German Environment Agency

Umwelt Bundesamt

The nexus between resource use and climate change

Making Europe more resource efficient and climate friendly

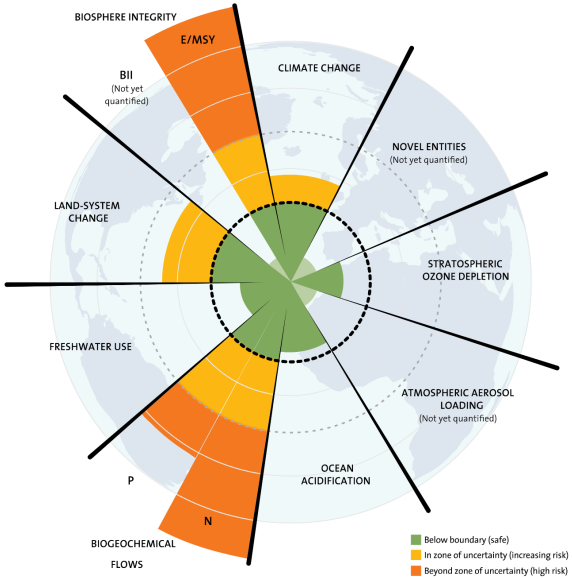
Dr. Harry Lehmann

German Environment Agency (UBA)

Goals

SUSTAINABLE DEVELOPMENT GOALS

17 GOALS TO TRANSFORM OUR WORLD



International Resource Panel

100% RENEWABLES

www.go100re.net

COP21 · CMP11

PARIS 2015

UN CLIMATE CHANGE CONFERENCE

TIME FOR ACTION

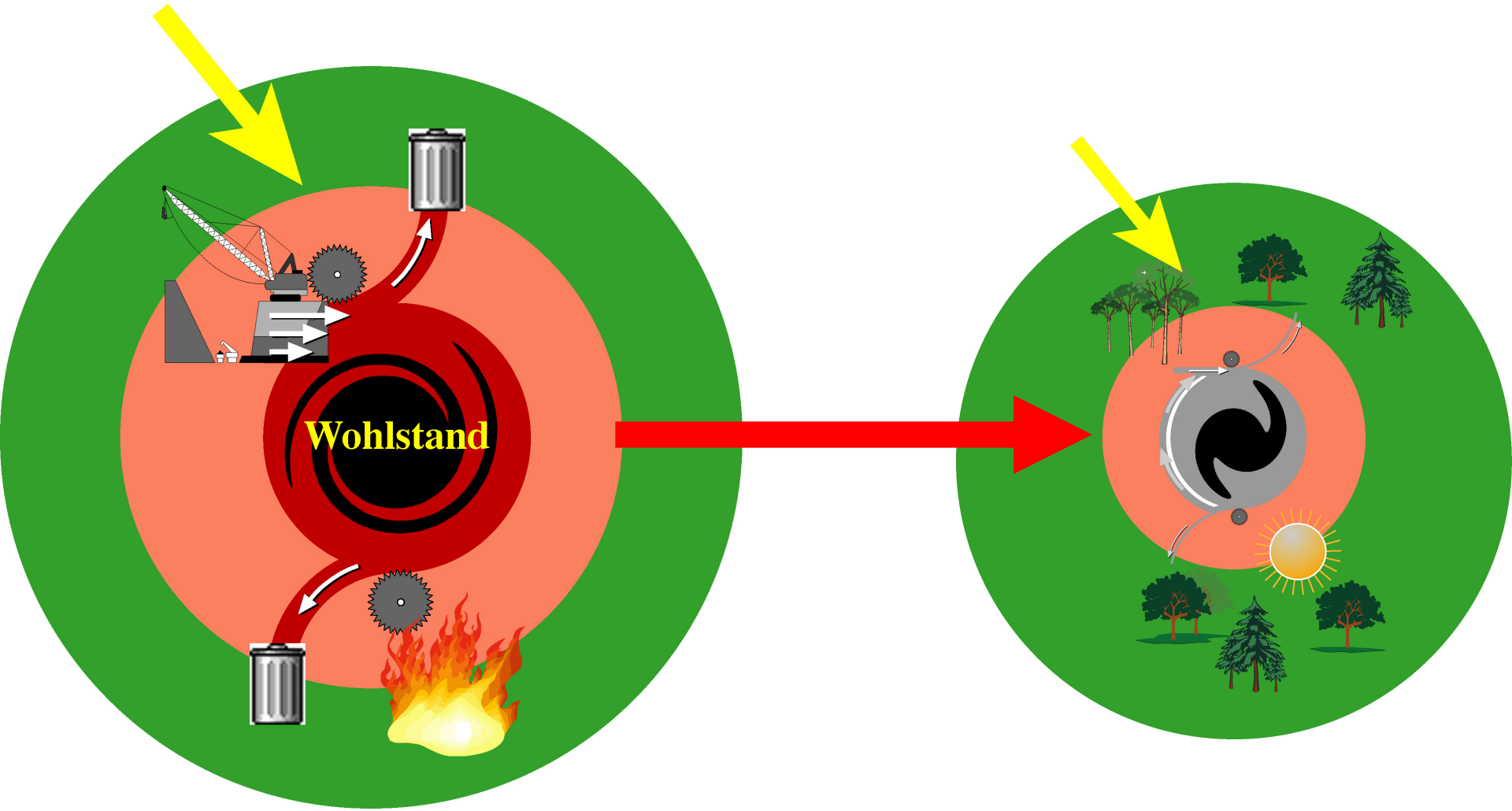
COP25 CHILE MADRID 2019

UN CLIMATE CHANGE CONFERENCE

Energie wende

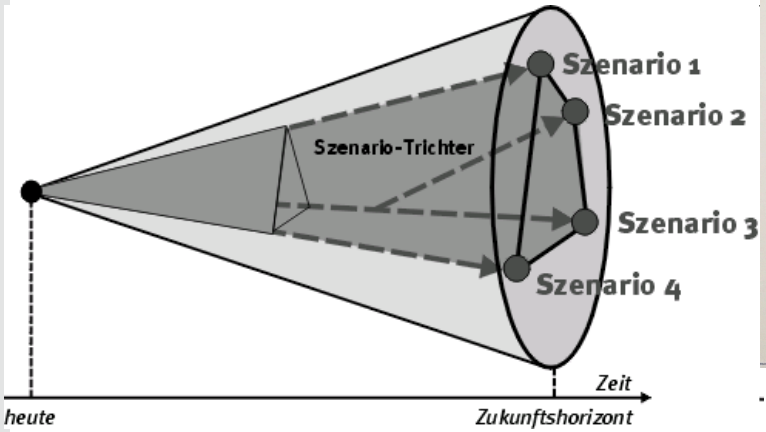
Switch to the Future

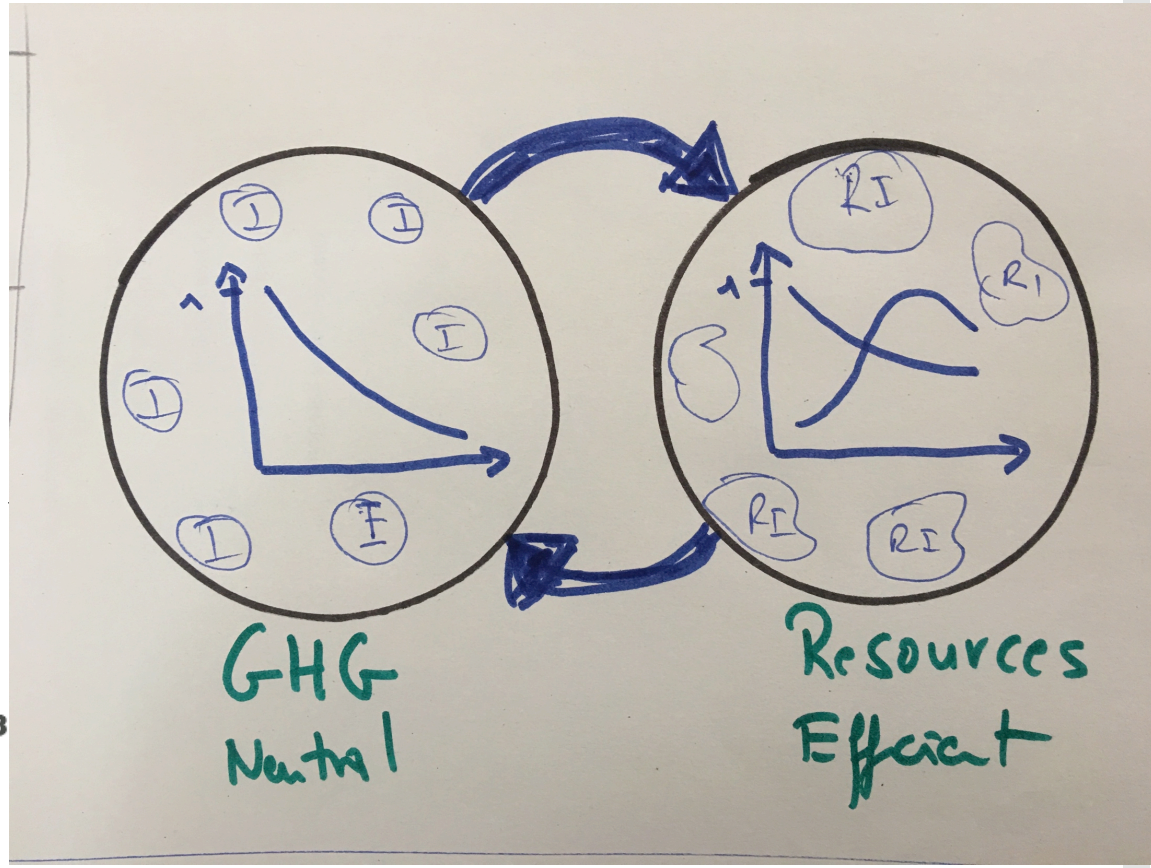
„Great Transformation“



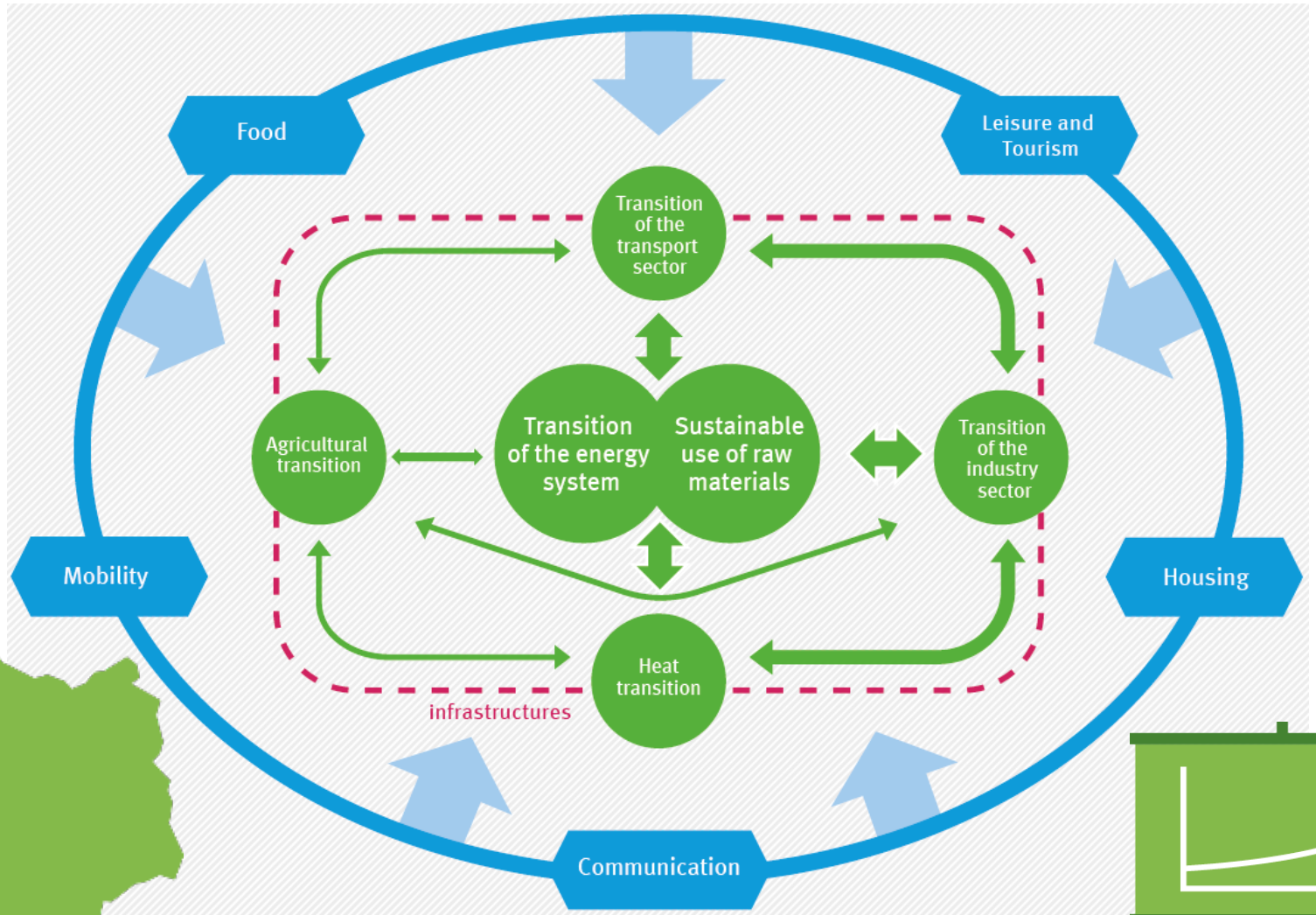
Harry Lehmann - 2004

Goals and Scenarios



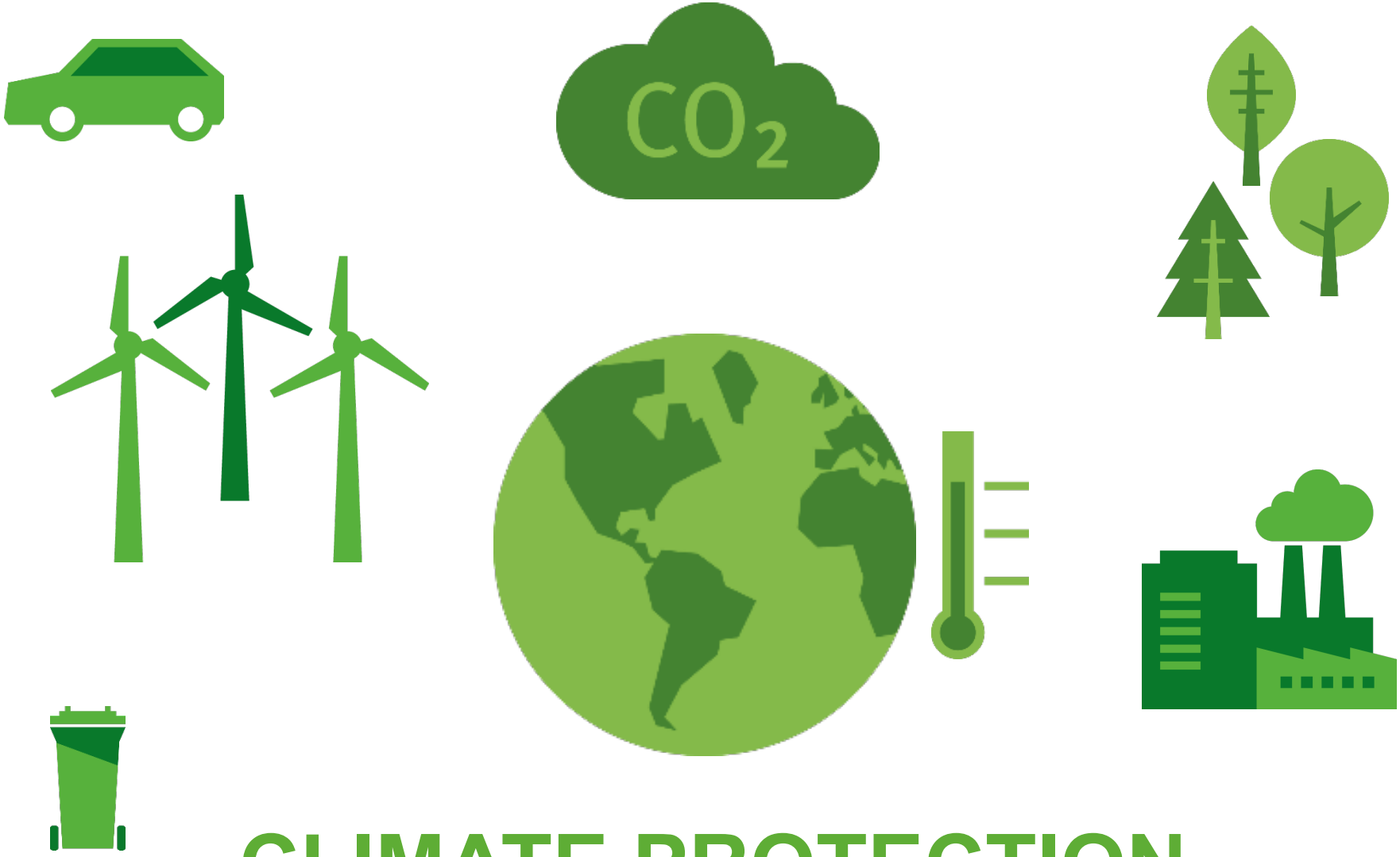


RESCUE – Resource-Efficient Pathways towards Greenhouse-Gas-Neutrality

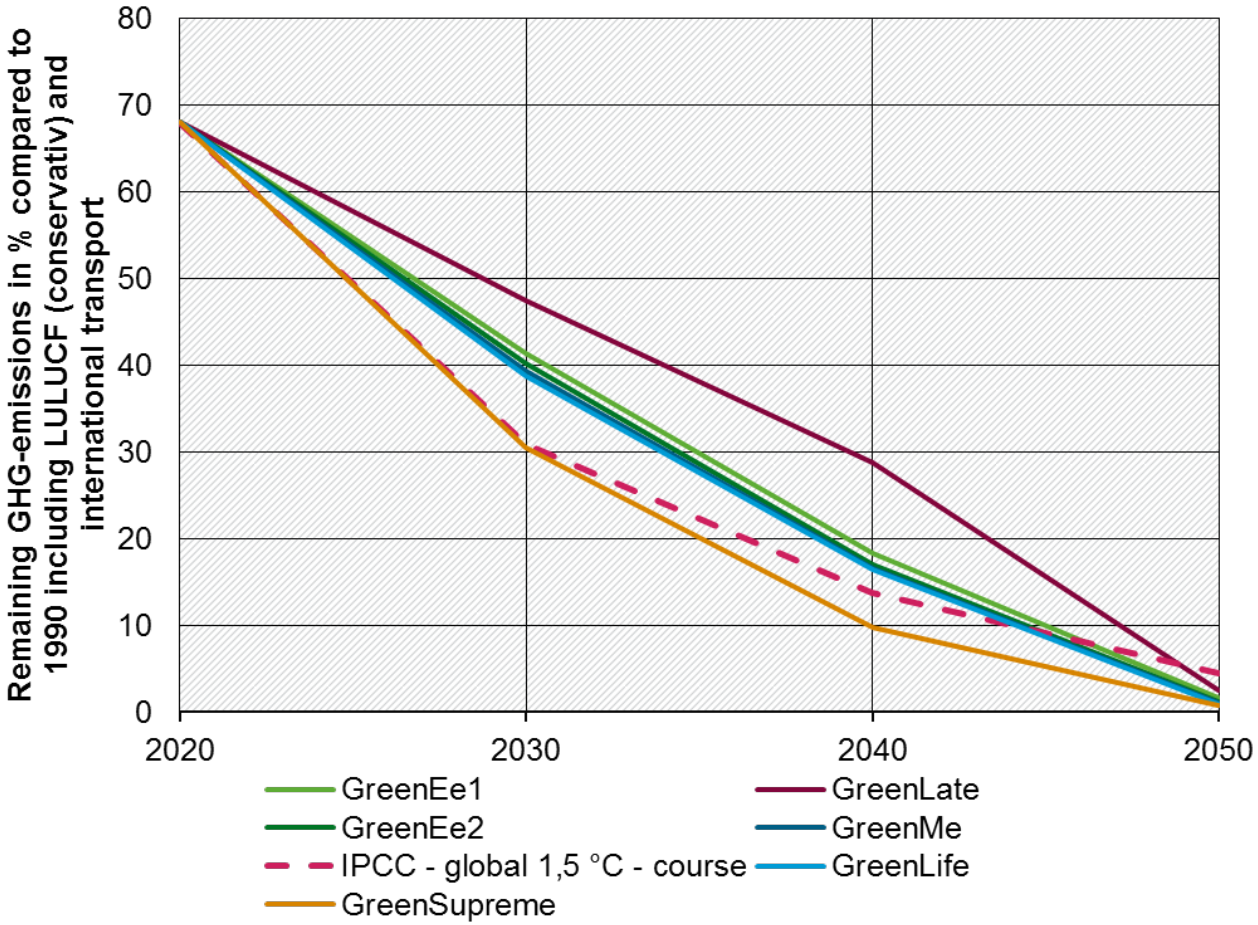


GREEN-SCENARIOS

RESCUE – Resource-Efficient Pathways towards Greenhouse-Gas-Neutrality

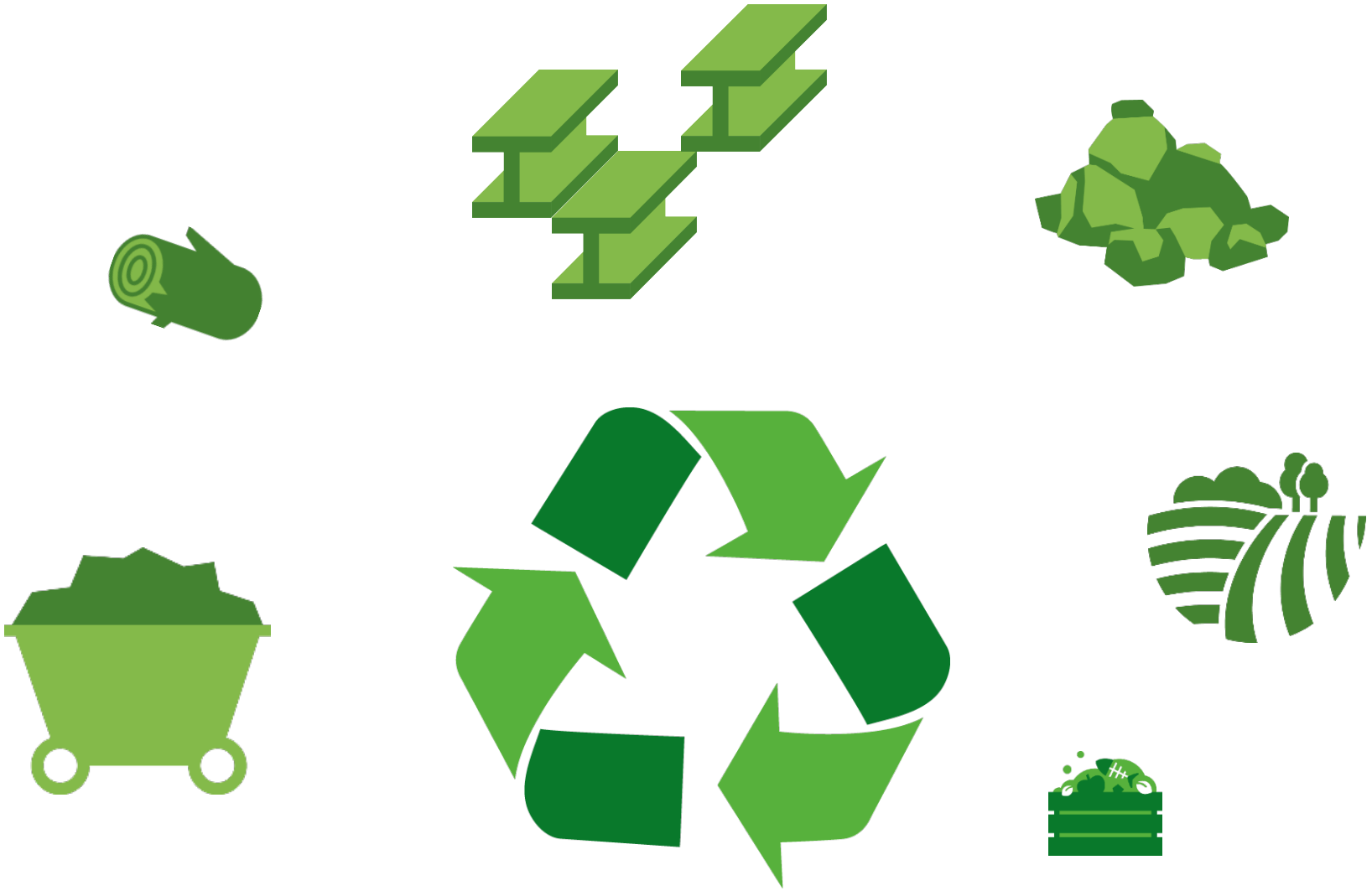


RESCUE – Resource-Efficient Pathways towards Greenhouse-Gas-Neutrality



- Only GreenSupreme, represents a nearly compatible transformation path.

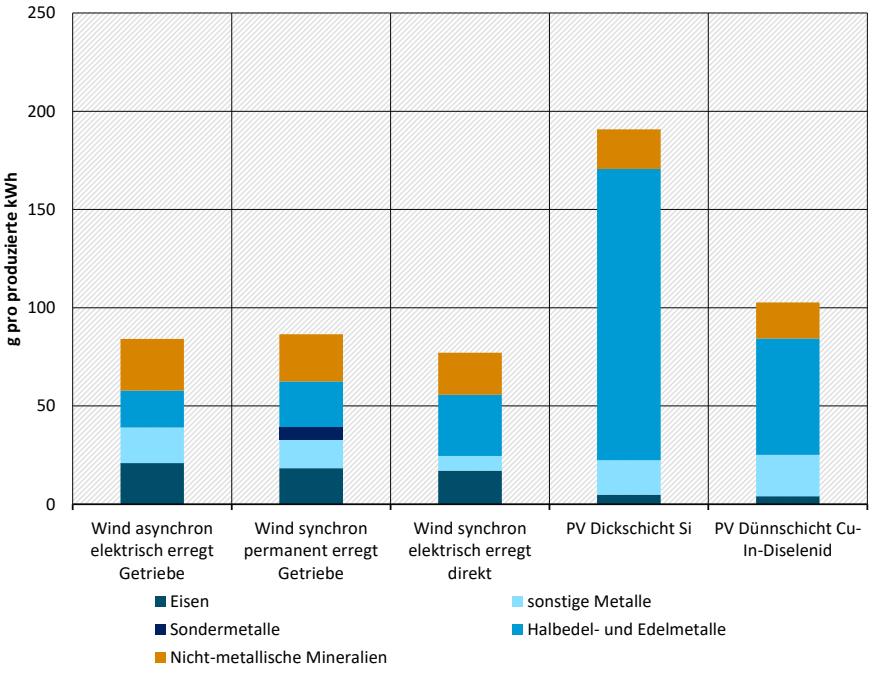
RESCUE – Resource-Efficient Pathways towards Greenhouse-Gas-Neutrality



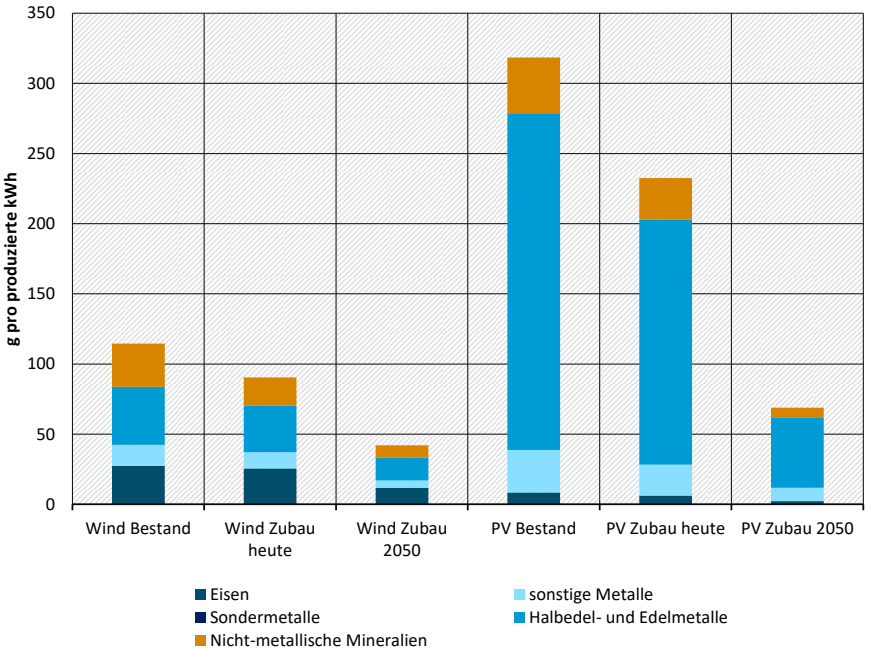
RAW MATERIALS USE

Resources and Technologies ...

Rohstoffnutzung ausgewählter einzelner Energieerzeugungsanlagen (heutiger Stand) im Vergleich

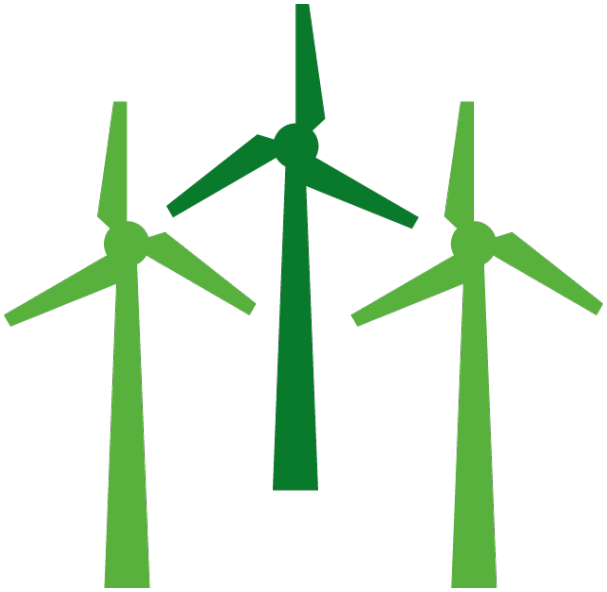


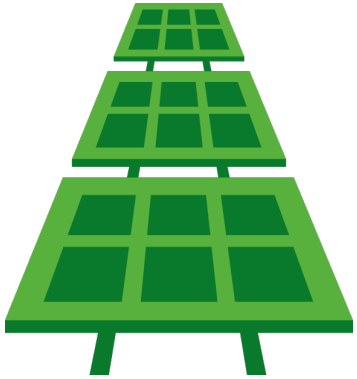
Entwicklung der Rohstoffnutzung ausgewählter einzelner Energieerzeugungsanlagen im Vergleich



Quelle: Wiesen et al. (2017) „Analyse des Rohstoffaufwandes der Energieinfrastruktur in Deutschland“. Sachverständigengutachten, unveröffentlicht

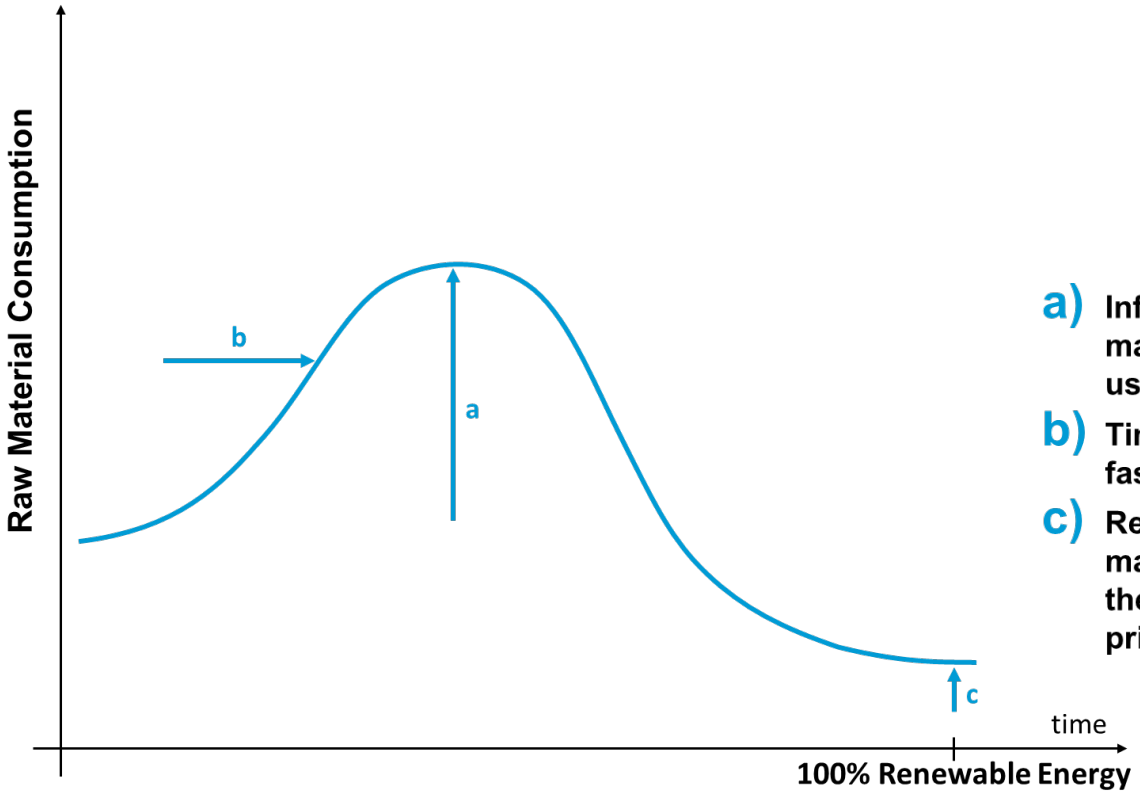
RESCUE – Resource-Efficient Pathways towards Greenhouse-Gas-Neutrality





GLOBAL OUTLOOK ENERGY-SYSTEM

Interaction of renewable energies and raw materials



a) Influenced by efficiency (energy and material) – the more efficiently material is used, the lower the curve

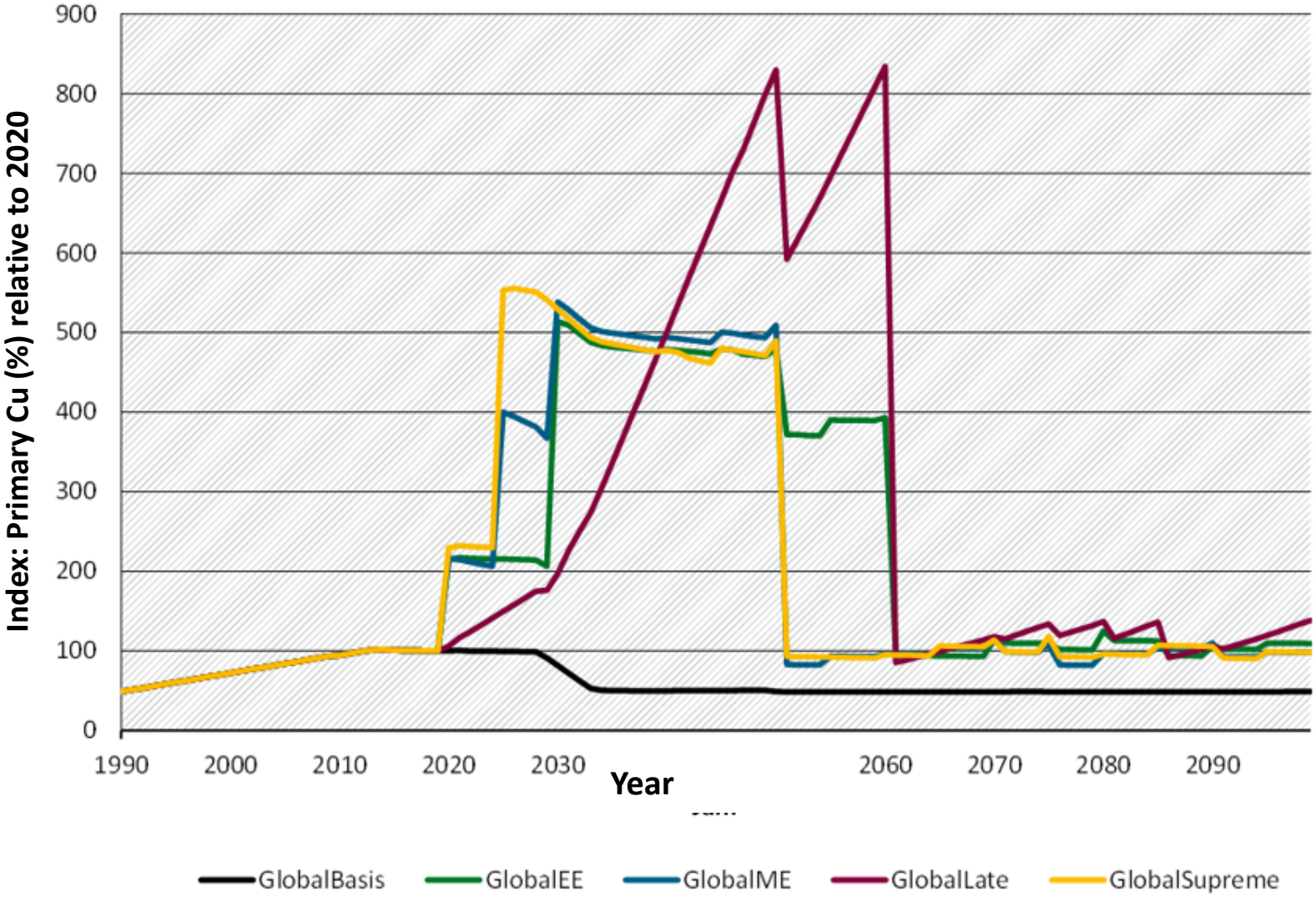
b) Timing & speed of RE integration – the faster, the steeper the curve

c) Recycling or saving of primary raw materials – the higher the recycling rate, the lower the permanent extraction of primary raw materials

- The phase-out of fossil energy has benefits for climate protection and the consumption of raw materials.
- energy-related GHG-emissions can be reduced to zero
- Raw material consumption can not be reduced to zero

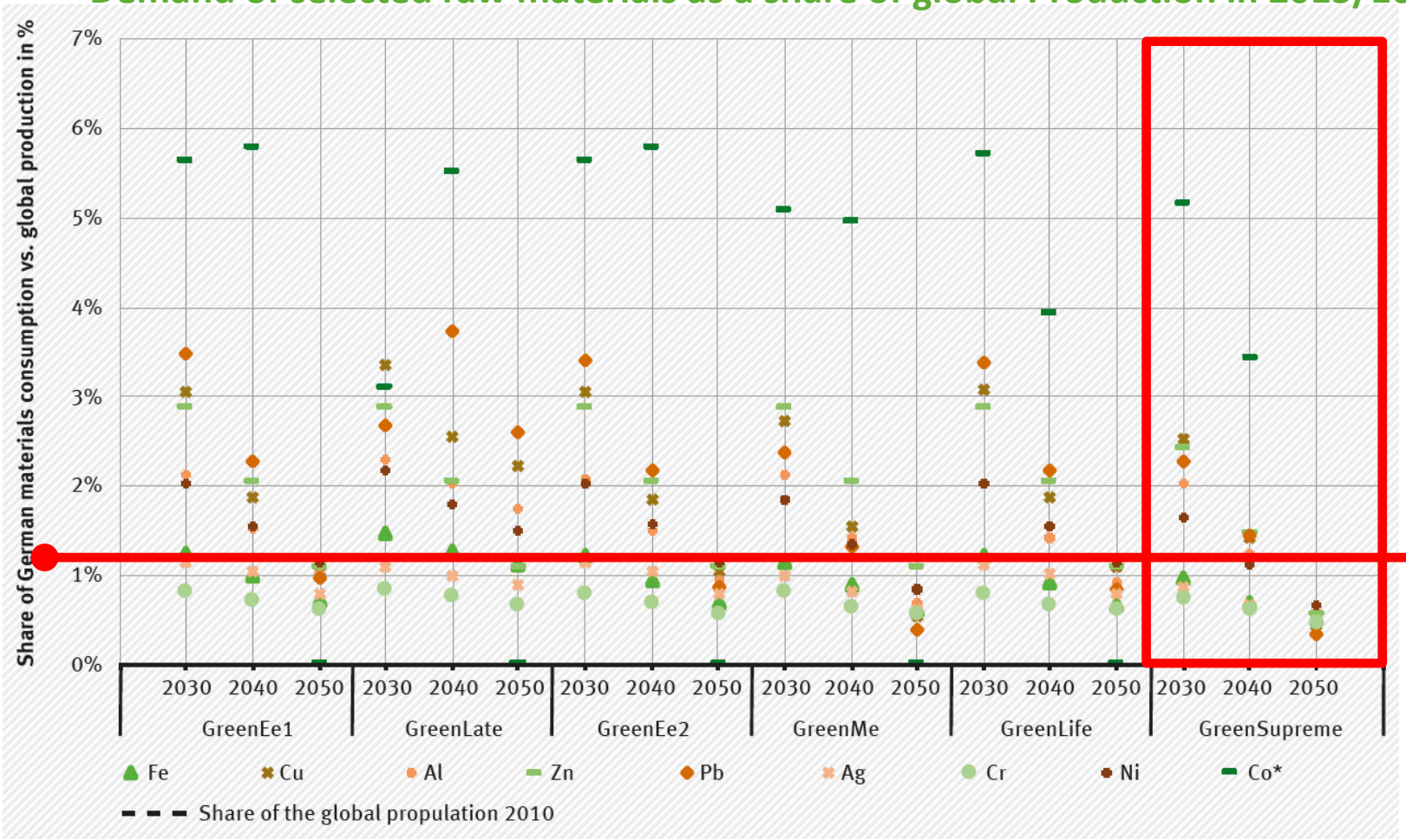
Global Transferability

copper (Cu) demand for the renewable energy system



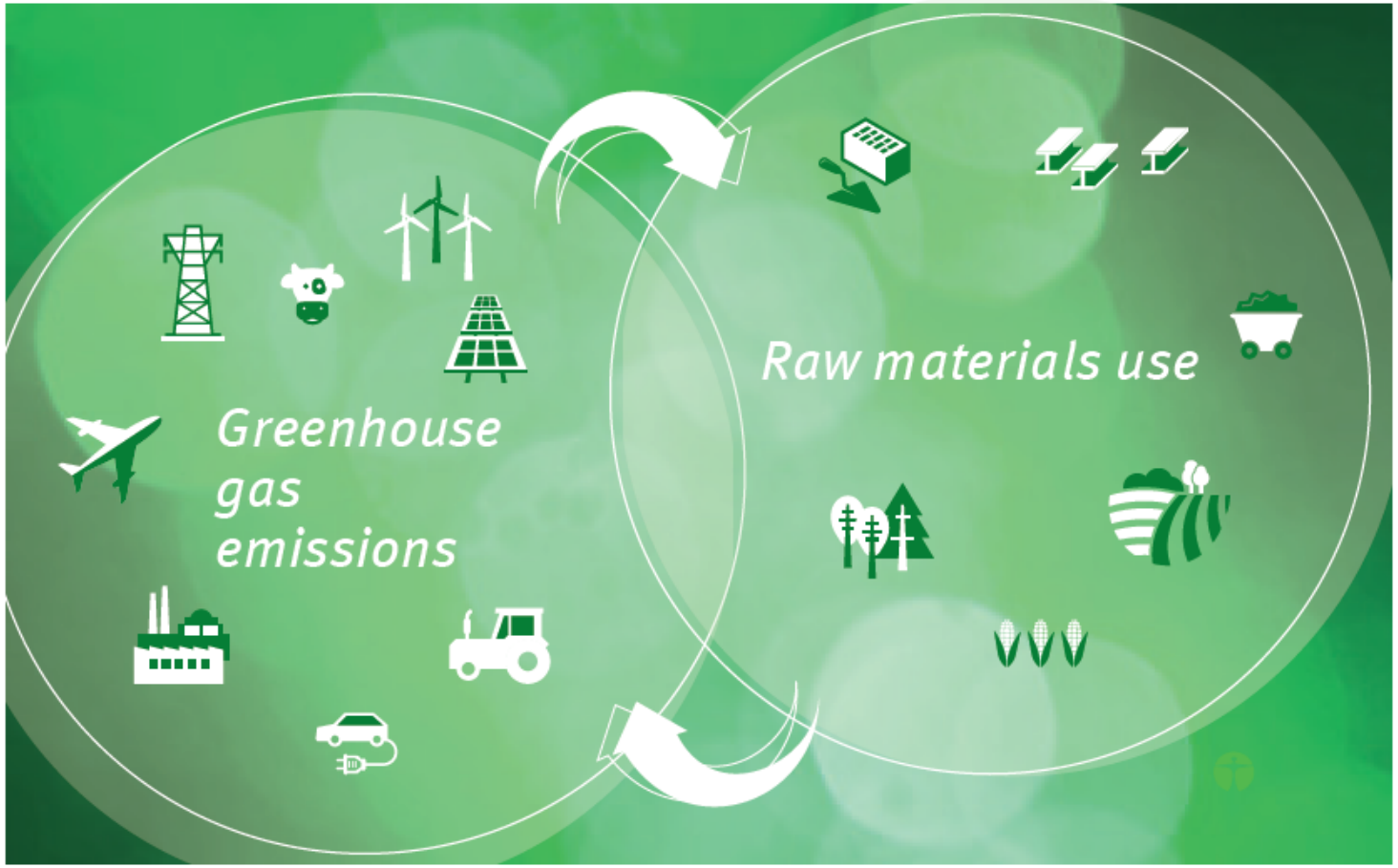
Global Fairness

Demand of selected raw materials as a share of global Production in 2015/16



* Estimate only for batteries used in transportation.
** Germany's population in 2010 was 81.75 million people and the global population equaled 6.96 billion people (81.75 million people / 6.96 billion people = 1.17 %).

Note: Global production estimates were taken from USGS for the latest year available. For chromium, the production data from chromite was used and a metal content of 30 % assumed.



CONCLUSIONS

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