Design issues

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Securing the EU's Resource Efficiency – A Systemic Approach

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
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)
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](https://example.com/fig1.png)

Tang et al., ES&T 2023, 57 p44-52

Advanced sorting@ TU Delft

Irrepairable Dell keyboard versus upgradable Fairphone