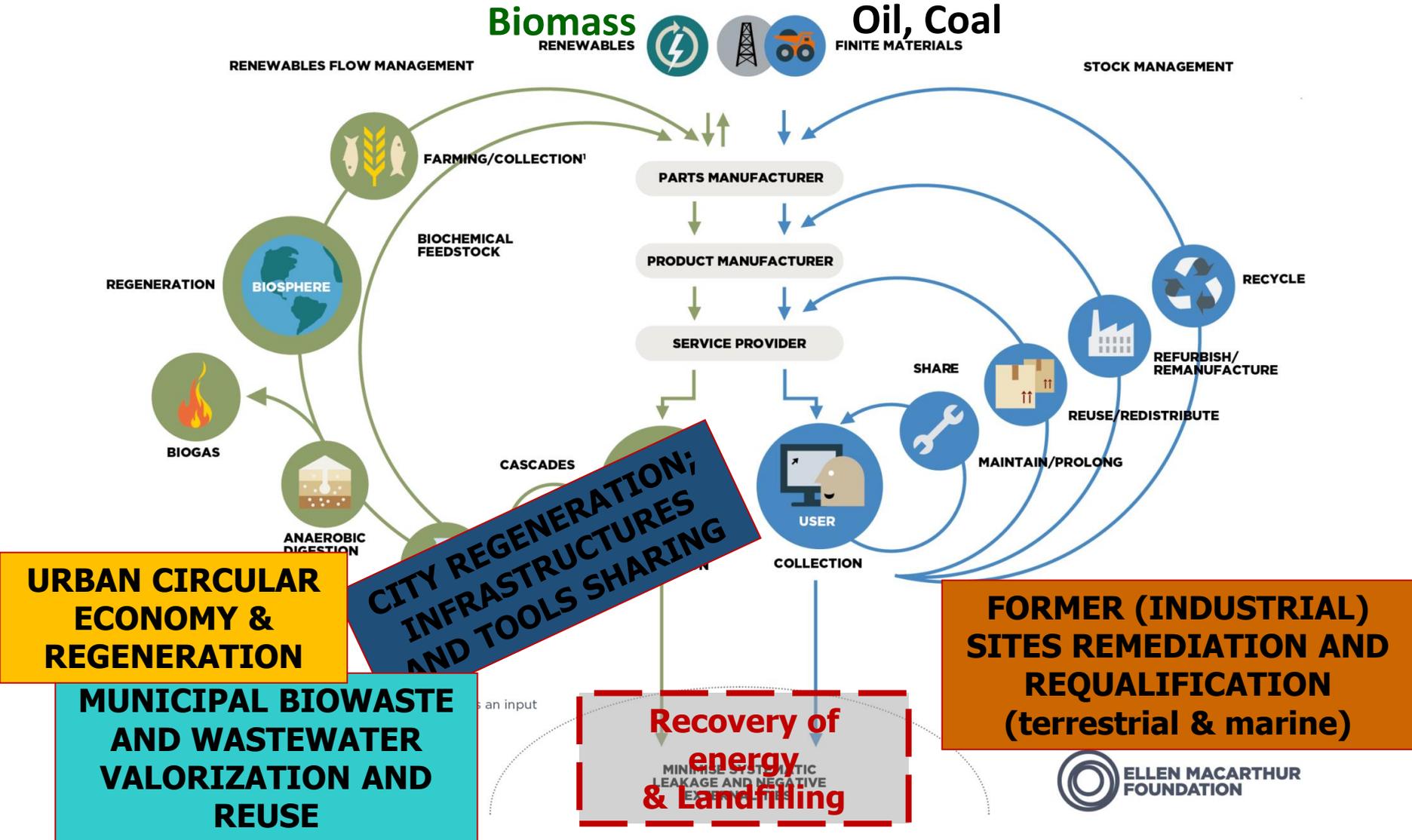
- Reduce CO<sub>2</sub> availability in the environment, by a) assimilating it (via forest, sea and soil "metabolism") and b) producing a lower amount of it, by making chemicals, materials and fuels from biomass and not from oil;
- Produce biodegradable products and plastics, avoiding their accumulation in the environment and delivering organic carbon to the soil;
- Dispose impacting bio-waste and wastewater with the production of clean water, bio-products and digestate to be used for restoring soils;
- Restore biodiversity and ecosystems, regenerates forest, rural, coastal and former industrial areas, preventing/containing future zoonosis and epidemics.

## Social benefits

- Produce food, and for all, along with clean water and essential products;
- Guarantee healthy ecosystems services;
- Create new jobs in rural and costal areas and abandoned lands.

**High resilience**, given its value chains longer and deeply routed in the territories.

# Circular Economy: other actors, sectors and value chains



# EU Circular Economy: Legislation

**2015: Parliament Resolution; EU adoption of the Circular Economy package:** Dec 2, 2015

*[https://ec.europa.eu/commission/priorities/jobs-growth-and-investment/towards-circular-economy\\_en](https://ec.europa.eu/commission/priorities/jobs-growth-and-investment/towards-circular-economy_en)*

**2018: EU adoption of the Circular Economy package:** July 4, 2018 European Circular Economy Package ("CEP")

*[http://ec.europa.eu/environment/circular-economy/index\\_en.htm](http://ec.europa.eu/environment/circular-economy/index_en.htm)*

**2020: A new EU Circular Economy Action Plan**

*<https://ec.europa.eu/environment/circular-economy/>*

## **Legislation revision:**

- A common EU **target for recycling 60% of municipal waste** by 2030;
- A common EU **target for recycling 70% of packaging waste** by 2030;
- A **reduction of landfill to maximum of 10%** of all waste by 2030.

**The responsibility of the producers on the achievement of the recycling standards of the products they are producing has been introduced.**

# Waste management in Europe (EC data)

Overview **recycling rates** of different waste streams (2018)



# EU Circular Economy: other EU actions

**PRODUCTION:** Ecodesign working plan for 2016-2019 with tailored standards and BATs

**MARKET FOR SECONDARY RAW MATERIALS:** development of **quality standards for secondary raw materials** to increase the confidence of operators/consumers. A **revised Regulation on fertilisers**.

**CONSUMPTION:** labelling of products, guidance on unfair commercial practices and **Green Public Procurements**.

## SECTORIAL ACTIONS

- 1) **strategy on plastics**, and **target for significantly reducing marine litter (Jan 2018)**;
- 2) **Stakeholders platform on food waste**, new legislation waste, food, feed;
- 3) **recycling protocol for construction and demolition waste**;
- 4) **actions on waste water reuse** and exploitation.

**Commission communication on WASTE-TO-ENERGY in Circular Economy**

**Launch of a CIRCULAR ECONOMY FINANCE SUPPORT PLATFORM and of a EUROPEAN CIRCULAR ECONOMY STAKEHOLDER PLATFORM**

*[http://europa.eu/rapid/press-release\\_IP-17-104\\_en.htm](http://europa.eu/rapid/press-release_IP-17-104_en.htm)*

*[http://ec.europa.eu/environment/circular-economy/index\\_en.htm](http://ec.europa.eu/environment/circular-economy/index_en.htm)*

**By 2030 in EU: about -50% CO<sub>2</sub> production; -30% resource use; +0.5% additional annual turnover; +0.7 M jobs**

# EU Circular Economy: investments in R&I

**Horizon2020, ~79 Billion, 2014-2020)** ([www.ec.europa/research/horizon2020](http://www.ec.europa/research/horizon2020))

## Excellent Science

- **European Research Council**
- **Future and Emerging Technologies**
- **Marie Curie Actions**
- **Research Infrastructure**

## Industrial Leadership

- **Leadership in enabling and industrial technologies (NMPB)**
- **Access to risk finance**
- **Innovation in SMEs**

## Societal Challenges

- 1. Health, demographic change and wellbeing**
- 2. Food security, sustainable agriculture, marine and maritime research & bioeconomy**
- 3. Secure, clean and efficient energy**
- 4. Smart, green and integrated transport**
- 5. Climate action, resource efficiency and raw materials**
- 6. Inclusive, innovative and reflecting societies**
- 7. Secure societies**

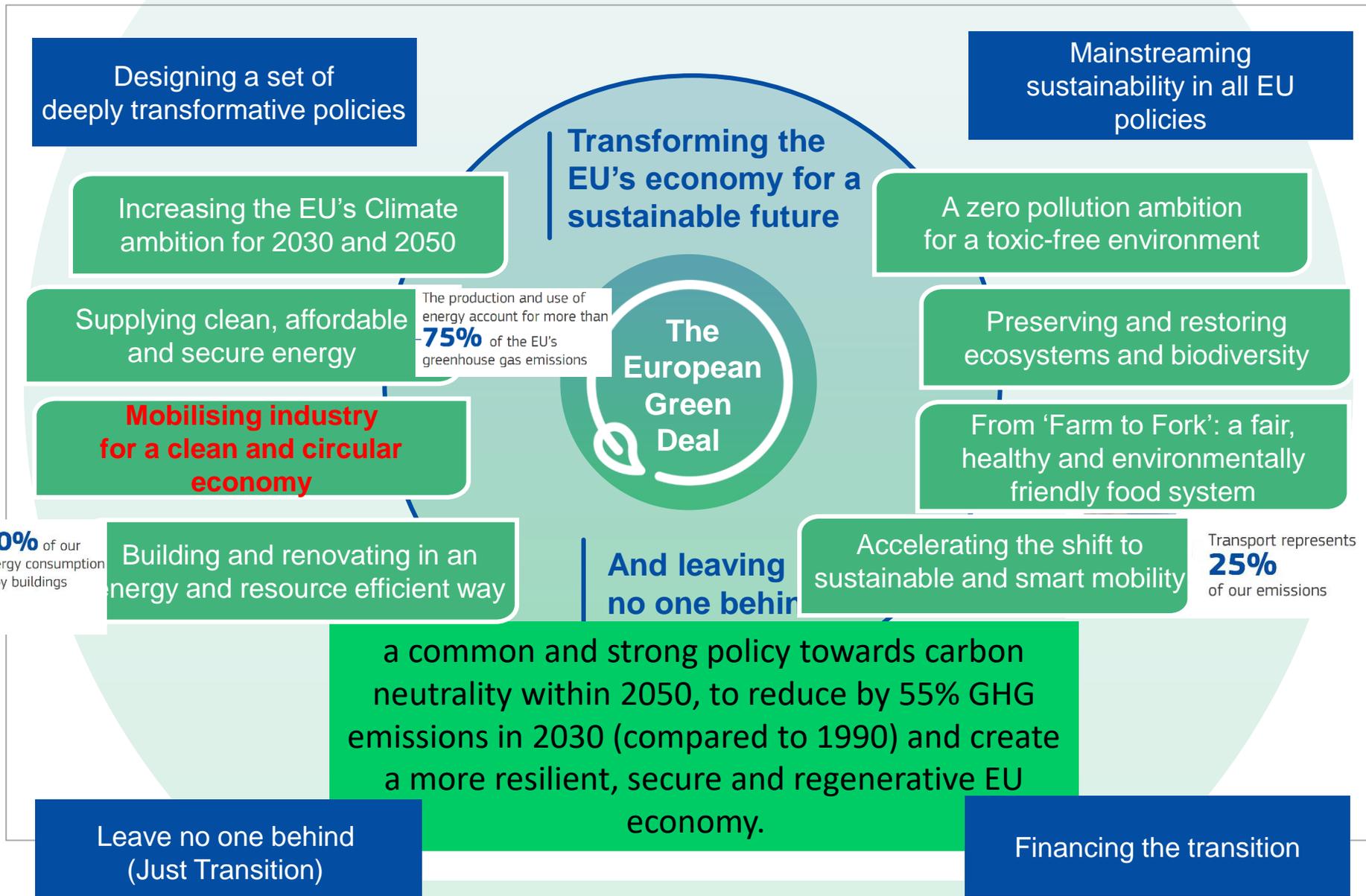
€ 960 Millions (2016-2020) via Horizon2020 (incl. SMEs instrument)

€ 500 Millions via PPPs "Factories of the Future", "Sustainable Process Industries" and "Bio-based Industries", LIFE projects etc.

€ 5.5 Billion via structural funds (2014-2020)

# **The European Green Deal**

# The European Green Deal (a)



# The European Green Deal (b)

## THE EUROPEAN GREEN DEAL INVESTMENT PLAN

Mobilising at least **€1 trillion** of investments over the course of 10 years, thanks to the combined:

- capital from EU and national budgets;
- public and private investments;
- additional measures to facilitate and boost green public and private investment;
- attractive investment conditions;
- technical assistance to help investors in selecting sustainable projects.



**25%** of all European Union funding for climate measures

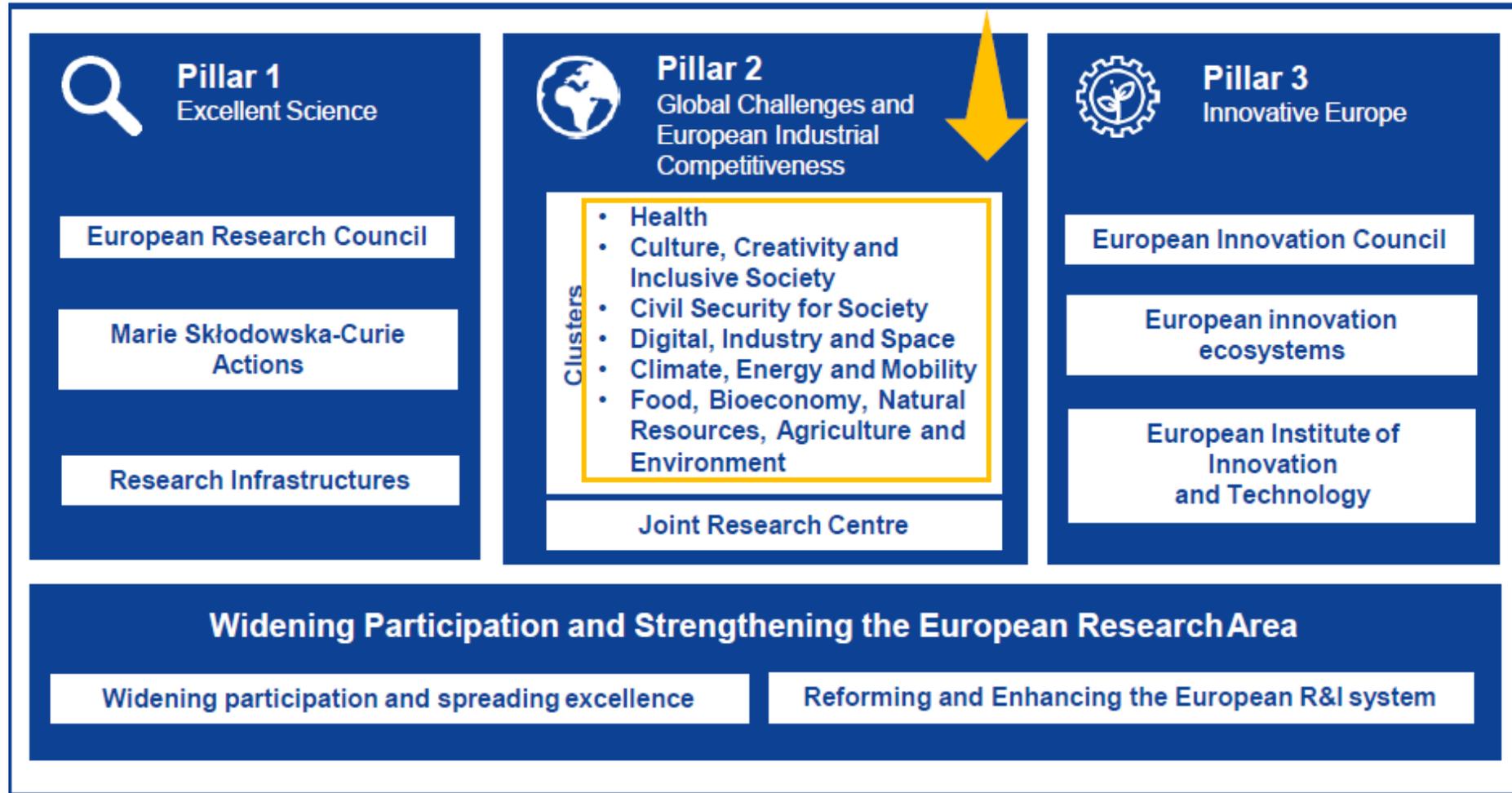


**30%** of InvestEU to projects that fight climate change



Stimulating green investments with support from the EIB Group

# Horizon Europe (€ 95.5 Bln, 2021-27) (a)



**5 MISSIONS**

**49 PARTNERSHIPS (with a clear role of the MSs)**

# Horizon Europe (€ 95.5 Bln, 2021-27) (b)



EUROPEAN UNION

## EU MISSIONS



**Concrete solutions for our greatest challenges**

Commission's Communication on European missions (29 September 2021) marks the official launch of the missions:

Adaptation to  
Climate Change

Cancer

Climate-neutral  
and Smart Cities

Restore our  
Ocean and Waters

Soil Deal  
for Europe



# The European Green Deal (c)

INVESTMENTS (continued): At least 25% of the EU's long-term budget should be dedicated to climate action, and the European Investment Bank and Europe's climate bank, will provide further support. For facilitate the private sector contribution to financing the green transition, the EC presented a Green Financing Strategy. The Horizon EU programme will sustain strategic R&I in the sector with € 95 Bln in the 2021-2027 (35% of it will be dedicated to green deal priorities) (see next slide).

Fighting climate change and environmental degradation is a common endeavor but not all regions and Member States start from the same point. A **Just Transition Mechanism** will support those regions that rely heavily on very carbon intensive activities. It will support the citizens most vulnerable to the transition, providing access to reskilling programmes and employment opportunities in new economic sectors.

The global challenges of climate change and environmental degradation require a **global response**. The EU will continue to promote its environmental goals and standards in the UN's Biodiversity and Climate Conventions and reinforce its green diplomacy. The G7, G20, international conventions, and bilateral relationships will be used to persuade others to step up their efforts. The EU will also use trade policy to ensure sustainability partnerships with the Balkans and Africa to help them in their own transitions.

*Thank You!*