

Design issues

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Securing the EU's Resource Efficiency – A Systemic Approach



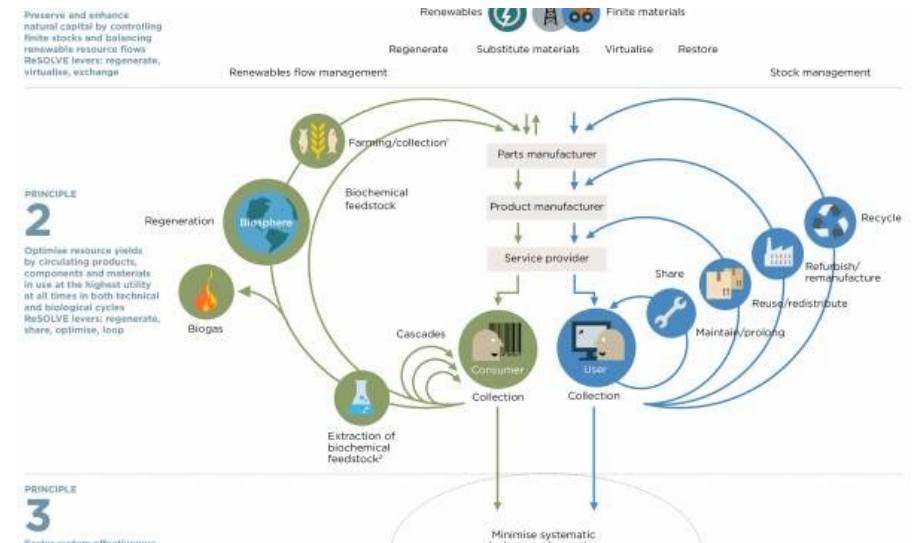
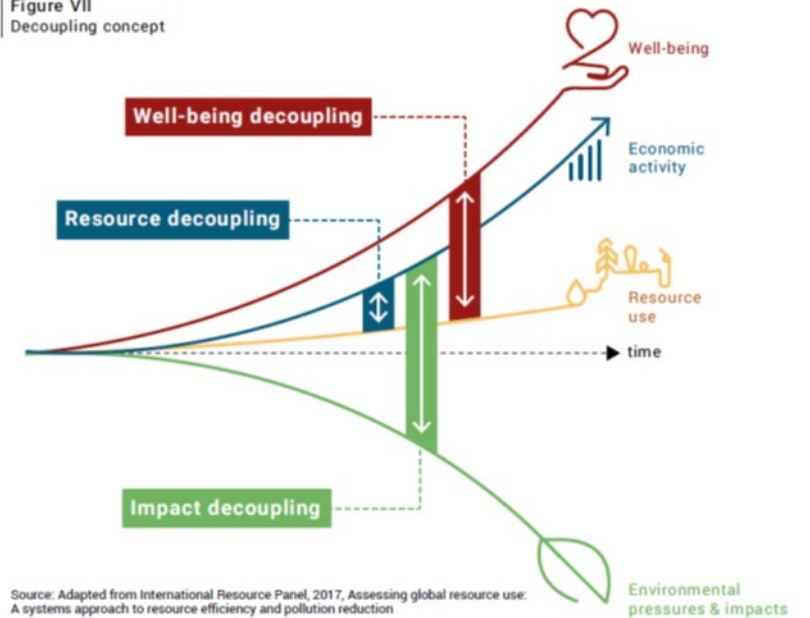
Universiteit
Leiden
The Netherlands

GLOBE-EU Meeting, European Parliament
26 September 2023

We must use *less* resources

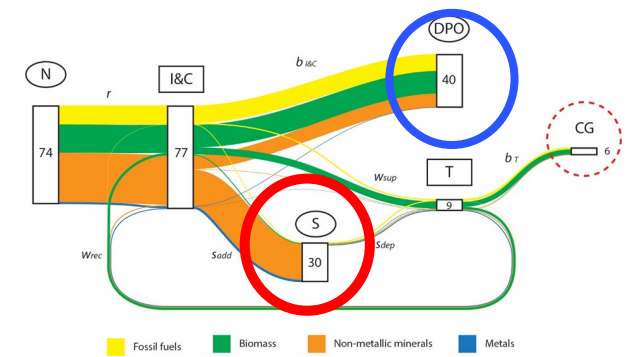
- BAU (UN IRP): from 88 bio ton now to 190 bio ton in 2050
- Decouple well-being from economic, resource use and impact growth
- Keep materials as long as possible in circular loops

Figure VII
Decoupling concept

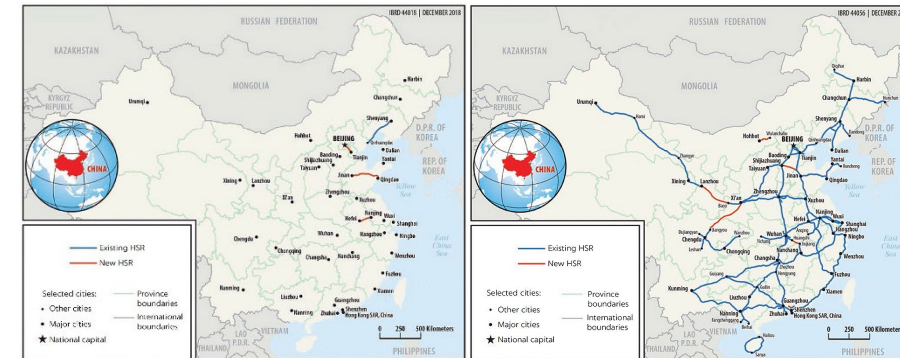


We need however *more* resources

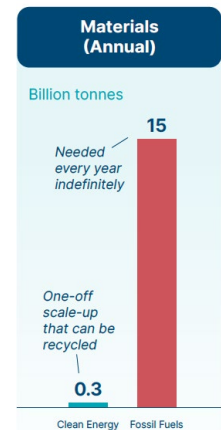
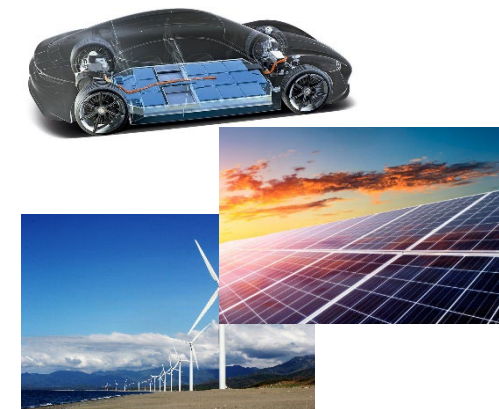
- Current resources/‘Urban mine’ not always fit for re-use
 - 50% inherently dissipative (food, fossil energy)
 - 40% goes to (mainly building) stocks – and stays there
- Expanding economies inevitably need new materials (particularly in the Global South)
- The Energy transition inevitably needs new materials (but much less as current fossil fuels)



Resources, Conservation and Recycling
Volume 151, December 2019, 104452

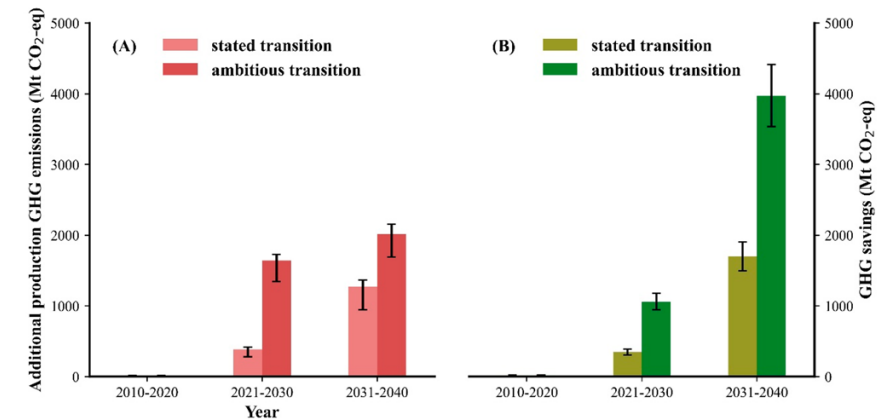


High Speed Rail China 2007-2017



Key: transition to a circular, low carbon society

- Ensure resilient CRM supply
- Produce materials sustainable a.s.a.p.
 - Low-carbon energy transition: enables low embodied carbon in EV, PV, wind etc.
 - Low impact mining: reduces biodiversity loss and water use
- Develop smart ‘urban mining’ for existing stuff
- Design all new stuff for circularity NOW
 - Long life
 - Repairable
 - Re-usable



Very fast EV penetration: CO₂ emissions for producing EVs > saved driving emissions 2021-2030
Tang et al., ES&T 2023, 57 p44-52



Advanced sorting@ TU Delft



Irreparable Dell keyboard versus upgradable Fairphone