

SYSTEMS TRANSFORMATION HUB

Launch Event



Co-funded by the
European Union



WORLD
RESOURCES
INSTITUTE



Metabolic

Welcome



Sirpa Pietikäinen
Member of the European Parliament

Opening remarks



Sandrine Dixson-Decleve
Co-President, The Club of Rome

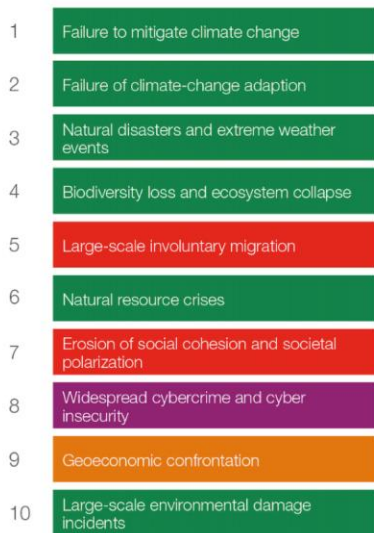
Top 10 Risks

“Please estimate the likely impact (severity) of the following risks over a 2-year period and a 10-year period”

2 years



10 years



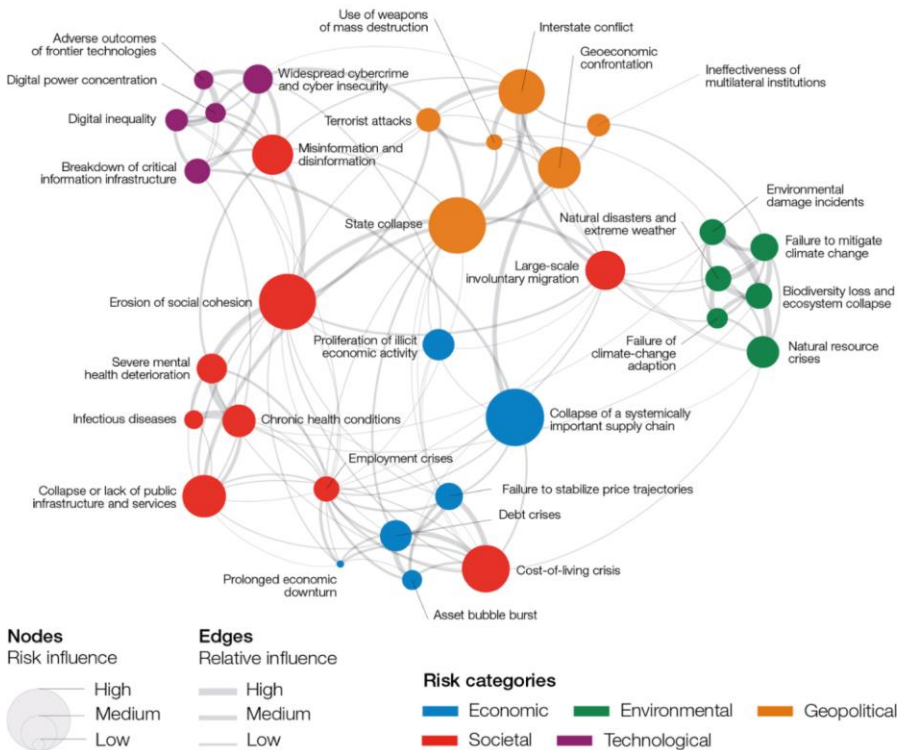
Risk categories



Source: World Economic Forum, Global Risks Perception Survey 2022-2023

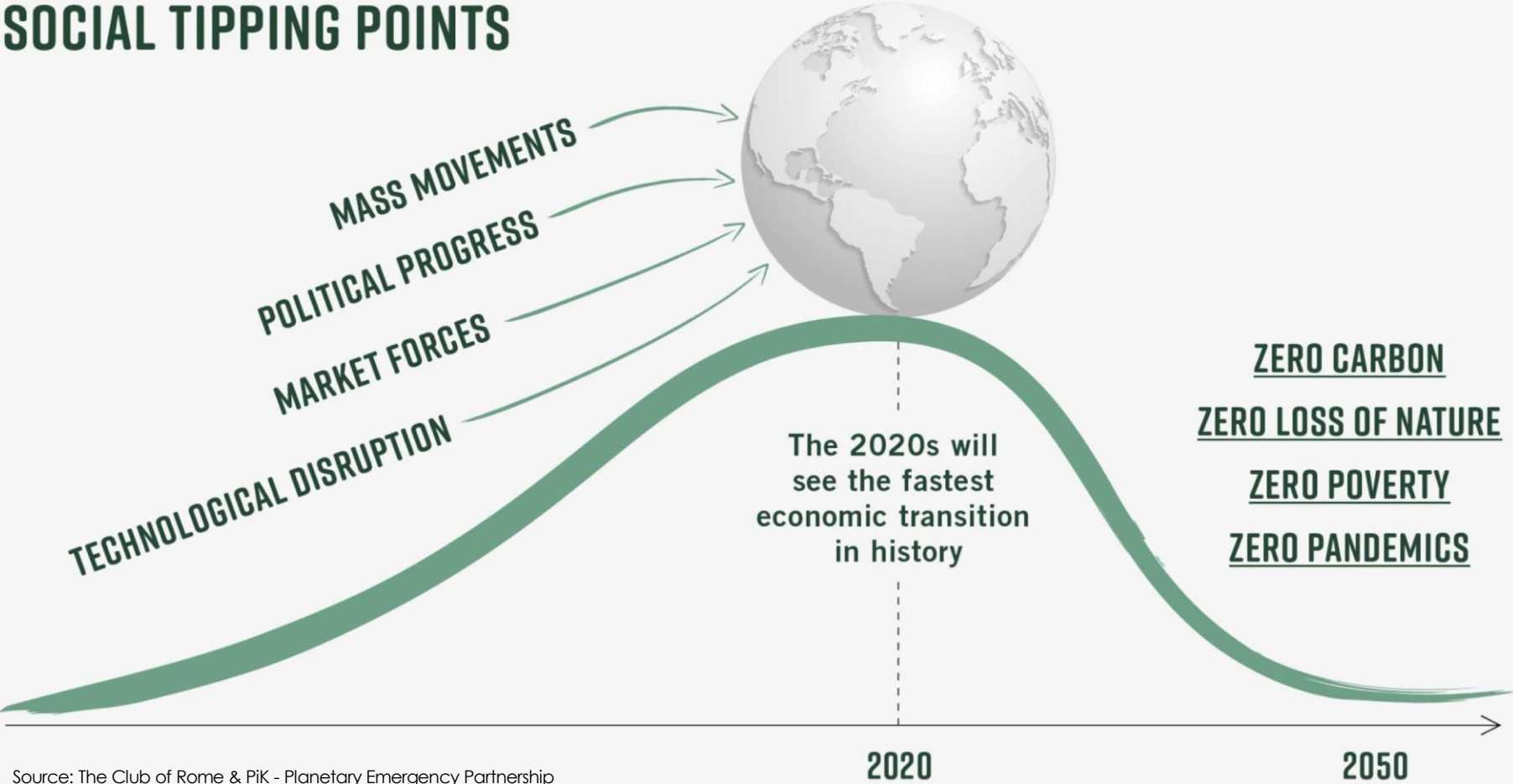


Global risks landscape: an interconnections map



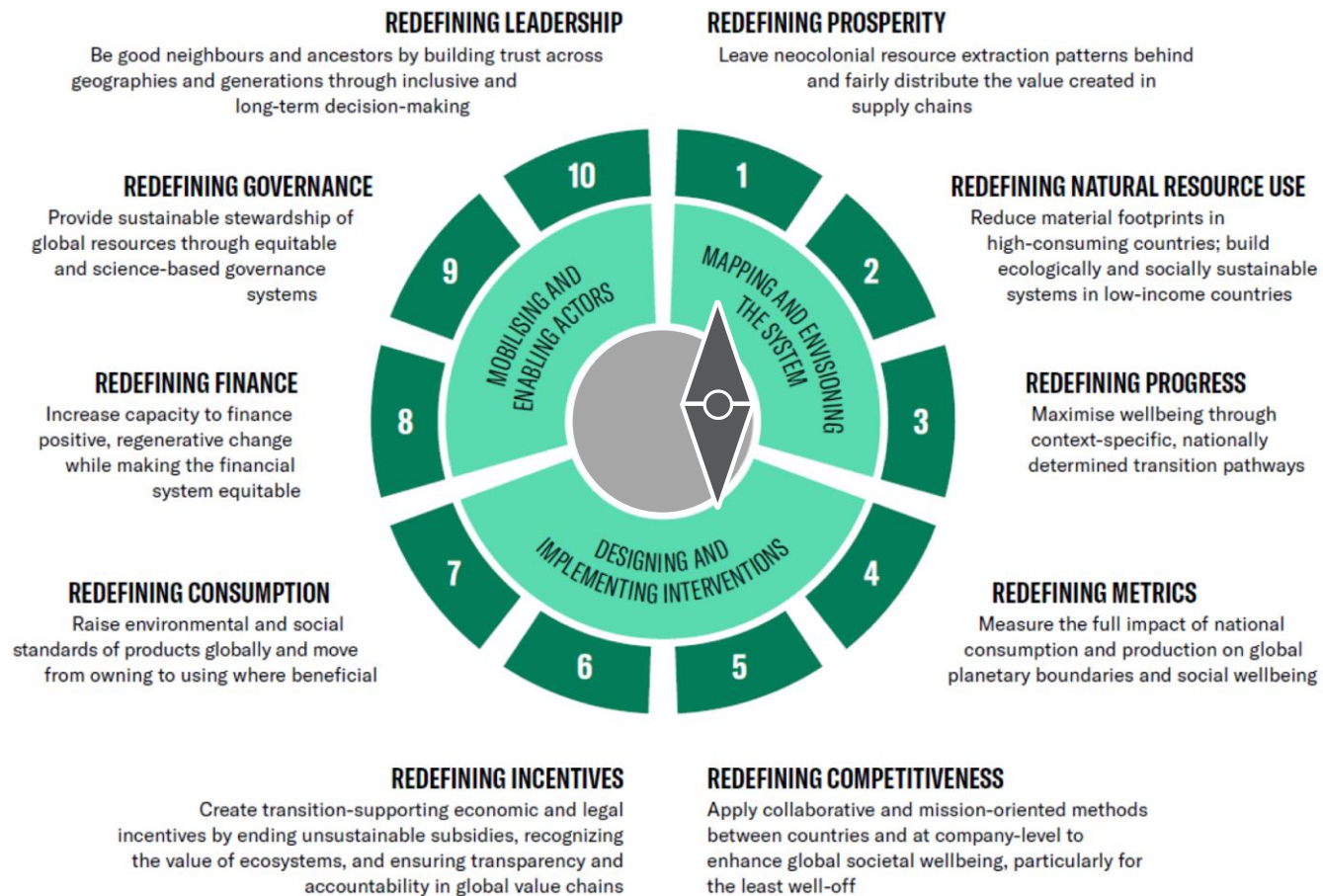
Source: World Economic Forum, Global Risks Perception Survey 2022-2023

SOCIAL TIPPING POINTS



Source: The Club of Rome & PiK - Planetary Emergency Partnership

The system change compass



Why a Systems Transformation Hub

The Systems Transformation Hub will support a systems change approach for the '24-'29 Commission period and beyond, based on recommendations developed in its initial systems roadmap and toolkit of solutions. Its focus will consist of:

- **Convening multi-stakeholder dialogic processes for change**, to dissect the obstacles and "super wicked problems" preventing change within our current systems
- **Envisioning and creating knowledge**, to address identified gaps for systems approach policymaking
- **Experimenting systems approaches in policymaking**, to demonstrate if such ideas are feasible and can shift incentive structures as desired at multiple scales
- **Coordinating the partnership and partners' EU activities**, to amplify the impact and reach of each individual organisation, without restricting their independence.
- **Providing rapid-response intelligence and advice**, to support and impact short-term decision-making, on urgent and complex issues that are pressing in nature

What is required for a Systems Approach to policy making?

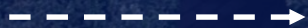
The European Green Deal is under pressure due to mounting social and political tensions



It is imperative that Europe stays steady in its resolve to demonstrate leadership for a sustainable future



Systems thinking and systematic approaches¹ are essential to navigate the poly-crisis, ensure stability and Europe's democratic processes



We have a unique opportunity to deliver **Systems solutions for the next European Commission and beyond**

¹Systems change is defined as changing the elements and connections of a system to alter its function or purpose (based on Meadows, 2008), for a detailed description of a systems approach in a European context, see slide 17.

What is required for a Systems Approach to policy making?

Based on our respective experience developing roadmaps with a systems approach, we identified the 7 capacities required to develop such roadmaps at the desired scale, depth, and robustness:



Innovative system change models



Track record working with all governance levels



Thematic boundary crossing expertise & networks



Experimentation spaces for policy innovation



Local and international perspectives and networks



New Narrative crafting capabilities



System Change policy advice expertise

Why this new radical new partnership?

We collectively possess the essential capacities required to develop a EGD 2.0 roadmap and policy proposals for the future, through the following activities, projects and programmes. We currently possess:



Innovative system change models - Earth4All, IRP¹, Carbon Harvest Model



Thematic boundary crossing expertise & networks - FOLU², Climate-KIC's members, Club of Rome members, ETC³ and many more



Local and international perspectives and networks - Collective global activities, International Systems Change Compass



System Change policy advice expertise - System Change Compass, System Change Lab, Earth4All



Track record working with all governance levels - Eurocities, Climate-KIC's programmes



Experimentation spaces for policy innovation - Metabolic and Climate-KIC's deep demonstrations spaces



New Narrative crafting capabilities - Founders' storytelling experience at highest levels

We strive for a European Union that can promote pathways for global society that is prosperous, equitable and sustainable, based on:

- A shift of policy making in silos to an integrated system change approach
- A new positive, progressive narrative on change
- The capacity to diagnose complex challenge, experiment, innovate and implement using systems approaches is mainstreamed in the EU policy-making
- A shift of paradigm from short term economic policy needs to coherent and integrated systems approach
- A European economic model that shifts from current growth paradigm to long term socio-economic well-being within planetary boundaries

Video Intervention



Maroš Šefčovič

European Commission Executive Vice-
President for the European Green Deal

Keynote



Kurt Vandenberghe
Director-General – DG CLIMA,
European Commission

STH in practice



Janez Potočnik

Former European Commissioner, Partner at SYSTEMIQ
and Co-Chair of the International Resource Panel



Kirsten Dunlop

Chief Executive Officer at EIT Climate-KIC

Launching
**THE SYSTEMS
TRANSFORMATION HUB**

24th of January 2024
18.00-19.30 CET | ONLINE



Enabling the Energy Transition
System Change Approach to CRMs

JANEZ POTOČNIK

Co-Chair International Resource Panel - IRP

Partner SYSTEMIQ

Member Club of Rome

Brussels, 24th January 2024

THE CHALLENGE

Decarbonisation and Decoupling

*European Green Deal “Reaching no net emissions of greenhouse gases in 2050
and where economic growth is decoupled from resource use”*

Top Six Takeovers from WEF - Critical Minerals are Hot

Financial Times, Gillian Tett, January 19th, 2024

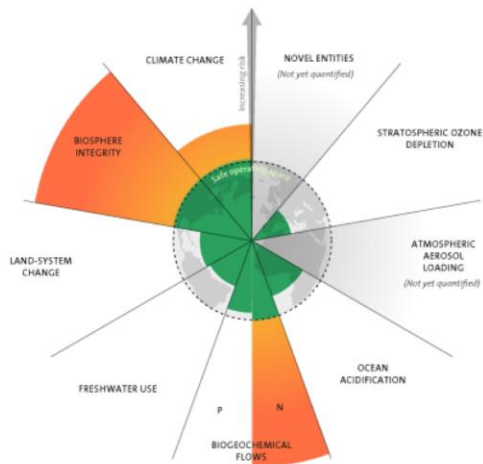
Everyone in green tech is obsessed with the periodic table these days: extensive sources of minerals such as lithium and nickel are needed to make renewable energy fly. And the fact that supply chains around these are so geographically focused is a source of endless angst on many corporate boards - not to mention western security institutions. A hot topic was whether it is possible to diversify sourcing.

The Behavioural Crisis Driving Ecological Overshoot

Joseph J. Merz et al, Sage journals, September 20th, 2023

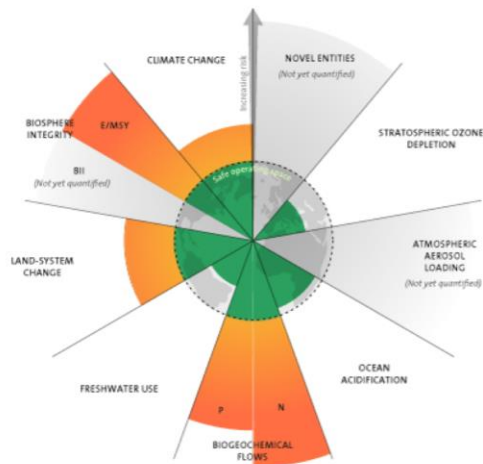
Climate breakdown is a symptom of ecological overshoot, which in turn is caused by the deliberate exploitation of human behaviour. We need to become mindful of the way we're being manipulated. The material footprint of renewable energy is dangerously underdiscussed. These energy farms have to be rebuilt every few decades - they're not going to solve the bigger problem unless we tackle d

2009



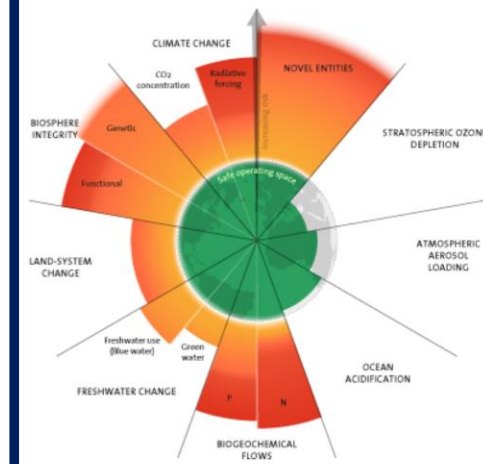
3 boundaries crossed

2015



4 boundaries crossed

2023

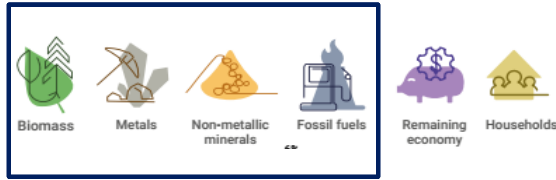


6 boundaries crossed

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

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

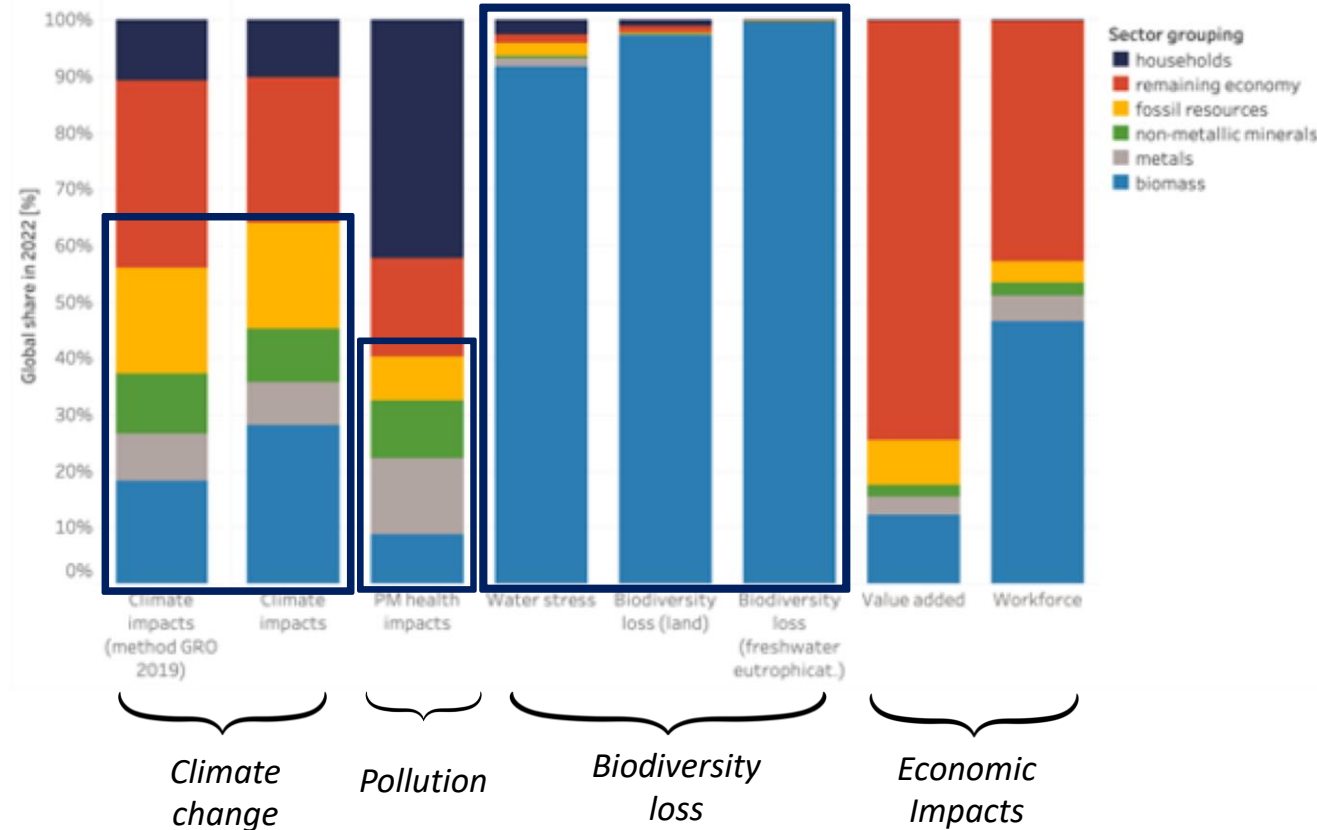


60% of global climate change impacts including land use change

40% of air pollution health impacts

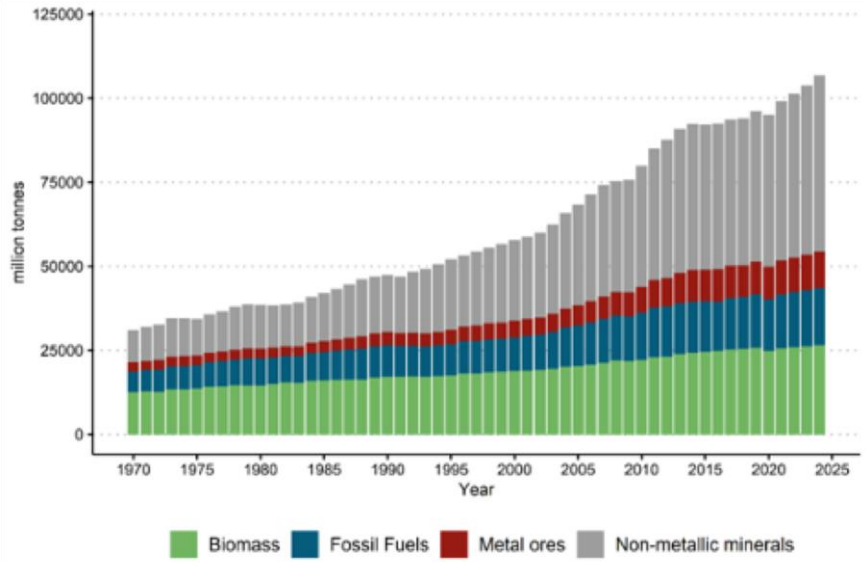
More than 90% of water stress and global land and water eutrophication related biodiversity loss

STH Launch



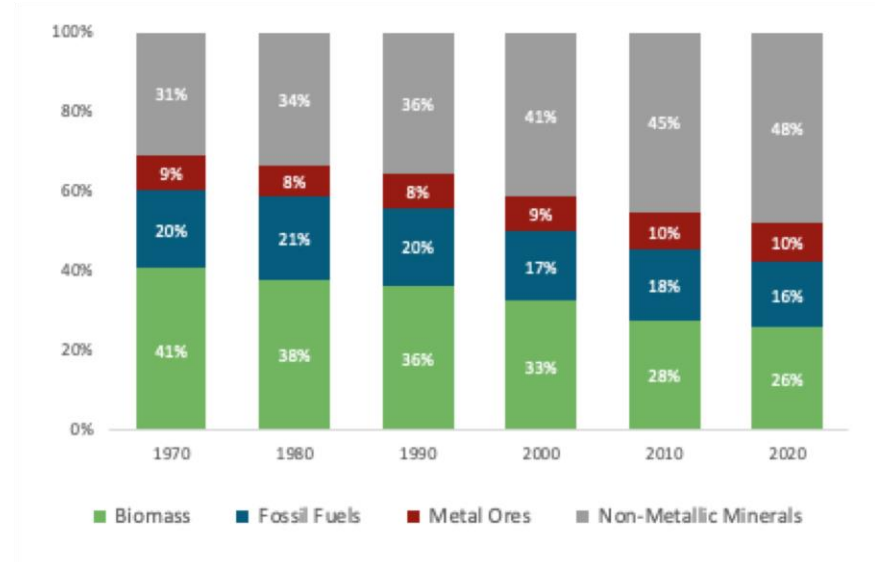
Trends: Global Material Use and Share in 1970-2023

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



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

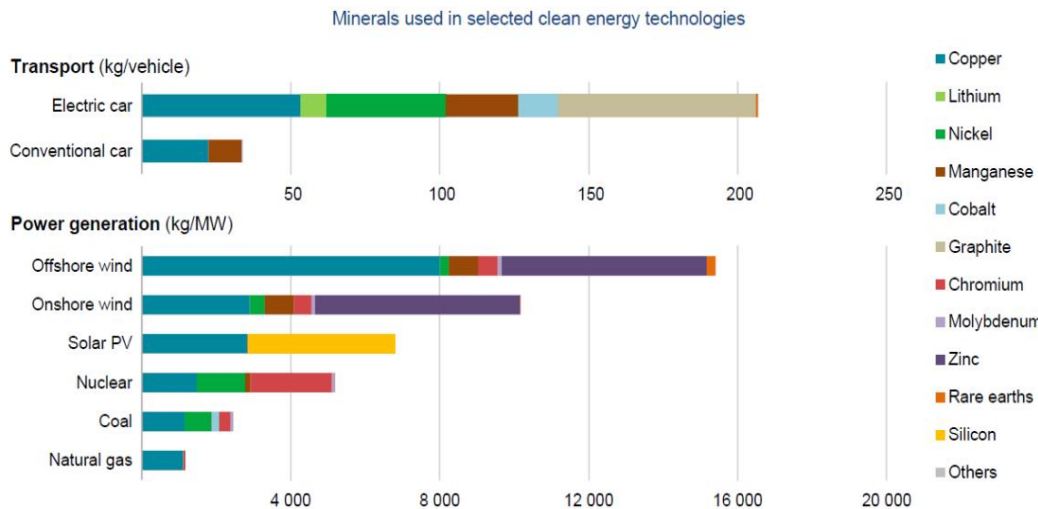


Global material extraction, four main material categories, 1970-2020, shares

Key Critical Raw Materials (Transition Materials)

STH Launch

Transition to net zero GHG target is materials demanding on the supply (energy production), and on demand (energy use) side



Electric vehicles use close to ten times the material of conventional cars – using at least eight different critical material types, compared to just three for conventional cars.

Reaching net zero by 2050 will require about six times today's critical mineral use in 2040. And even meeting today's under-ambitious national climate plans would require more than doubling of critical minerals we are using today.

Notes: kg = kilogramme; MW = megawatt. Steel and aluminium not included. See Chapter 1 and Annex for details on the assumptions and methodologies.

Source: International Energy Agency

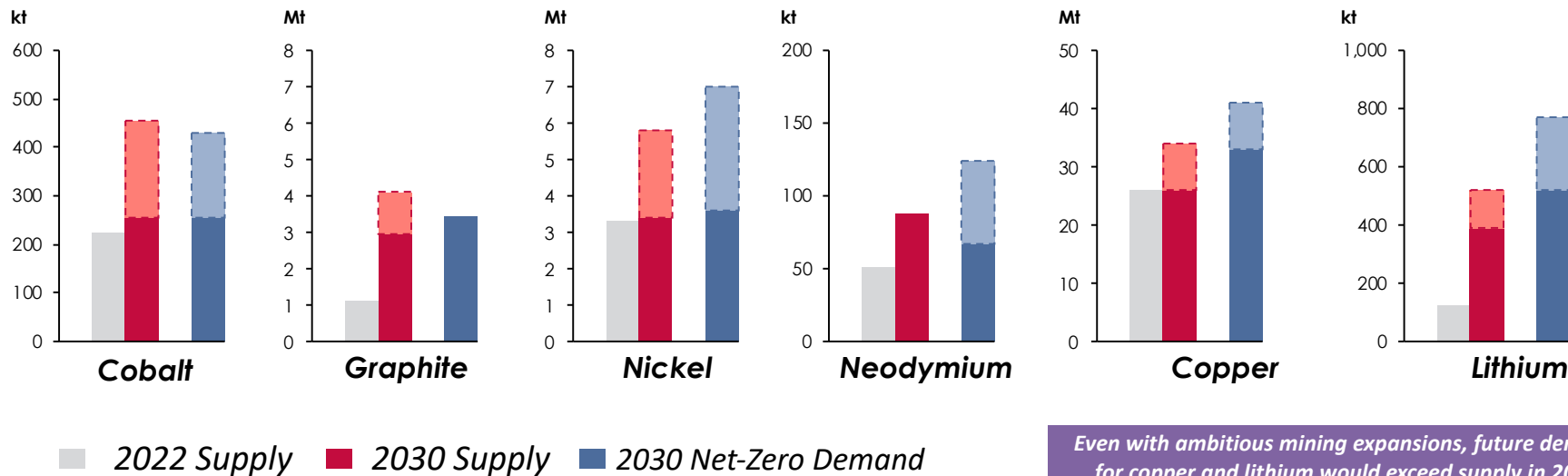
Net-Zero Demand for CRMs

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Ambitious mining expansion is unlikely to meet fast-growing demand

Demand and supply forecasts for key energy transition materials in 2030

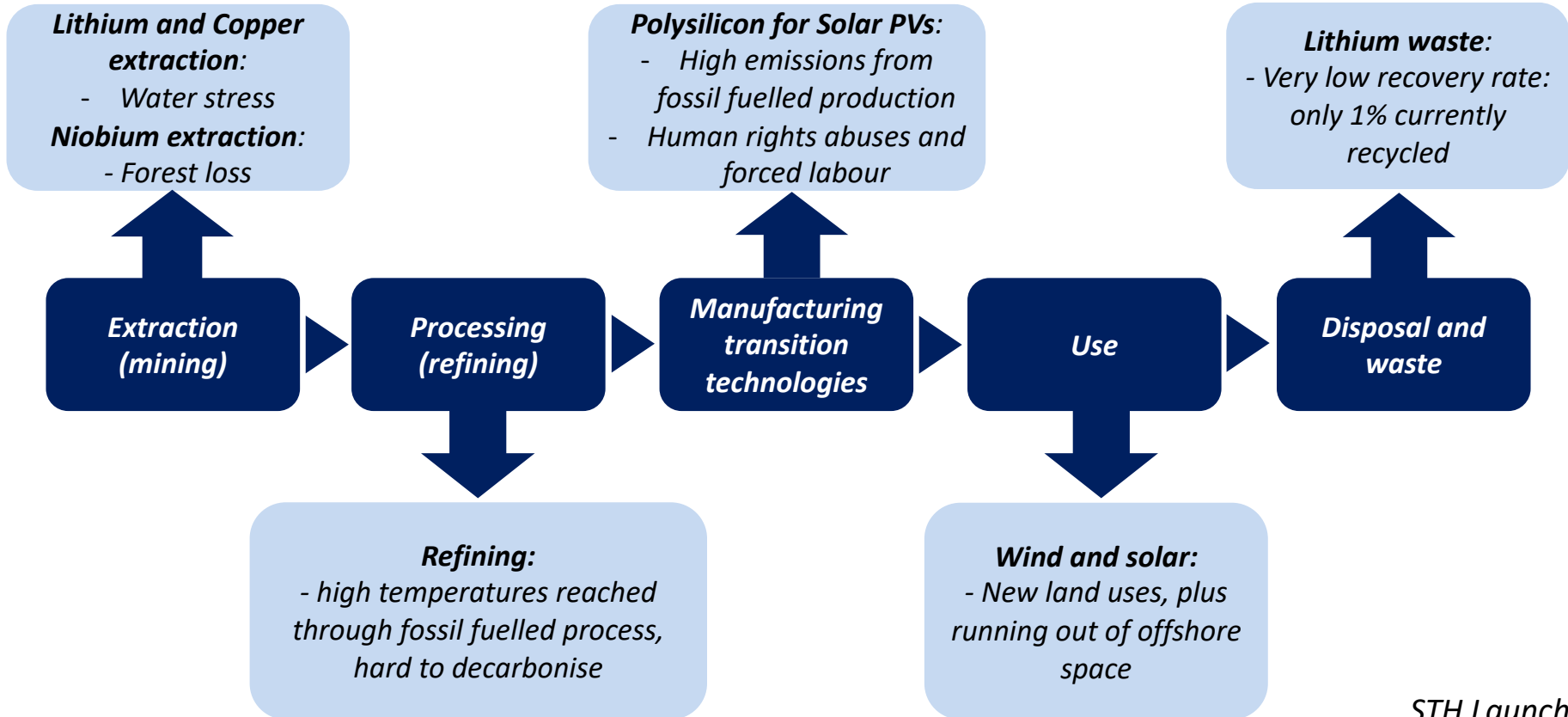
Nickel, Copper = Million metric tonnes; Cobalt, Lithium, Neodymium = Thousand metric tonnes;



Even with ambitious mining expansions, future demand for copper and lithium would exceed supply in 2030

Source: Systemiq analysis for the ETC; IEA (2023), *Energy technology perspectives* and IEA (2022), *World Energy Investments*; BNEF (2023), *Transition Metals Outlook*; ICF/RMI (2023), *Net zero roadmap to 2050 for copper & nickel mining value chains*; S&P Global (2022), *The future of copper*; &P Global Market Intelligence (2022), *Lithium project pipeline insufficient to meet looming major deficit*; Benchmark Mineral Intelligence (2023), *Albemarle's turbo-charged demand data showcases lithium's growing supply problem*; Albemarle (2023), *Strategic update*; McKinsey & Co. (2023), *Bridging the copper supply gap*; McKinsey & Co. (2022), *Lithium mining: How new production technologies could fuel the global EV revolution*

Environmental and Social Impacts along the value chain



How are High-Income Countries Approaching Increased Material Needs?

The EU CRM Act

“...streamline Strategic Projects in mining, extraction, and recycling. [...]. Member States are responsible for circularity efforts and promoting material efficiency

US strategy on CRM

“...prioritizes a Made in America Supply Chain, with investments in domestic production for critical minerals and materials.”

G7 Strategy

The G7 ministers prioritize strengthening critical minerals supply chains for a net-zero economy with high ESG standards and human rights. “... aiming for efficient international recovery, capacity building, and research for sustainable alternatives.”

*Multilateral and national strategies are focusing on managing supply chain risks of CRM (diversification) but **too little focus is on environmental impacts, and missed opportunities to reduce demand through systemic circular economy strategies***

Source: https://ec.europa.eu/commission/presscorner/detail/en/ip_23_1661

<https://www.whitehouse.gov/briefing-room/statements-releases/2022/02/22/fact-sheet-securing-a-made-in-america-supply-chain-for-critical-minerals/>

<http://www.g8.utoronto.ca/environment/2023-communique.html>

Illustration: not exhaustive of all CRM strategies

Indispensable Pillars for Material Resilience



1

Supply Transition Materials with highest environmental and social standards

***Securing enough supply:** ensuring supply is sufficient to power the energy transition*

*Aligning expanded supply with **sustainable development***

*Improving **supply resilience** by improving TM **geographic diversification***



2

Activate policies which encourage all circularity levers

***Recycling:** Capturing future secondary Transition Materials*

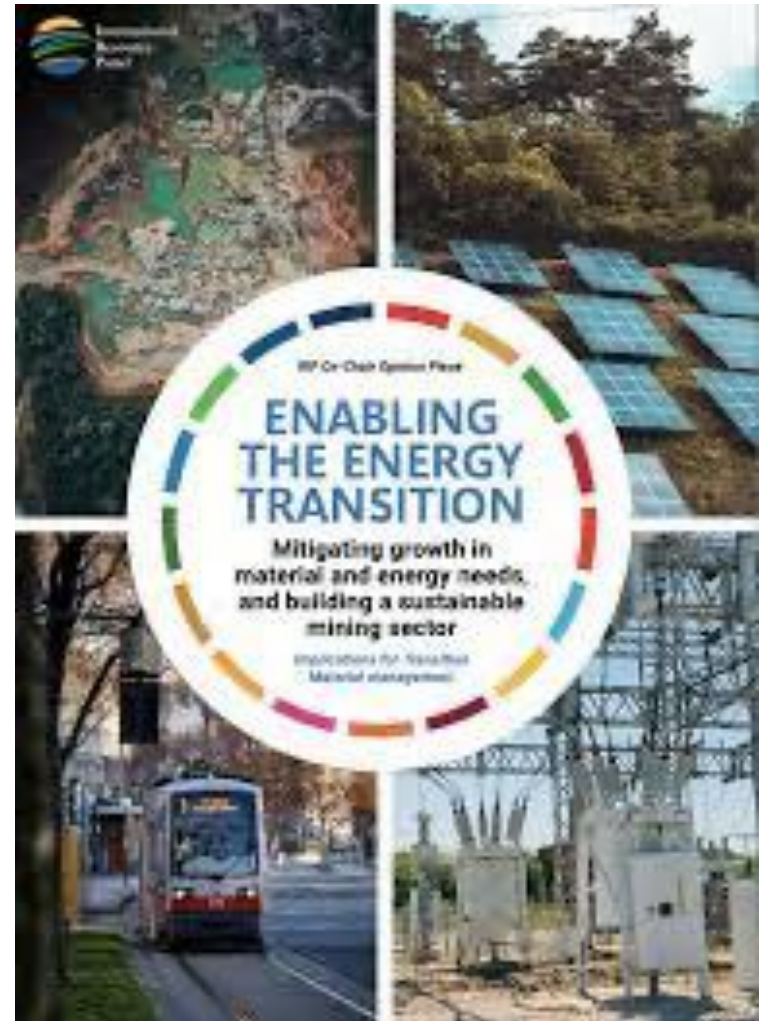
***More intensive use:** Using products that contain transition materials more intensively*

***Light weighting:** Reducing the weight of products that contain transition materials*

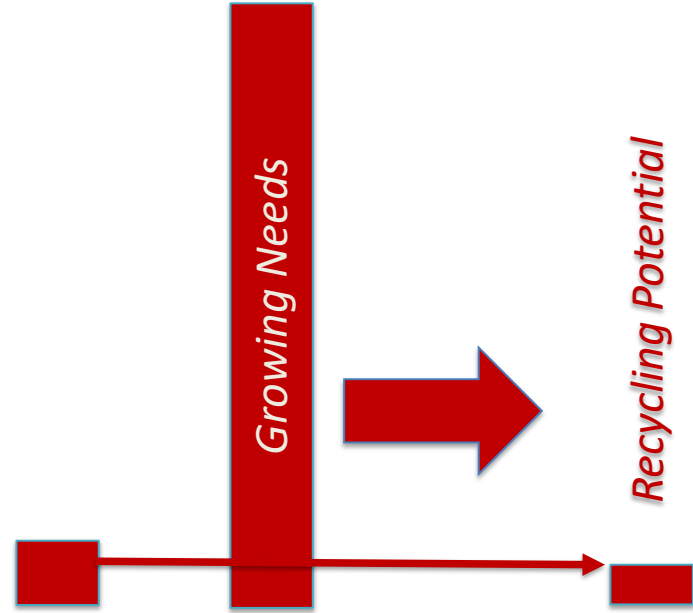
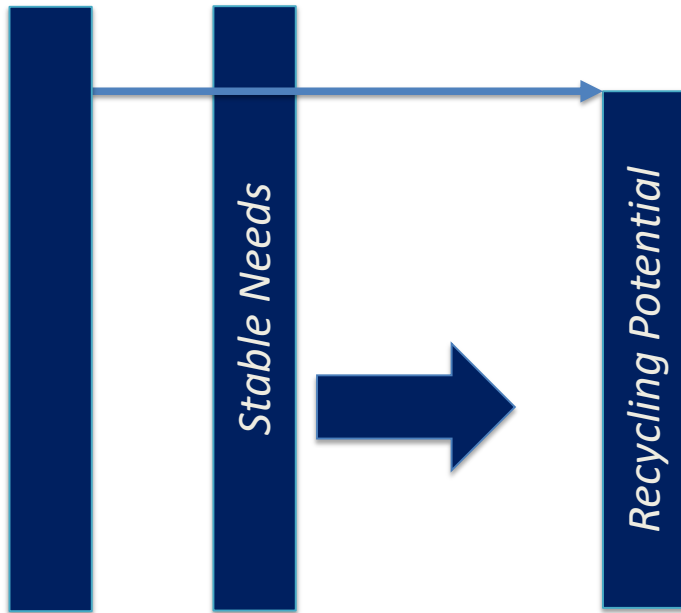
***Lifetime extension:** Increasing the lifetime of products that contain transition materials*

Transition materials (CRMs) are meeting two criteria:

- They are materials which are **essential to key energy transition technologies** (eg., the electrification of mobility needs powerful lithium batteries, while the expansion of electricity grids requires extensive copper cabling); and
- They are either **projected to see significant growth in demand or likely to experience supply-demand gaps** in the next decade or so. In particular, we focus on materials for which supply at scale is a new challenge. These include lithium and copper, for which demand is expected to exceed supply by 2030.



Pillar 2: Recycling Potential: Stable and Growing Needs

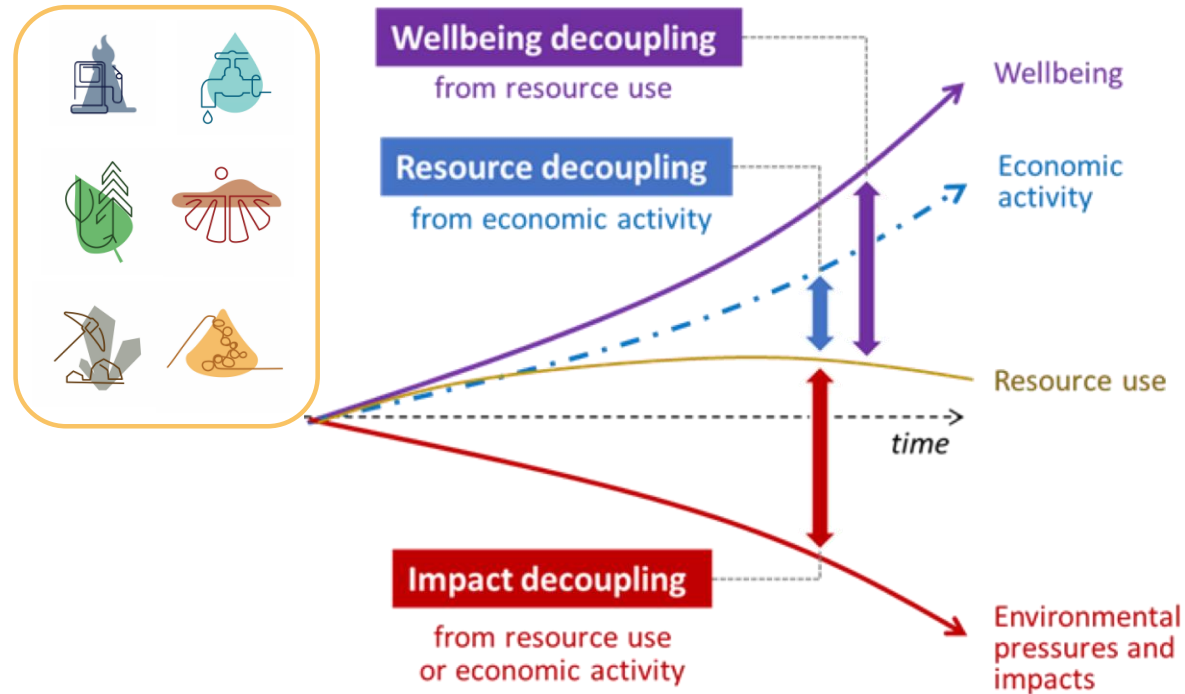


STH Launch

THE SOLUTION

Systemic Approach Unleashing all the Options

Decoupling is essential for “Living well and thriving within planetary boundaries”



Indispensable Pillars for Material Resilience



1

Supply Transition Materials with highest environmental and social standards

Securing enough supply: ensuring supply is sufficient to power the energy transition

Aligning expanded supply with sustainable development

Improving supply resilience by improving TM geographic diversification



2

Activate policies which encourage all circularity levers

Recycling: Capturing future secondary Transition Materials

More intensive use: Using products that contain transition materials more intensively

Light weighting: Reducing the weight of products that contain transition materials

Lifetime extension: Increasing the lifetime of products that contain transition materials



3

Optimize delivery of human needs in energy and material intensive systems

Most energy and material intensive systems (GRO24)

Mobility: reduced need for travel through work from home, balanced urban design; communal and active transport

Buildings: better utilisation of buildings; space-efficient, balanced neighbourhoods

Indispensable Pillars for Material Resilience



1

Optimize delivery of human needs in energy and material intensive systems

Mobility: reduced need for travel through work from home, balanced urban design; communal and active transport

Buildings: better utilisation of buildings; space-efficient, balanced neighbourhoods

Most energy and material intensive systems (GRO24)

2

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More intensive use: Using products that contain transition materials more intensively

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Supply Transition Materials with highest environmental and social standards

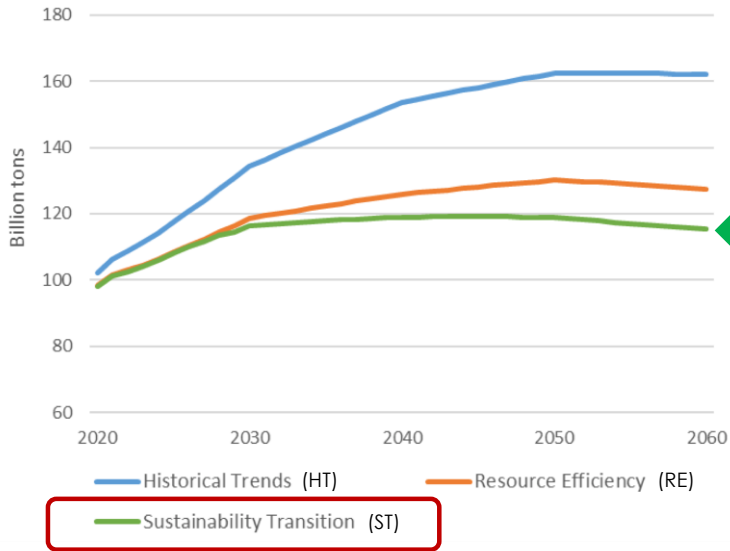
Securing enough supply: ensuring supply is sufficient to power the energy transition

Aligning expanded supply with sustainable development

Improving supply resilience by improving TM geographic diversification

GRO24 IRP modelling: Decoupling is possible and benefits are important

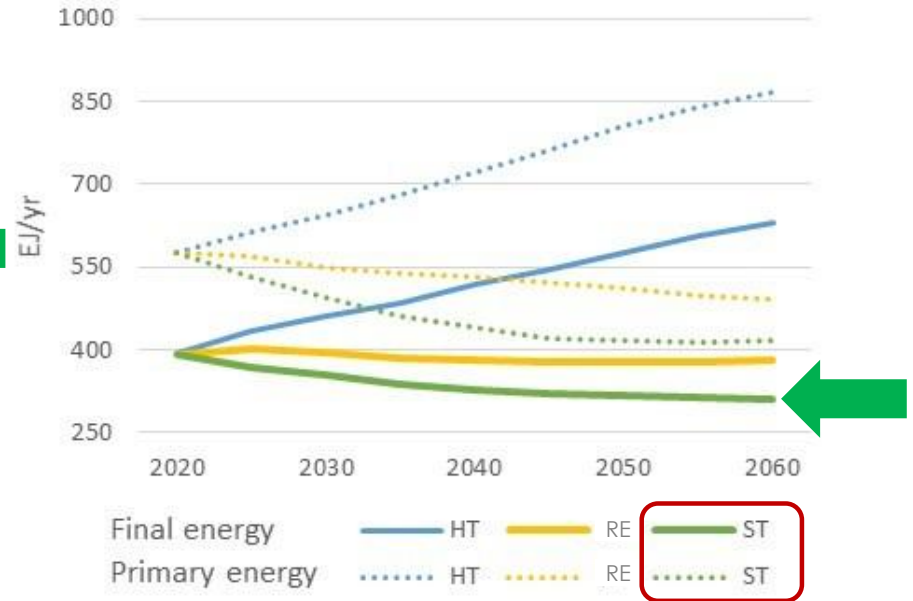
Global material extraction



Sustainability Transition (ST)

We can **mitigate growth in material use** by **30%** by 2060, compared to continued historic trends...

Global energy demand



Final energy HT RE ST
Primary energy HT RE ST

... and **reduce energy demand by 25%** by 2060, compared to 2020 levels.

In short ...

STH Launch

- *Energy transition from fossil to renewable energy is a must. Energy transition requires increased demand for materials on a supply as well as on a demand side.*
- *Additional CRMs should be supplied respecting the highest environmental and social standards, and limited by activating policies which encourage all circularity levers and optimizing delivery of human needs in energy and material intensive systems.*
- *Decoupling wellbeing and economic activity from resource use is essential for living well and thriving within planetary boundaries. Thus, CRMs needed for energy transition must be secured respecting overall decoupling logic.*
- *EC Circular Economy Action Plan(s) are to some extent aligned with needed approach, but the absence of that logic in CRM legislation is just confirming the need for a more systemic approach.*
- *We need to create necessary consistency among addressing climate and other environmental and social targets and challenges. This would also make energy transition easier and feasible, as well as reduce some difficult and polarising conceptual debates and potentially needed solutions (need for a deep see mining, role of CCS/CCUS, use of biomass for energy purposes ...)*



The question we should ask is not only how to secure and diversify the supply of additionally needed CRMs, but also how to limit their needs by reorganising our most resource intensive human needs, providing them in resource efficient way respecting planetary boundaries ...

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TRANSFORMATION HUB**

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THANK YOU

for helping us delivering the future we want!

100 Climate-Neutral and Smart Cities by 2030

Practice case: cities and systems change

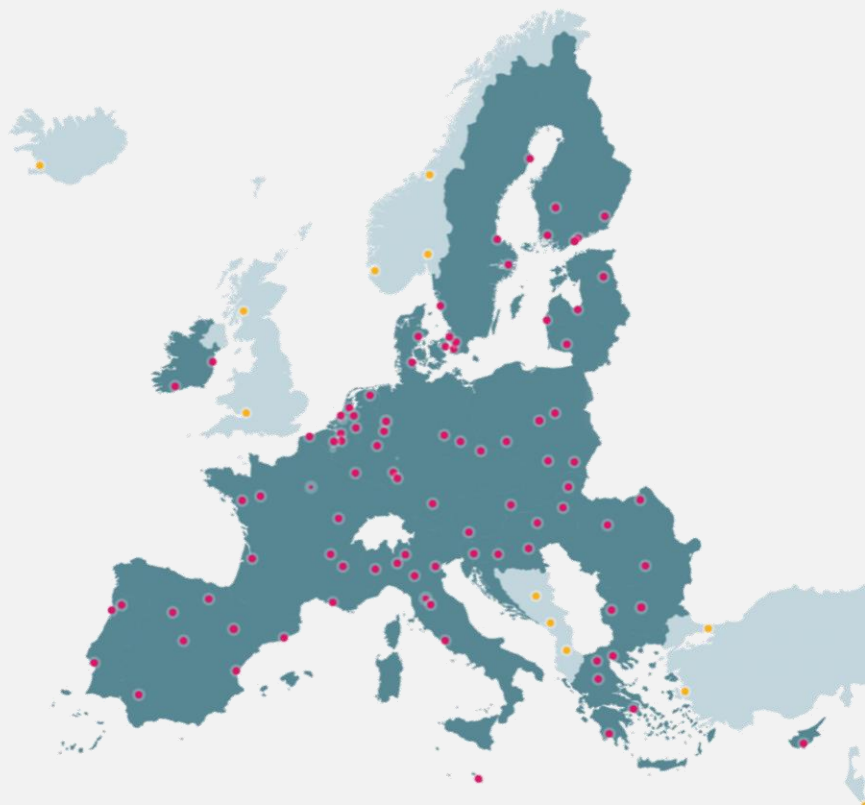
Kirsten Dunlop | CEO EIT Climate-KIC



NetZeroCities has received funding from the H2020 Research and Innovation Programme under grant agreement n°101036519.

The EU Mission for “Climate Neutral and Smart Cities by 2030”

- The objectives of the EU Horizon Europe Cities Mission are to achieve **100 climate-neutral and smart European cities by 2030** and to ensure that these cities act as experimentation and innovation hubs to **enable all European cities to follow suit by 2050**.
- The Cities mission exemplifies scope and scale dimensions:
 - **multi-level governance** to address policy needs;
 - **test-bed innovations** to aggregate activities to scale where capital and policy combine to transform market structures;
 - **engagement and social innovations** to activate and mobilise spectrum of citizens, businesses, civic organisations, universities
 - not only participate, but to call for and **support required policy actions**
 - diverse options to ensure maximum spread in innovation and test cases, and foster **accelerated learning**



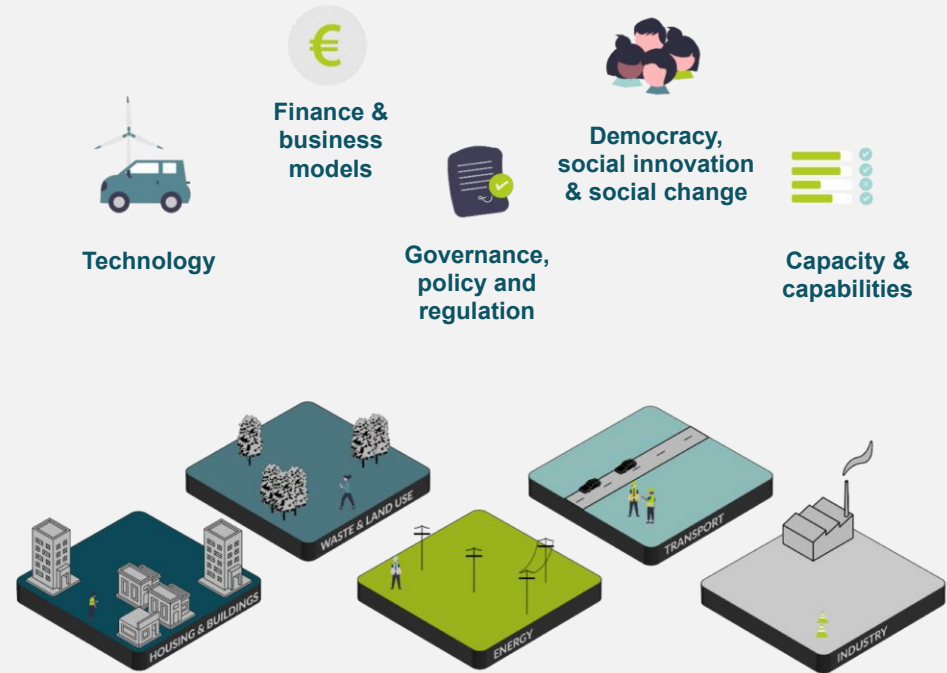


Cities and Systems Change

A core capability to achieve transformation at this scale and speed is to **map interdependencies** and **identify barriers** impeding progress, **gaps** in current efforts, **learnings** from the past and **potential levers for change**.

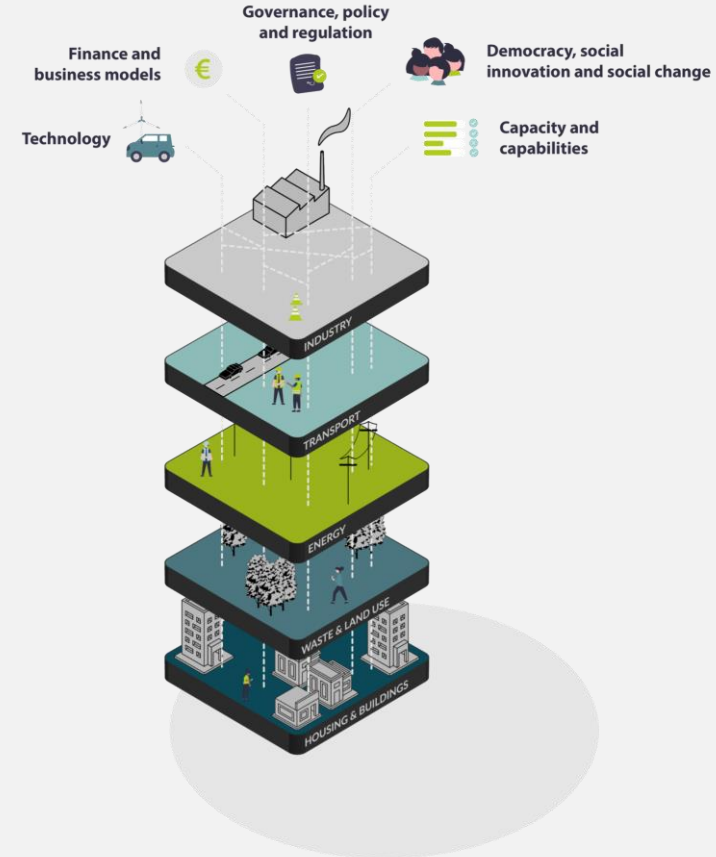
This is a **collective act** as the full picture can only be achieved by bringing together all complementary perspectives. There is so much we do not know about **how to combine different interventions and solutions**.

Above all it requires **holistic and systemic thinking and policy making** to ensure enabling constraints and steady directional signal.



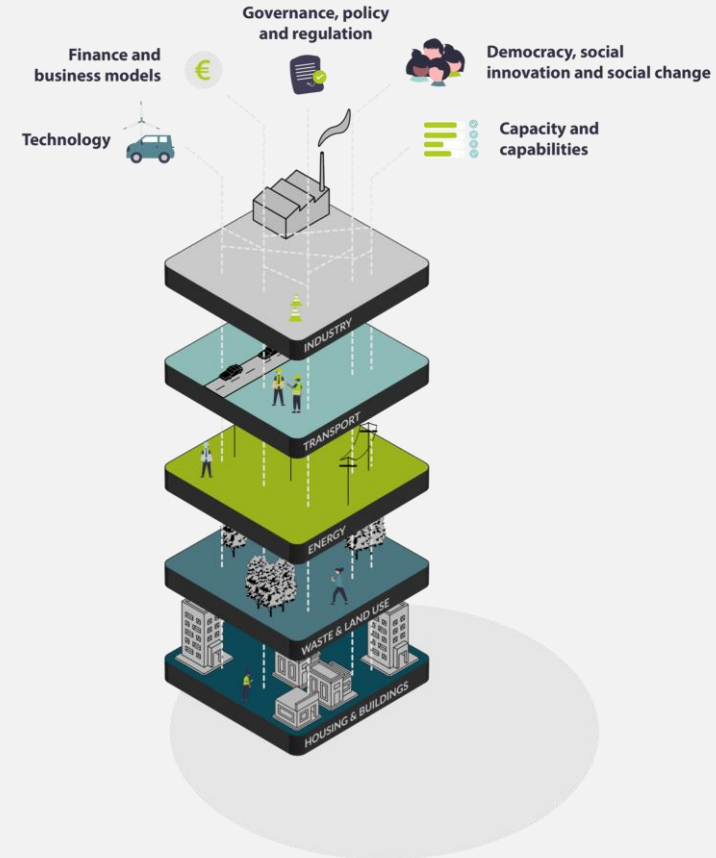
The role of coherent multi-level policy making

- European Commission and EU, national governments, and city governments **have complementary, synergistic policy needs:**
 - To ensure success, **Europe needs to create enabling policy environments**, set market signals, and mobilise capital to support capacity-building and partnerships;
 - **Countries rationalise enabling policies into operational structures**, enable cities to lead on policies for aggregation and replicating and scaled deployment, while offering needed procurement mechanisms; contribute capital and investments through national structures and institutions;
 - **Cities activate and mobilise businesses and citizens to support and participate in collective actions**, design and execute deployment strategies consistent with mission-level outcomes.
- **Engagement without these pieces working together undermines the objectives of transformation at city scale**, due to unmet expectations, lack of credibility, backlash dynamics due to incomplete picture and disconnects from outcomes.



Examples of where this need is acute

- **Regional transport and circular economy uniformly require pan-European work.** Supply chains and commercial truck/ship. Packing regulation needed to address plastics in residual waste.
- **Energy use in buildings.** Balance of European and member states especially in light of commitments to greater energy efficiency. Should be best initiated and led by Europe with CoR actively driving. **Spatial energy planning is critical tool to unlock levers**, likely to 'force' national moves here that focus on outcomes and let front runners do more.
- **Stationary energy.** Multiple barriers at national levels hinder cities to move faster on transition. Specific issues are: heating network regulations, locking in gas via large contracts without the wiggle room for cities to still accelerate fuel-switching. CCS in need of regulatory framework as cities look to test various methods.



Systems Transformation

Hub

We are positioned to support the EU and Member States to create **enabling policy environments** that ensure the success of transformative programmes like the EU Cities Mission. Our objective: **survival, a thriving Europe** and **just transition**.

Our activities:

- **Convening multi-stakeholder dialogic processes for change**, to dissect the obstacles and "super wicked problems" preventing change within our current systems
- **Envisioning and creating knowledge**, to address identified gaps for systems approach policymaking
- **Experimenting systems approaches in policymaking**, to demonstrate if such ideas are feasible and can shift incentive structures as desired at multiple scales
- **Coordinating the partnership and partners' EU activities**, to amplify the impact and reach of each individual organisation, without restricting their independence.
- **Providing rapid-response intelligence and advice**, to support and impact short-term decision-making, on urgent and complex issues that are pressing in nature

Conversation and Q&A

Panel



Bernard Mazijn

Chef de Cabinet, Minister for Climate, Environment, Sustainable Development and Green Deal, Belgian federal government, Belgian Presidency of the European Council



Andrea Renda

Senior Research Fellow and Head of Global Governance, Regulation, Innovation & Digital Economy - CEPS



Agata Meysner

Director of Generation Climate Europe



Heather Grabbe

Senior Fellow at Bruegel

Moderator



Stientje van Veldhoven

Vice President and Regional Director for Europe at World Resources Institute

Closing remarks



Eva Gladek
Founder and CEO of
Metabolic

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Launch Event



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