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PLANET ARK

Circularity 2023

21 NOV | 11:00 AM - 12:00 PM

Critical Minerals and Resource Extraction in a Carbon Neutral and Circular Economy: What are the options?

Keynote

Heinz Schandl
CSIRO

Moderator

Sally Kasner
thinkstep-anz

Ross Lambie
Minerals Council of Australia

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Circularity 2023 Melbourne
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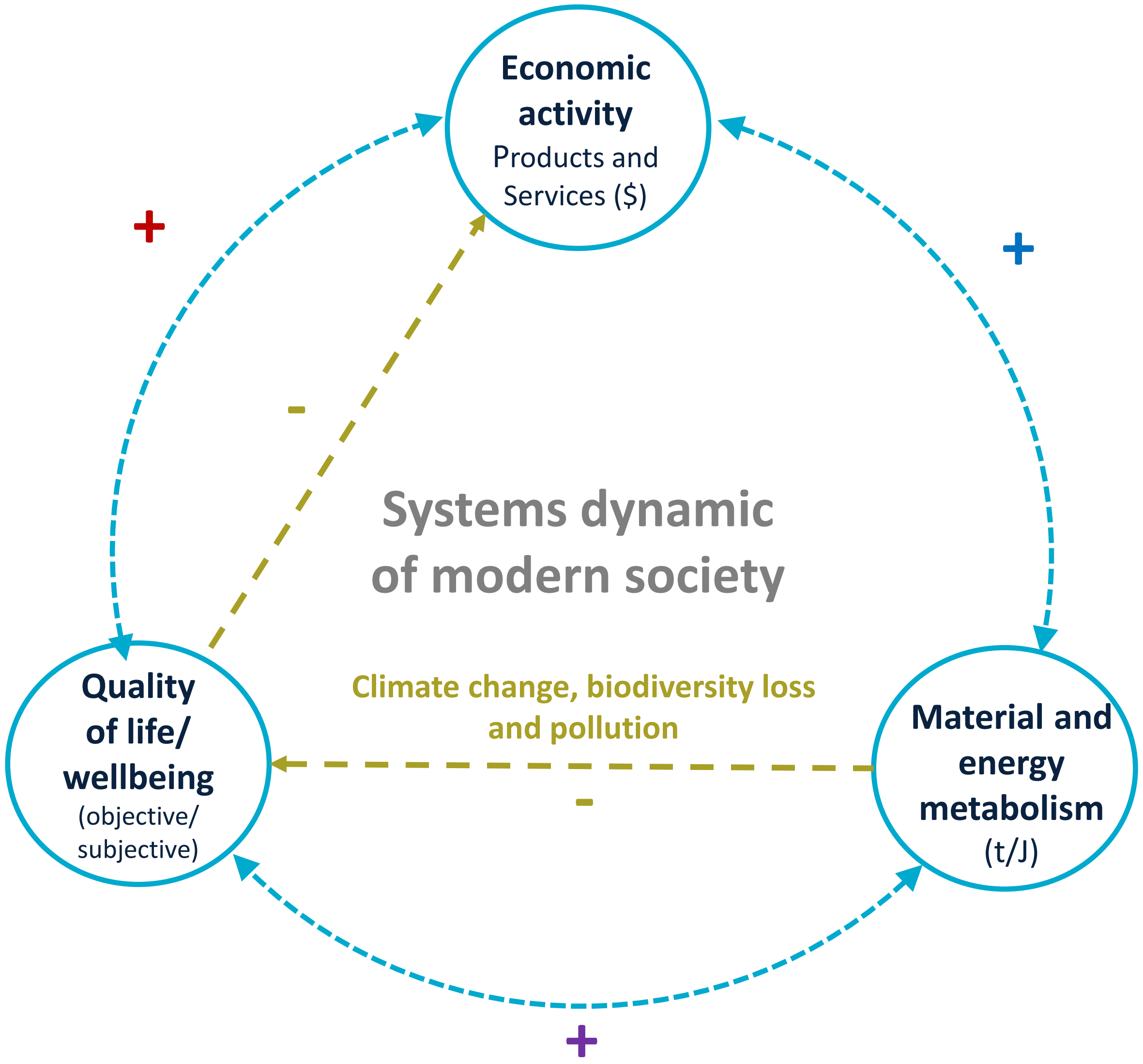
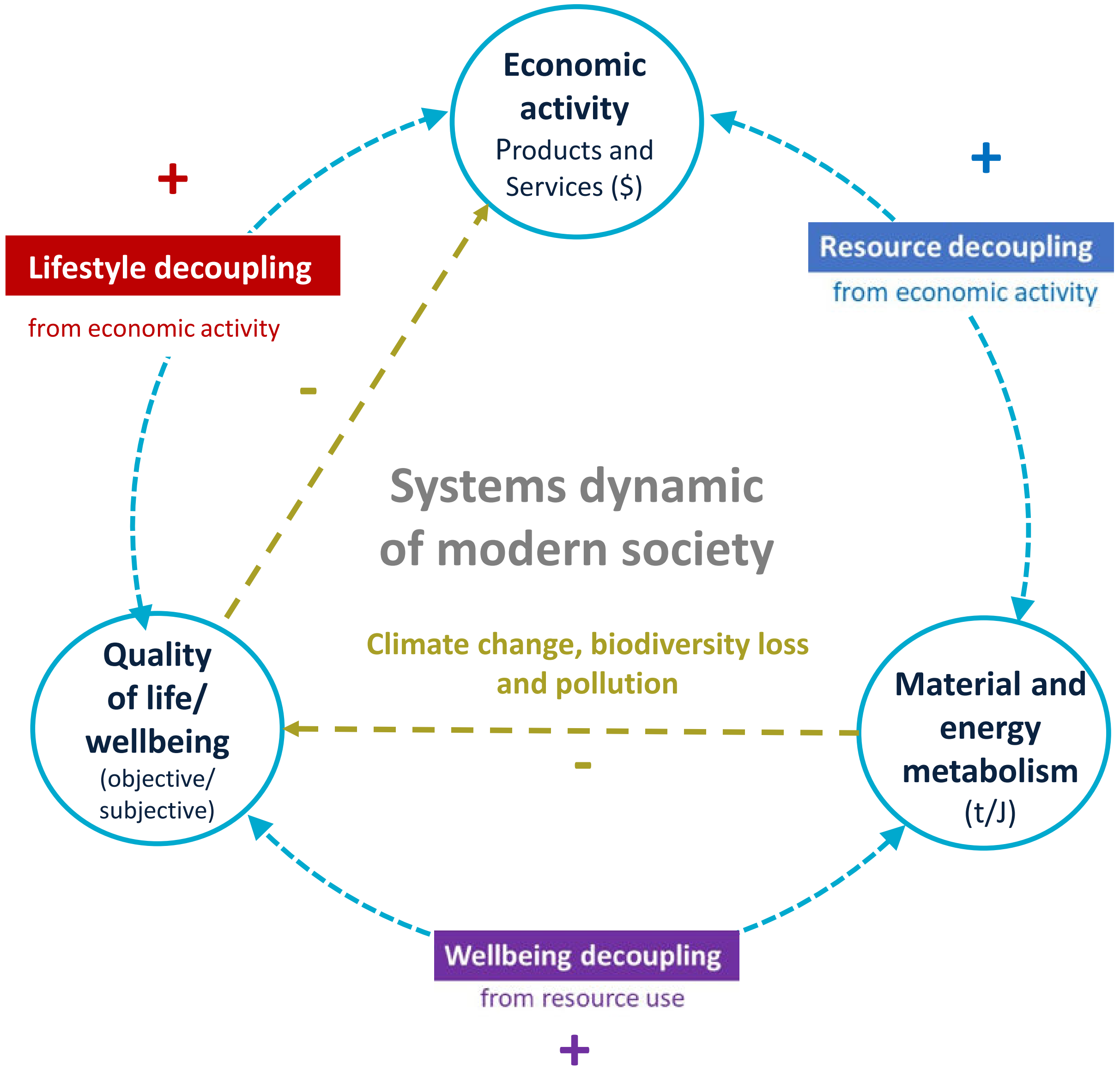
Systems dynamic of modern society



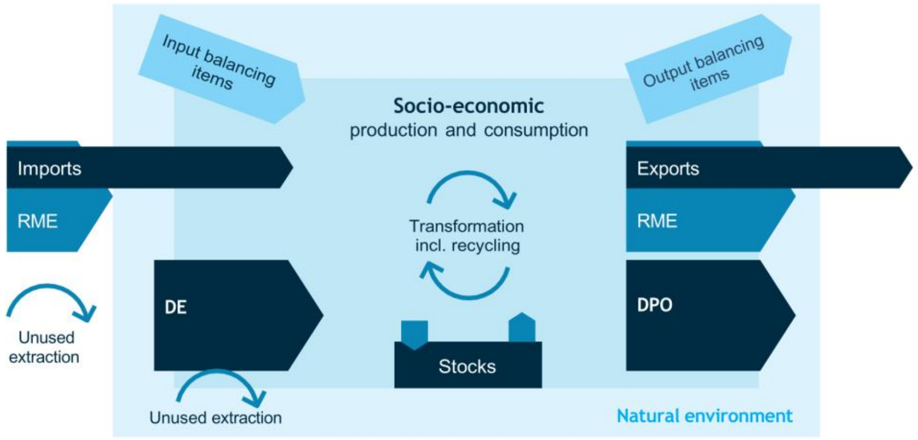
Systems dynamic of modern society



Material Flow Analysis

- a well-established tool to track the use of resources in a national economy
- complementary to economic accounts, SEEA framework
- used to measure circularity in the EU, Japan, China, the UNEP and OECD

Figure 1.2 Schematic representation of EW-MFA.



Legend

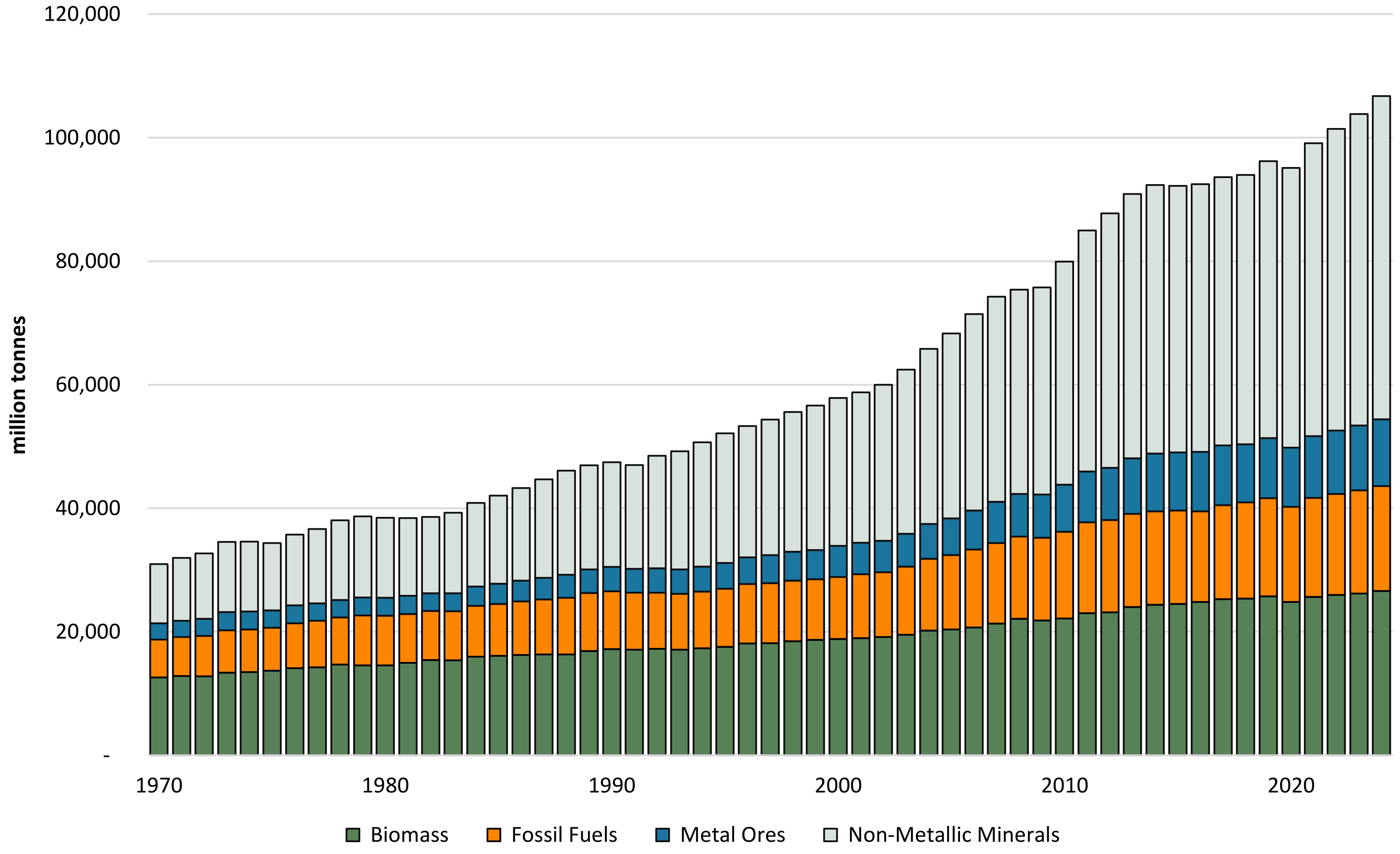
DE = domestic extraction; DPO = domestic processed outputs, i.e. wastes, emissions, dissipative uses and losses;

RME = raw material equivalents

Source: (Matthews *et al.* 2000, modified).

[A Global Manual on Economy Wide Material Flow Accounting | Resource Panel]

Global material use 1970-2024



Source: UNEP-IRP, 2024

106.7 billion tonnes of biomass, fossil fuels, metal ores and non-metallic minerals in 2024

Projected 160 billion tonnes by 2060

Stagnant material efficiency, growing waste and emissions

Triple planetary crisis of climate change, biodiversity loss and pollution

50% of climate change impacts

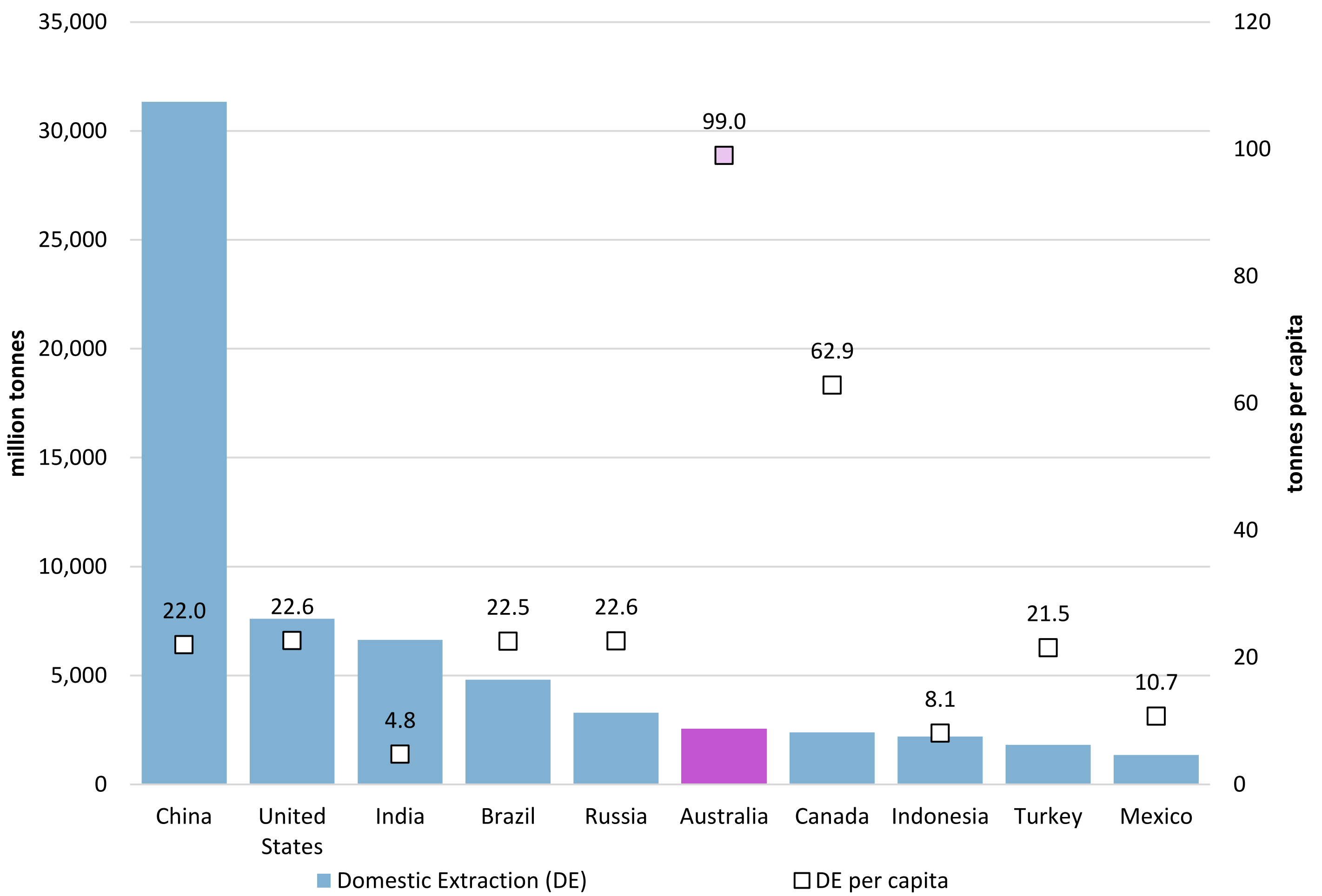
90% of water stress and land use related biodiversity loss

30% of pollution related health impacts

Benefits unequally distributed

World economy is around 7.5% circular

Top-10 primary material producers in 2020



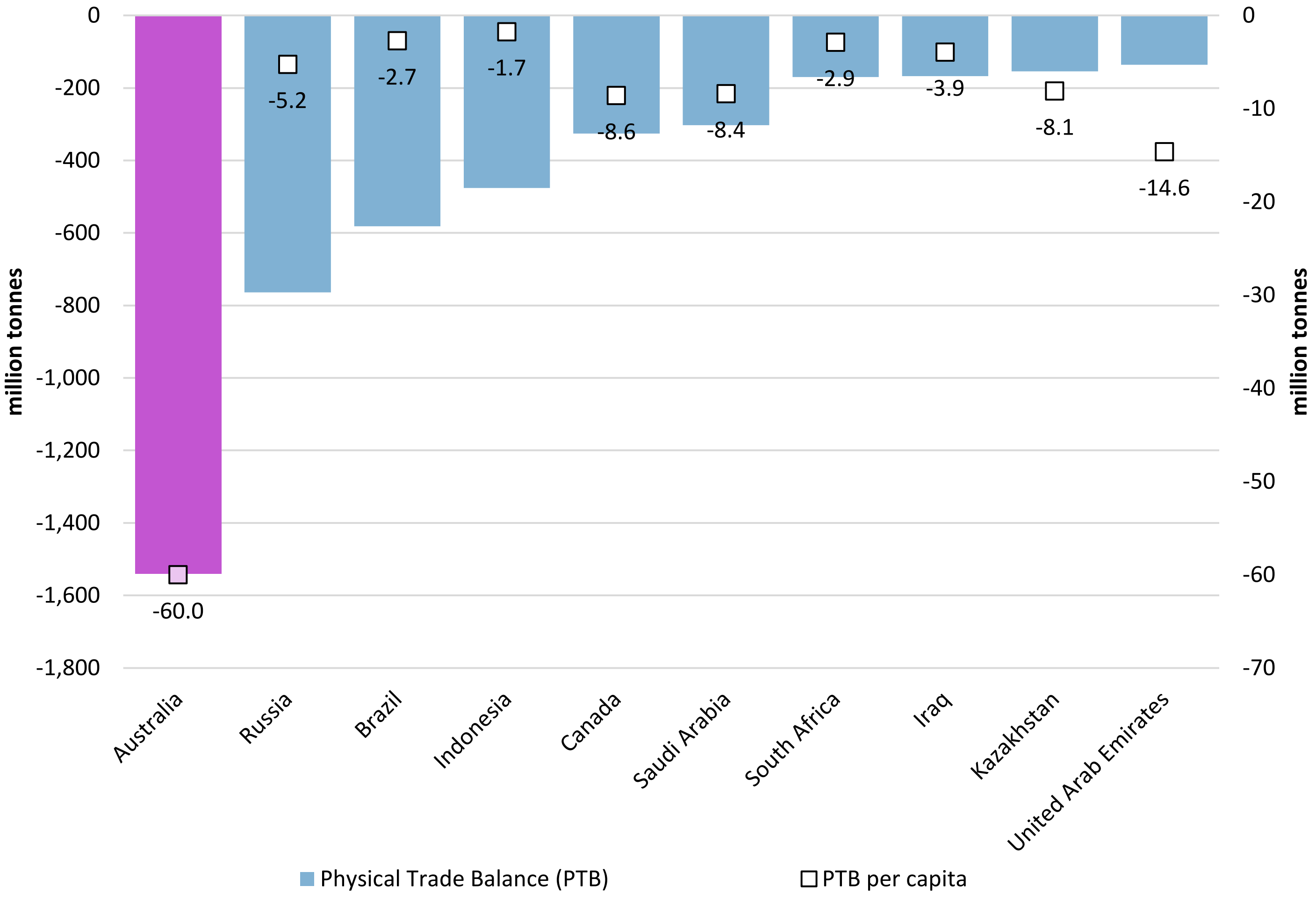
Source: UNEP-IRP, 2024

Australia is among the top-10 primary material extractors globally

Australia produced 2.5 billion tonnes of biomass, fossil fuels, metal ores and nonmetallic minerals

99 tonnes per person

Top-10 primary material exporters in 2020



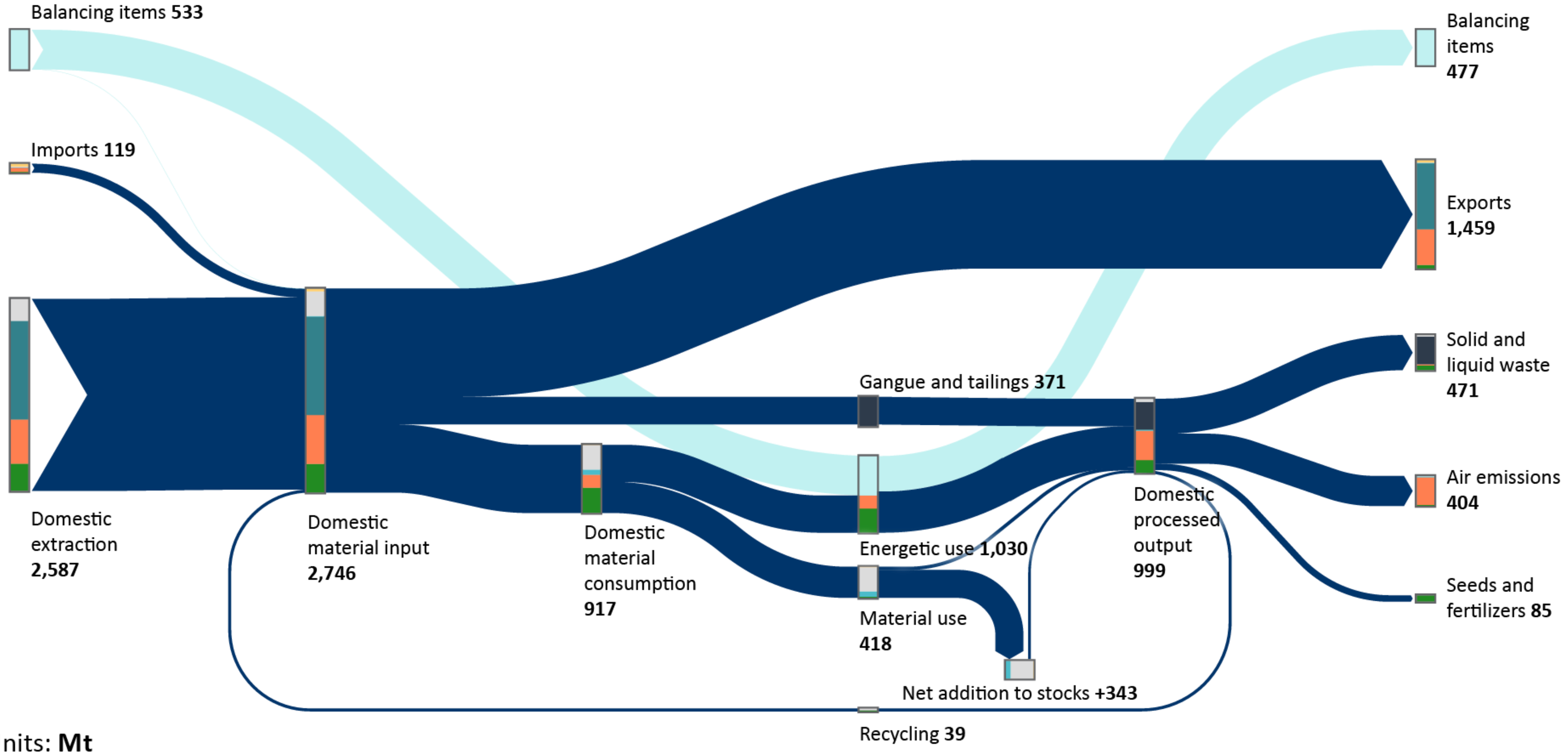
Source: UNEP-IRP, 2024

Australia is the largest exporter of primary materials globally

Australia exported 1.54 billion tonnes of biomass, fossil fuels and metals

60 tonnes per person

Australia's material flows 2019



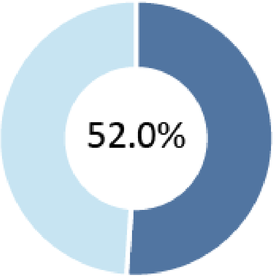
Units: **Mt**

Biomass | Fossil fuels | Metals | Metal ores | Gangue and tailings | Nonmetallic minerals | Other products n.e.c. | Balancing items

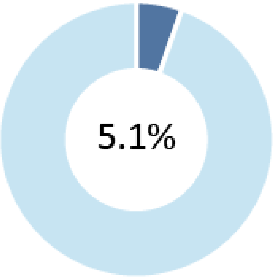
Australia’s circularity metrics

- Recycling rate – how much of end-of-life waste is recycled
- Circularity rate – material that is returned to a second use of all material that we manage
- Circularity potential – maximum amount of material that can be kept in circulation based on material characteristics and technologies

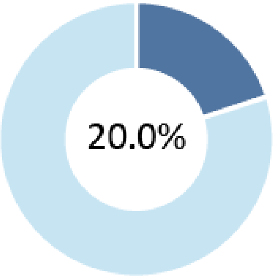
Recycling rate



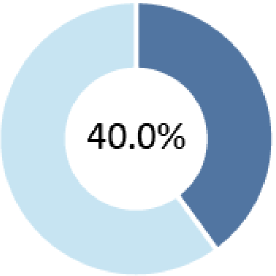
Circularity rate



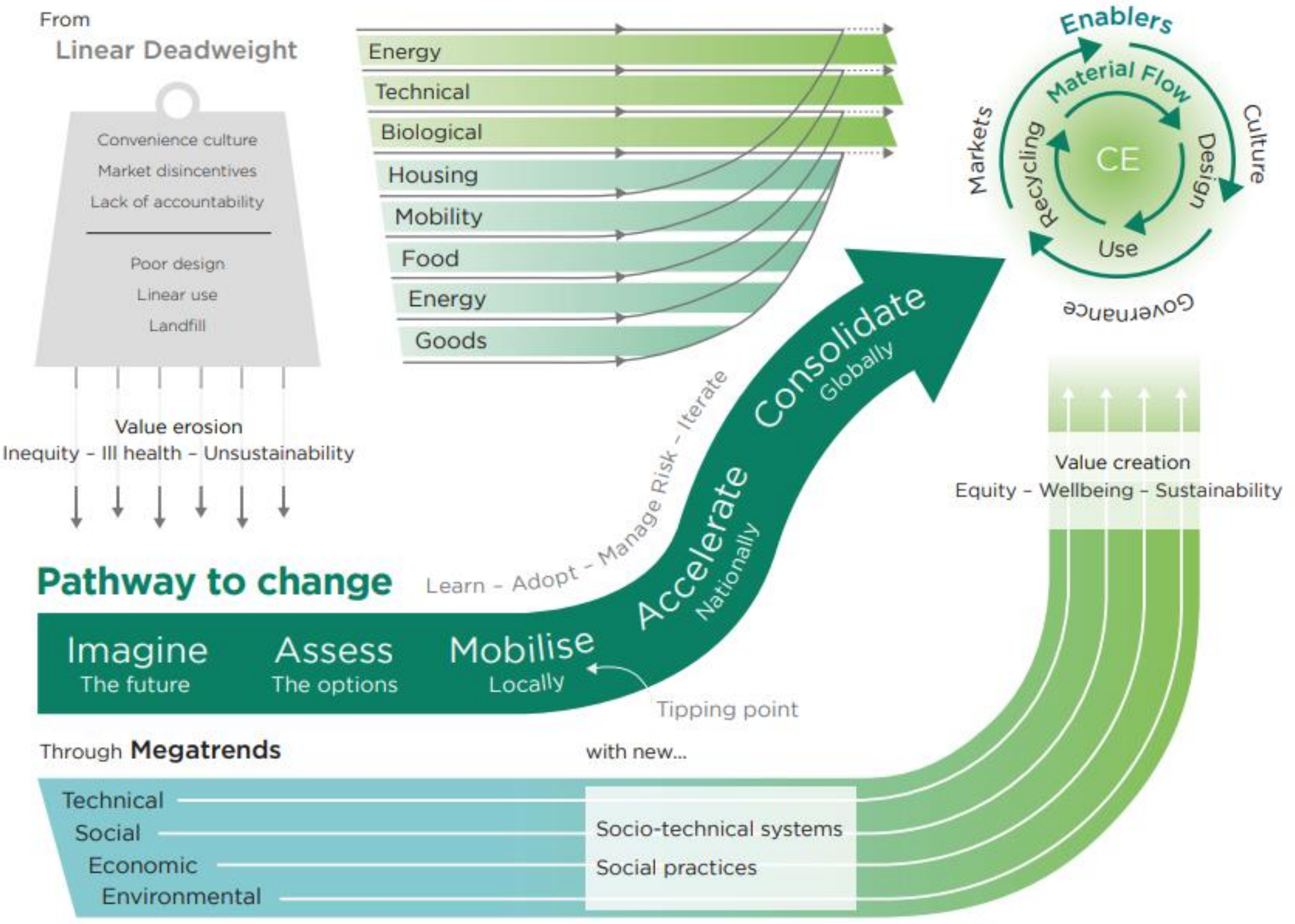
Circularity potential Australia

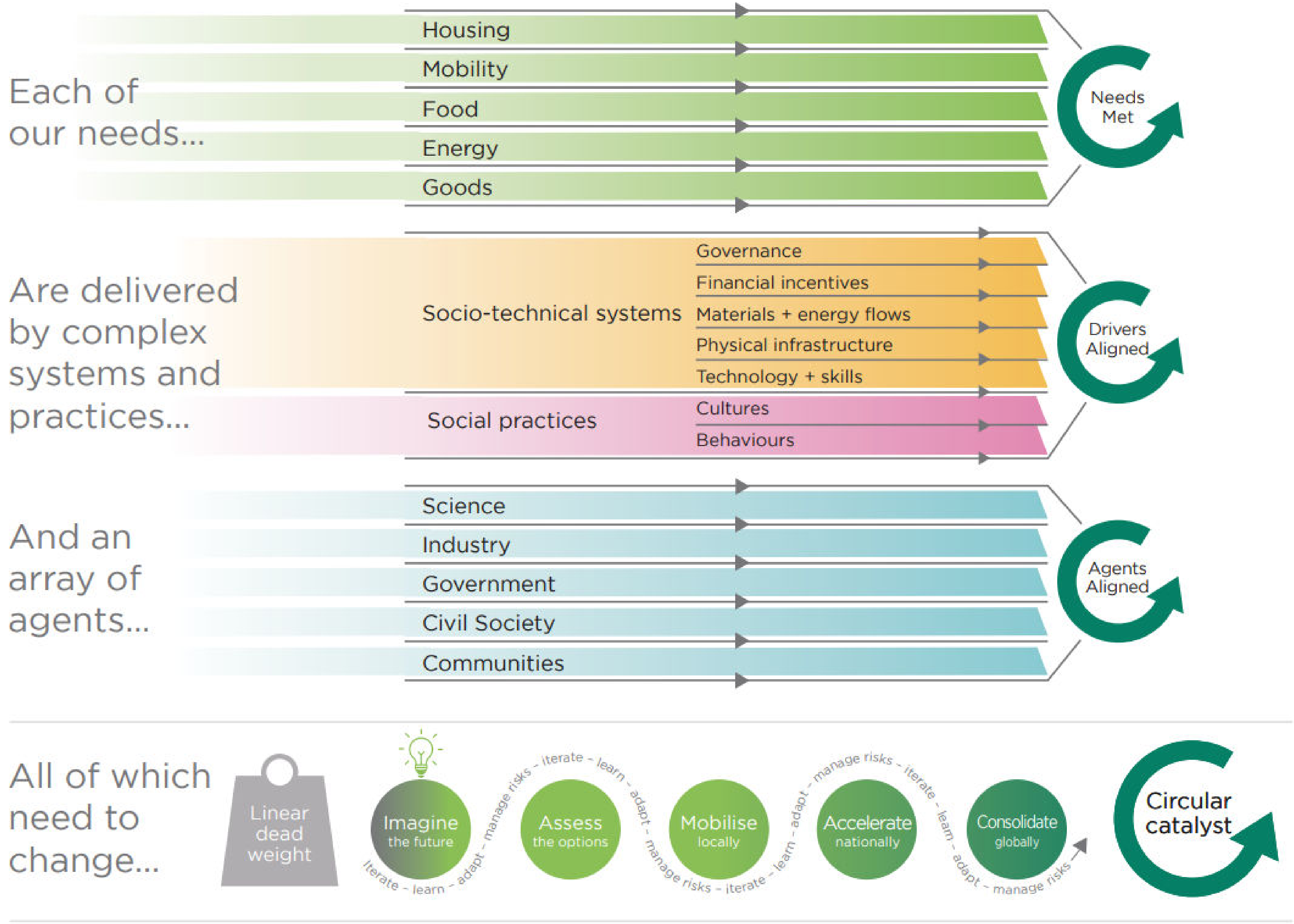


Circularity potential European Union



Change how we meet **people's needs** to... a **Circular Economy**





Each of our needs...
Housing
Mobility
Food
Energy
Goods
Needs Met
Are delivered by complex systems and practices...
Socio-technical systems
Governance
Financial incentives
Materials + energy flows
Physical infrastructure
Technology + skills
Social practices
Cultures
Behaviours
Drivers Aligned
And an array of agents...
Science
Industry
Government
Civil Society
Communities
Agents Aligned
All of which need to change...
Linear dead weight
Imagine the future
Assess the options
Mobilise locally
Accelerate nationally
Consolidate globally
iterate - learn - adapt - manage risks - iterate - learn - adapt - manage risks - iterate - learn - adapt - manage risks - iterate - learn - adapt - manage risks - iterate - learn - adapt - manage risks
Circular catalyst

Pathway to Change

- What is our sustainable future?

- What trade offs are needed?
- What are the risks to equity?
- What are the risks to wellbeing?
- What barriers do we face?

- Who acts first?
- What is working?
- How can we show that?

- What market incentives are needed?
- What culture change is needed?
- What regulation is needed?

- What rules or sanctions are needed?
- What treaties are needed?

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