21st Century Challenges

EGD and the Importance of Natural Resources Management

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Brussels, 16th October 2020

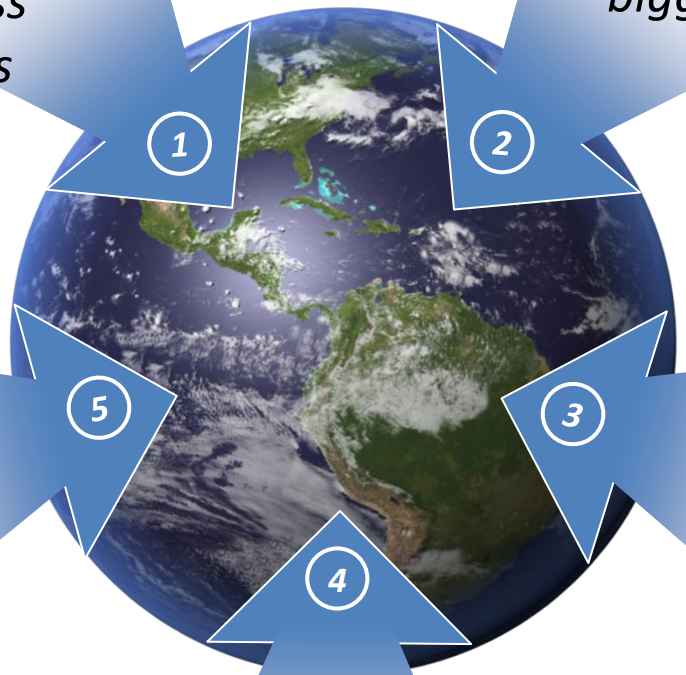
2020: Wake-up call for "The future we want"

We are reaching the tipping points:

We are leaving the "safe operating space" across multiple earth systems

An economic reset:

Economies in lockdown and governments releasing the biggest stimulus packages in recent memory



Paradigm change in European politics:

The European Green Deal as new strategic objective, supported by a new cohort of politicians

Multilateralism on the test bench:

America and China are going different ways

Climate activism with renewed vigour:

Greta Thunberg, "Convention Citoyenne pour le Climat" in France, "German Zero", etc.

European Green Deal

Important to Remember

- *It is a new growth strategy acknowledging that environmental and economic goals are not in contradiction and future economic development depends on how we will preserve and protect our natural capital*
- *Special attention is given to social considerations of the transition. Success of the reform efforts proposed by EGD depends on acceptance, particularly from the socially more vulnerable groups of people.*

European Green Deal

Annual Sustainable Growth Strategy 2020
Climate Pact

A New Industrial Strategy for Europe

Circular Economy Action Plan 2020

Shaping Europe's Digital Future

White Paper on Artificial Intelligence
A European Strategy for Data

Farm to Fork
Biodiversity Strategy

And … more documents existing and coming

The Commission will take actions to:

- *Reduce by 50% the use and risk of chemical pesticides by 2030. Reduce by 50% the use of more hazardous pesticides by 2030.*
- *Reduce nutrient losses by at least 50%, while ensuring no deterioration on soil fertility. Reduce fertilizer use by at least 20% by 2030.*
- *Reduce by 50% the sales of antimicrobials for farmed animals and in aquaculture by 2030.*
- *Boost the development of EU organic farming area with the aim to achieve 25% of total farmland under organic farming by 2030.*

State of the Union 2020

September 16th, 2020

"We will enhance emission trading, boost renewable energy, improve energy efficiency, reform energy taxation. But the mission of the European Green Deal involves much more than cutting emissions. It is about making systemic modernisation across our economy, society and industry. It is about building a stronger world to live in."

"Our current levels of consumption of raw materials, energy, water, food and land use are not sustainable. We need to change how we treat nature, how we produce and consume, live and work, eat and heat, travel and transport. So we will tackle everything from hazardous chemicals to deforestation to pollution. This is a plan for a true recovery. It is an investment plan for Europe."

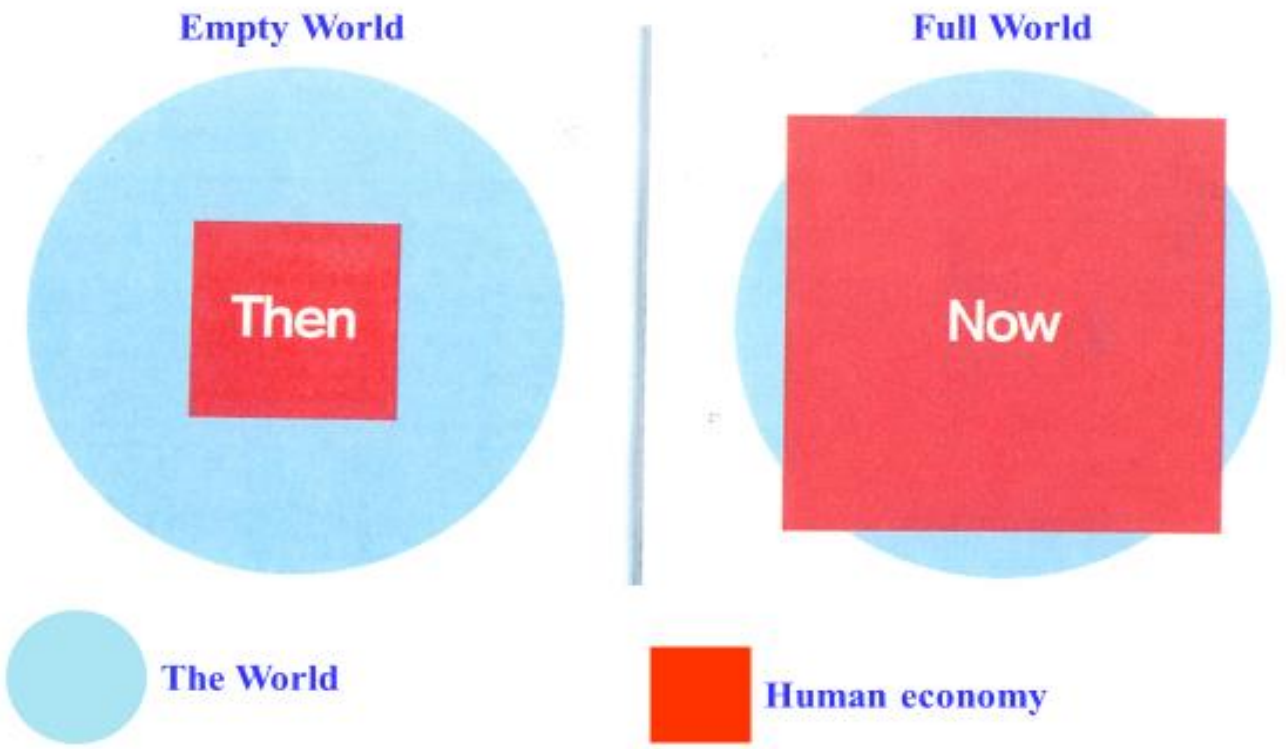
Source; European Commission (2020)

For the first time in a human history we face the emergence of a single, tightly coupled human social-ecological system of planetary scope.

We are more interconnected and interdependent than ever.

Our individual and collective responsibility has enormously increased.

Empty World and Full World



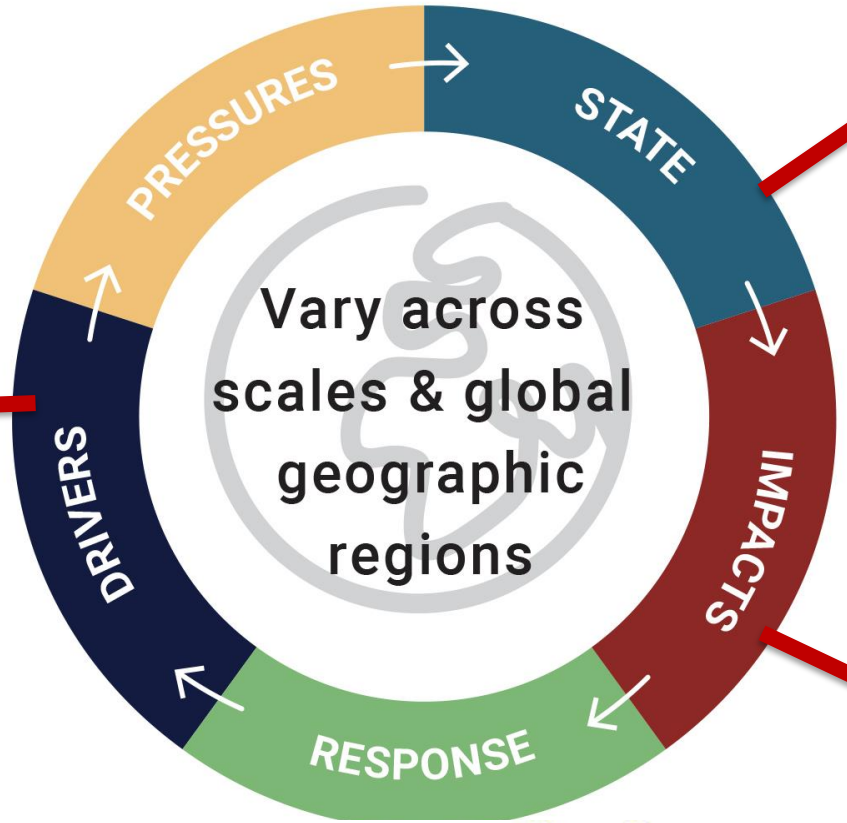
Source: Club of Rome: Simplified after Herman Daly

Labour and Infrastructure limiting factors of human wellbeing

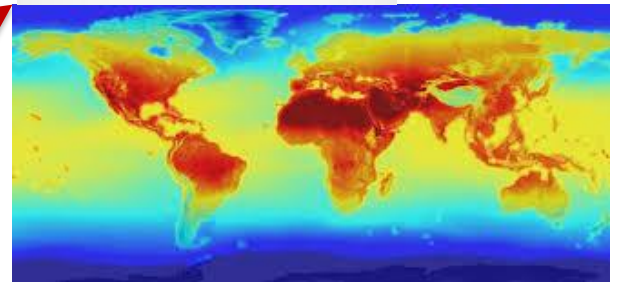
Natural resources and Environmental sinks limiting factors of human wellbeing

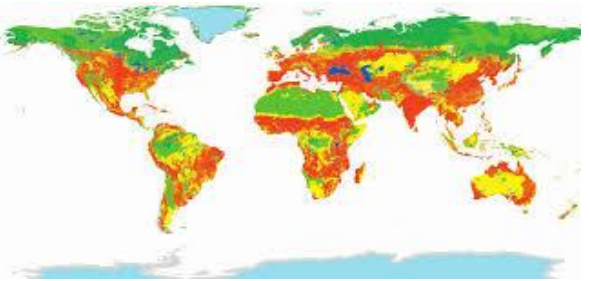
International Resource Panel

Our Economy



ipcc
INTERGOVERNMENTAL PANEL ON climate change

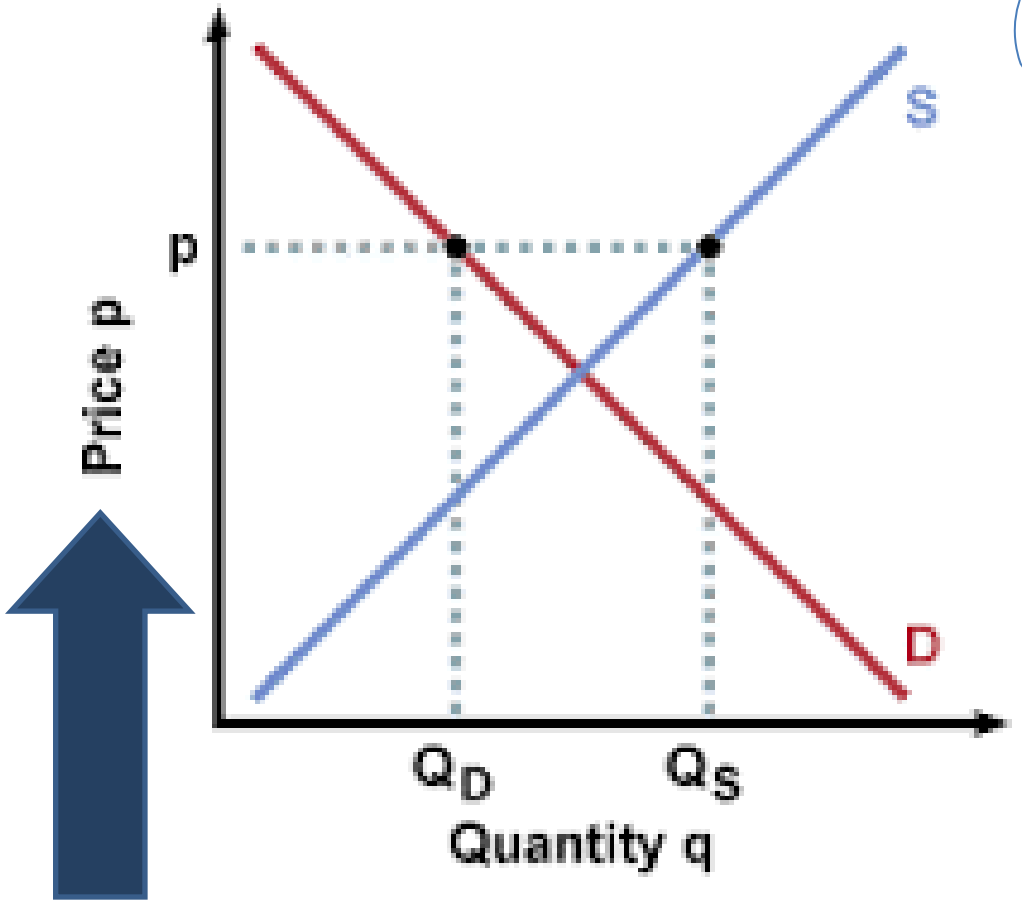




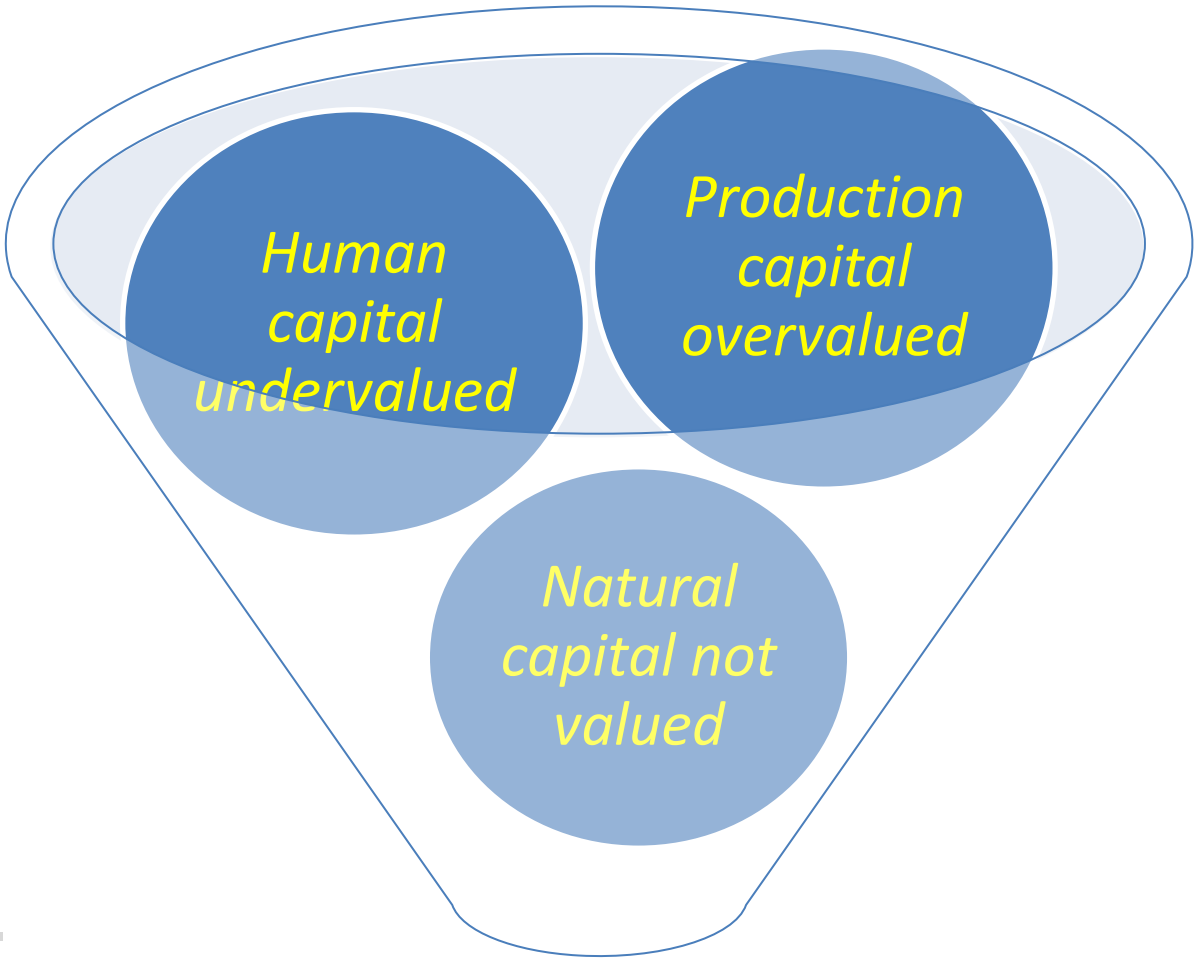
Convention on Biological Diversity

ipbes
Science and Policy for People and Nature

Producers/Consumers Rational Behaviour



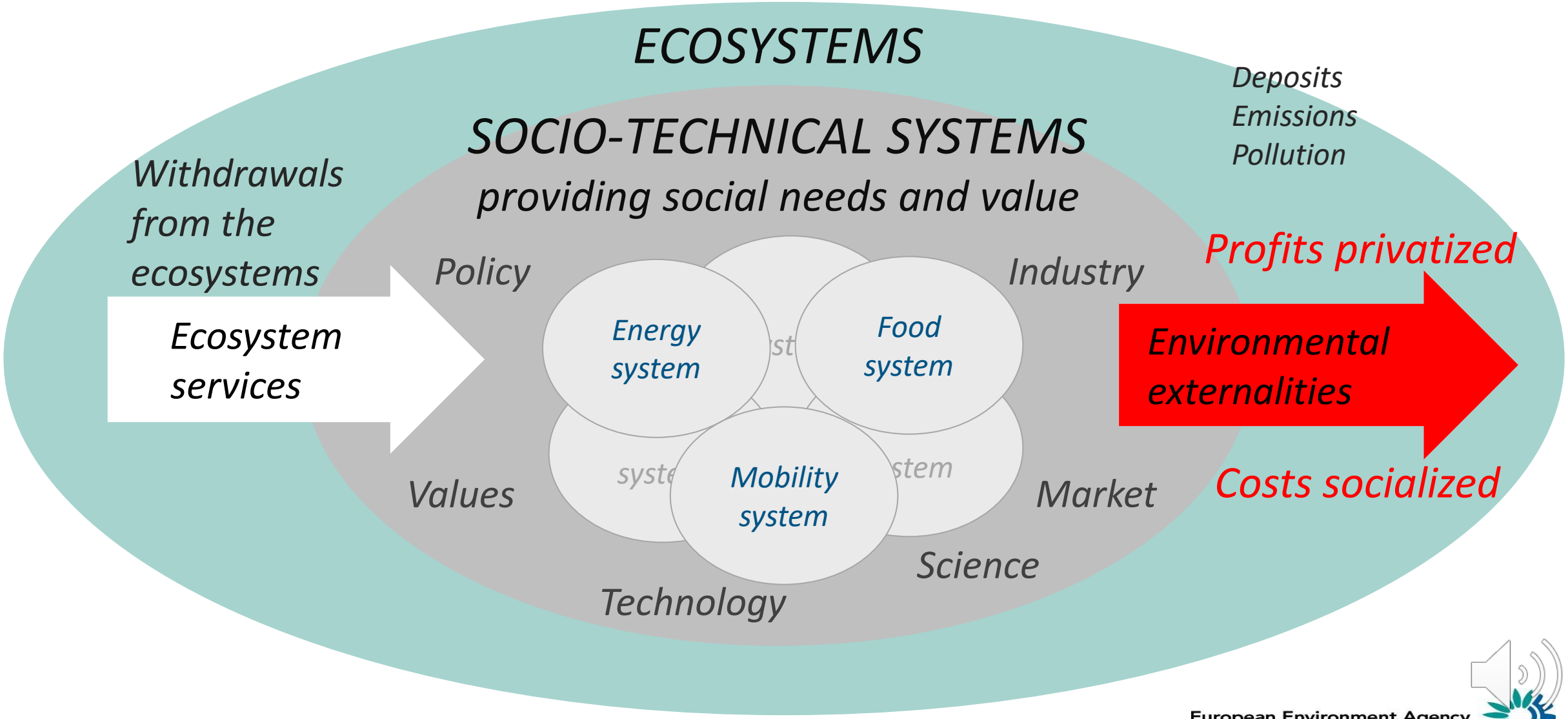
Market Economy



Economic, social and environmental (in)balance

LIVING WELL WITHIN ECOLOGICAL LIMITS

ECONOMIC SYSTEM FUNCTION OF ECOSYSTEM

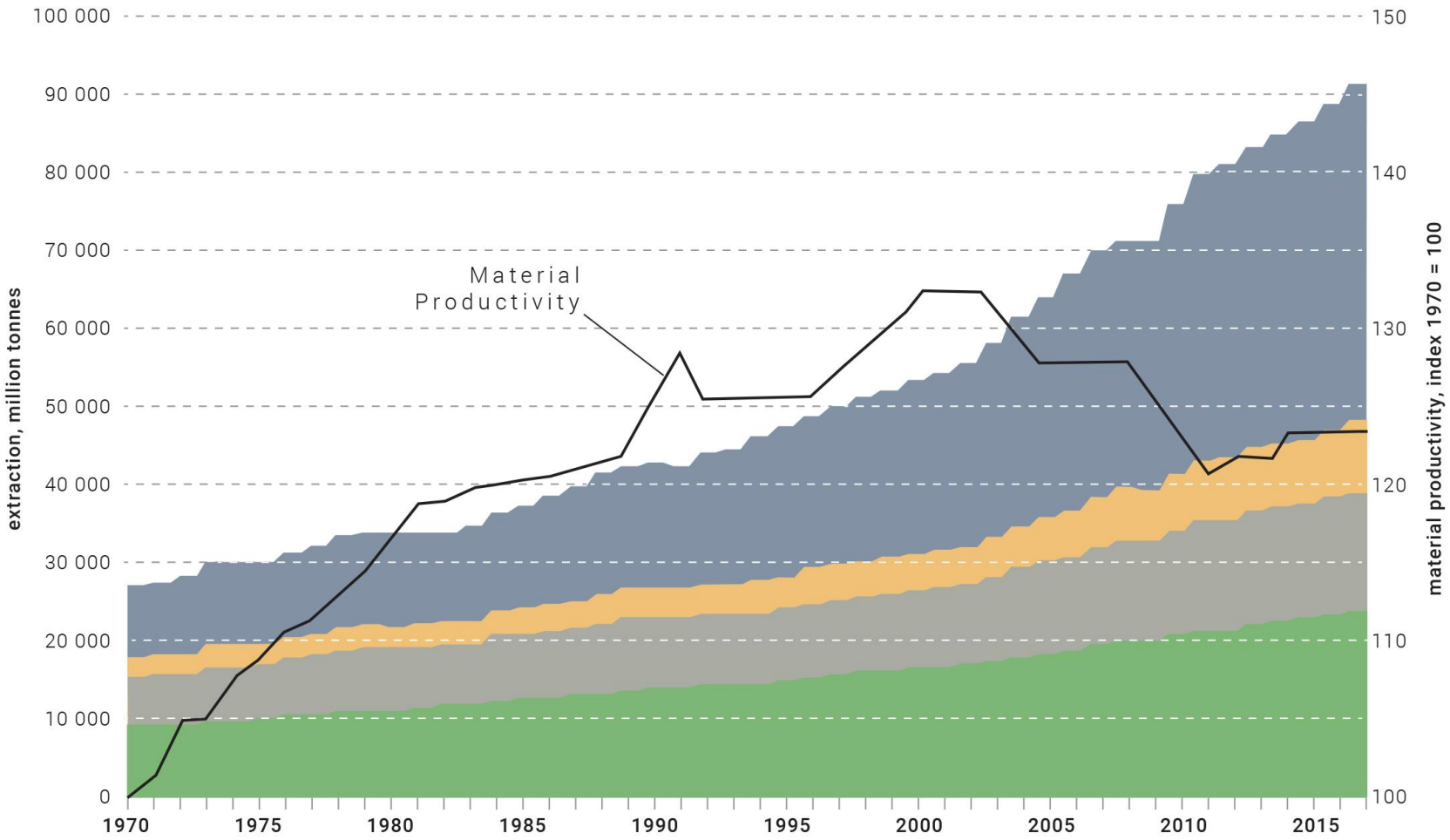


European Environment Agency

Relentless demand: Global resource use, Material demand per capita and Material productivity

International Resource Panel

Global material extraction and material productivity, 1970 - 2017



- *Global resource use has more than tripled since 1970*
- *Global material demand per capita grew from 7.4 tons in 1970 to 12.2 tons per capita in 2017*
- *Material productivity started to decline around 2000 and has stagnated in the recent years*

Non-metallic minerals
Metals
Fossil fuels
Biomass

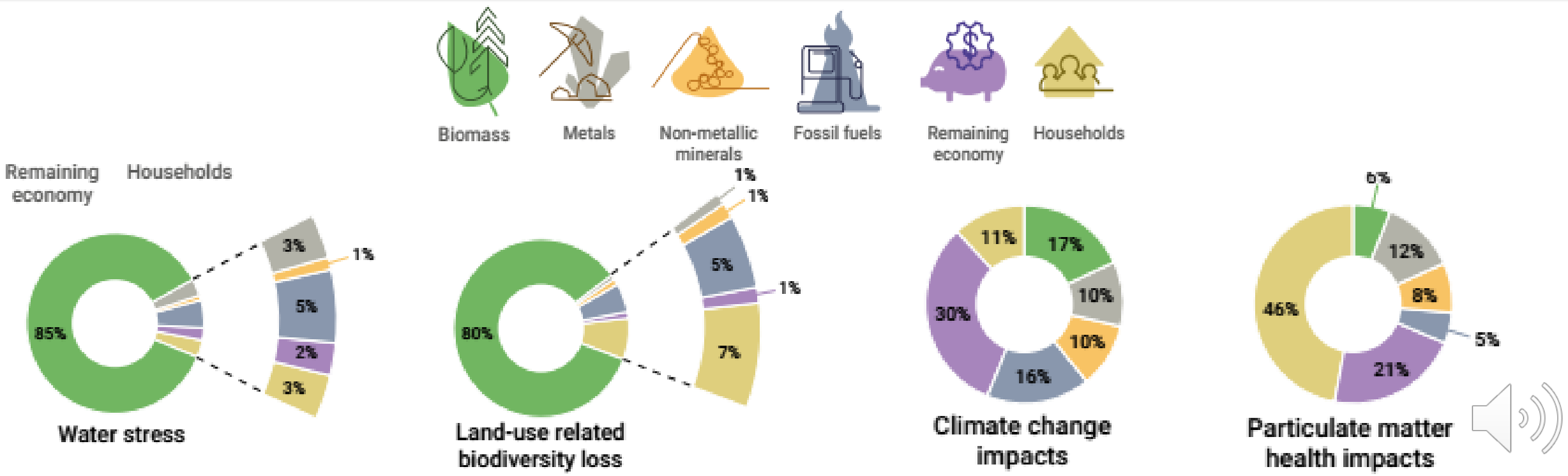
Environmental impacts in the value chain

resource extraction and processing phase

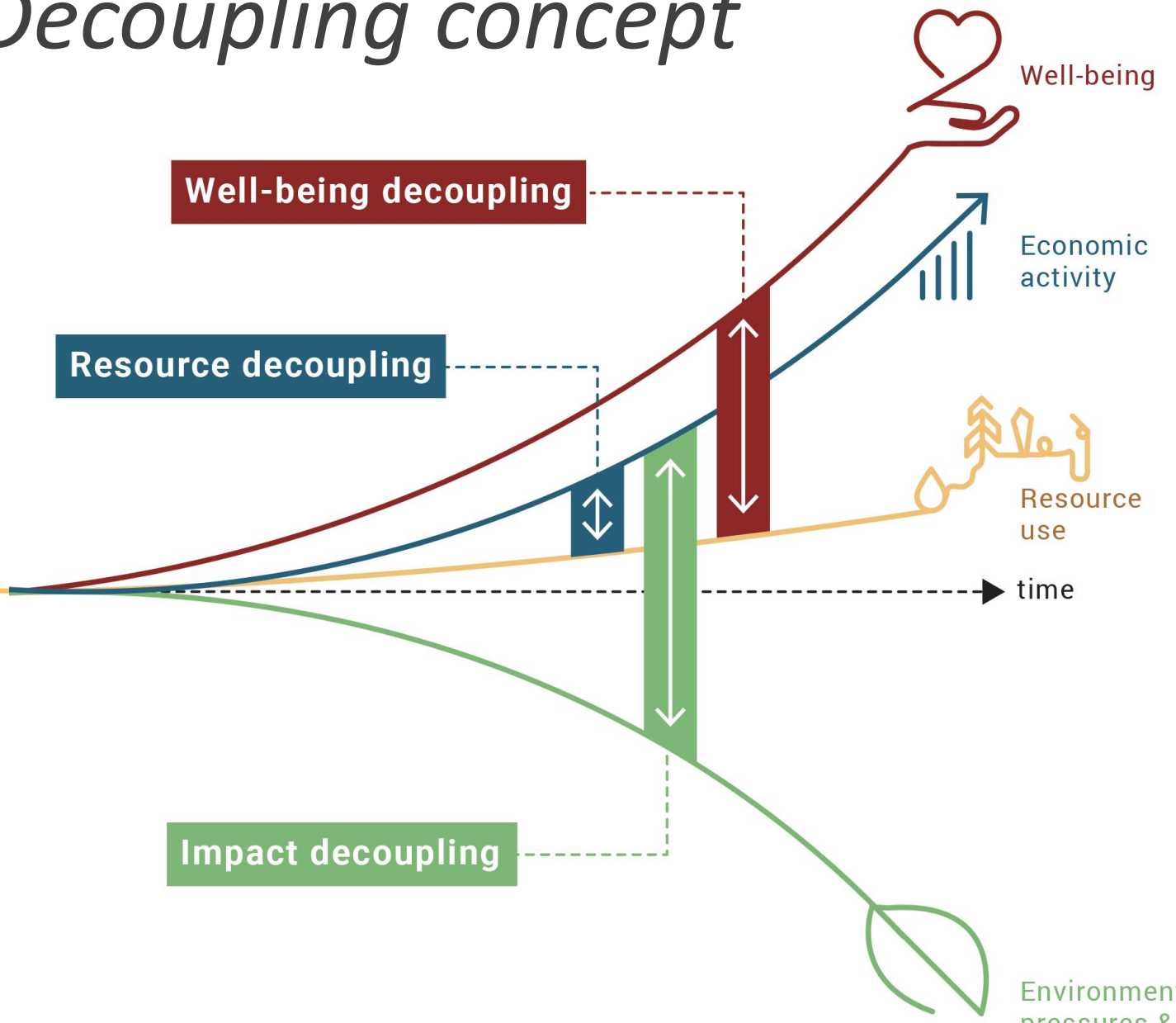
90%** of global **biodiversity loss** and **water stress

***50%** of global **climate change** impacts*

1/3 of air pollution health impacts

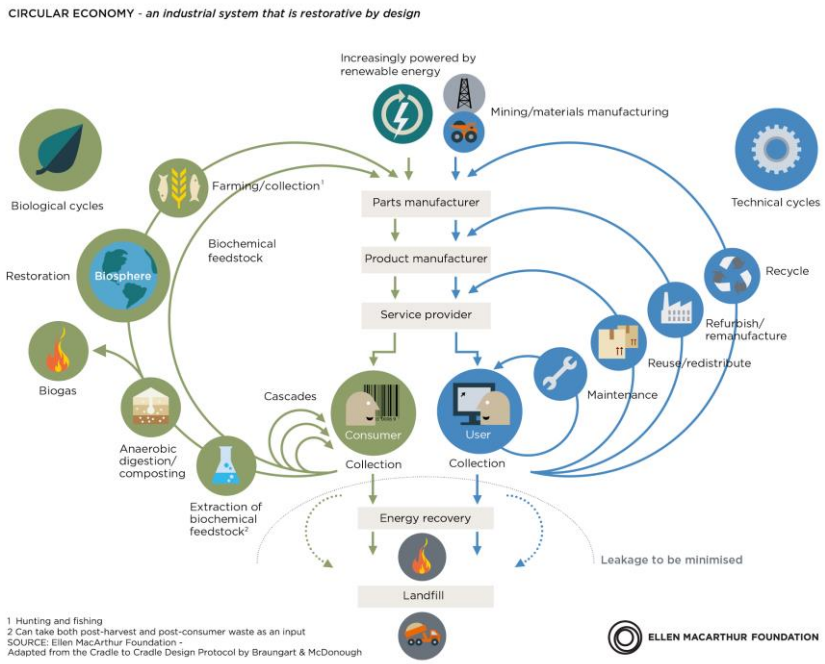


Decoupling concept



UN environment

International Resource Panel

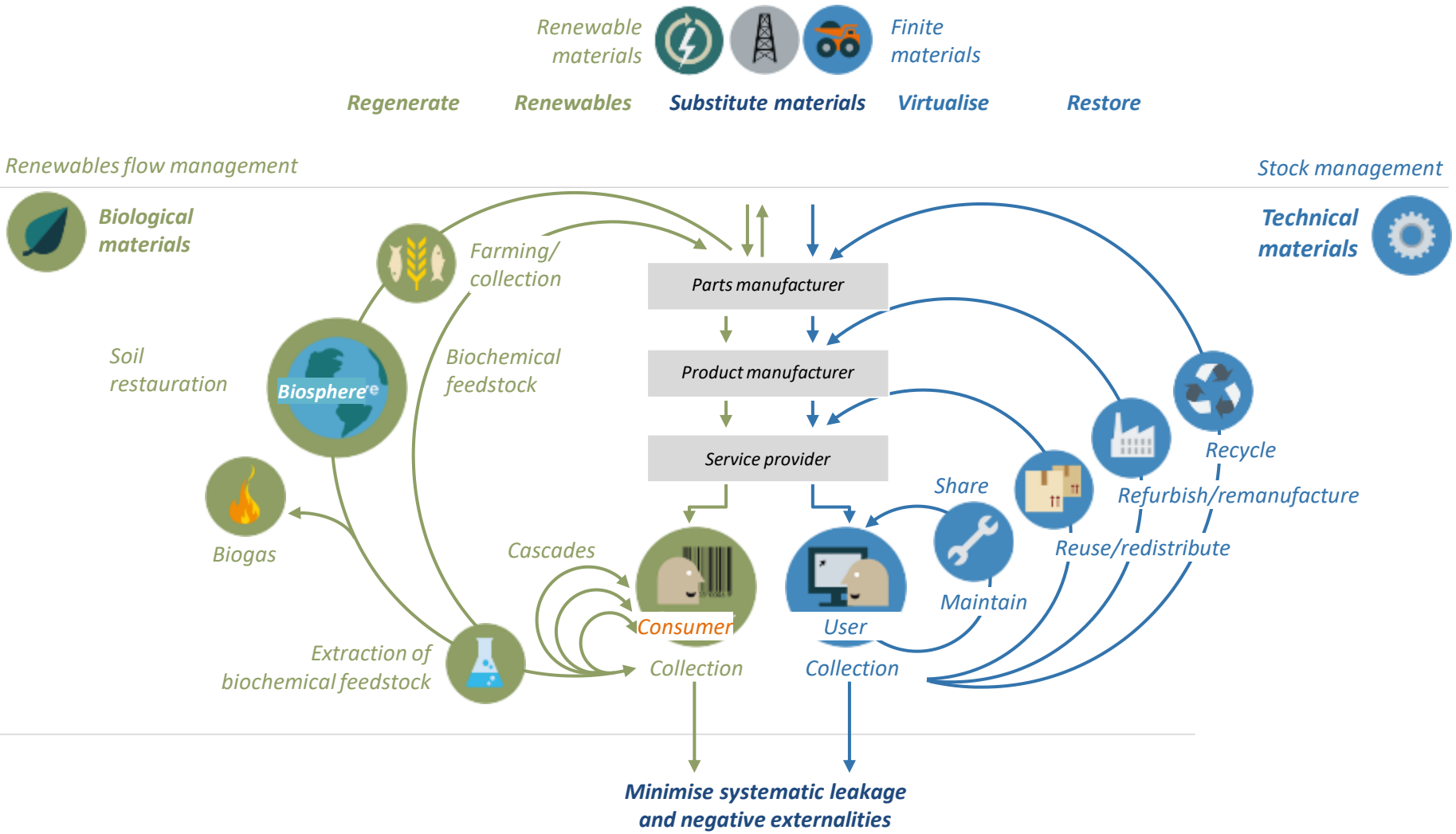


Circular Economy should be seen as an instrument for deliver decoupling of economic growth from resource use and environmental impacts and as a part of the bigger picture of economic, societal and cultural transformation needed to deliver the SDGs.

OUTLINE OF A CIRCULAR ECONOMY SYSTEM

Principles

1. *Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows*
2. *Optimise resource yields by circulating products, components and materials in use at the highest utility at all times in both technical and biological cycles*
3. *Foster system effectiveness by revealing and designing out negative externalities*

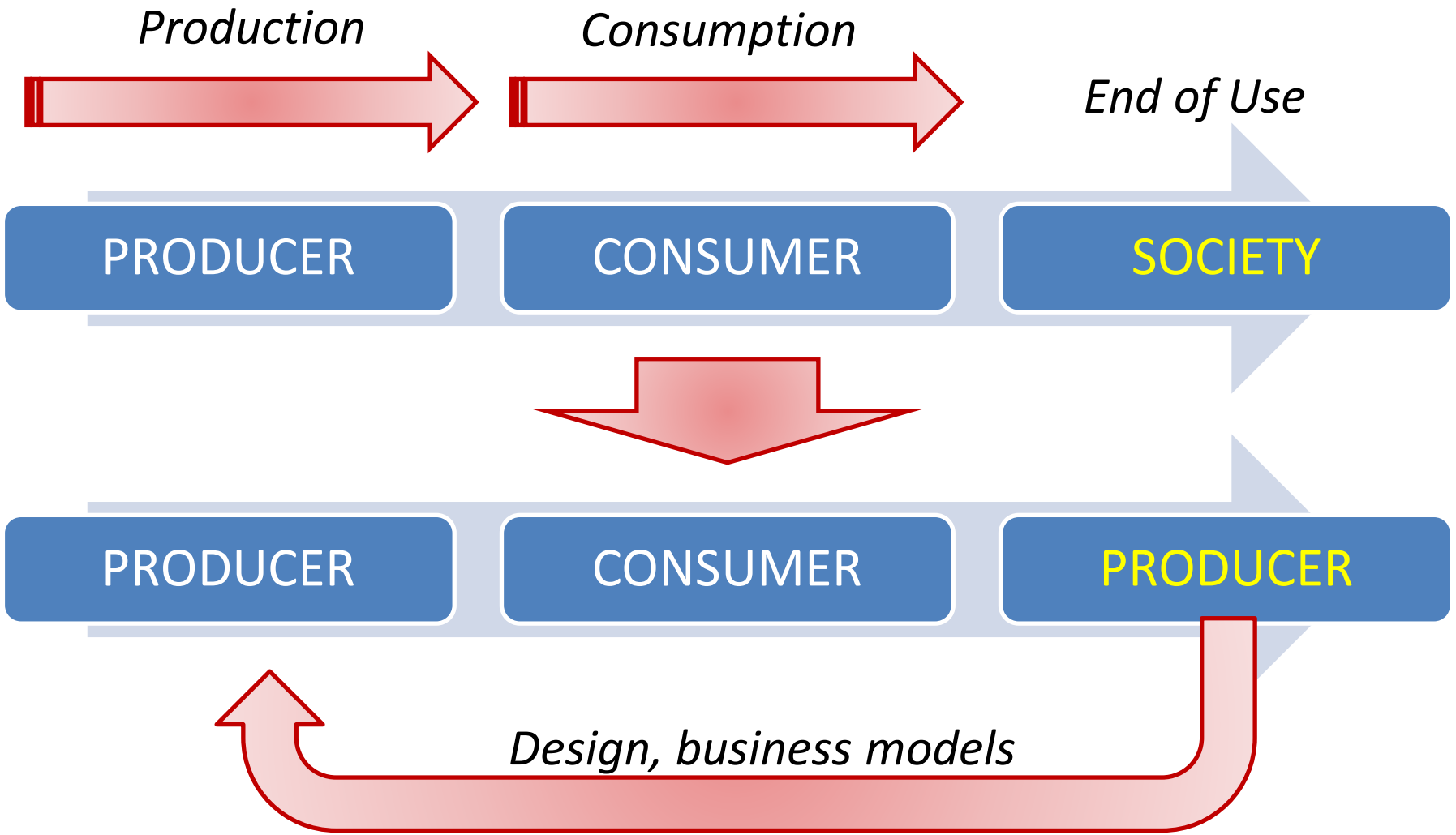


Source: Ellen MacArthur Foundation; McKinsey Center for Business and EnvironmenStiftungsfonds für Umweltökonomie und Nachhaltigkeit;

ELLEN MACARTHUR FOUNDATION

Ownership and resource (under)utilisation - Producer

Better Connecting Producer with his Product



Retaining the Value, Rethinking Ownership, aligning Incentives with Regulation

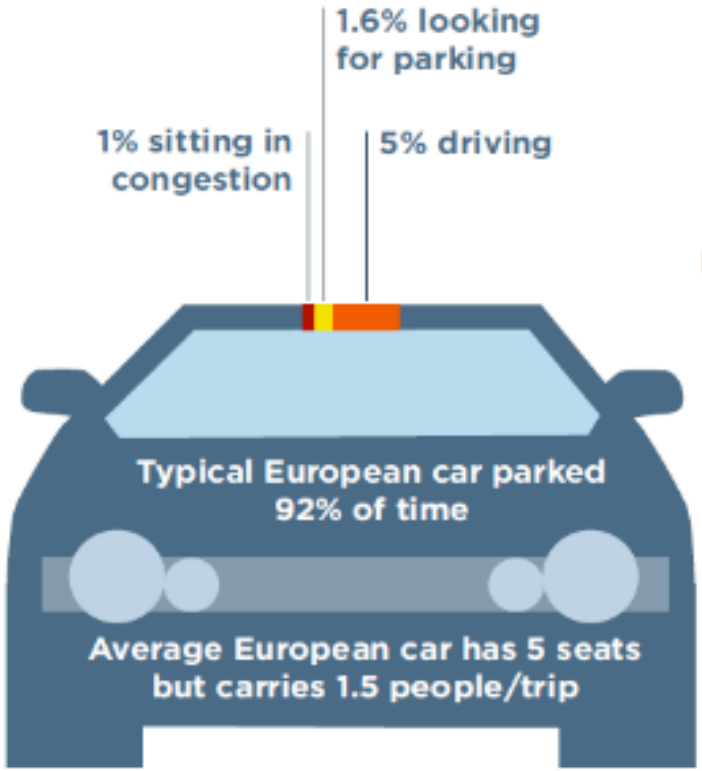
Ownership and product (under)utilisation - Consumer

It is not not about owing it is about using

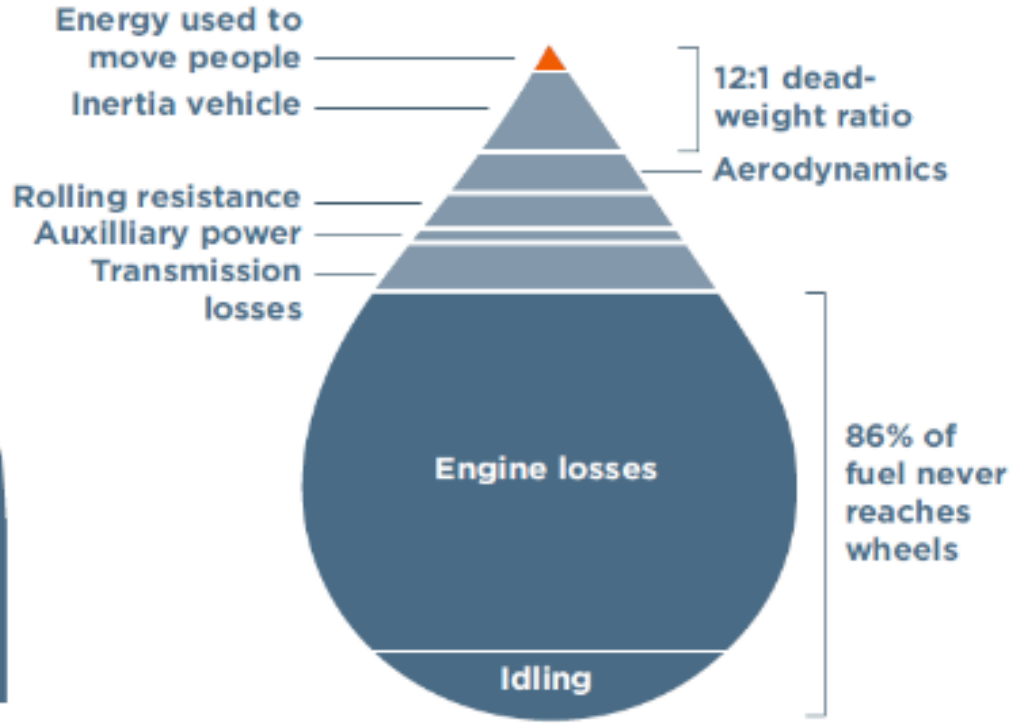
We do not need cars	*…*	*We need mobility*
We do not need light bulbs	*…*	*We need light*
We do not need chairs	*…*	*We need to sit*
We do not need refrigerators	*…*	*We need chilled and healthy food*
We do not need CDs	*…*	*We want to listen to the music*
We do not need pesticides	*…*	*We want healthy plants*

STRUCTURAL WASTE IN A MOBILITY SYSTEM

CAR UTILISATION

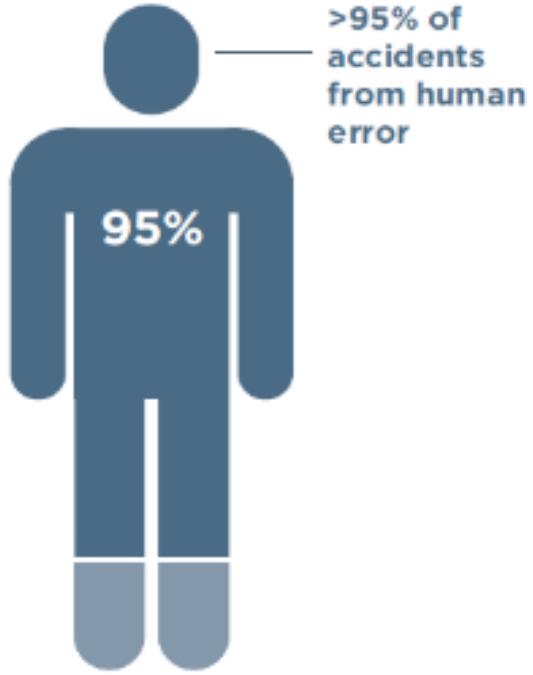


TANK-TO-WHEEL ENERGY FLOW - PETROL



DEATHS AND INJURIES/ YEAR ON ROAD

30,000 deaths in accidents and 4X as many disabling injuries



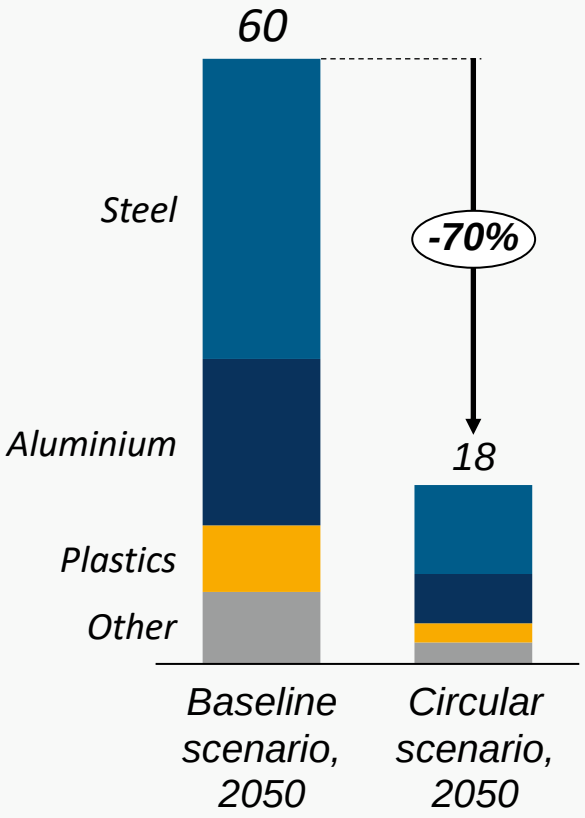
LAND UTILISATION:

5% Road reaches peak throughput only 5% of time and only 10% covered with cars then

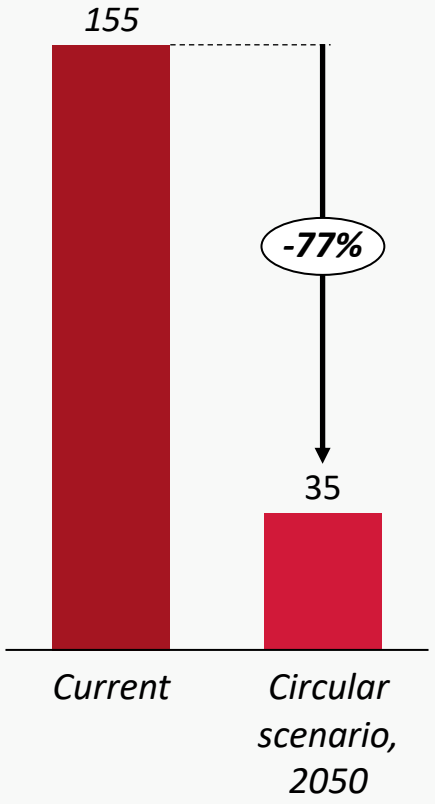
50% 50% of most city land dedicated to streets and roads, parking, service stations, driveways, signals, and traffic signs

A SHARED MOBILITY SCENARIO IS A HIGHLY ATTRACTIVE VISION FOR PASSENGER CARS

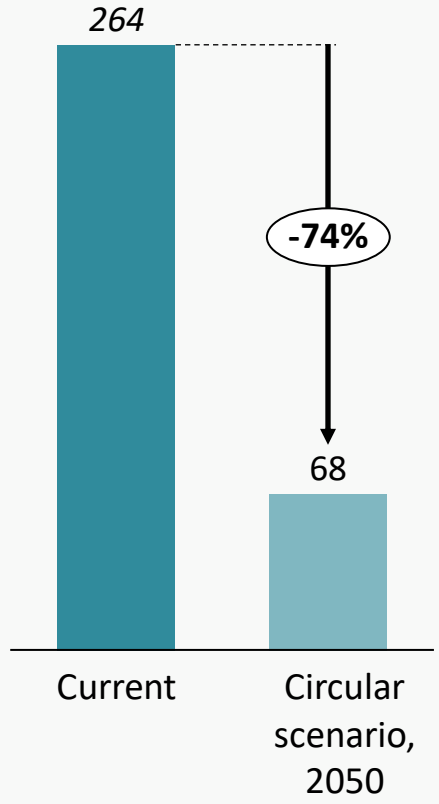
CO_2 impact of materials
Mt CO_2 per year, Europe



Total cost of ownership
EUR per 1000 pkm



Externalities and cost to society
EUR per 1000 pkm



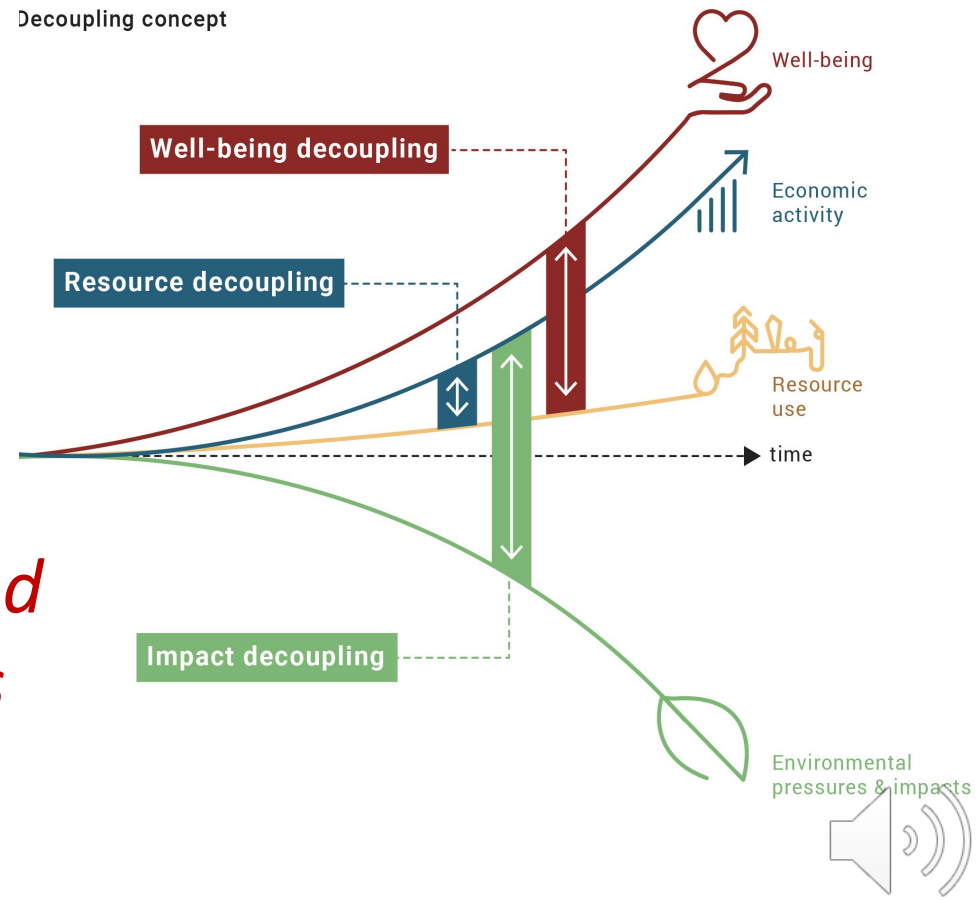
pkm = passenger kilometre

MATERIAL ECONOMICS

Ownership and product (under)utilisation - Consumer

It is not not about owing it is about using

- *Problem: Preferences from consumers to own products like houses, cars, refrigerators, cloth … are driving consumption in a massive lock-in in underutilization*
- *Solution: Explore the opportunity that the young generation has less ownership biased constraints and provide alternative options*



SUPPLY SIDE SOLUTIONS

CARBON MANAGEMENT

LAND | WATER | ENERGY | MATERIALS

DECOUPLING - CIRCULAR ECONOMY

DEMAND SIDE SOLUTIONS

ECO-SYSTEM SERVICES, ENVIRONMENTAL SINKS

NATURE BASED SOLUTIONS

The System Change Compass:

Implementing the European Green Deal in a time of recovery

Ambition of the EGD is high…

- ***Sets zero net emissions*** *of GHG by* ***2050*** *and* ***decoupling of growth and resource use***
- *Acknowledges need for fair and* ***just transition***
- *Aims at* ***strongly interlinked and mutually reinforcing*** *policy recommendations*

…but implementation is uncertain

- ***Does not sufficiently address drivers and pressures*** *that cause environmental damage*
- ***Does not offer systemic perspective*** *to guide decision-making*
- *Implementation is put at extra risk due to* ***COVID-19 recovery***

The System Change Compass guides action on all levels of the system

- ***Maps and envi*** *service of peop*
- ***Derives system*** *towards desire*
- *Charts pathwa and wellbeing* ***boundaries***

SYSTEMIQ

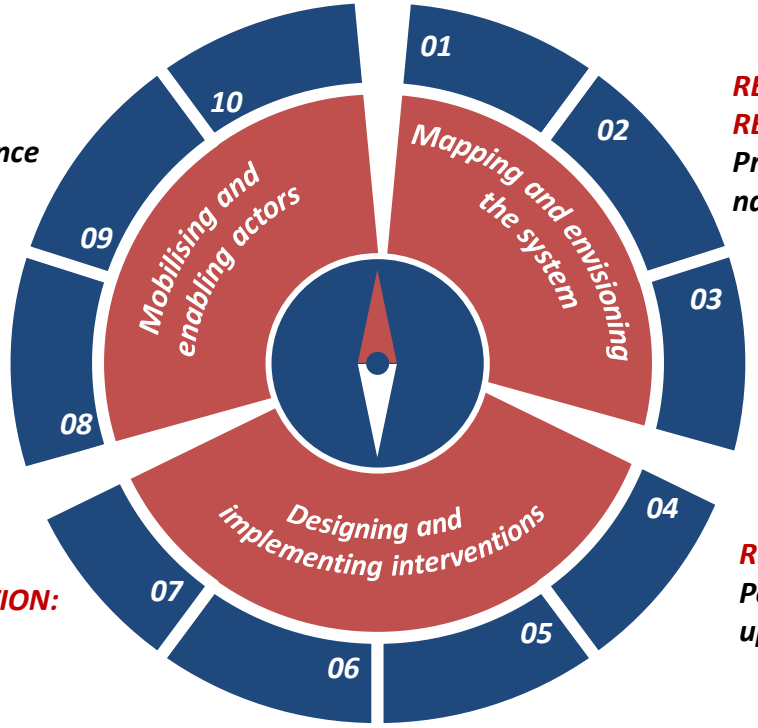
THE CLUB OF ROME

The System Change Compass

REDEFINING LEADERSHIP:
Intergenerational agreement through new forms of leadership

REDEFINING PROSPERITY:
Embracing social fairness for real prosperity

REDEFINING GOVERNANCE:
A systematic approach to governance influenced by science



REDEFINING NATURAL RESOURCE USE:
Prosperity decoupled from natural resource use

REDEFINING FINANCE:
The facilitator of the transition

REDEFINING PROGRESS:
Meeting societal needs as a purpose of a model based on economic ecosystems

REDEFINING CONSUMPTION:
From owning to using

REDEFINING METRICS:
Performance measurement updated

REDEFINING INCENTIVES:
Show the real value of social and natural capital

REDEFINING COMPETITIVENESS:
Digitization and smart prosperity at the heart of European competitiveness

SYSTEMIQ

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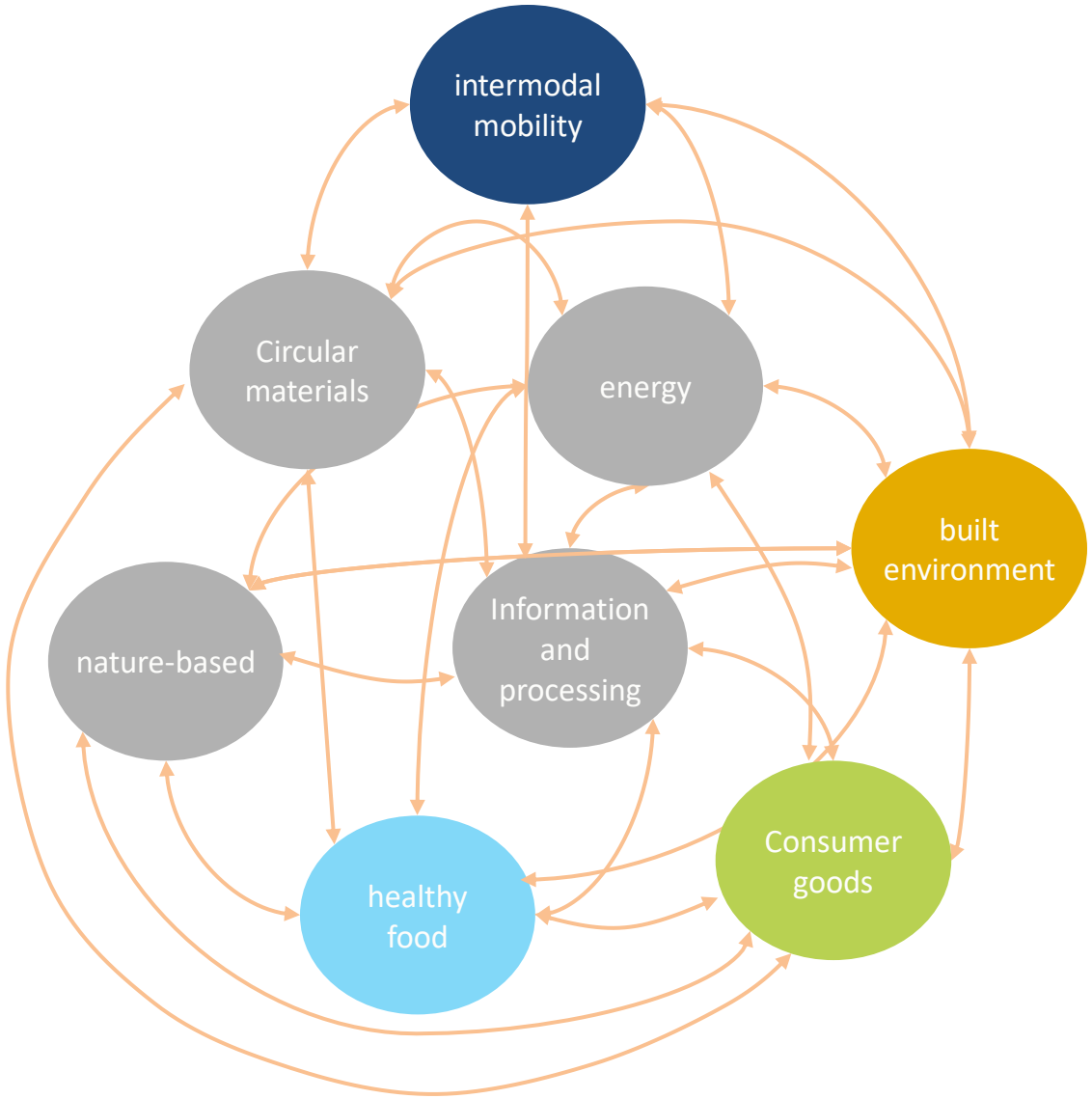
Economic Ecosystems



Related to resource intensive human needs

- *Nutrition*
- *Mobility*
- *Housing*
- *Daily functional needs*

Supporting the other economic ecosystems in their delivery of societal needs

50+ nascent industrial champions
that should be supported to built ecosystems based on compass orientations

Healthy food

- Organic food and beverages
- Regenerative agriculture
- Sustainable aquaculture and fishing
- Reduce and valorise food waste
- Urban agriculture
- Product reformulation for nutritious food
- Alternative proteins

Built Environment

- Smart urban planning
- Rethink built environment ownership
- Repurpose underutilized buildings
- Retrofit existing buildings
- Fluid and sufficiency-oriented space management
- Circular and net-zero housing

Intermodal Mobility

- Fast charging infrastructure
- High speed railway infrastructure
- Modern and adapted transit infrastructure
- Car- and ride-sharing models
- End-of-life management for cars
- Electric and autonomous vehicles
- Infrastructure to improve traffic flow and AV adoption
- Green aviation
- Green shipping
- Walking/cycling infrastructure

Consumer goods

- Product-as-a-Service models
- Maintenance and value retention in products
- Peer-to-peer product sharing platforms

Nature-based

- Restoration of degraded land and coasts
- Smart forest management
- Urban greening
- Systems for paid ecosystem services
- Seaweed
- Marine and land-based environmental protection areas
- Ecotourism

Energy

- Renewable power generation
- Energy storage
- Hydrogen economy
- Smart metering and (point-of-use) energy management
- Grid integration and technologies
- Production of low-carbon gaseous and liquid fuels (transition technology only)
- Carbon capture infrastructure (transition technology only)

Circular Materials

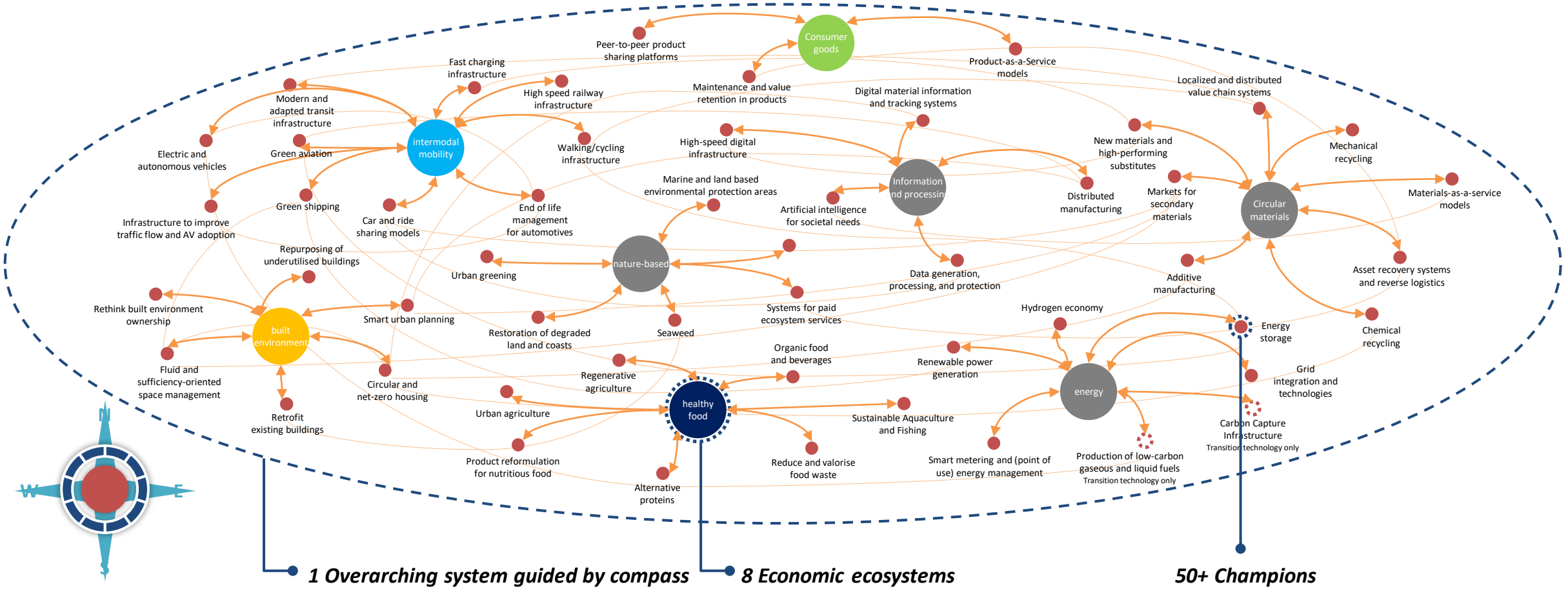
- Localised and distributed value chain systems
- Asset recovery systems and reverse logistics
- Markets for secondary materials
- High-value material recycling
- Materials-as-a-Service models
- New materials and high-performing substitutes
- Additive manufacturing

Information and processing

- Distributed manufacturing
- High-speed digital infrastructure
- Digital material information and tracking systems
- Data generation, processing, and protection
- Artificial Intelligence for societal challenges

R&I European Partnerships (49 proposed)

A new systems map to envision the system and its parts



1 Overarching system guided by compass

8 Economic ecosystems

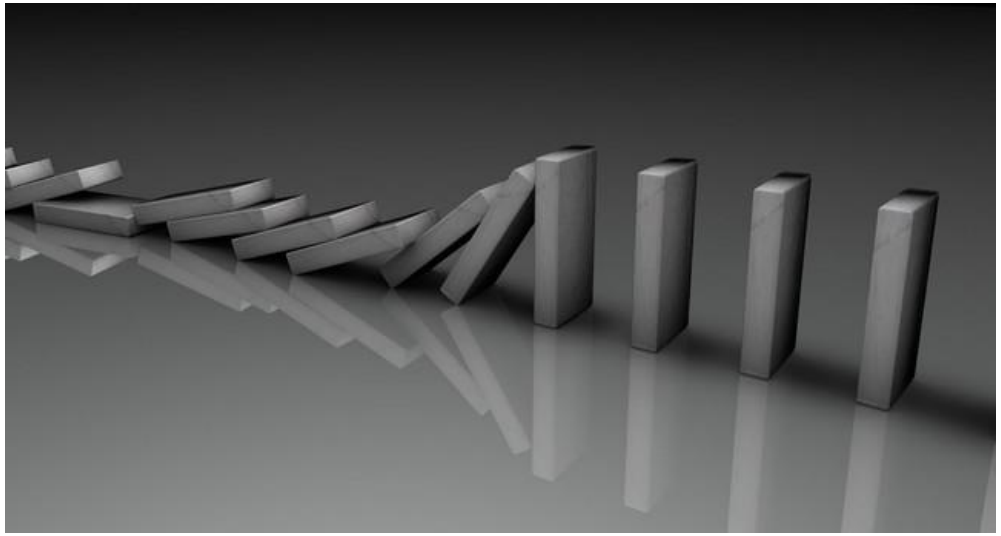
50+ Champions

New organization of economic activities	*One overarching system that consolidates the European economy in its entirety.*	*Economic ecosystems can meet a specific societal need (e.g. intermodal mobility system) or support the fulfilment of multiple societal needs (e.g. new energy system).*	*"Champions" are economic subsystems which could become the new spearheads of the green, resilient and fair post-COVID economy Europe wants to build*
Application of the compass on each level	***30 System-level political orientations***	***3-5 economic ecosystem level orientations***	***50+ champion orientations***

Compass for the Renovation Wave

TO CONCLUDE

Transition to a more sustainable economy and society



IS UNAVOIDABLE!

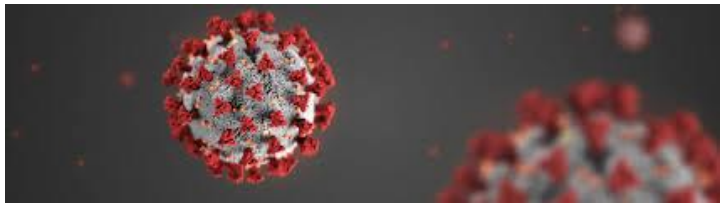
Humans are supposed to be intelligent. It is high time to prove it.

We have to fix a broken compass!

Why the changes are so difficult in practice?

- *While the challenges we face require a deep systemic change and long-term rethinking of the way how we govern our societies, political cycles, public and financial institutions, to a large extent also private companies, have inbuilt short-term focus and logic. This inconsistency limits our ability for efficient and strategic action.*
- *Production and consumption systems are based on the logic of consumerism fuelled by quantity-driven profits and growth measured by GDP. GDP could be best explained by saying, that one will not reach the goal by walking faster, if walking in the wrong direction! We have to fix a broken compass!*
- *Markets are core mechanism for the interaction among economic actors, producers and consumers. Production capital is over-valued and over-rewarded, labour capital is undervalued and under-rewarded and natural capital is in many cases not valued at all. This cannot lead to economic, social and environmental balance. Signals to economic actors should change.*
- *The existing lock in, and vested interests – companies are thinking strategically, they know where they would like to be in the future, but they also know where they are now. They struggle how to make a transition and stay profitable in the short term.*
- *A transition to a more sustainable economy and society will only be possible if it is just, fair and inclusive. We have to make our societies more equitable and do more in the fight against poverty. Social unrest is growing even in high-income countries and it is high time to hear the echo of the streets and the voice of a frustrated young generation.*

COVID-19 – Basic Lessons



- ***Three crises world and EU are facing:*** *The acute health and socio-economic crisis as economies have shut down, and a crisis with deeper roots – a chronic crisis of globalisation and economic transformation. The latter has been feeding climate change and income inequality and is rapidly leading to massive unemployment.*
- ***The world after Covid-19:*** *Many are saying that will not be the same again. It will be the same. We will just better understand it. Very likely the frequency and severity of health-related outbreaks, climate related extreme weather events … will in the future increase. We need to rethink the way we are managing the risks, as individuals and collectively, as private companies and public policy makers, locally and globally. We need to collaborate more to built resilient societies and be better prepared.*
- ***The role of science:*** *Policy making and decisions should be in the future based more science-based*
- ***Precautionary principle:*** *is written in EU Treaties. Maybe trying to better implement it in practice is not a bad idea. It can save our jobs … and lives.*

There has never been a better moment for

Europe to move form the history of "resource-driven imperialism" into an era of responsible use of natural resources, mitigating its resource fragility and strengthening preparedness and resilience

This would also clearly position EGD and give it a real historic and strategic weight.

Johann Wolfgang Goethe

imdb.com

Knowing is not enough; we must apply.

Willing is not enough; we must do.

International Resource Panel

SYSTEMIQ

UN environment

THANK YOU

For more information

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Visit our website at https://www.systemiq.earth