UN environment programme

International Resource Panel

GLOBE EUROPEAN UNION

The Network for Environmental Legislators

Global Resource Outlook 2024

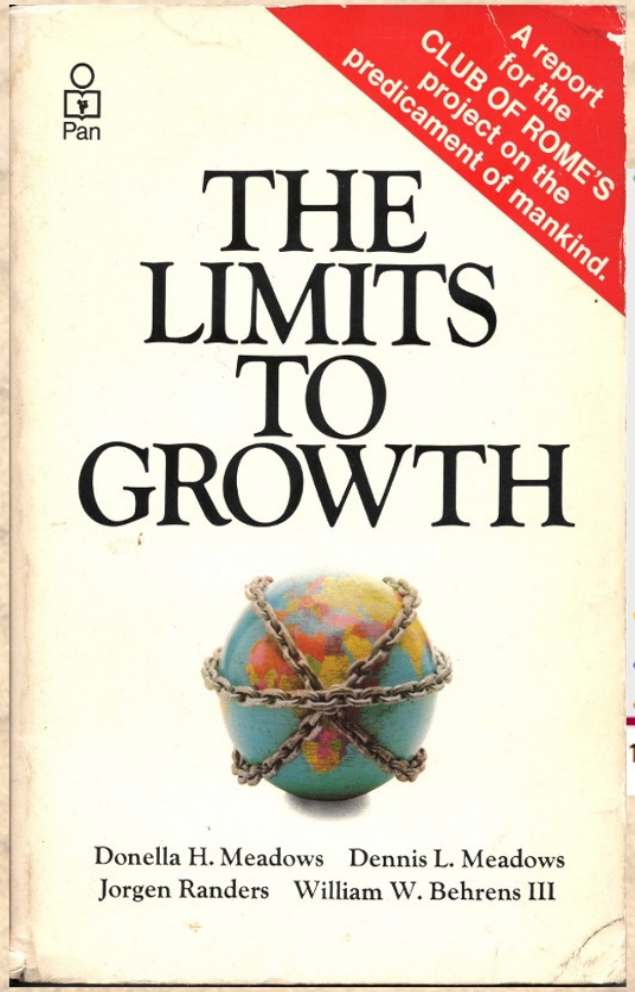
Bend the Trend

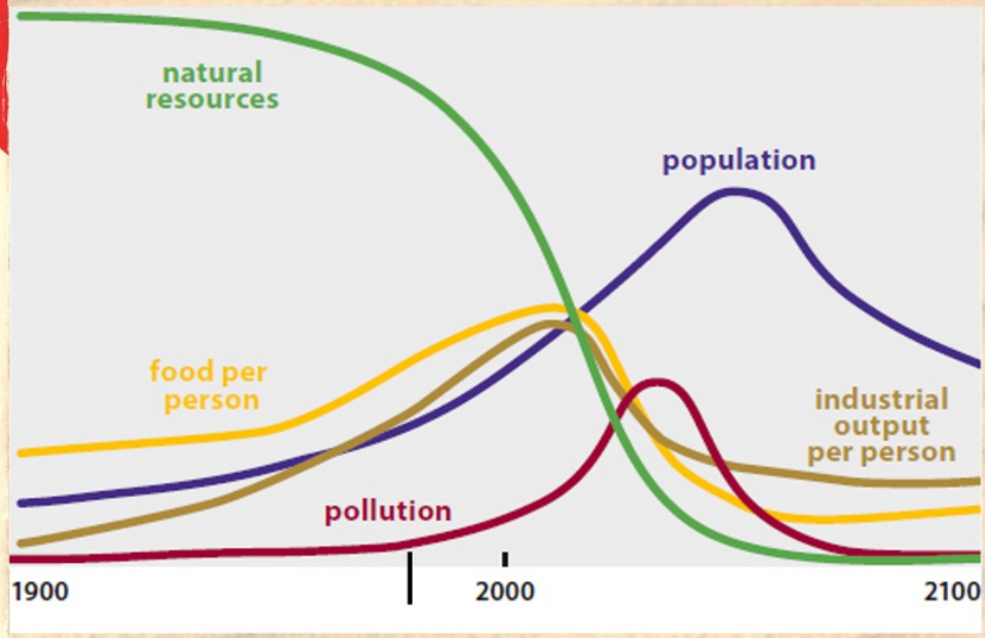
Pathway to a Liveable Planet as Resource Use Spikes

Anders Wijkman - comments at EASAC Environment Panel Meeting on March 19, 2024

Member International Resource Panel - IRP
Member Club of Rome

Recalling The Limits to Growth





1972

The book predicted collapse.
The value issue was avoiding collapse.

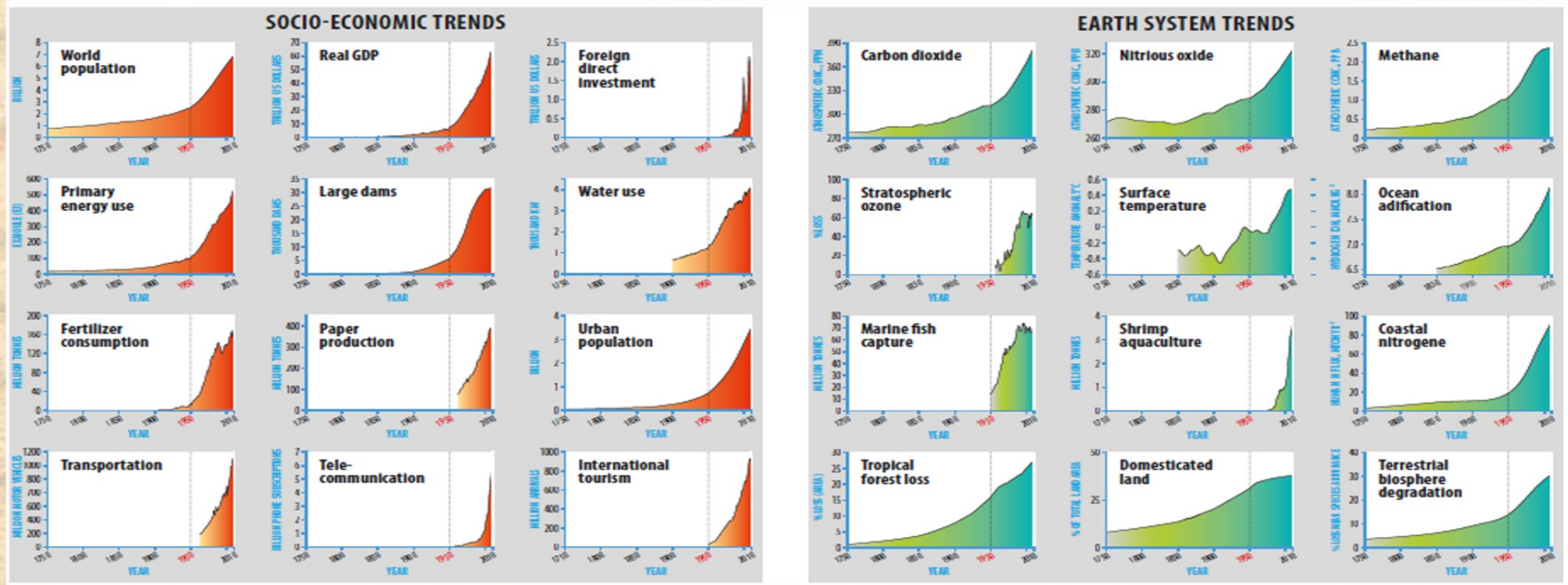
WATERSHED

r att lägga till anteckningar

et: Utforska Anteckningar Kommentarer 114 %

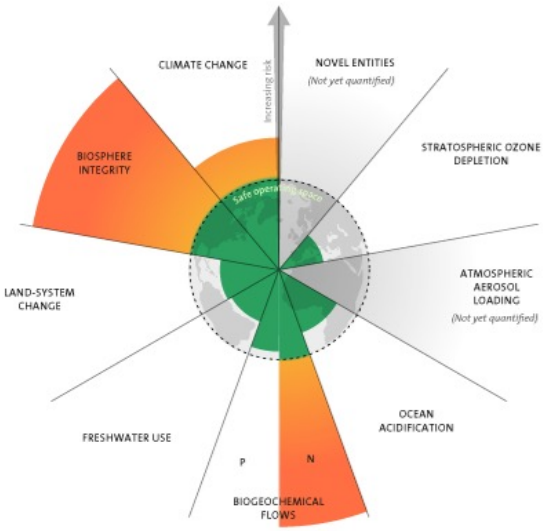
The Anthropocene: steep upwards curves since 1950

of human consumption and of human induced pollution.



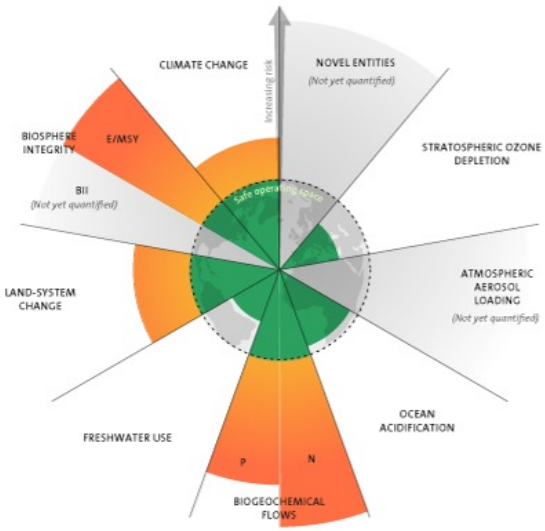
adapted from Steffen, Crutzen et al 2007

2009



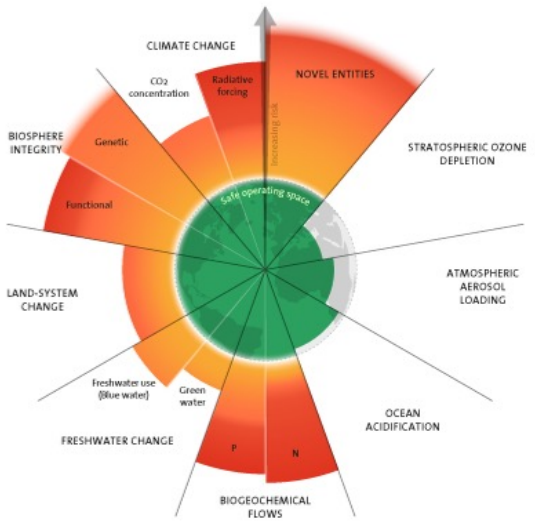
3 boundaries crossed

2015



4 boundaries crossed

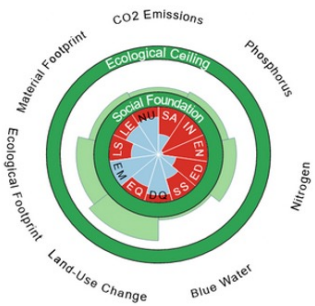
2023



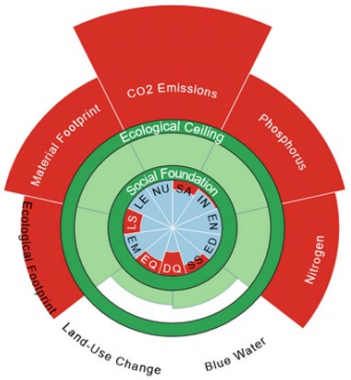
6 boundaries crossed

Source: Azote for Stockholm Resilience Centre, based on analysis in Richardson et al 2023

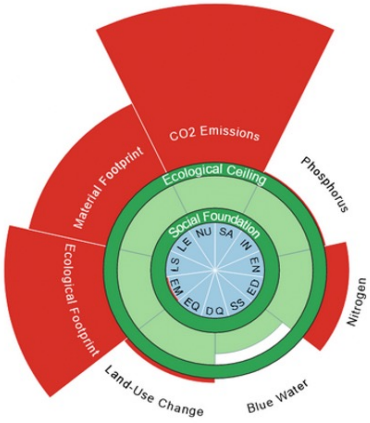
Rich countries are **massively** overstepping planetary boundaries



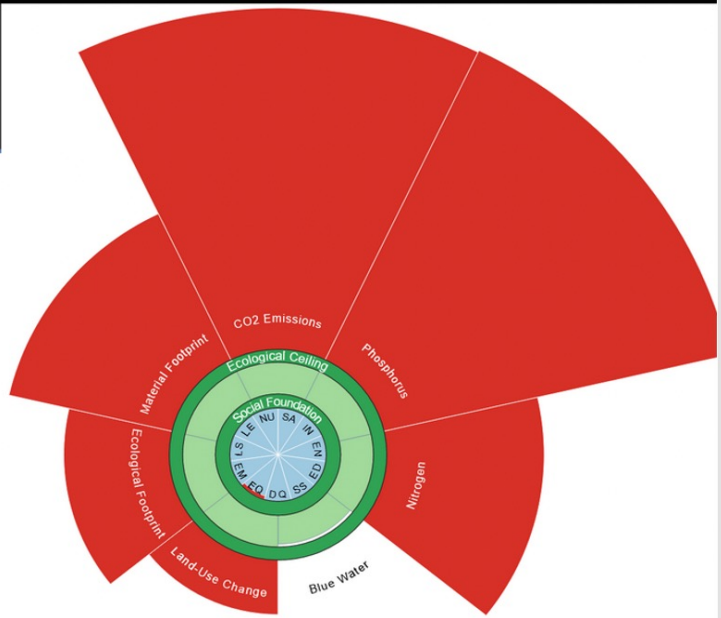
Malawi
$1,000 pc



China
$17,200 pc



Belgium
$54,000 pc



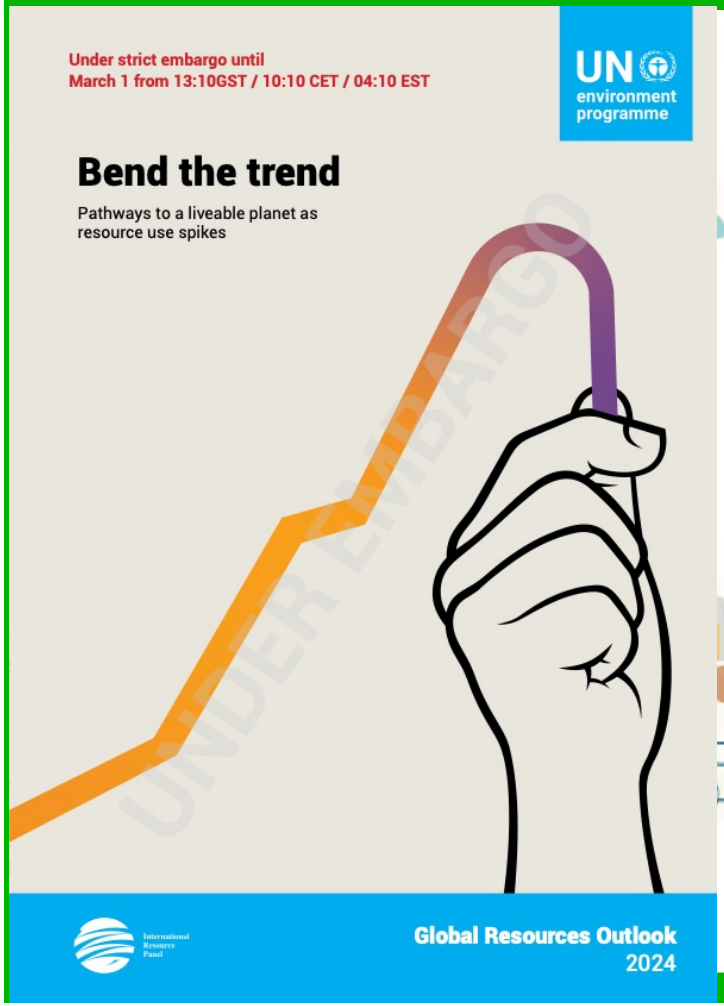
Australia
$54,900 pc

Source: Doughnut Economics Action Lab, University of Leeds (goodlife.leeds.ac.uk)

THE CLUB OF ROME

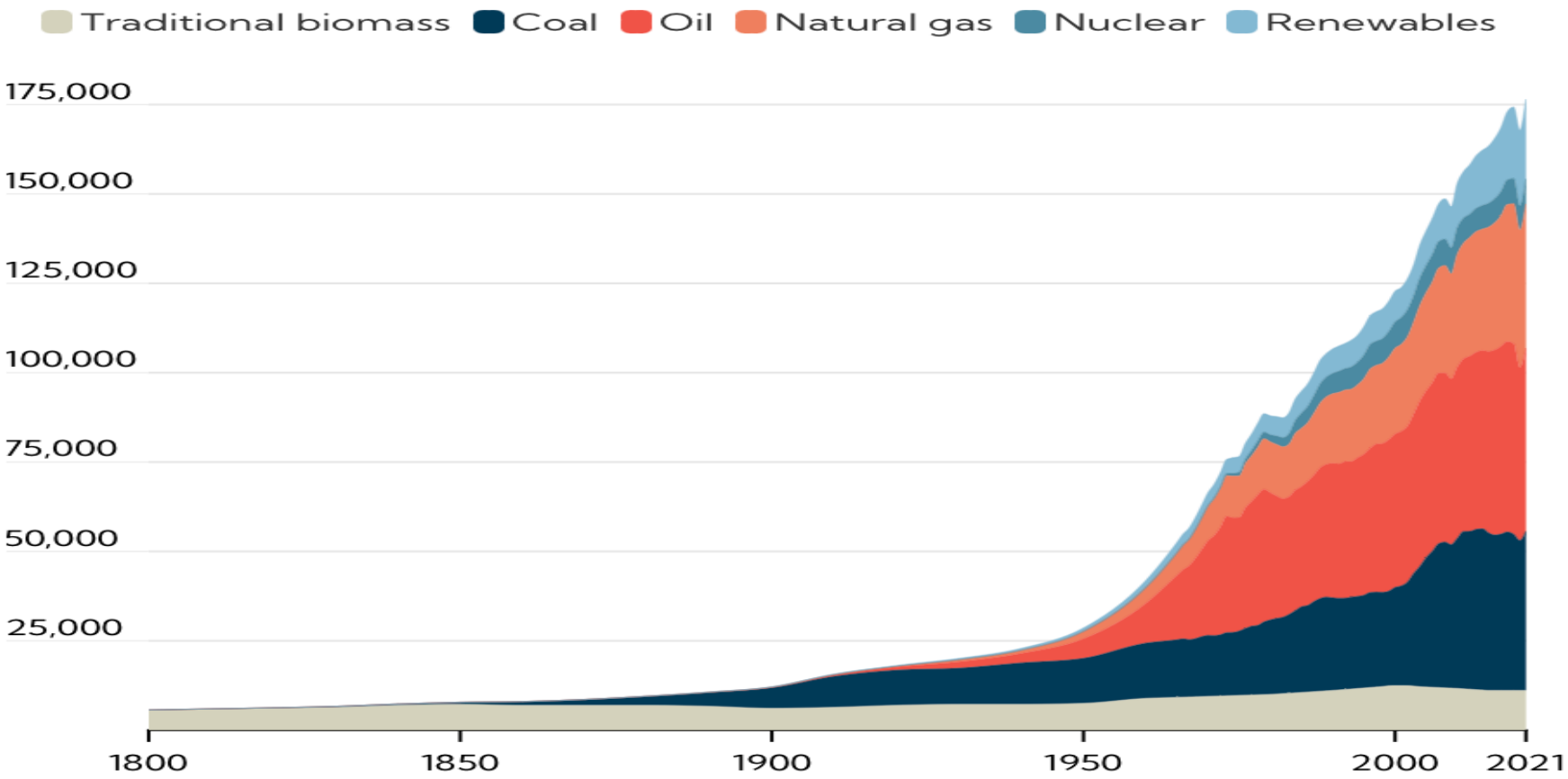
Earth 4All

Global Resources Outlook 2024

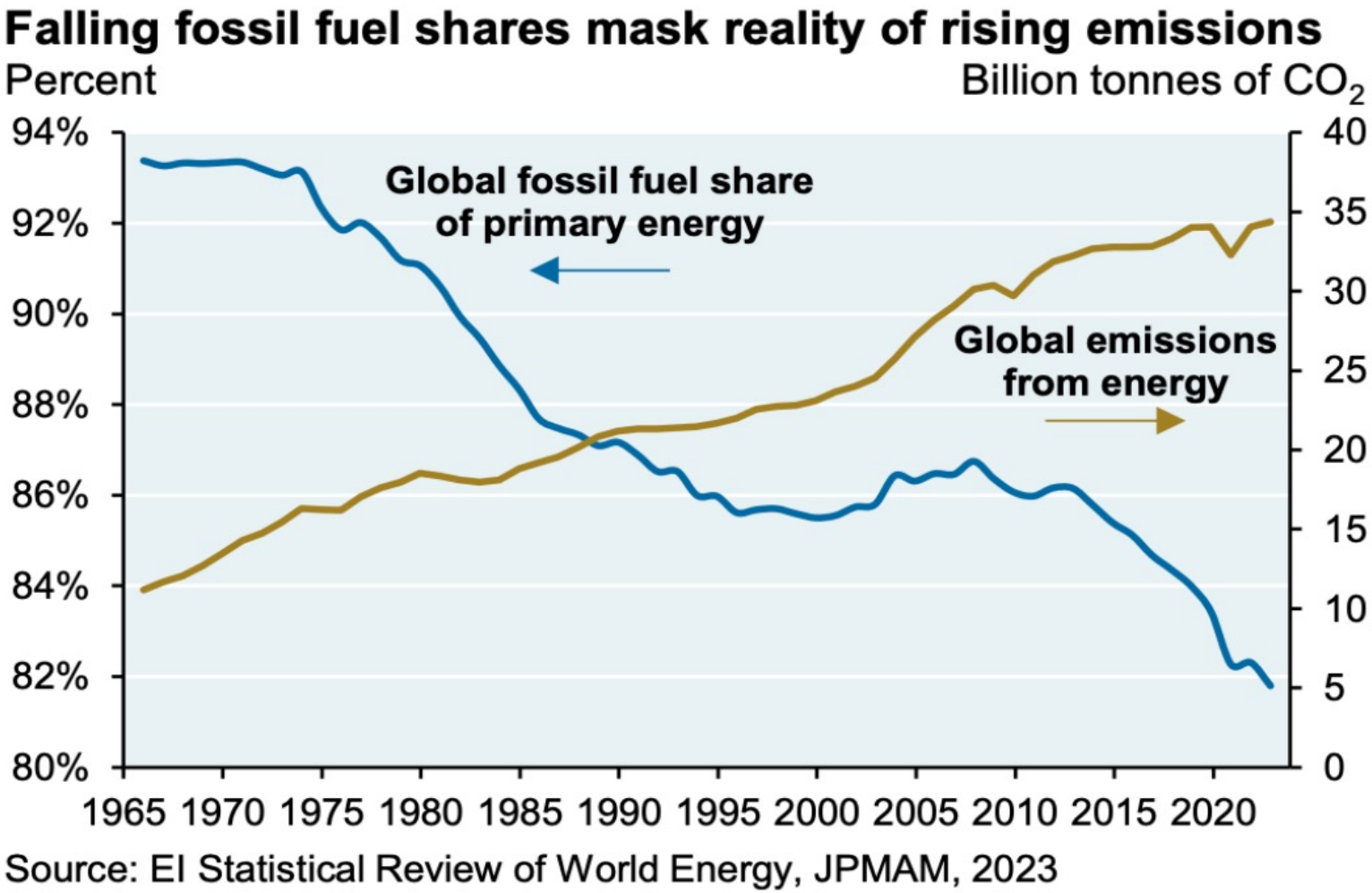


An uphill battle...

Global primary energy consumption by source.
(terrawatt–hours)

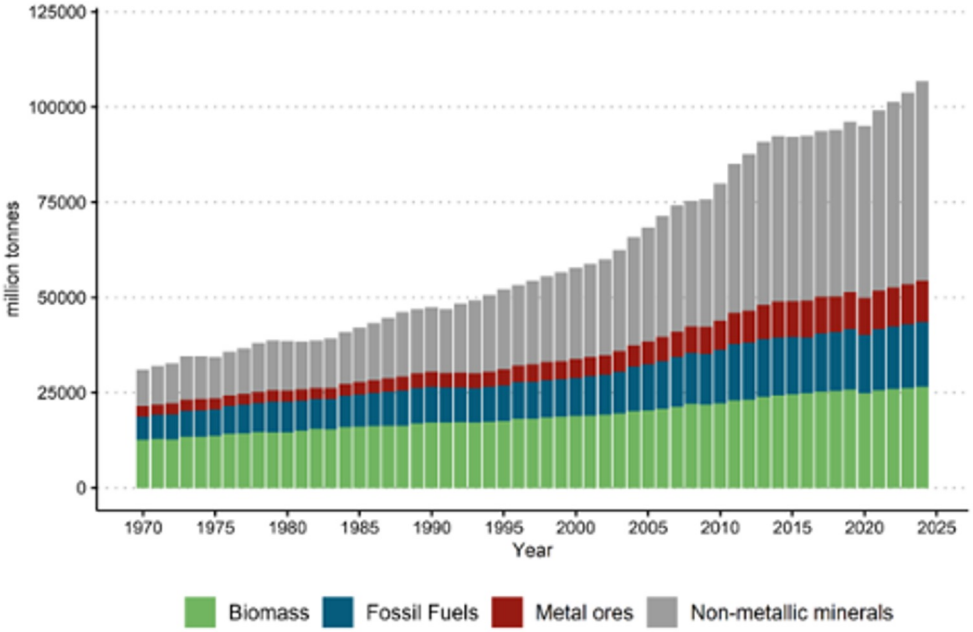


Source: Our World in Data based on Vaclav Smil, Energy and Civilization: A History; and the BP Statistical Review of World Energy. Note: Primary energy is calculated according to the 'substitution method' which takes account of the inefficiencies in fossil fuel production by converting nonfossil energy into the energy inputs required if they had the same conversion losses as fossil fuels.


Falling fossil fuel shares mask reality of rising emissions
Percent
Billion tonnes of CO_2
94%
92%
90%
88%
86%
84%
82%
80%
40
35
30
25
20
15
10
5
0
Global fossil fuel share of primary energy
Global emissions from energy
1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015 2020
Source: EI Statistical Review of World Energy, JPMAM, 2023

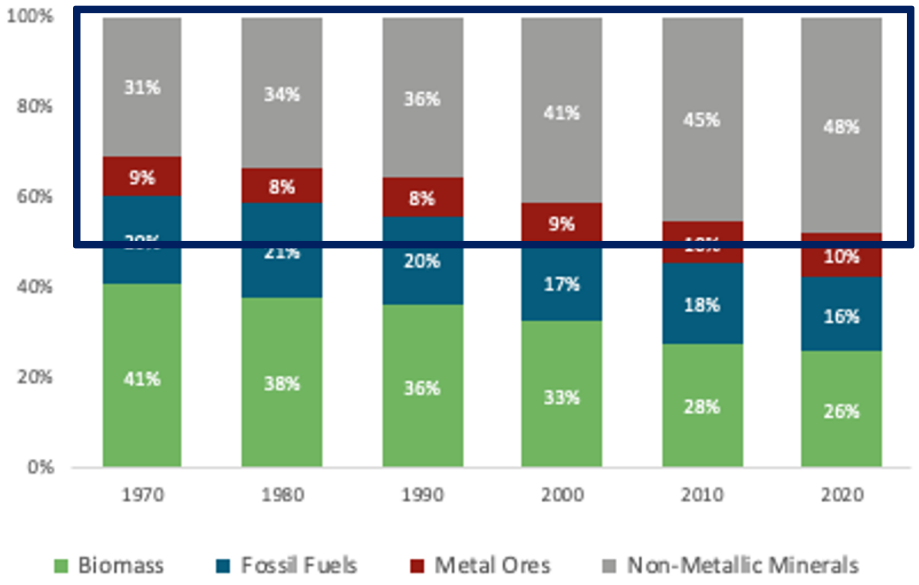
Trends: Global Material Use and Share in 1970-2023

Global Material Use has increased for more than a factor of 3 since 1970 due to urbanisation and industrialisation (and population growth) - 2.3% per year



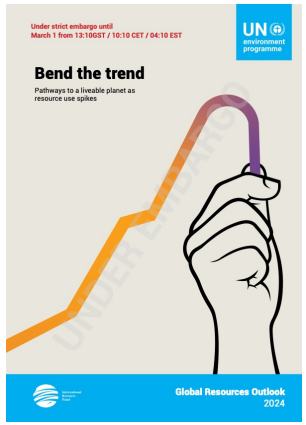
Global material extraction, four main material categories, 1970 – 2024, million tones.

… which is increasing also the share of Non-Metallic Minerals in Global Material Use



Global material extraction, four main material categories, 1970-2020, shares

Definition: Materials and Resources



***Biomass**: crops for food, energy and bio- based materials, wood for energy and industrial uses*

***Fossil fuels**: covering coal, gas and oil, among other*

***Metals**: such as iron, aluminum and cooper, among other*

***Non-metallic minerals:** sand, gravel, limestone and minerals used for industrial applications*

Land

Water

Materials:
Everything extracted from the Earth

Resources:
Materials + Land and Water

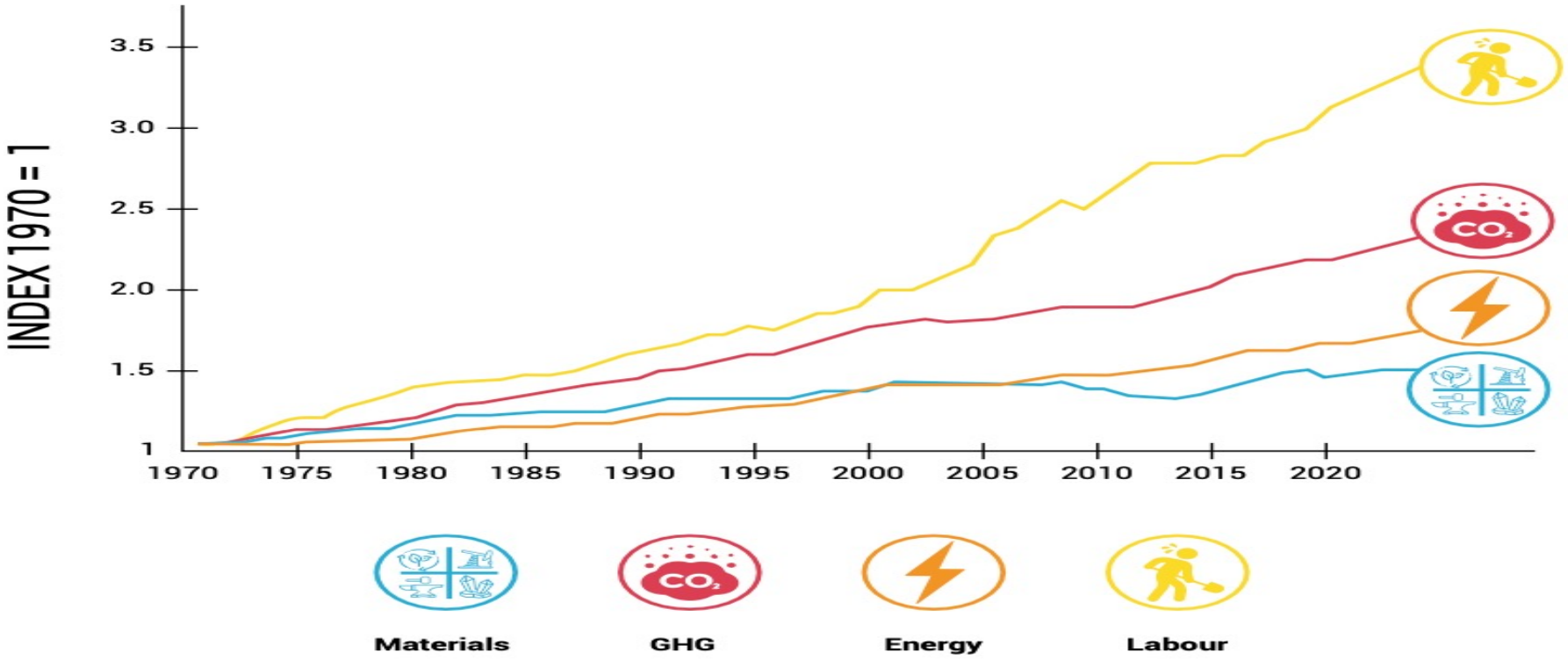
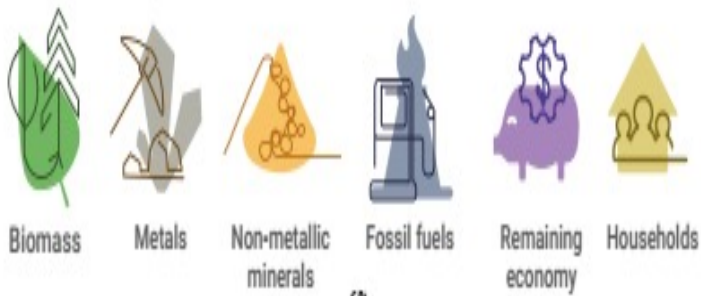


Figure 2(b): Global resource productivity of materials, GHG emissions, energy and labour productivity, 1970 – 2024, index

(Source: EDGAR World Emission Database; IEA World Energy Database; Penn World Table version 10.01; UNEP-IRP (2023) Global Material Flow and Resource Productivity Database)

Impacts: Extraction and Processing of Natural Resources Drives all Aspects of the Triple Planetary Crisis

Environmental impacts of materials in the value chain in extraction and processing phase



60% of global climate change impacts

40% of air pollution health impacts

More than 90% of water stress and global land and water eutrophication related biodiversity loss

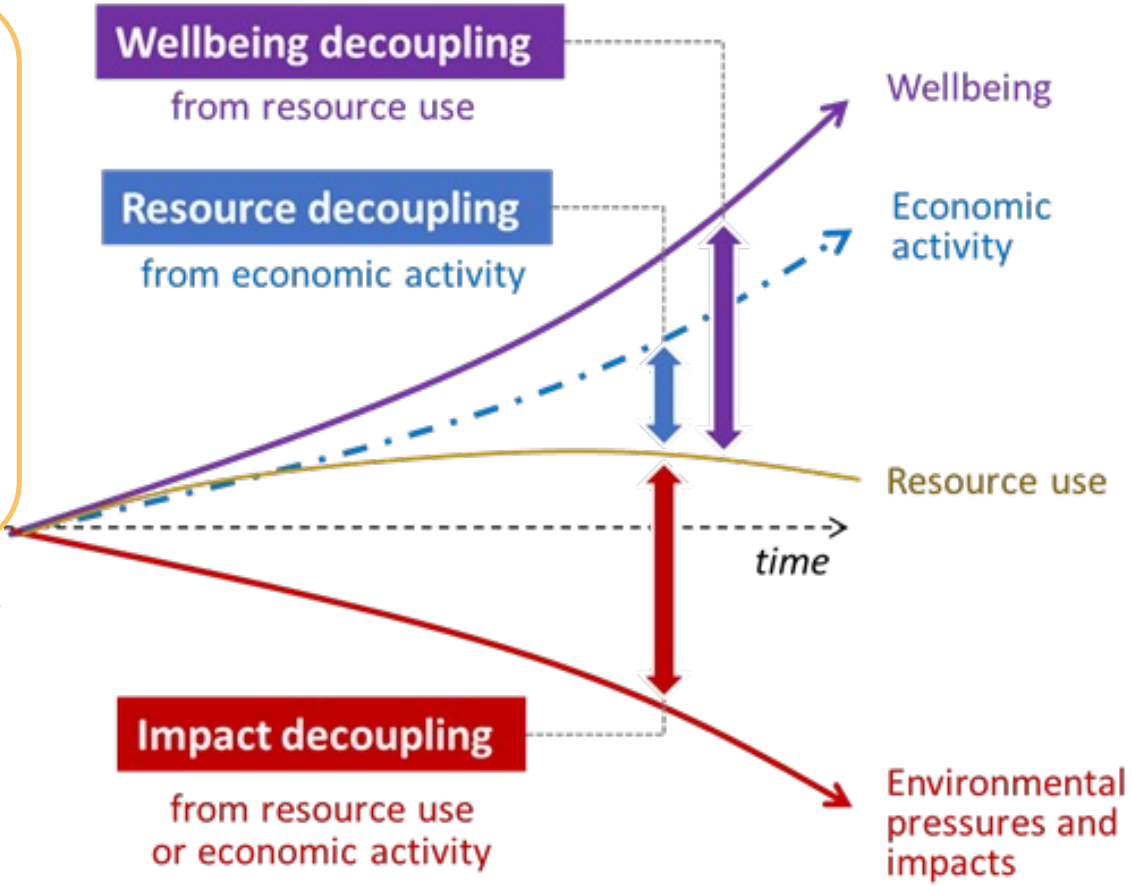
To mitigate climate change by a focus on the phase-out of fossil fuels alone will not work;

Material consumption is the main driver and materials such as steel, concrete, aluminum, plastics, ammonia, textiles etc require a lot of fossil materials for their production

Ex 1,9 Billion tons of steel produced every year; the transition to green steel will take decades and the more demand can be reduced, the better

If current trends would continue, global material consumption is predicted to increase for 60% by 2060 comparing to 2020 levels

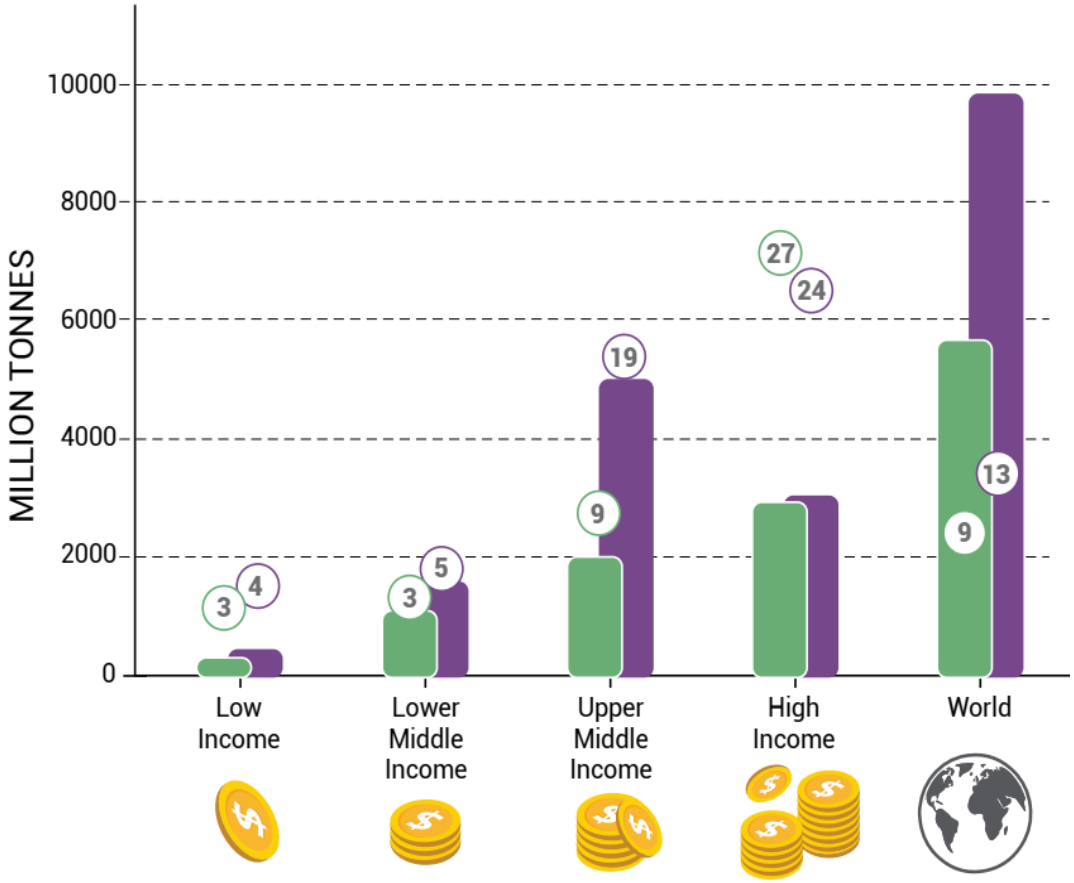
Decoupling



UN environment programme

International Resource Panel

Trends: High-income countries use six times more materials per capita and are responsible for ten times more climate impacts per capita than low-income countries.



Since 2000 …

- *High-income: Highest material footprint of all groups, relatively constant. Climate impact per capita = 10 x low-income group.*
- *Middle-income: material footprint more than doubled, approaching high-income levels. Climate impact per capita = roughly 50% of high-income group; 6 x low-income group.*
- *Low-income: Remain comparatively low, and mostly unchanged.*

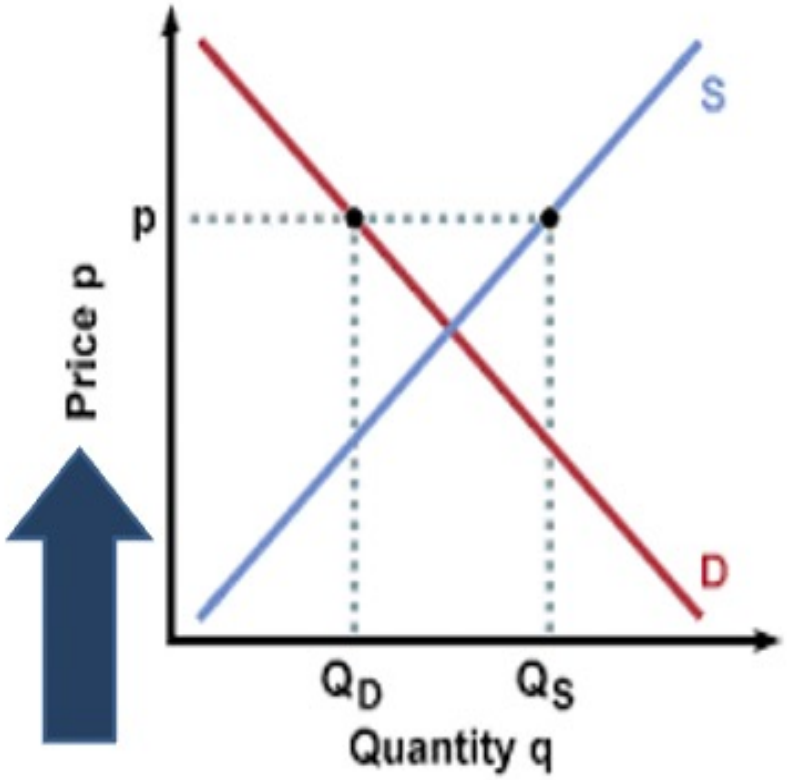
Economy championed by industrialised nations is wasteful and unjust.

We must shift away from the prevailing resource wasteful economic approach based on maximising the output of sectors, simplistically defined by GDP, towards an economy that is efficiently meeting human needs and optimise human wellbeing within the Planetary Boundaries.

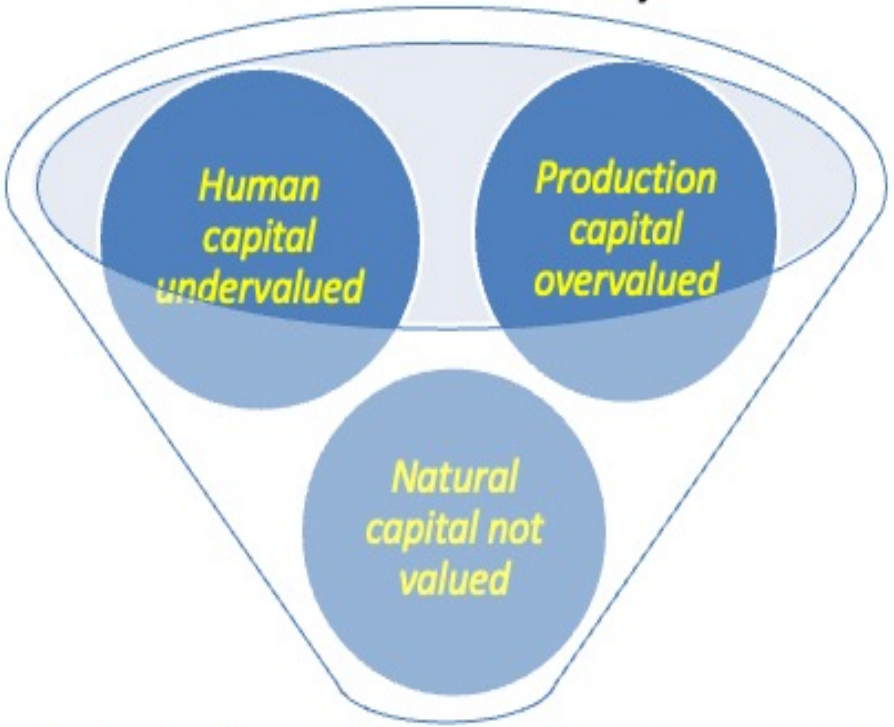
The current logic is both ethically and ecologically unsustainable.

Confusing market Signals Summary:

Producers/Consumers Rational Behaviour



Market Economy



Economic, social and environmental (in)balance

Source: Pixabay

A pathway towards sustainable resource use, which maintains and even enhances human wellbeing, while prevent planetary boundaries to be crossed is possible, but we urgently must change the direction and fix the broken compass

Source: Dentistry.co.uk

High-income countries have benefitted most, and have driven the planetary crisis, while emerging and developing economies hold least responsibility, and are facing the worst impacts. The World Inequality Lab in recently published 2023 Climate Inequality Report showed that the top 10% of global emitters are responsible for 50% of global carbon emissions. This is not just a country-level story: the highest consumers everywhere are responsible.

In high-income countries absolute decoupling should be the aim, whereas, in low and some middle-income countries, where additional resource use is still needed to meet people's basic wellbeing needs, we should aim at relative decoupling.

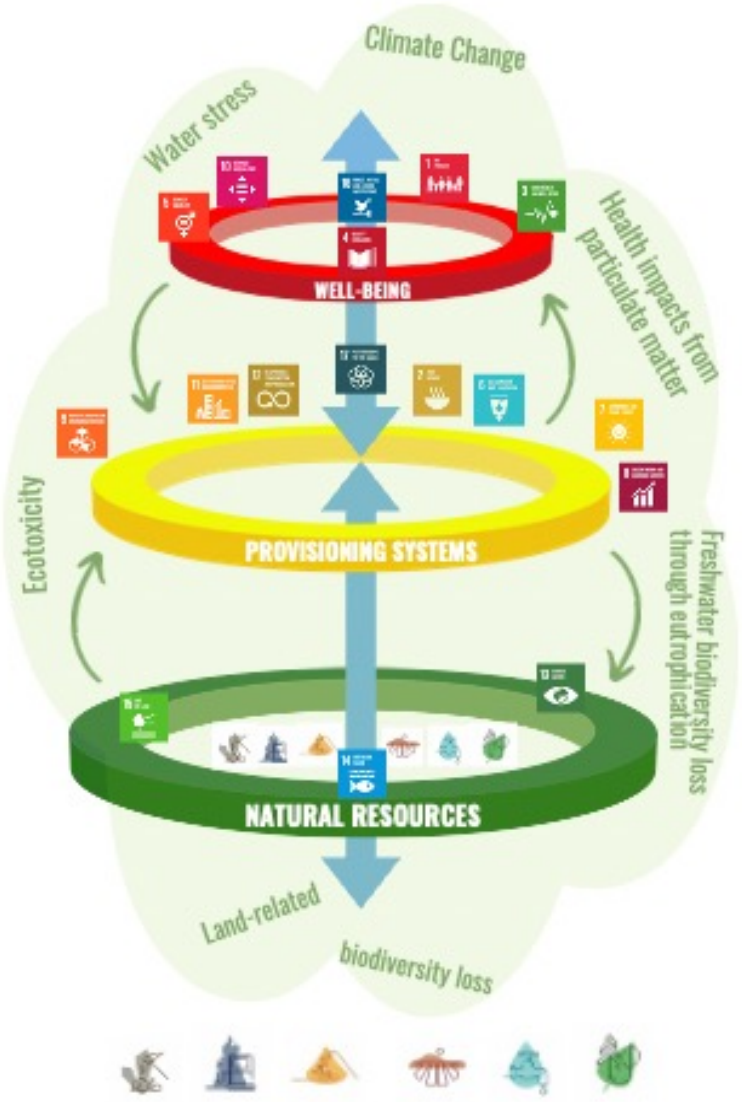
Major novelty of GRO24

- *We have simply been setting the order right. Economy was invented to serve humans and not the opposite.*
- *We were looking at how to optimise provisioning systems, human needs, rather than maximising the output of individual sectors. We acknowledge the usefulness of GDP, but we should be guided by wellbeing.*
- *We propose to focus on the most resource intensive provisioning systems - built environment, mobility, food, and energy, which represent 90% of global material demand.*

Main question often-overlooked to be addressed

How to meet human needs in most energy and resource efficient way?

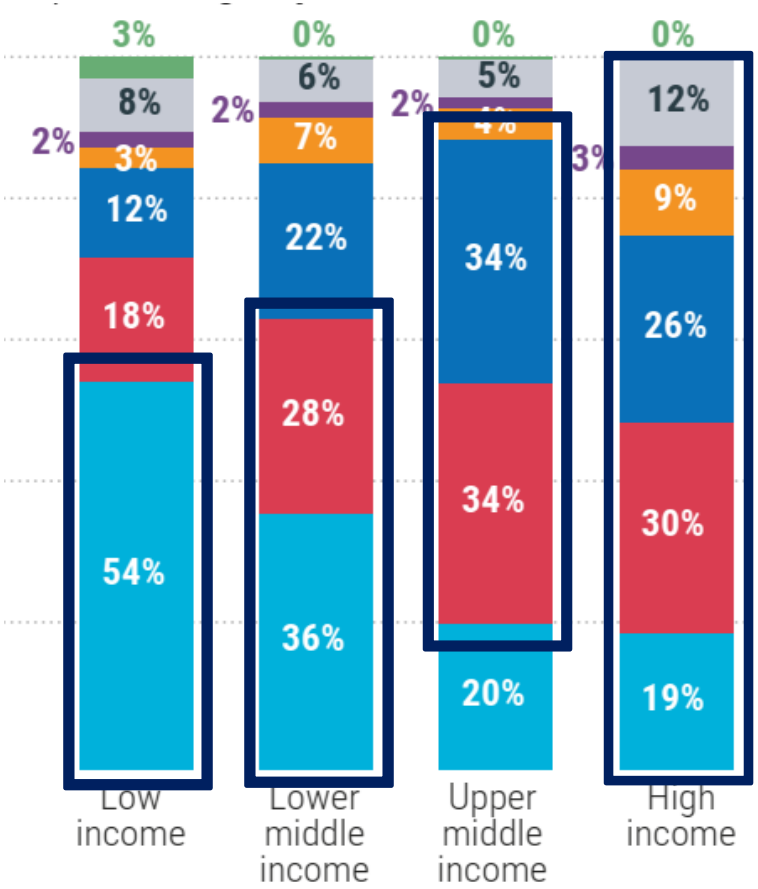
https://edistaffing.com



GRO24 "provisioning systems" in focus:

Food and nutrition, Mobility, Built Environment, Water and Sanitation, Energy, Clothing, Water Sewage and Health, Education, Households and Other

Trends: The material needs for provisioning systems (built environment, mobility, energy and food) by country income groups (2020)



Food
Mobility
Built environment
Energy
Communication
Other
Waste Management and Resource Recovery

Energy includes household energy consumption
All other provisioning systems include their embodied energy

Built environment and mobility: *(construction, transport sector&infrastructure): 59 billion tonnes*

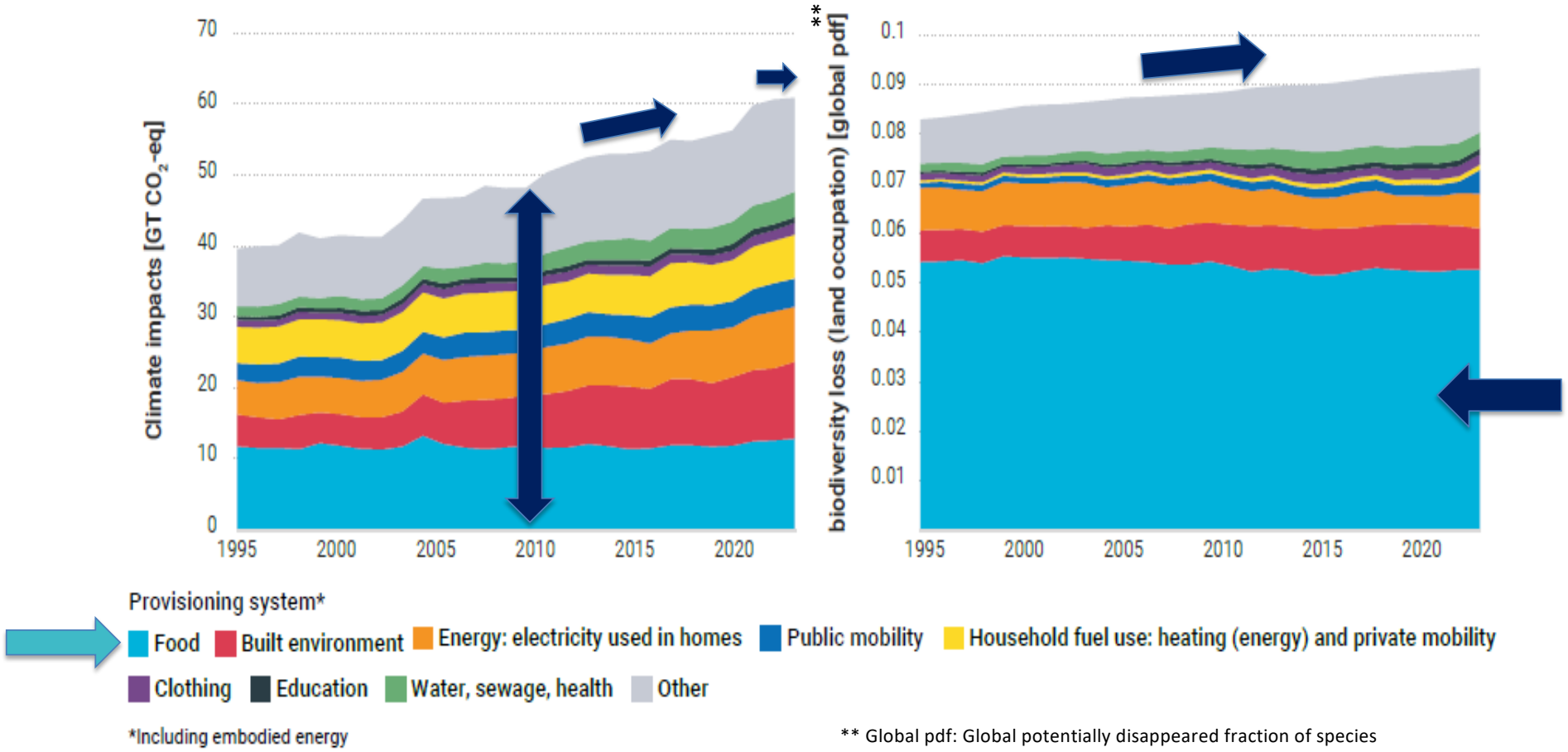
Food*: 23.6 billion tonnes*

Energy: *(electricity, power, heat): 6.1 billion tonnes*

Together = 90% of total global material demand, but differ in importance by income group

Source: Global Material Flows Database (UNEP 2023a)

Impacts: "Provisioning systems" - human needs with most environmental impacts requesting our focus



*Including embodied energy

** Global pdf: Global potentially disappeared fraction of species

[Ingen rubrik]

Modelling Scenarios Capturing the System Change Dimension

- *Modeling results are not predictions, but illustrations of 'what if' effects.*
- *Historic Trends scenario explores the consequences of continued historical trajectories of resource production and consumption, including current improvements rates in resource efficiency as well as production methods and current climate policies*
- *Sustainability Transition Scenario explores a sustainable path for global resource use if we would do a systemic shift to provisioning systems from both a supply and demand side and consumption perspective*

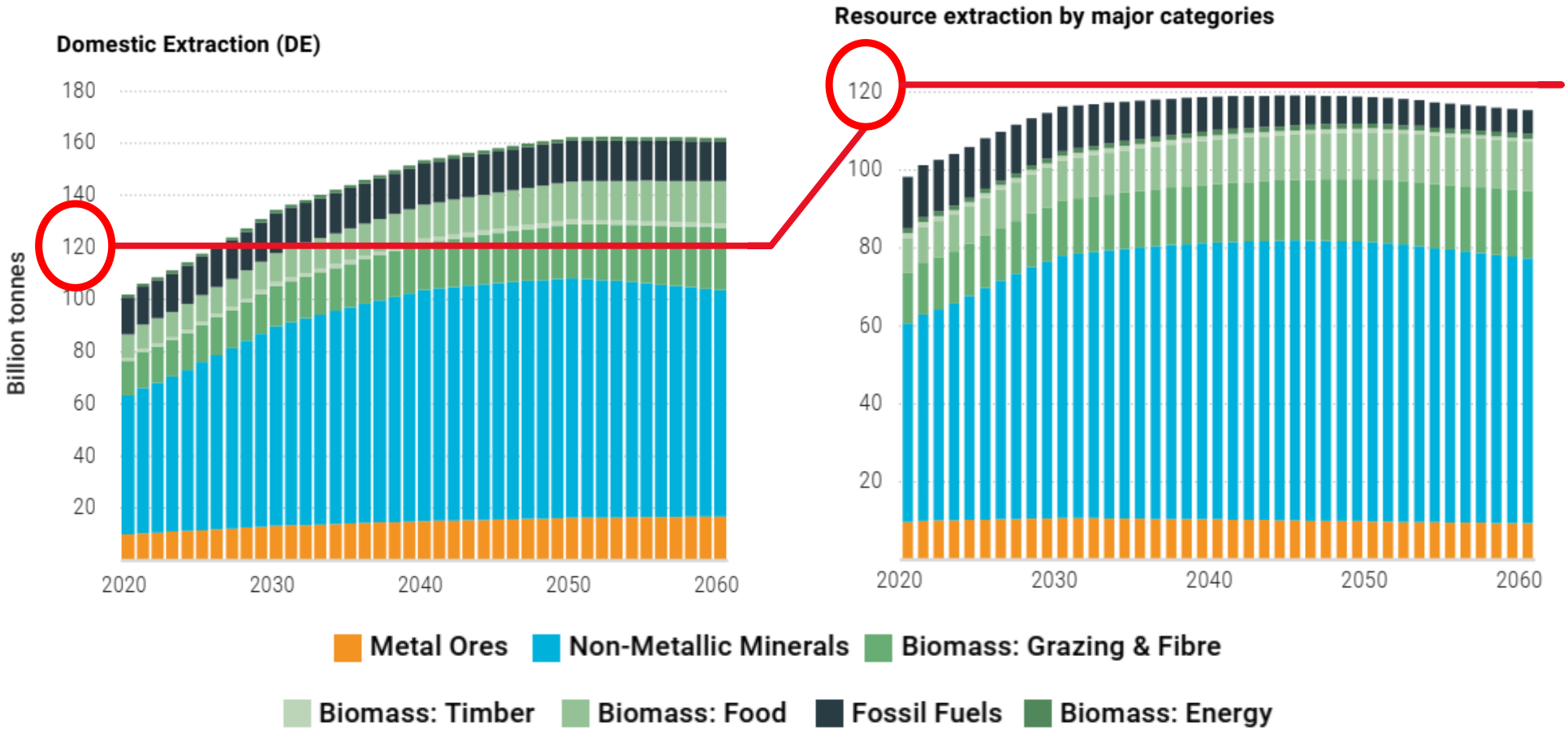
Scenario outlook: Sustainability Transition compared to Historical Trends Scenario (2060)

Growing Economy:	*+ 3%*
Reduced inequality:	*Lower income group Material Footprint gap*
Improved wellbeing:	*Higher HDI all income groups*
Reduced growth in resource use:	*By 30%*
Reduced environmental impacts:	*GHG emissions - 83%*
	Energy demand - 27%
	Agricultural land area - 5%

Impacts: Outlook of Material Extraction under two scenarios

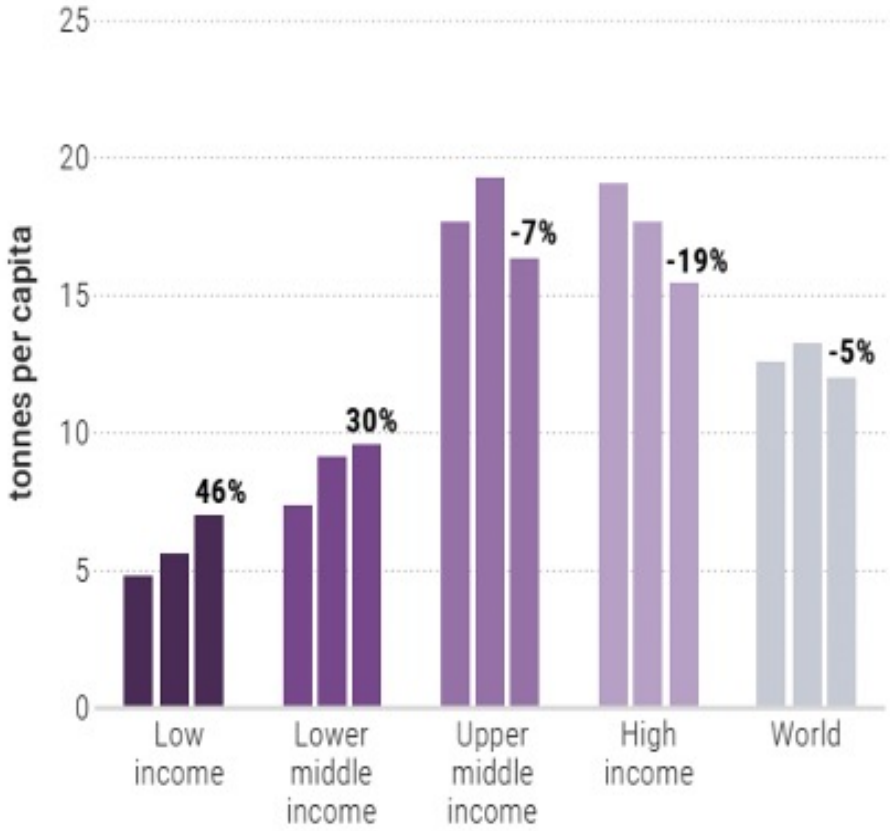
Historical Trends

Sustainability Transition

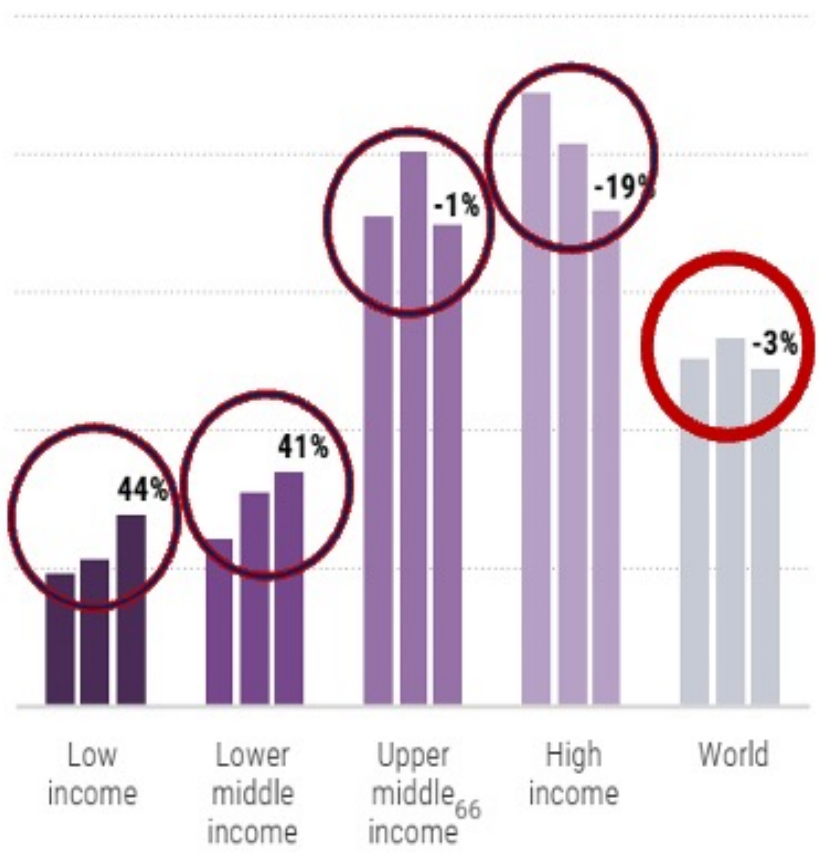


Impacts: Reductions in high consumption contexts means that resource use grows where it is most needed

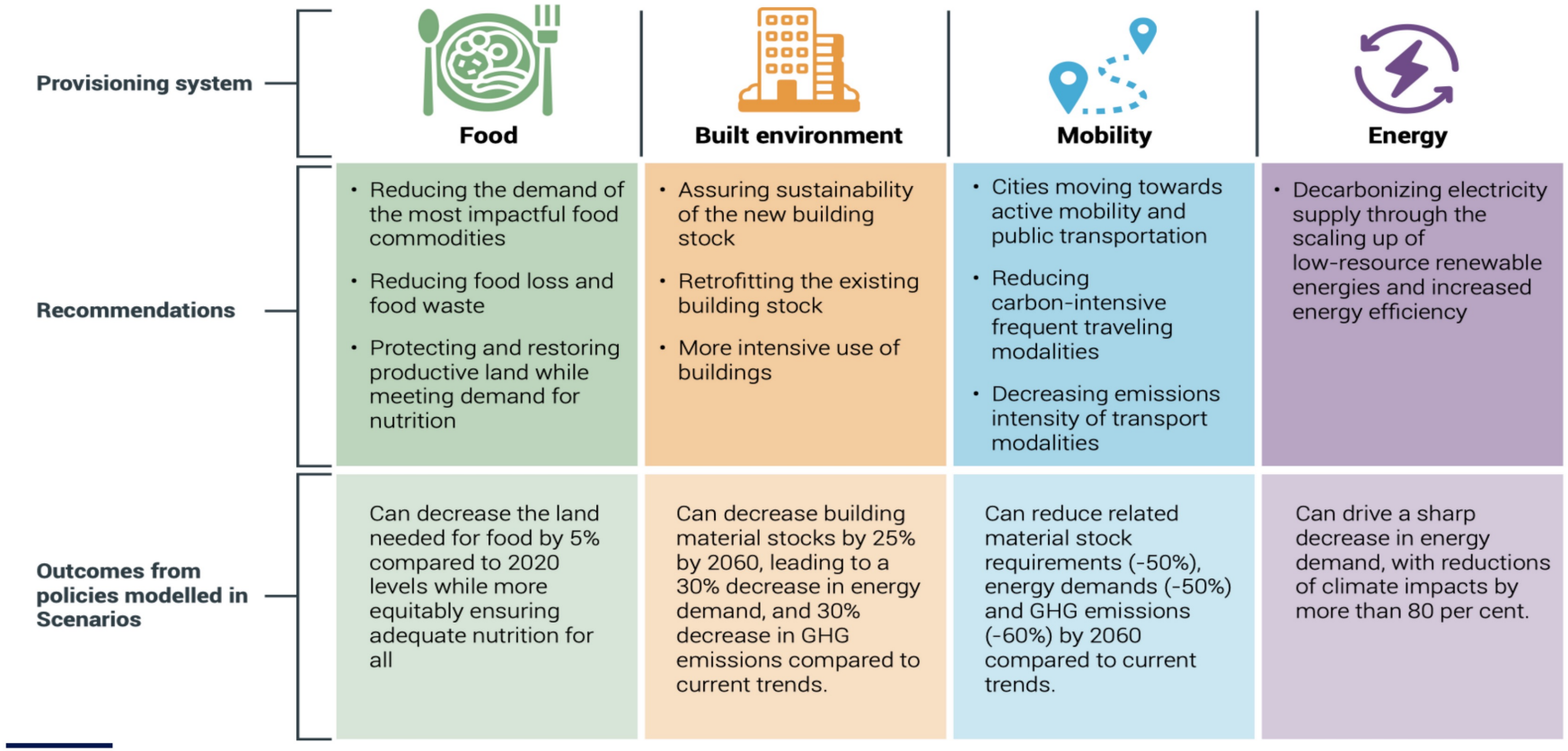
Resource extraction (DE) per capita by income group, 2020, 2040 and 2060



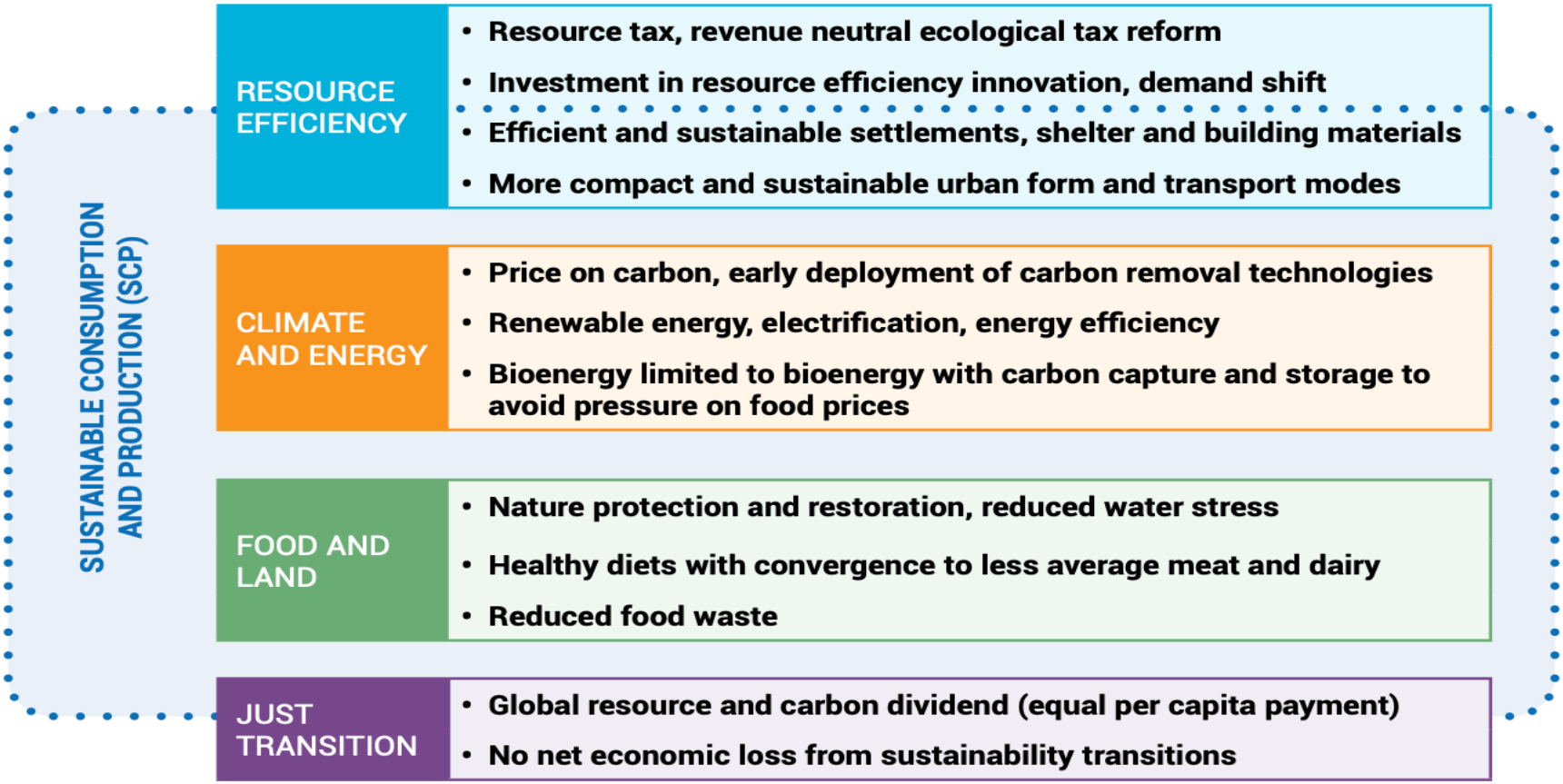
Material footprint (MF) per capita by income group, 2020, 2040 and 2060



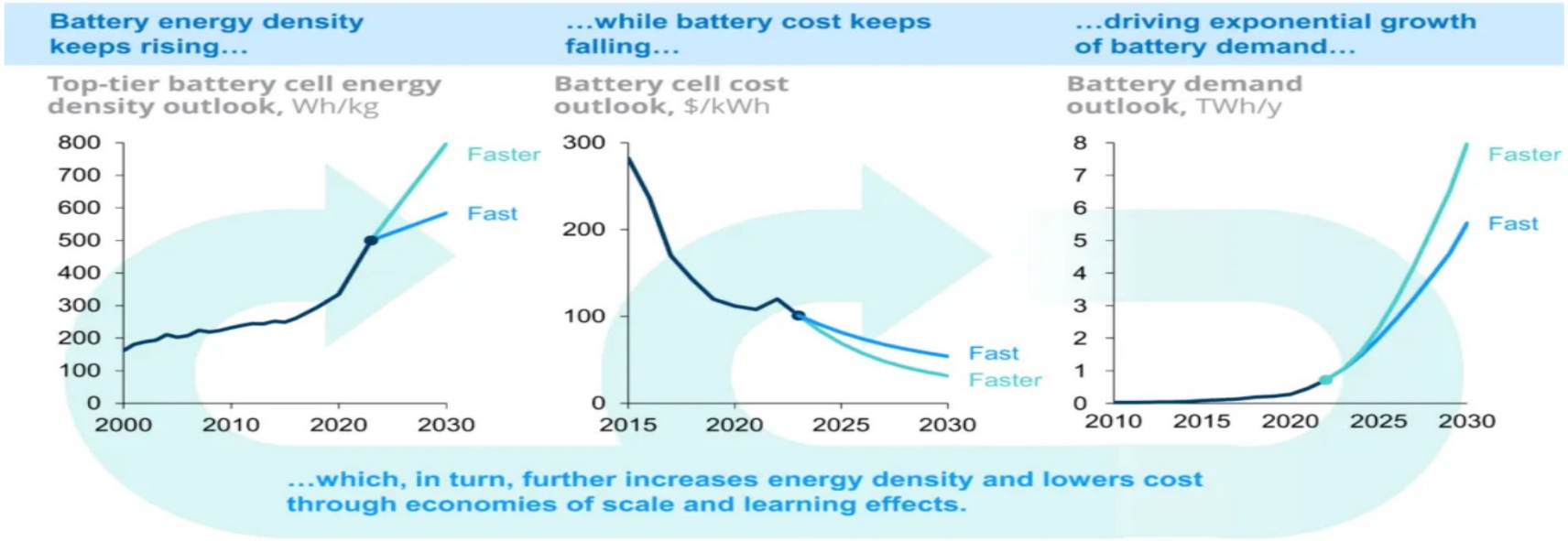
Solutions: Strategies for Reducing Resource Use across Provisioning Systems



Provisioning system	Food	Built environment	Mobility	Energy
Recommendations	• Reducing the demand of the most impactful food commodities • Reducing food loss and food waste • Protecting and restoring productive land while meeting demand for nutrition	• Assuring sustainability of the new building stock • Retrofitting the existing building stock • More intensive use of buildings	• Cities moving towards active mobility and public transportation • Reducing carbon-intensive frequent traveling modalities • Decreasing emissions intensity of transport modalities	• Decarbonizing electricity supply through the scaling up of low-resource renewable energies and increased energy efficiency
Outcomes from policies modelled in Scenarios	Can decrease the land needed for food by 5% compared to 2020 levels while more equitably ensuring adequate nutrition for all	Can decrease building material stocks by 25% by 2060, leading to a 30% decrease in energy demand, and 30% decrease in GHG emissions compared to current trends.	Can reduce related material stock requirements (-50%), energy demands (-50%) and GHG emissions (-60%) by 2060 compared to current trends.	Can drive a sharp decrease in energy demand, with reductions of climate impacts by more than 80 per cent.



v of policy packages and societal shifts in the Sustainability Transition scenario for GRO24



Source: Ziegler and Trancik (2021) before 2018 (end of data), BNEF Long-Term Electric Vehicle Outlook (2023) since 2018, BNEF Lithium-Ion Battery Price Survey (2023) for 2015-2023, RMI analysis.

To Conclude

Science is Clear and Change is Unavoidable

Towards the World of GRO 2024

Demand side, Sufficiency, Consumption

We can reduce demand (of energy and materials) from consumption as well as from production side

From the consumption side we can reduce consumption through optimising what is sufficient to meet human needs.

From the production side we can provide human needs by using less energy & materials – optimising sufficiency of energy and materials needed to meet human needs.

To clarify: Consumption behaviour concept is more addressing consumer.

Consumption system concept is more addressing producers.

Main Blind-Spots preventing us to move faster and deeper

Lack of Holistic System approach

Public leaders and others lack capacity or knowledge of how to translate system change visions into their concrete policies/investment structures which ends in conflicting policy logics that hinder real transformation

Lack of Drivers and Pressures Perspective

Policy attention does not focus on the roots of the problem and address the drivers and pressures. It lack focus on natural resource use and management, as well as on market signals leading consumers and producers' behaviour.

Lack of Demand Side Focus

Policy attention is mainly given to the supply side of the economy, to the cleaning of the existing economic system - lacking the attention to the demand side which is leaving out an important solutions potential and questions of responsibility and equity.

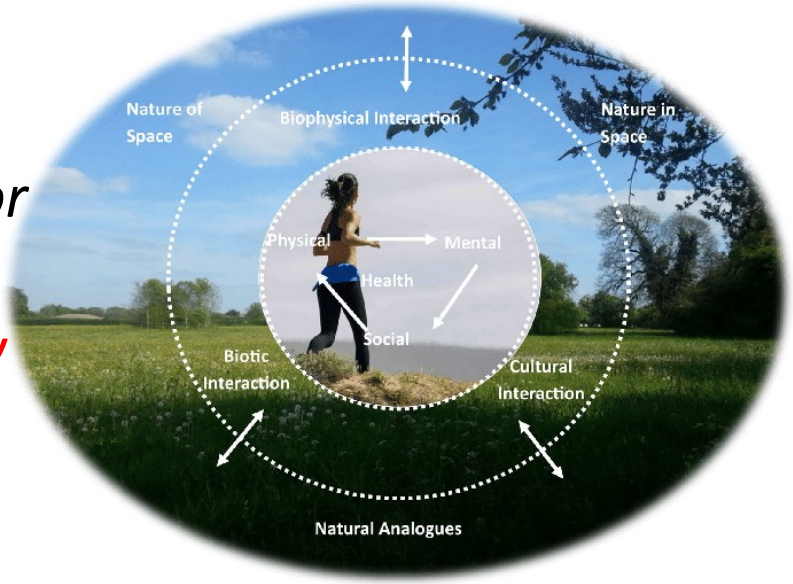
Any transformation is a major business opportunity

for those who are innovative, those who dare and those who understand the essence of the challenges ahead of us.

We should not accept that meeting human needs should be resource intensive and stop stimulating extraction based economic success and rather reward responsible, innovative, creative ways of meeting human needs.

Changing our Relationship with (the rest of) Nature, is ultimately an Economic, Equity and Security Imperative to strengthen collective Resilience

The lessons learned recently (war, pandemic, the hottest summer) are more than convincing to understood that. This relationship is not stable, nor balanced, and it will be resolved either with collective wisdom and effort, or in a hard and very painful way (conflicts, pandemics, migration …)



The future will be green … or there will be no future.