Resource Perspective of the Transition to a Sustainable Economy

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International Resource Panel

SYSTEMIQ

International Resource Panel
UNEP IRP

Essential Optic for Sustainability Journey

Who are we?

International Resource Panel - IRP *was launched in 2007 with the idea of creating a science-policy interface on the sustainable use of natural resources and in particular their environmental impacts over the full life cycle*

Climate Change

IPCC
INTERGOVERNMENTAL PANEL ON climate change

Biodiversity Loss

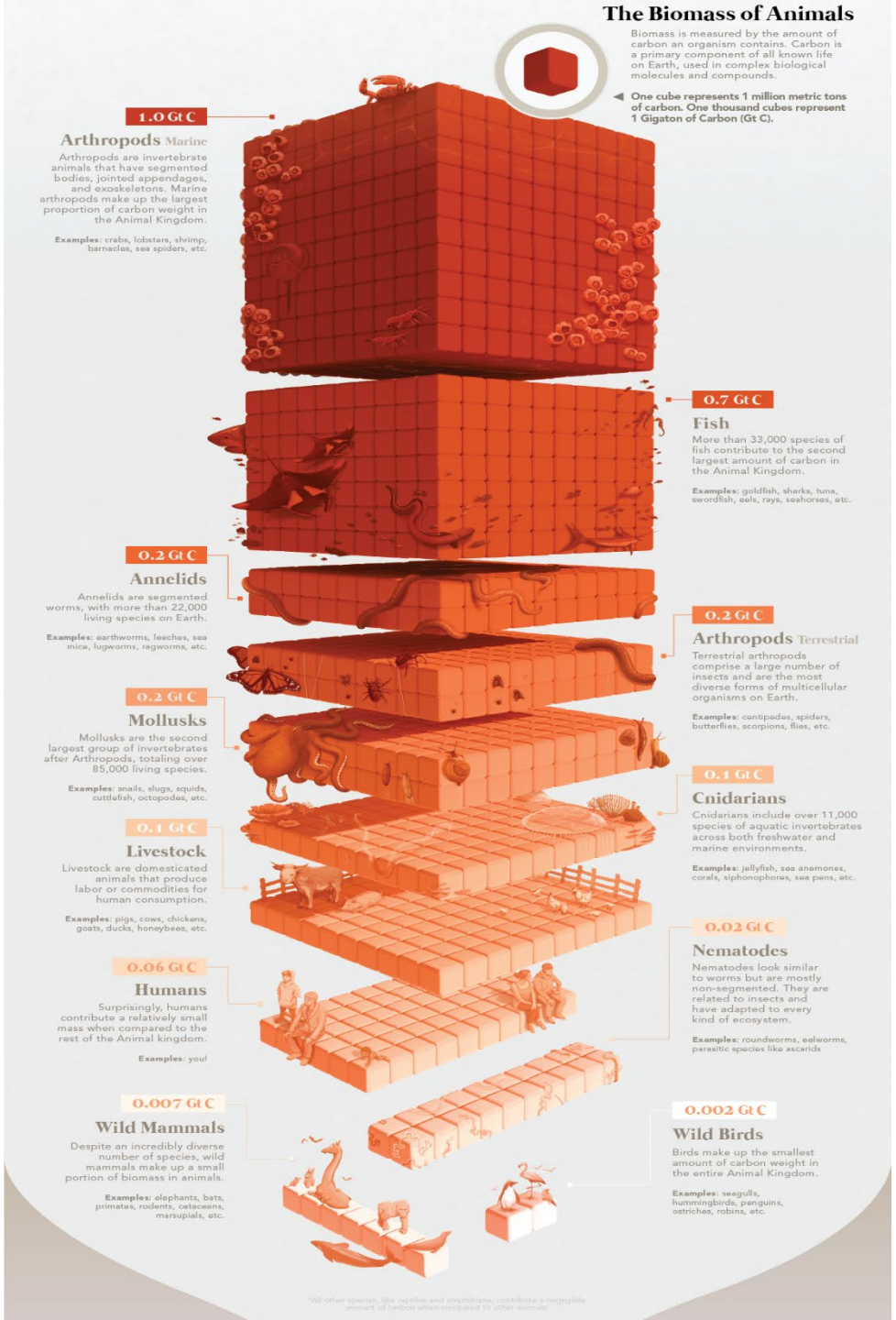
ipbes

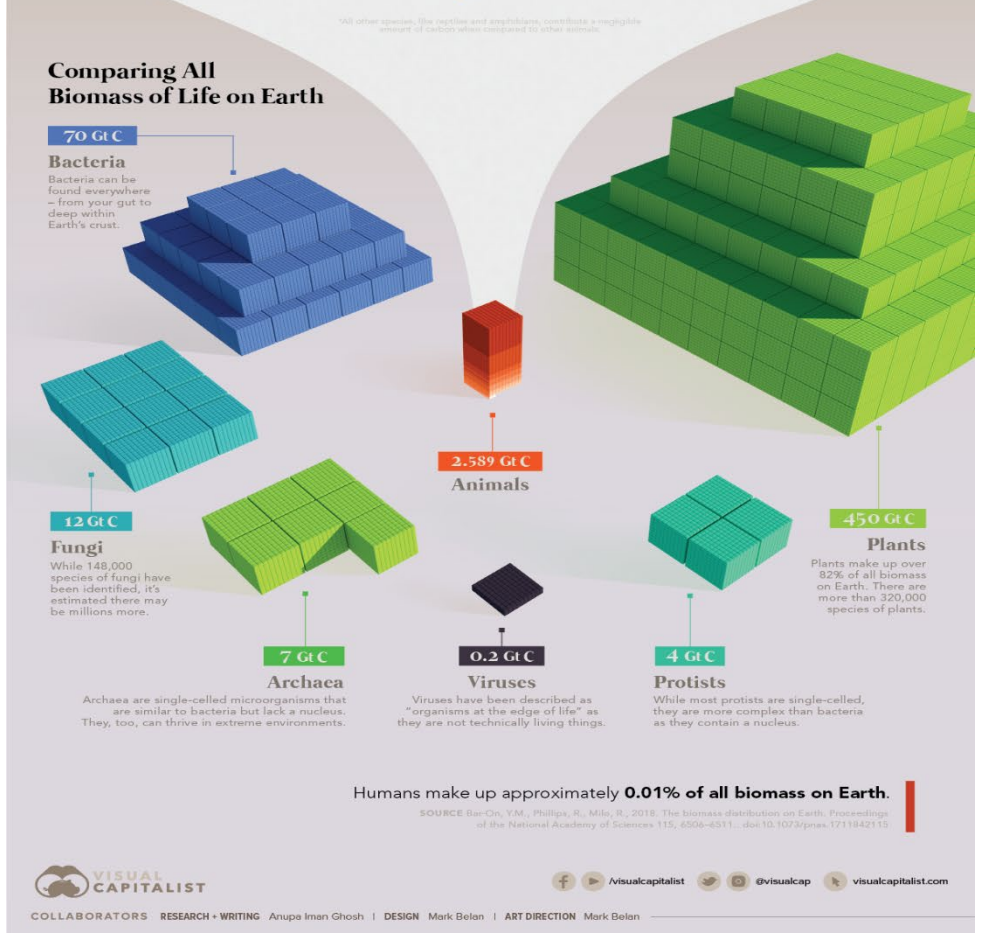
Resource Efficiency

International Resource Panel

Main Challenges

The diagnosis of the problem

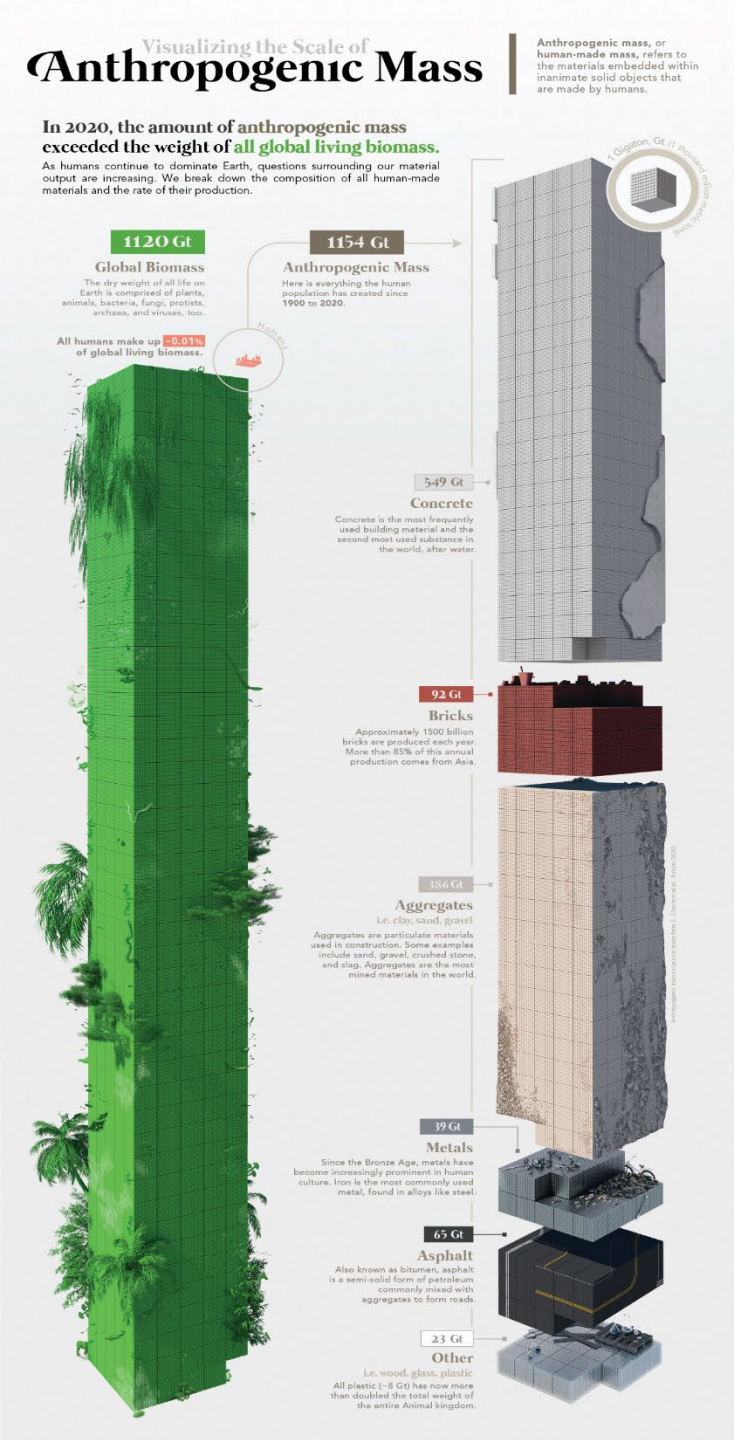


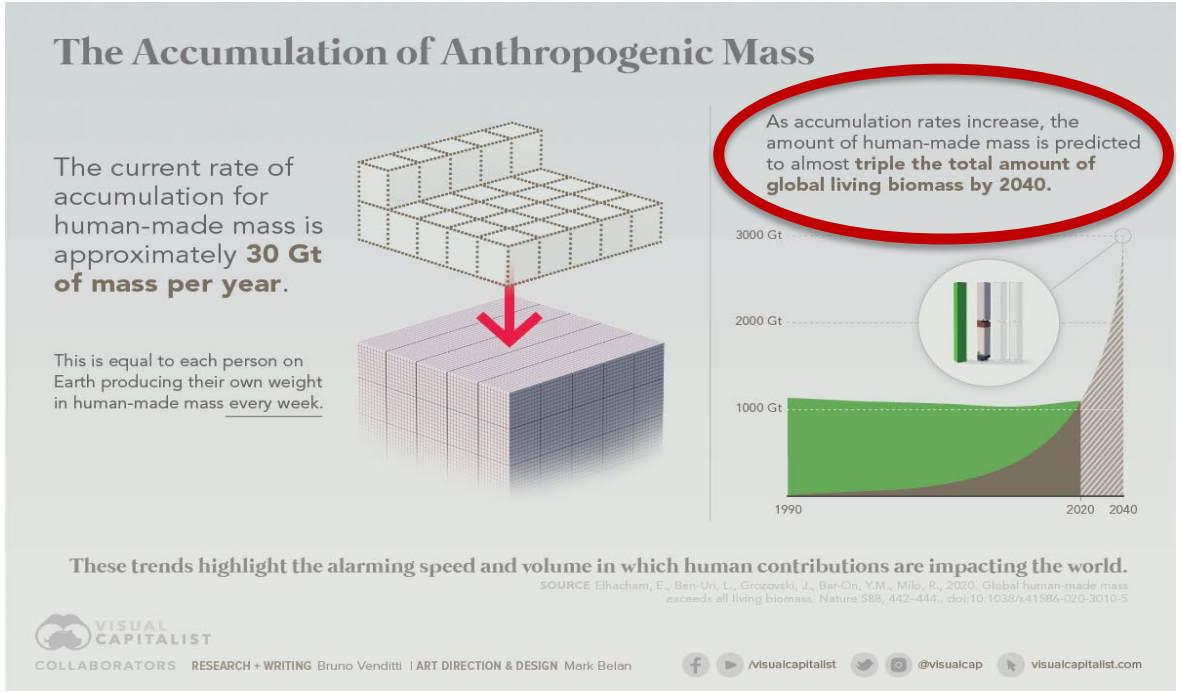


Biomass of Life

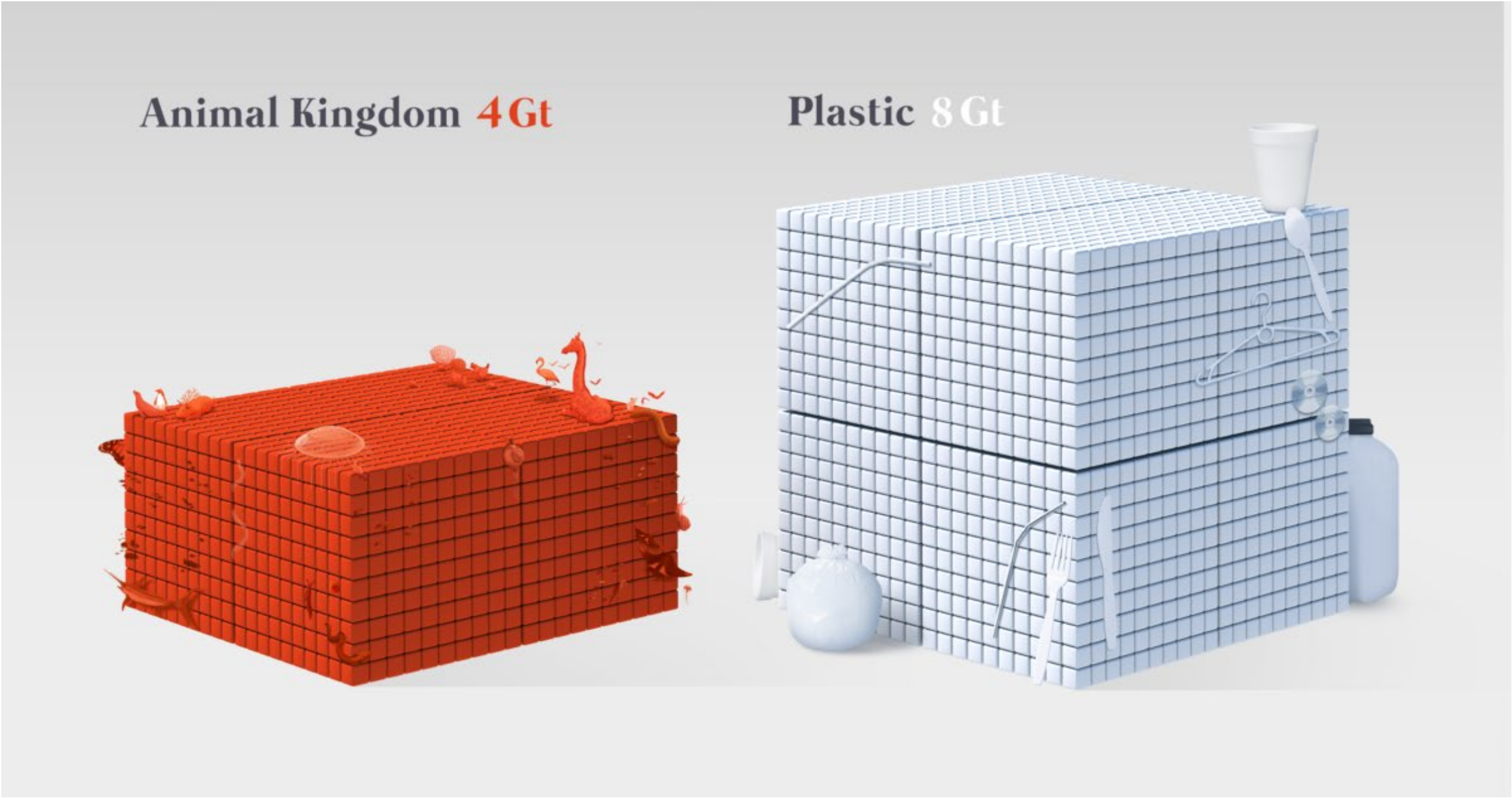
Humans in Perspective

Source: Visualcapitalist.com





Source: Visualcapitalist.com



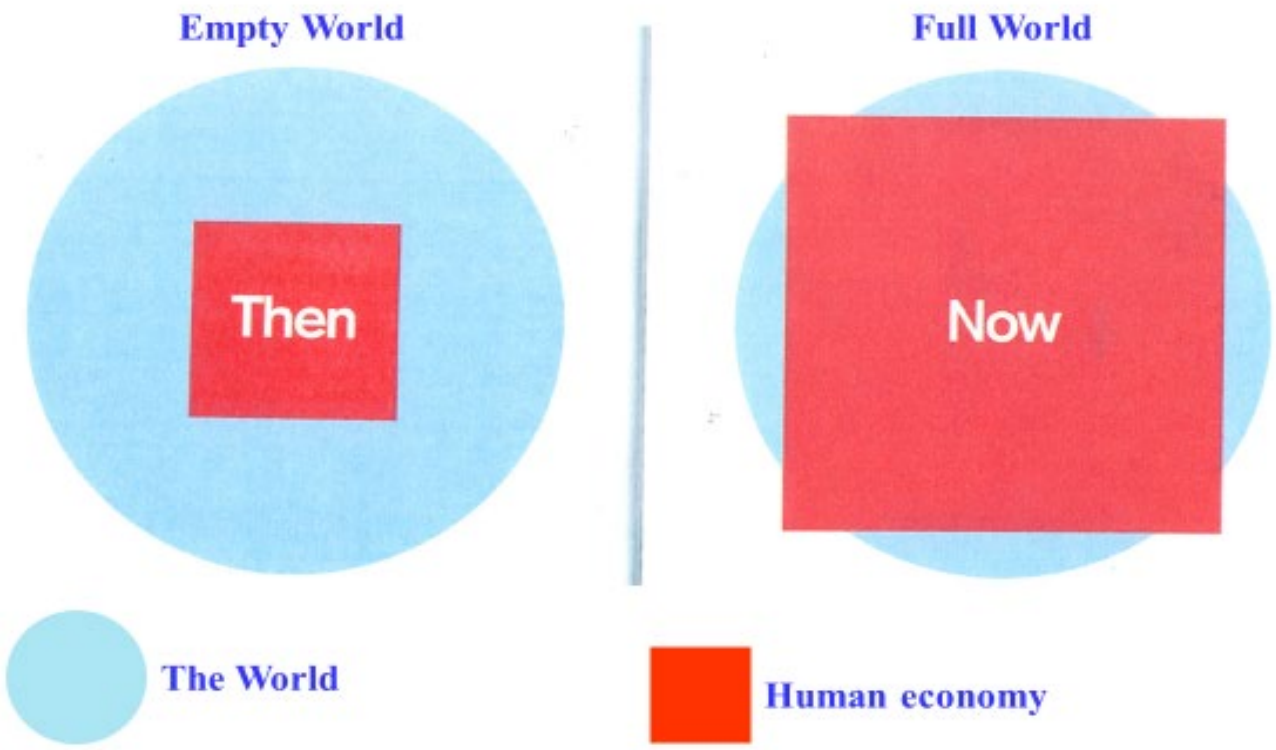
Source: Visualcapitalist.com

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.

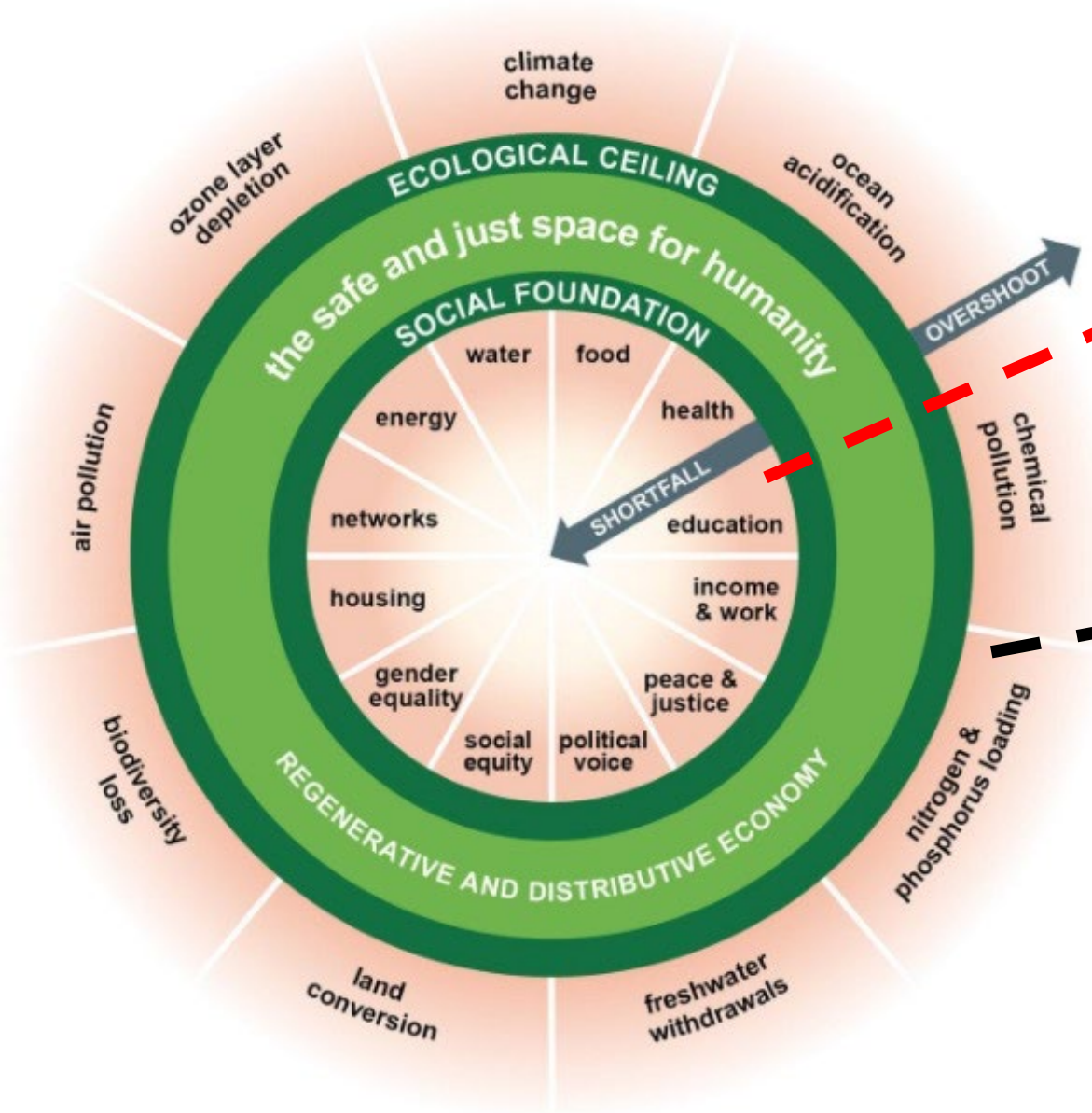
From "Empty" World to "Full" World



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*

A compass for human prosperity



Basis human needs

incl. minimum requirements

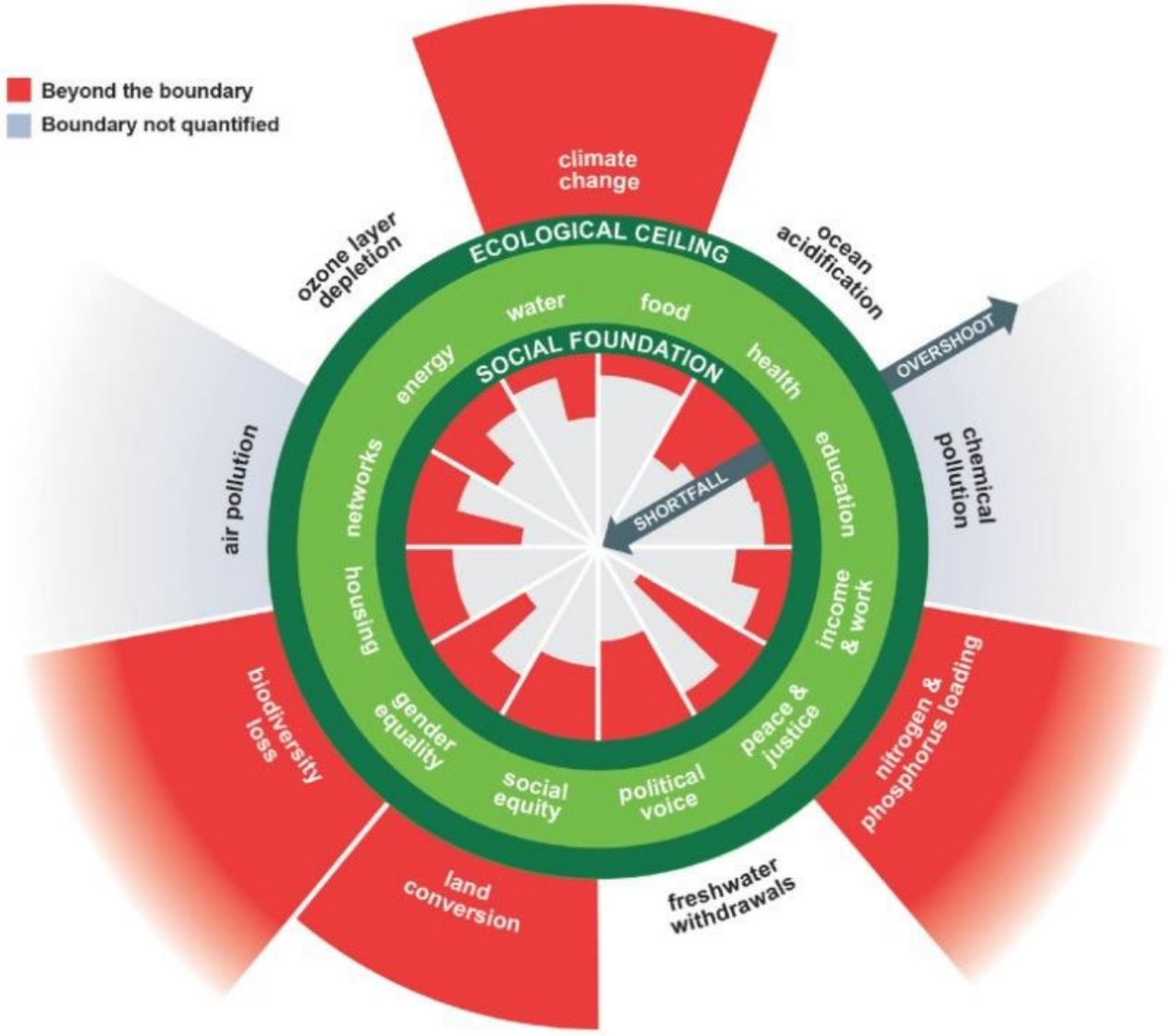
of resource supply

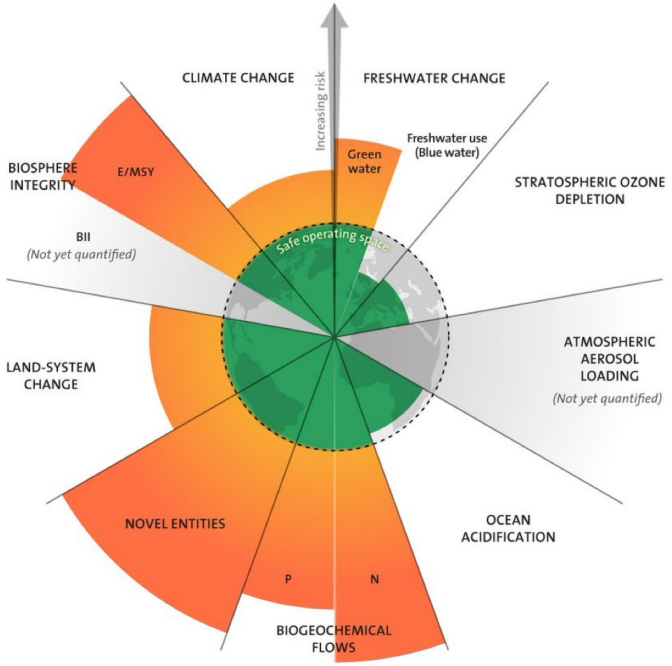
Outer limit by Planetary

Boundaries

Adapted from Raworth 2017

Humanity is living far out of balance





Source: Potsdam Institute for Climate Impact Research, 2022 reassessment

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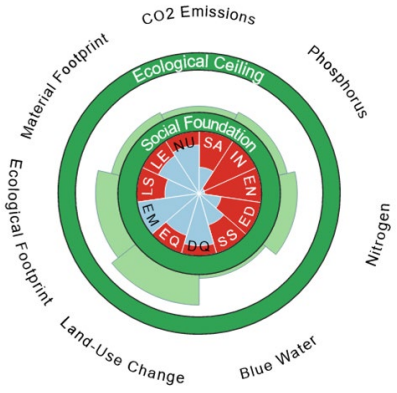
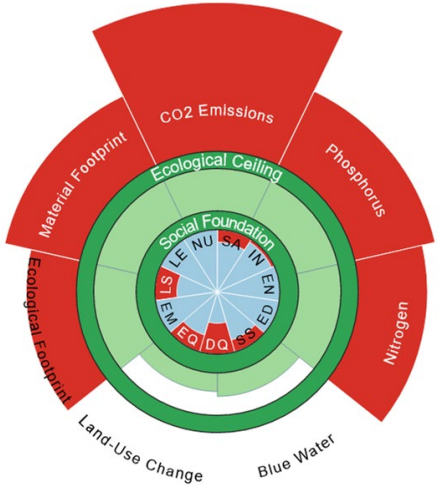
Divergent national contexts

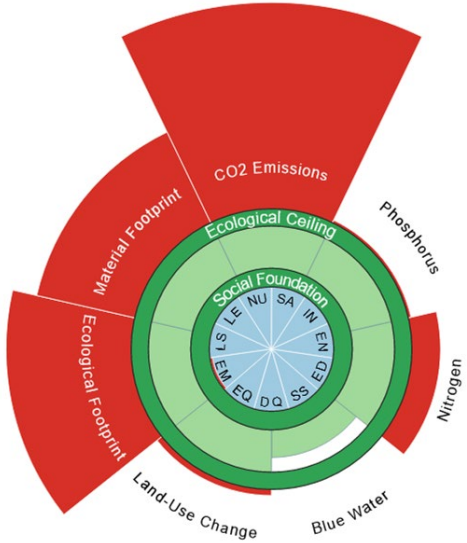
goodlife.leeds.ac.uk



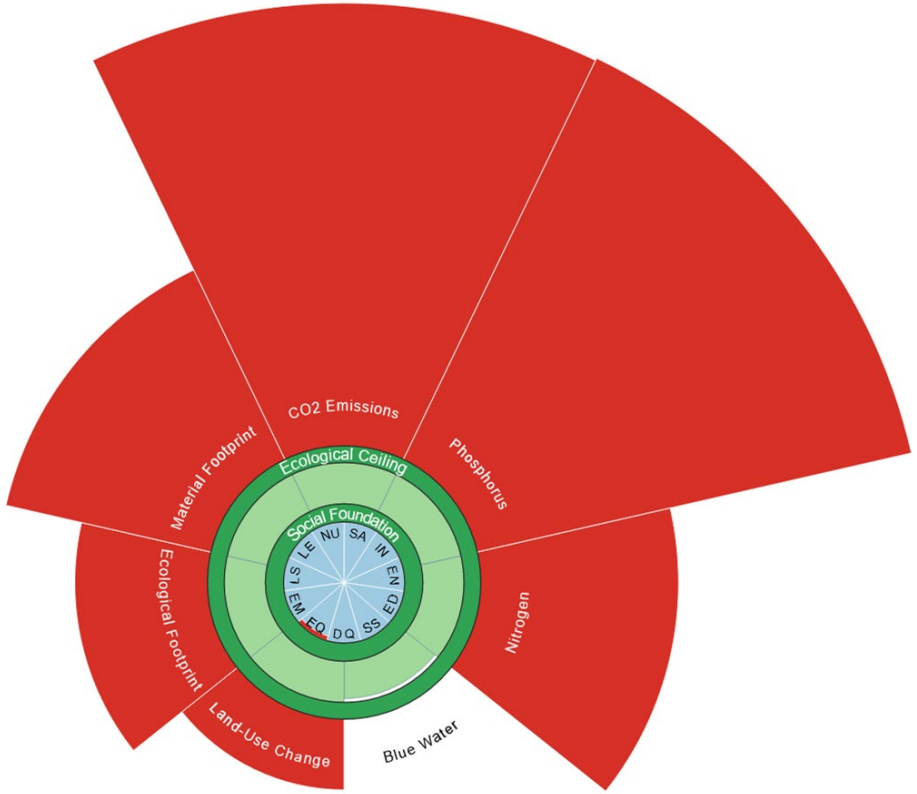
Malawi
$1,000 pc



China
$17,200 pc



Belgium
$54,000 pc



Australia
$54,900 pc

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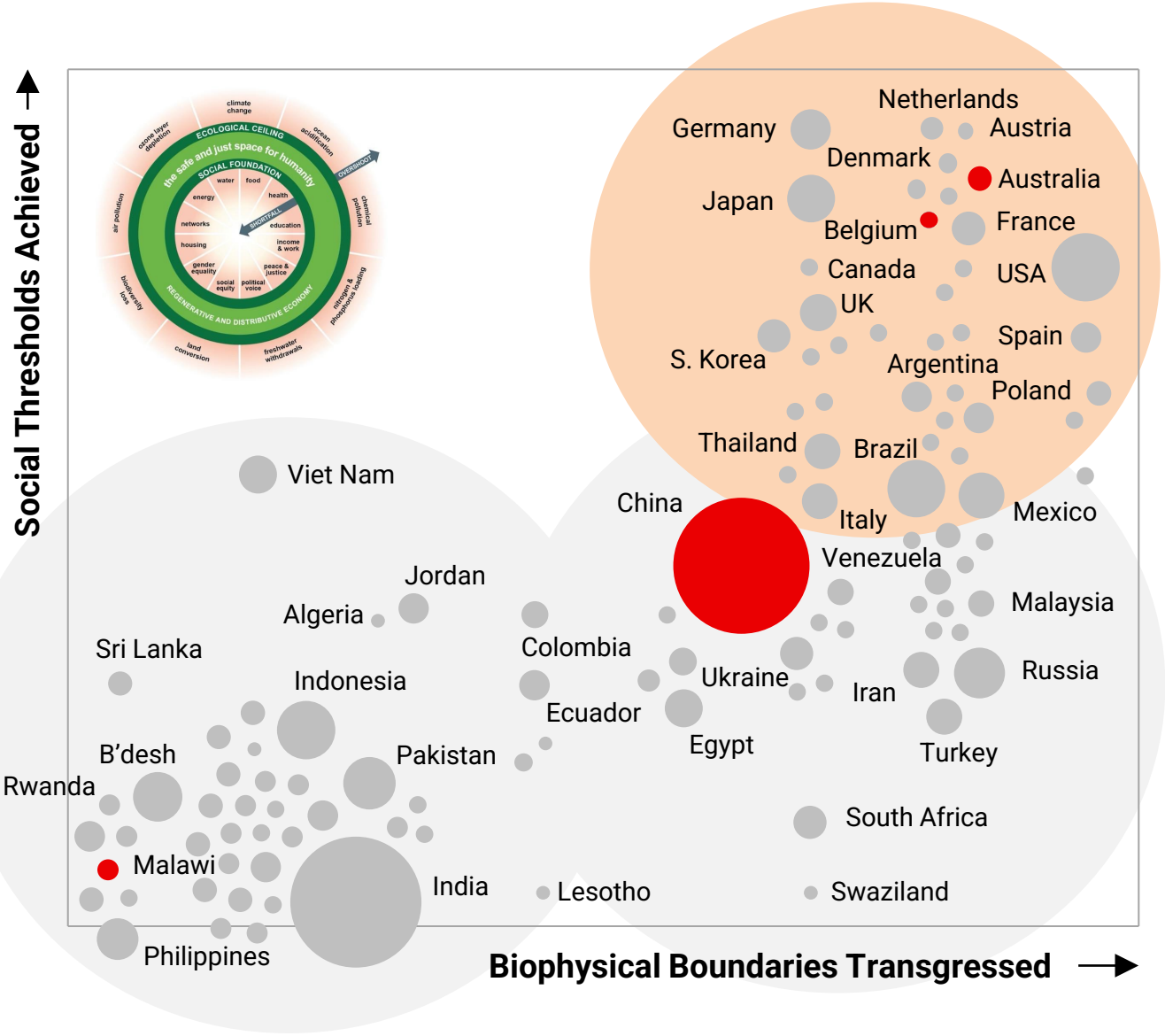
Humanity's sweetspot



colonialism

military power

trade & finance rules

resource extraction

climate-change impacts

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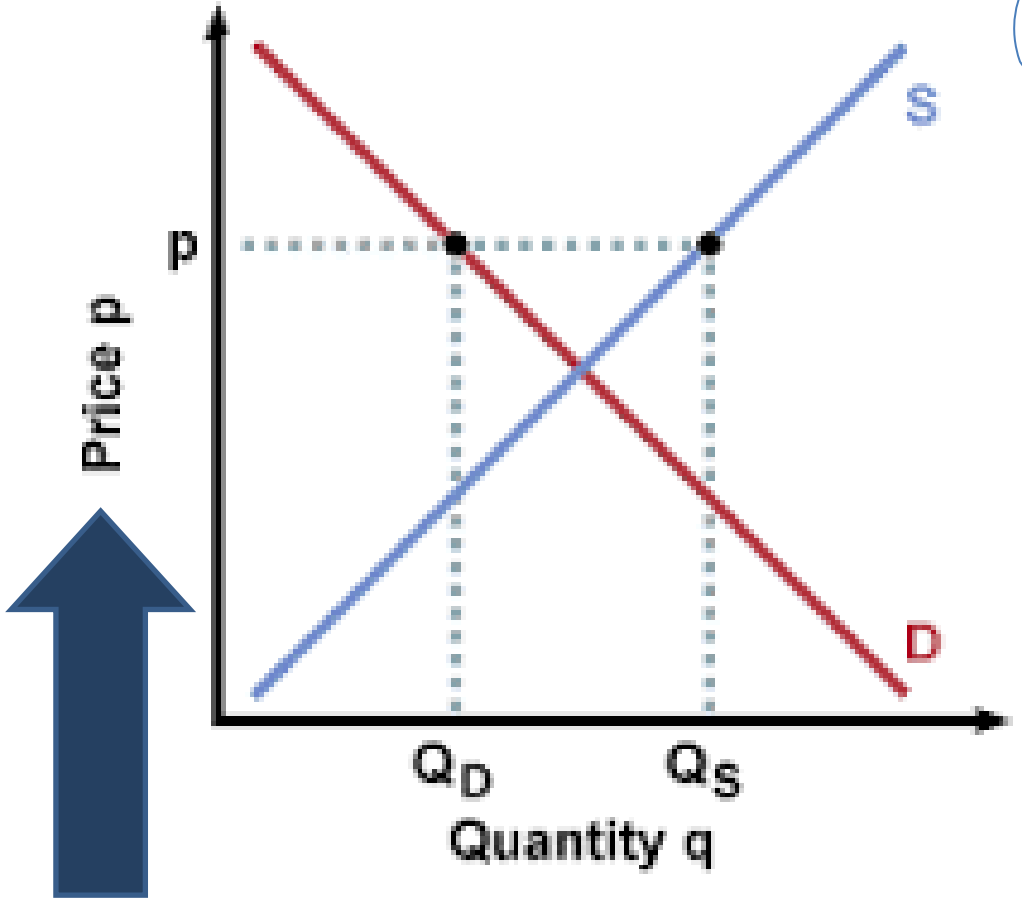
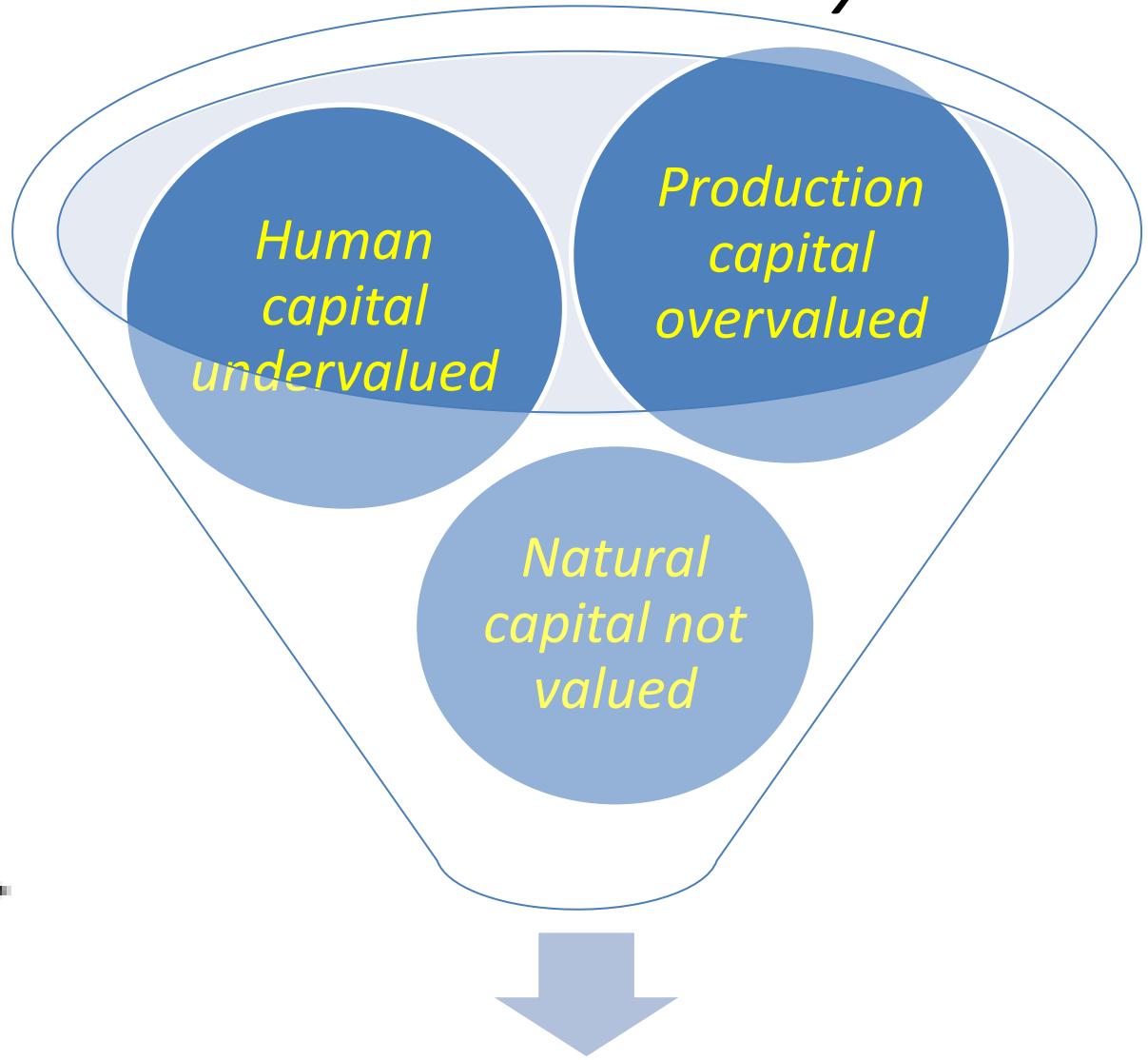
The Dasgupta Review

Main reasons for the current situation - it highlights institutional failure and the failure of contemporary economics to acknowledge that we are embedded in, and not external to nature, and to act accordingly.

Producers/Consumers Rational Behaviour



Market Economy



Economic, social and environmental (in)balance

Resource Management

The scientific backbone

Natural resources are the bridge between economy and competitiveness on one hand and climate change, biodiversity loss, pollution and health implications on the other

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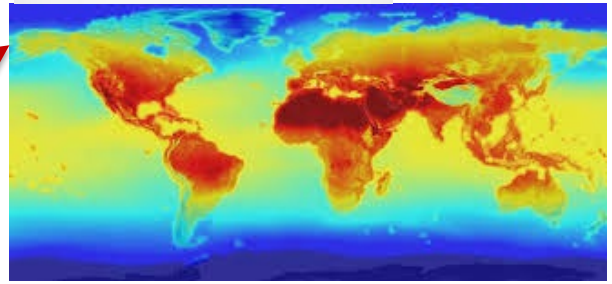
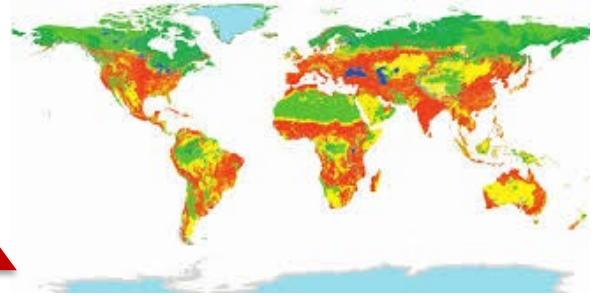




Convention on Biological Diversity

ipbes Science and Policy for People and Nature

- *Natural resources have been in the human history always closely related to stability, conflicts, wars (land, water, oil, precious minerals …)*
- *According to the UN IRP, in the mid-term, except in specific cases, resource shortage will not be the core limiting factor of our (economic) development …*
- *But the environmental (climate change, biodiversity loss, pollution …) and health consequences caused by excessive and irresponsible use of resources will be!*

Natural Resources:

Provide the foundation for the goods, services and infrastructure that make up our current socio-economic systems

Biomass (wood, crops, including food, fuel, feedstock and plant-based materials)

Fossil fuels (coal, gas and oil)

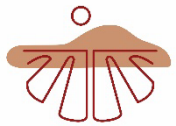
Metals (such as iron, aluminum and cooper…)

Non-metallic minerals (including sand, gravel and limestone)

Materials

Extracted from earth

Water and Land



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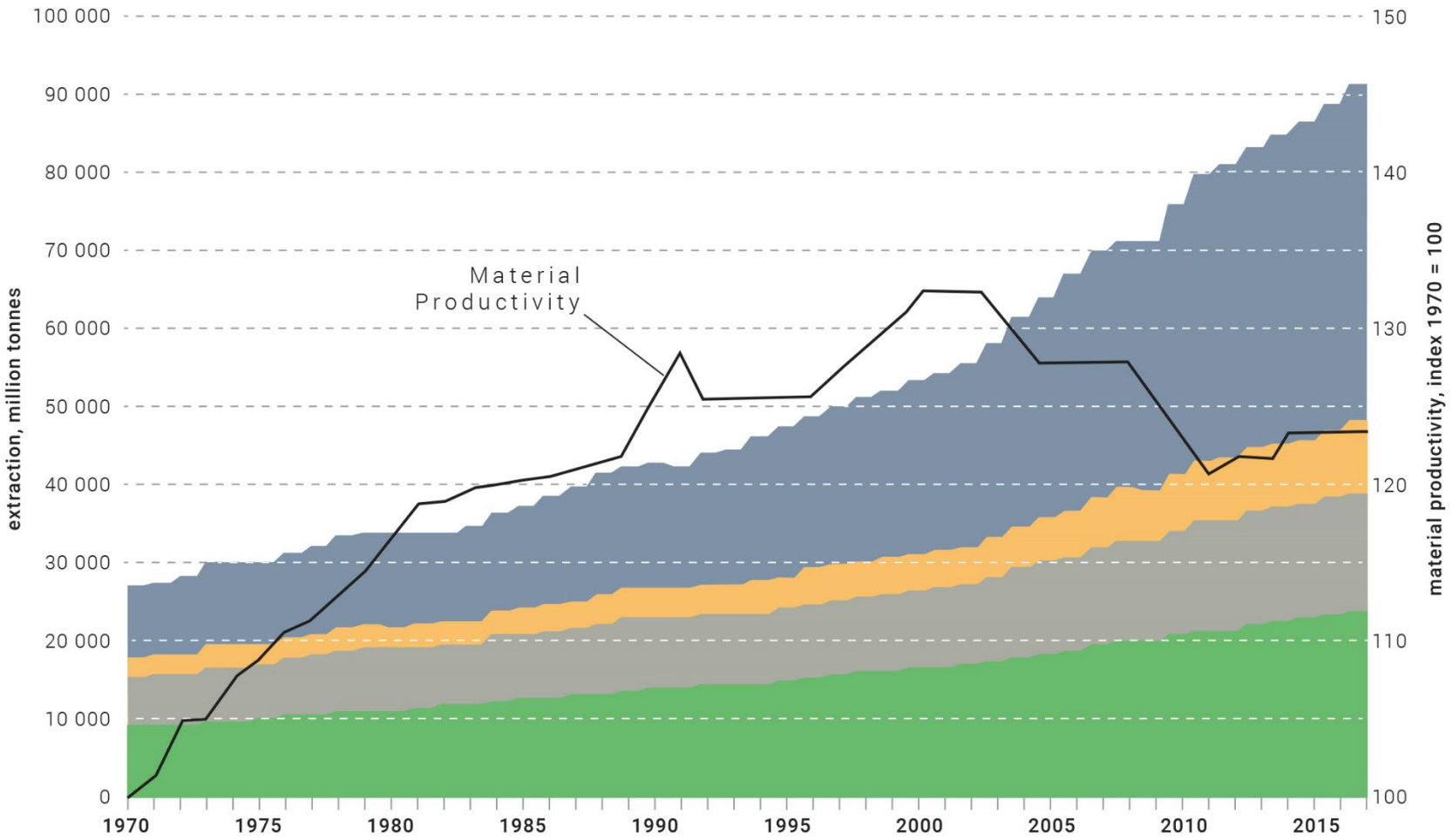
Global material use
Material demand per capita and Material productivity

Global material extraction and material productivity, 1970 - 2017



- *Global material 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

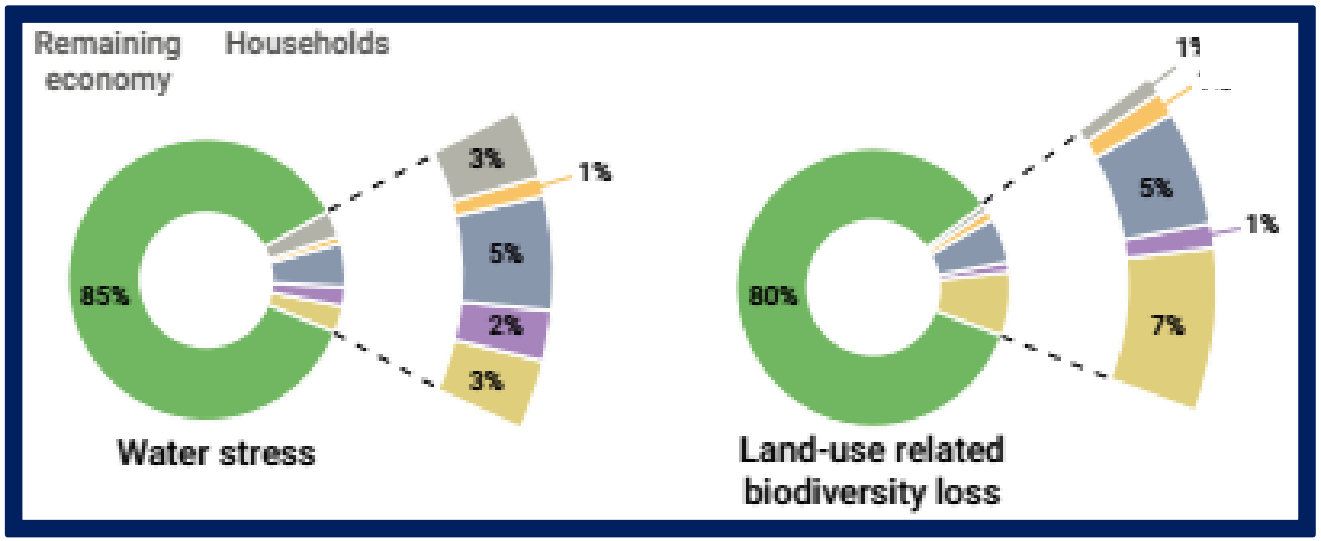
Environmental impacts of materials in the value chain

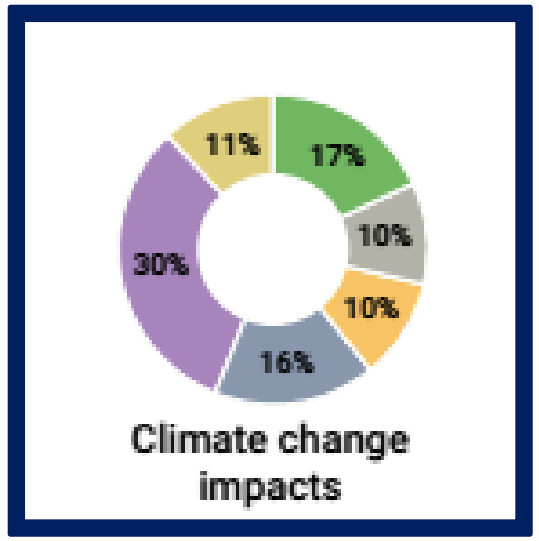
extraction and processing phase

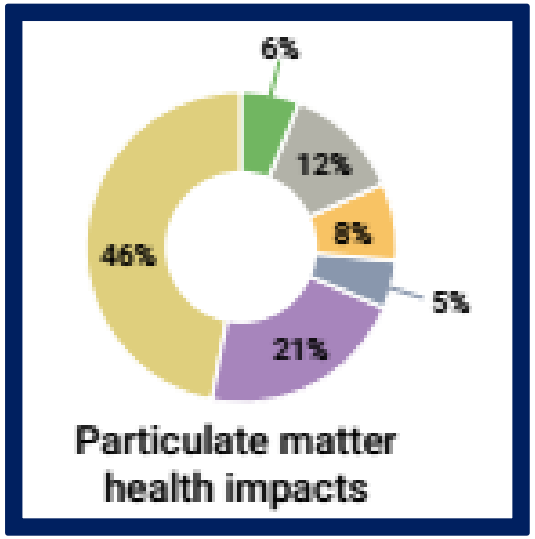
***90%** of global biodiversity loss and water stress*

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

1/3 of air pollution health impacts







Resources use and impacts magnified: Non-metallic minerals extraction and processing are responsible for 10% of climate change impacts and 8% air pollution impacts

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Non-metallic minerals
(mainly sand, gravel and clay)

Use of non-metallic minerals 1970 and today (2017) (see also figure 2)

Extracted 1970 **9 billion tonnes** Extracted 2017 **44 billion tonnes**

Non-metallic minerals extraction was **4.9 times higher in 2017** than in 1970, which represents the highest growth rate of all resource groups

Impacts of extraction and primary processing today (2017) - in shares of total global impact (see also figure 4)

- 10% of global **climate change impacts**
- 08% of global **particulate matter health impacts**
- 01% of global **water stress**
- 01% of global **land-use related biodiversity loss**

Biomass

Use of biomass 1970 and today (2017) (see also figure 2)

Extracted 1970 **9 billion tonnes** Extracted 2017 **24 billion tonnes**

Biomass extraction has **increased 2.7-fold between 1970-2017**

Impacts of extraction and primary processing today (2017) - in shares of total global impact (see also figure 4)

- 17% of global **climate change impacts**
- 07% of global **particulate matter health impacts**
- Over 85% of global **water stress**
- Over 80% of global **land-use related biodiversity loss**

Metals

Use of metals 1970 and today (2017) (see also figure 2)

Extracted 1970 **2.6 billion tonnes** Extracted 2017 **9.1 billion tonnes**

Metals extraction has **increased 3.5 times** between 1970 - 2017

Impacts of extraction and primary processing today (2017) - in shares of total global impact (see also figure 4)

- 10% of global **climate change impacts**
- 12% of global **particulate matter health impacts**
- 03% of global **water stress**
- 01% of global **land-use related biodiversity loss**

Fossil Fuels

Use of fossil fuels 1970 and today (2017) (see also figure 2)

Extracted 1970 **6 billion tonnes** Extracted 2017 **15 billion tonnes**

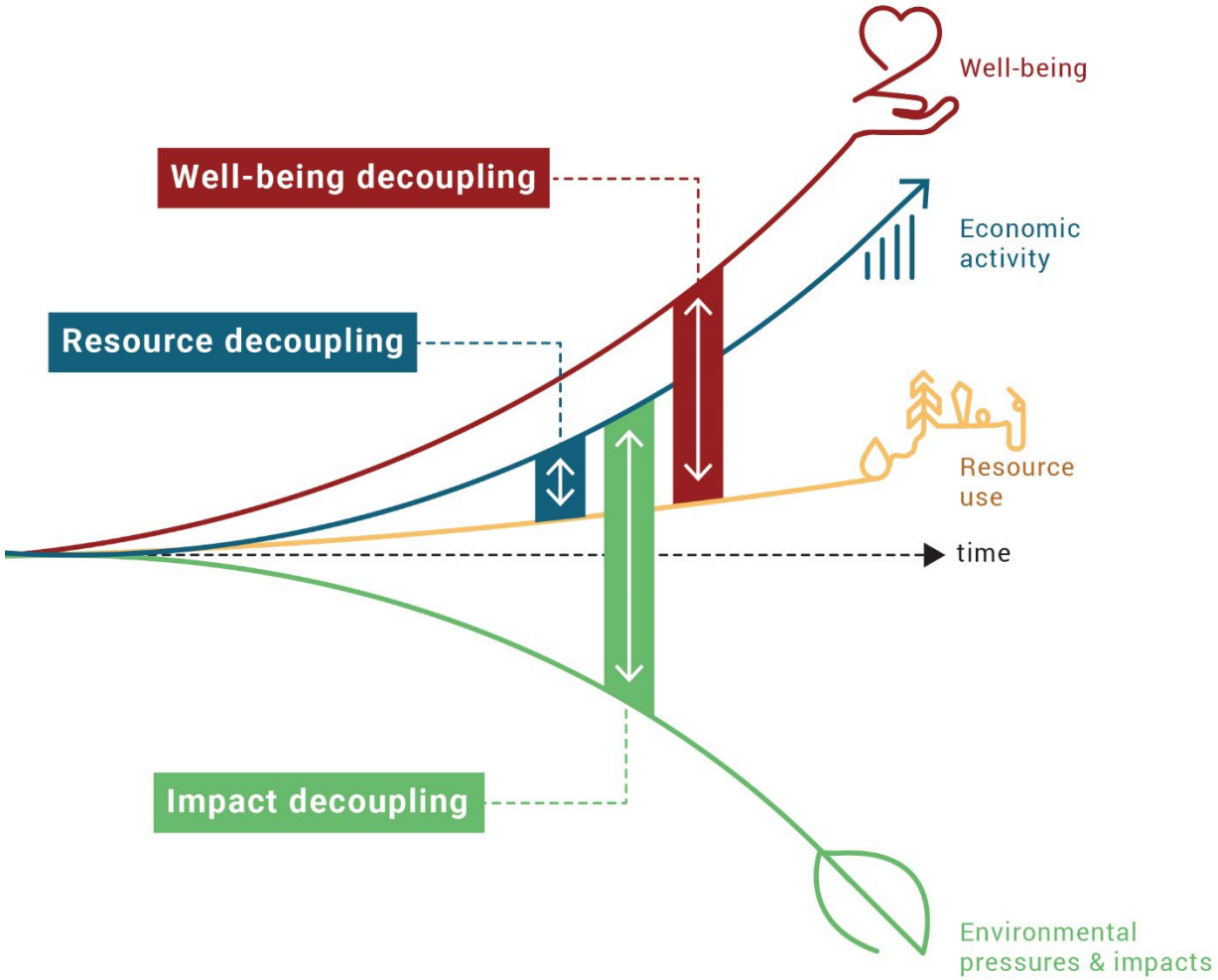
Fossil fuel extraction was **2.5 times higher in 2017** than in 1970.

Impacts of extraction and primary processing today (2017) - in shares of total global impact (see also figure 4)

- 16% of global **climate change impacts**
- 05% of global **particulate matter health impacts**
- 05% of global **water stress**
- Less than 05% of global **land-use related biodiversity loss**

If current trends would continue, global material consumption is predicted to double by 2060

Decoupling

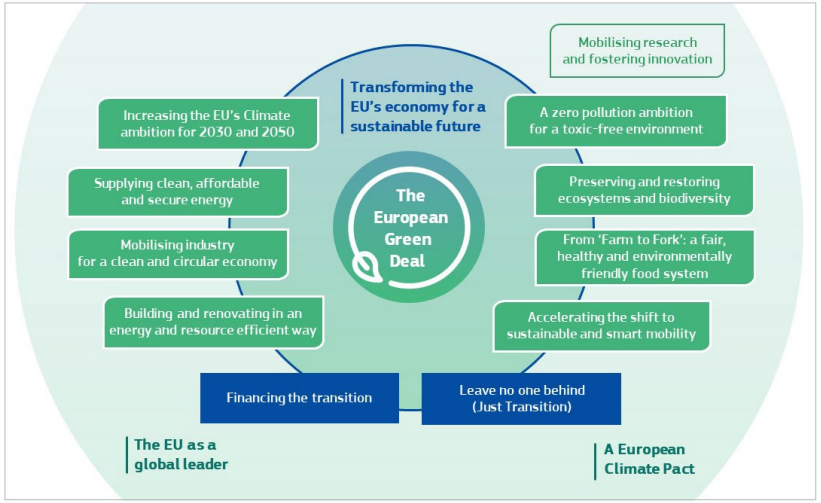


UN environment

International Resource Panel

European Green Deal

Vision challenged by recent developments



European Green Deal

Changing Perspective

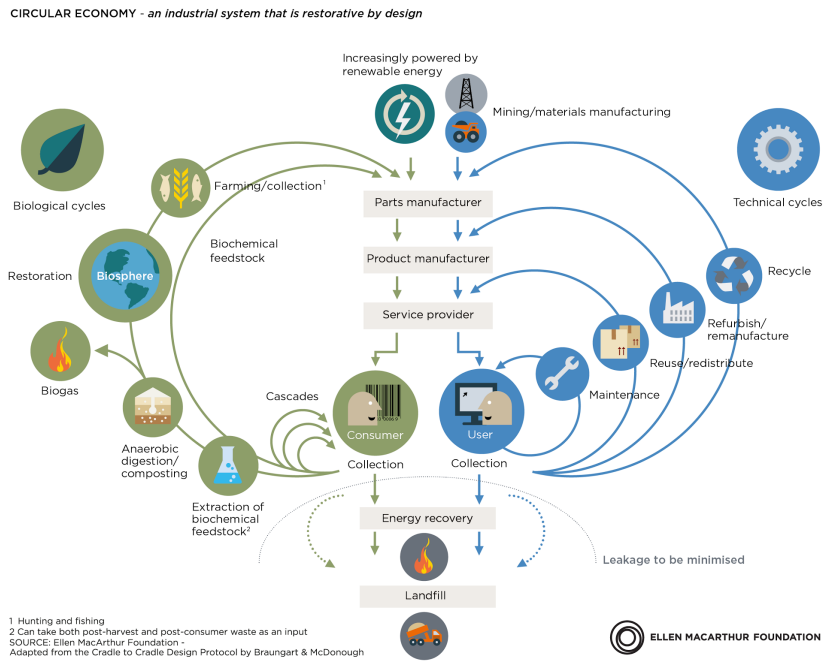
- *It is "a new growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use."*
- *Circular Economy Action Plan is a useful compass to guide recovery into more sustainable practices.*
- *Many important steps delivering the EGD vision were done or are prepared (Renovation Wave, A New Industrial Strategy for Europe, Sustainable Product Initiative, expected Strategy for a Sustainable Built Environment …)*

EGD is challenged by COVID and Terrible War in Ukraine …

- *Food and energy prices are rising, **economies in Europe are stretched** due to energy, food, materials crisis and governments are trying to address these challenges and improve strategic autonomy of Europe.*
- *It is **paramount that we address substantial knock-on effects of these challenges**, but what is even more important is **not to use them as an excuse for not continuing our sustainability efforts**.*
- *It is high time to understand how **dependent, fragile** our economies and societies are and how important it is to **increase our resilience**. This is calling for the **system change approach**: minimising trade-offs and future lock-ins and maximising co-benefits and synergies among all our efforts. Focusing only on cleaning the current production systems will not be enough. We must enter untapped territories of the needed deep system transformation - **reassessing our values, rethinking our economies, and reducing overconsumption**.*
- ***Efforts for strategic autonomy should** not **lead to** protectionism, but to **developing new concepts of production and consumption that are saving resources and reducing the use of virgin resources. Circular economy** is a typical example of such efforts leading to using fewer natural resources and stimulating jobs that could not be delocalised.*
- ***Standards and behaviour patterns linked to the current economic model were set by high-income countries, including Europe**. We are thus bound to show that we are willing and capable to change the reality we have created and lead the transition efforts - at home and globally.*

CIRCULAR ECONOMY

An economy consistent with SDGs



It 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.

Resource Efficiency

Dimensions	
1 BETTER: Minimise product need through better system design	Refuse and Rethink strategies
2 LEANER: Optimise product design	Reduce strategies in manufacture and use
3 LONGER: Maximise lifespan of products and its parts	Reuse, Repair, Refurbish, Remanufacture, Repurpose and Recycle strategies
4 CLEANER: Minimise waste and pollution	Recovery strategies

Often overlooked, but crucial for effectiveness

Source: Emerging thinking by IRP Co-Chairs, based on GRO19 and emerging GRO23 work

Why is the first dimension often overlooked?

Our economy still mostly optimizes product-by-product, or sector-by-sector (maximizing output measured by GDP) based on cheap virgin materials

This logic easily overlooks the great potential for deeper innovations to service-based business models, and can hinder shifts across sectors towards decoupled value creation

From Product Maximisation to Providing Human Needs

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*

From selling light bulbs to selling light

Dematerialisation and Decoupling

videohive.net

letstalkscience.ca

Light bulbs sold to the consumer are the basis for producers' profit

Light bulbs used to provide the light to the consumer are producers' cost

Climate Management

And Circular Economy

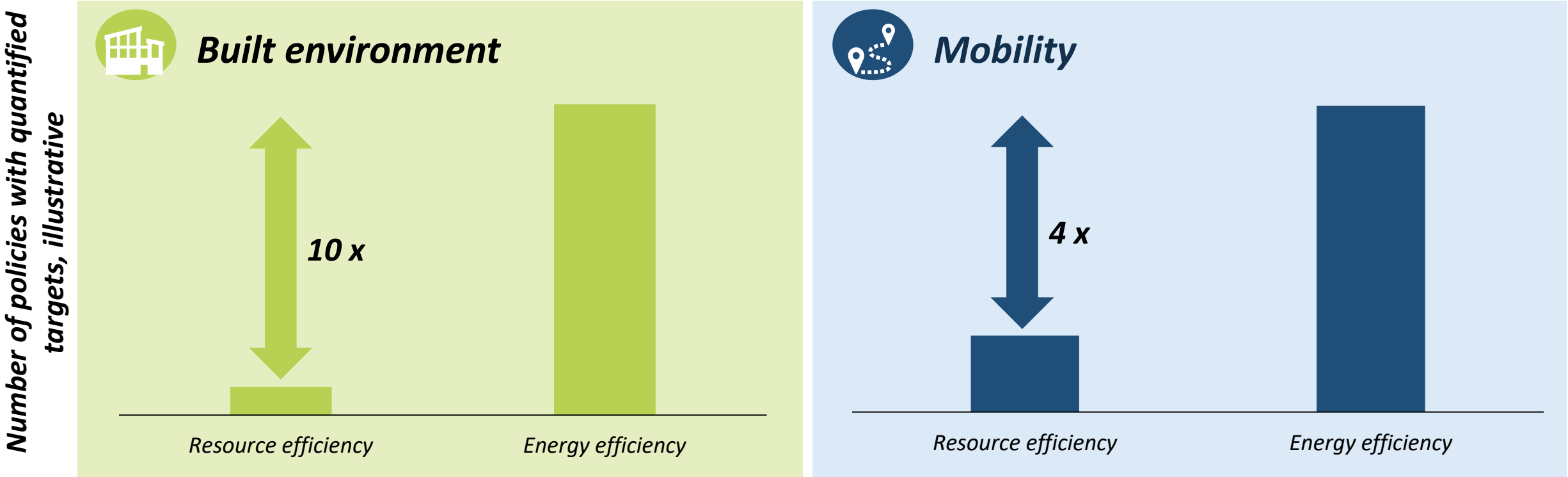
Why are Policy Improvements Needed?

- *Current approach is mainly based on optimising, greening the current economic model.*
- *It is addressing mainly supply-side problems. It is focused on cleaning the supply chains and ignoring the need for a deep system change transformation, addressing also the (over)consumption and existing overshooting of planetary boundaries by countries. This will not be enough to meet the 1.5 degrees and it also creates serious lasting tensions among high-income and low-income countries - real drivers and pressures are not adequately addressed.*
- *Low-income countries thus remain focused predominantly on financial support, which is important, but if core reasons for financial transfers remain and are not well addressed, and help is not provided in a more systemic way, needs and requests for financial help will, rightly so, just increase in the future.*
- *It is an energy-climate bubble where ministers for industry, agriculture, transport, trade, social matters, finance … do not participate - policy options in their disposal are not well considered and present. While energy is the most important part of the solution, an important part of materials and nature related policies and solutions are left out.*

Most climate policies still neglect systemic resource efficiency solutions, and thus miss major opportunities for climate and society

Examples - non exhaustive

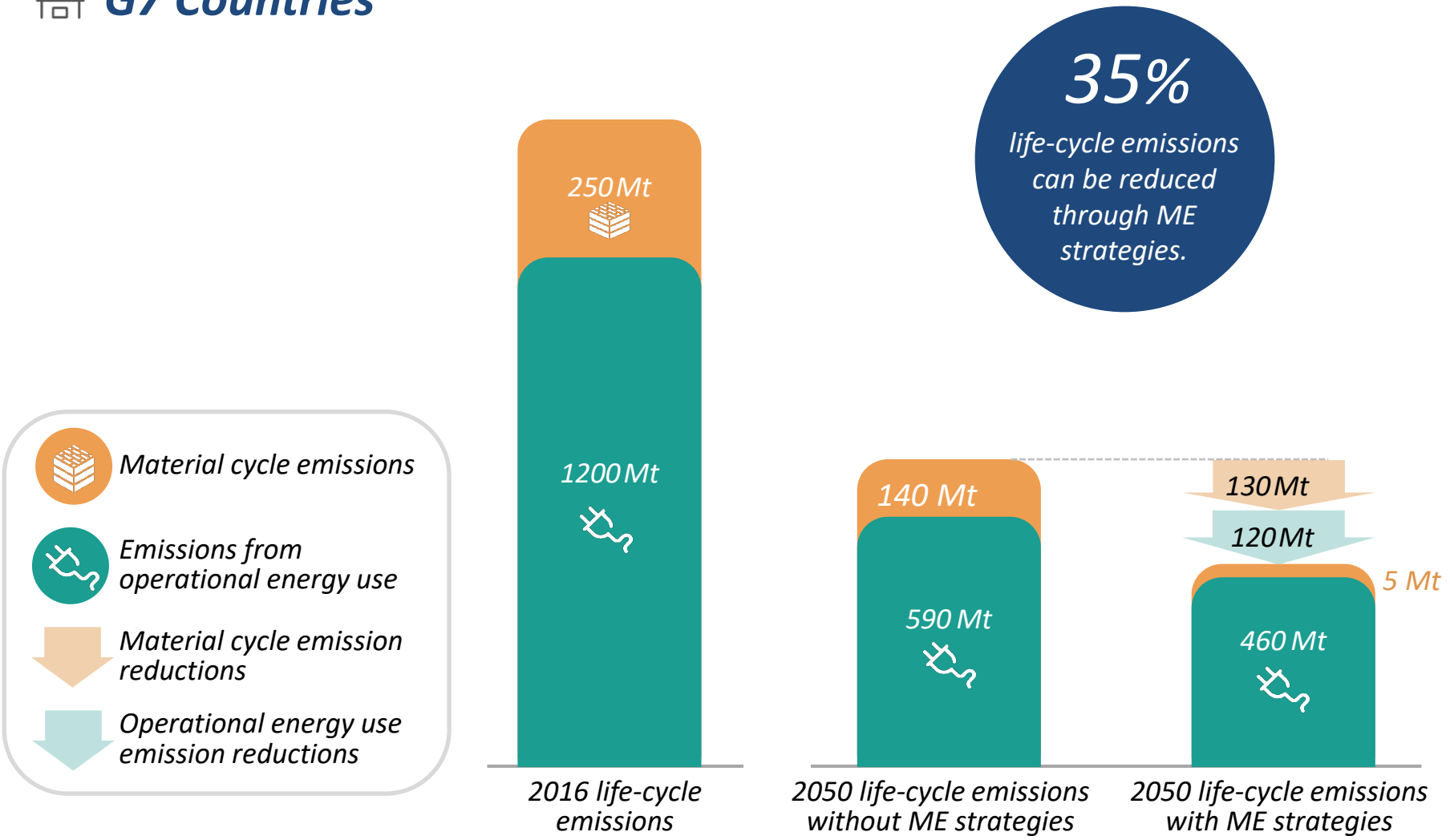
G20 Nationally Determined Contributions and Long-term Climate Plans focus on energy efficiency and miss out on more systemic resource efficiency opportunities.



Source: SYSTEMIQ analysis of G20 NDCs

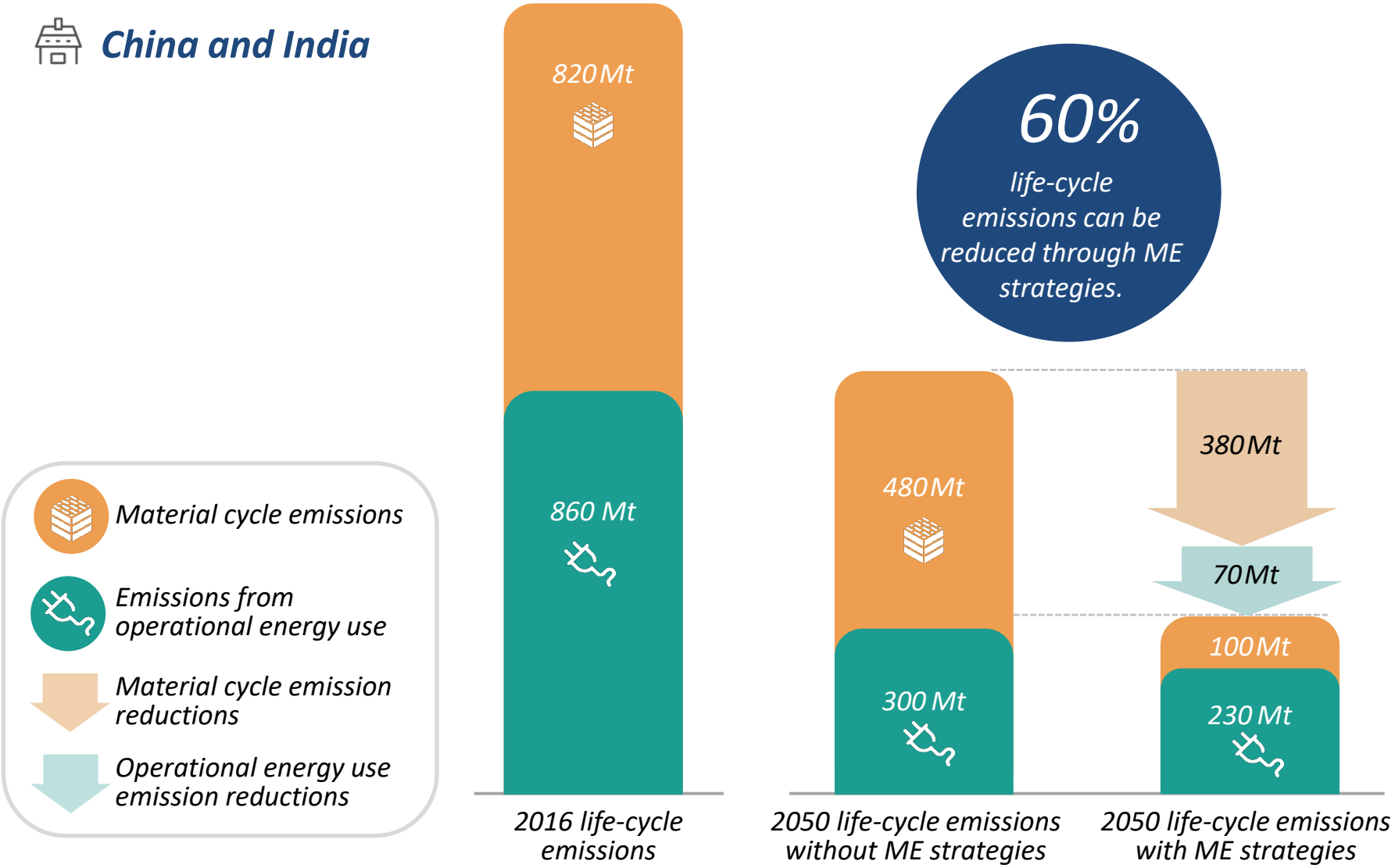
Material Efficiency Strategies (MES) can reduce 35% of lifecycle emissions from homes in G7 countries in 2050

G7 Countries



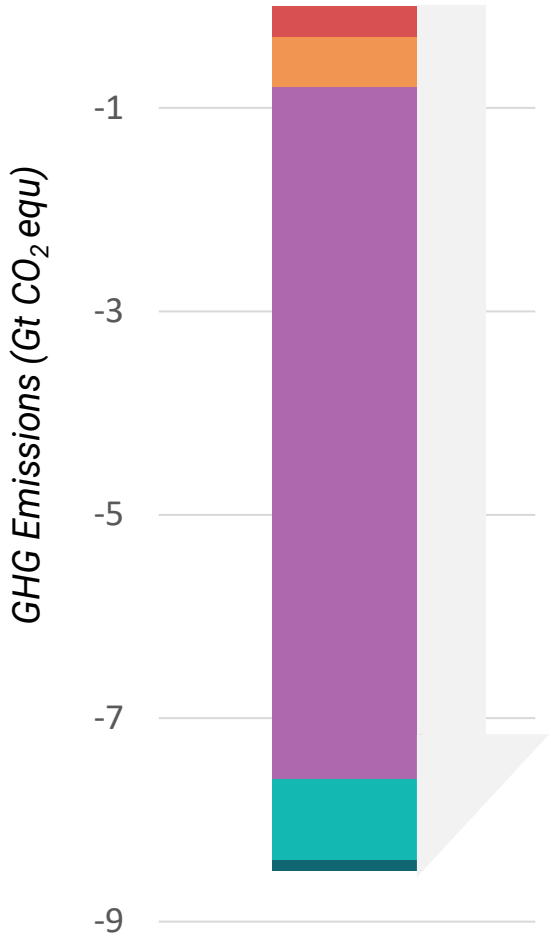
MES can reduce 60% of lifecycle emissions from homes in China and India in 2050

China and India



More intensive use and recycling are the most important strategies

Potential GHG savings from material efficiency strategies for homes in G7 (2016-2060)



- *Using less material by design*
- *Material substitution*
- *More intensive use*
- *Enhanced end-of-life recovery and fabrication yield improvements*
- *Product lifetime extension and reuse*

**The reduction potentials shown here are for strategy cascades, i.e. implementing one strategy after the other, therefore having synergetic effects.*

Most of the strategies reduce predominantly material related emissions

Some MES reduce materials AND operational emissions

'More intensive use' reduces materials and heating needs

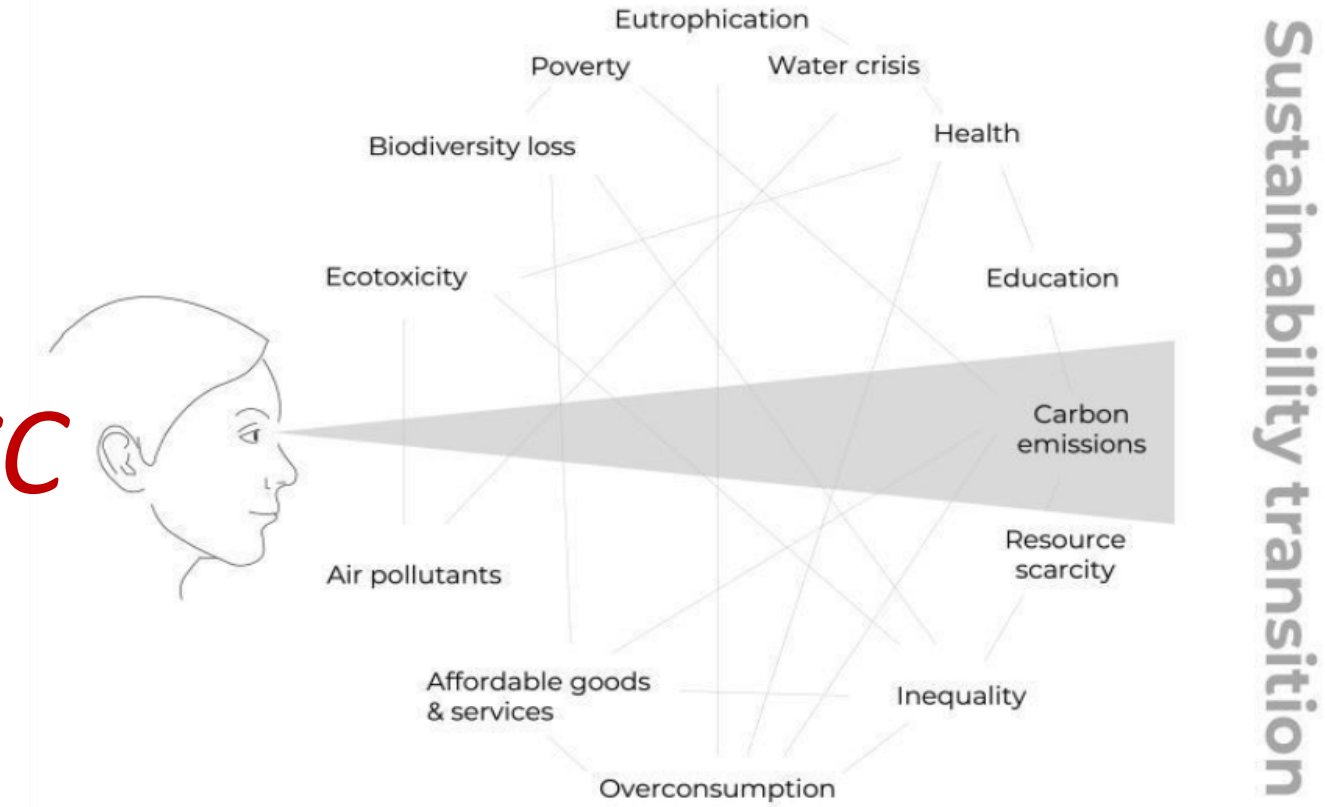
'Material substitution' (wood instead of cement) can reduce cooling needs

Ca. 20% cumulative savings

Icons/Freepik

We need to extend the optic and potential policy options beyond the currently prevailing energy supply …

UNFCCC



… to avoid trade-offs and future lock-ins and rather create synergies and potential multiple-benefits ➢ and resilient economy and society

SUPPLY SIDE SOLUTIONS

CARBON MANAGEMENT

LAND | WATER | ENERGY | MATERIALS

DECOUPLING - CIRCULAR ECONOMY

DEMAND SIDE SOLUTIONS

ECO-SYSTEM SERVICES, ENVIRONMENTAL SINKS

NATURE BASED SOLUTIONS

Global Resource Outlook 23: To implement all four Resource Efficiency dimensions, we need to optimize 'provisioning systems' for societal performance, not sectors for production

Provisioning systems that deliver resource intensive human needs

- *Nutrition*
- *Built Environment*
- *Mobility*
- *Daily Functional Needs*

Resource relevant systems enabling provisioning systems to deliver human needs

- *Nature-based*
- *Energy*
- *Materials*
- *Innovation Digitalisation*

Suggested wellbeing indicators: Contribution of human, social, and natural capital to overall wellbeing

Objective

- *Decent work and standard of living for all (including GDP)*
- *More equal society*
- *Good Health*
- *Good Education for all*
- *Social Capital (Personal and Community Relationships, Trust)*
- *Natural Capital (Quality of the natural Environment and Ecosystem Delivery)*

Provisioning System

- *Food*
- *Built Environment*
- *Mobility*
- *Communication*
- *Water*
- *Energy*
- *Circular Resources*

All connected to relevant SDG, to relevant indicators and indicators sources

Source: Emerging logic for the next IRP Global Resources Outlook based on the System Change Compass (SYSTEMIQ & Club of Rome)

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What would all this mean in policy terms?

- *Redefining consumption from owning to using;*
- *Redefining production from mass sales to providing efficient functionalities;*
- *Redefining core economic incentives such as taxation, subsidies, and public procurement;*
- *Integrating wellbeing as the objective across all policies;*
- *Measuring sustainability with a lifecycle perspective, harmonising across policy areas;*
- *Activating existing financial potential to enable transition;*
- *Looking at innovation in categories of economic ecosystems that provide societal functions, rather than in categories of production sectors;*
- *Etc.*
- *If we want to avoid extinction of elephants in nature, we should take care that there are no more elephants in the room*

To Conclude

Science is Convincing and the Change is Unavoidable

Johann Wolfgang Goethe

imdb.com

Knowing is not enough; we must apply.

Willing is not enough; we must do.

Being in a state of denial is just postponing the inavitable ... at a higher cost.

There has never been a better moment …

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

The future of your industry …

- *Built environment is an important resource intensive human need which means that it will receive a lot of policy attention in future transitional efforts.*
- *Gypsum is in theory fully recyclable and a "closed loop" material. It is ideal for implementing circular economy practices.*
- *Efforts linked to make your industry sustainable are important and highly valuable, but you should also play a proactive role in optimising and reducing the materials needs in built environment supply chain providing human needs*
- *The future of your industry will be on a safe side … if with our collective efforts we will keep also the planet and humanity on the safe side*

From the resource management point of view the 21st Century will be market by

DECARBONISATION

DECOUPLING

(Dematerialisation, Decommodification)

What does that mean for market players and how should we best prepare and (re)organize globally and locally ?

Circular Economy is not a new concept

It is the oldest concept on the planet Earth.

Nature is a "bio-economy" based on the principles of the circularity. Nothing is lost and everything has its purpose.

So, for the beginning we would need to answer only one question:

Do we agree that we humans are part of the nature too?

To answer this question, we probably do not need the help of the most famous Belgium detective, but his advice is always useful

HERCULE POIROT

When asked why he is speaking about himself always in a third person he replied something like that:

If one is such a genius like me, it is very important to establish a healthy distance to himself.

THANK YOU

for helping us delivering the future we want!