Nexus approaches in social metabolism research

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EPICamp II Sustainability, material use and climate justice

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Social metabolism: A systemic perspective on resource use

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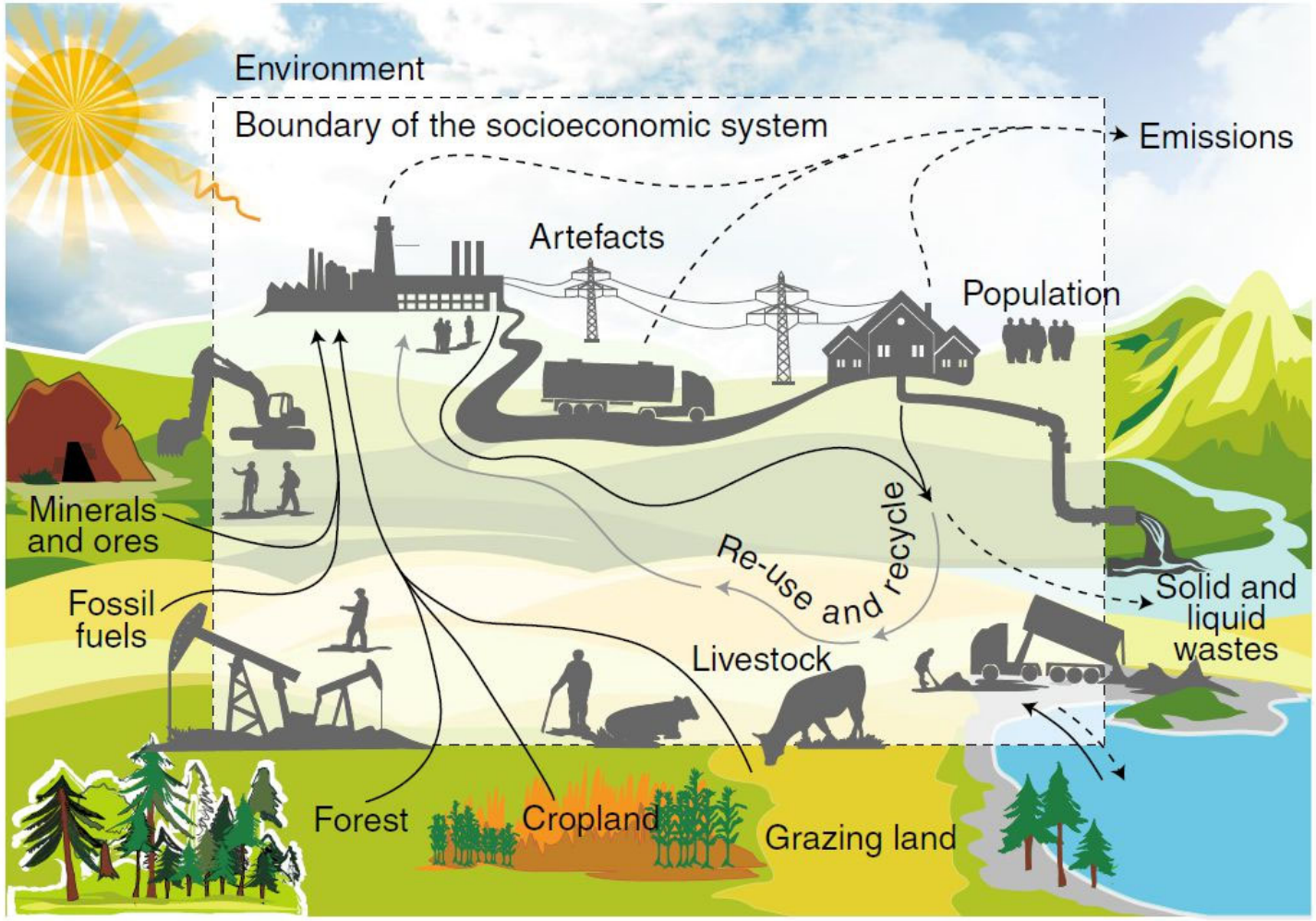

Pressures on land emerge from resource extraction, accumulation of stocks, and wastes and emissions

Haberl *et al* 2019. *Nature Sustainability* **2**, 173–184

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The *Gospel of Eco-Efficiency is good,* but not nearly good enough

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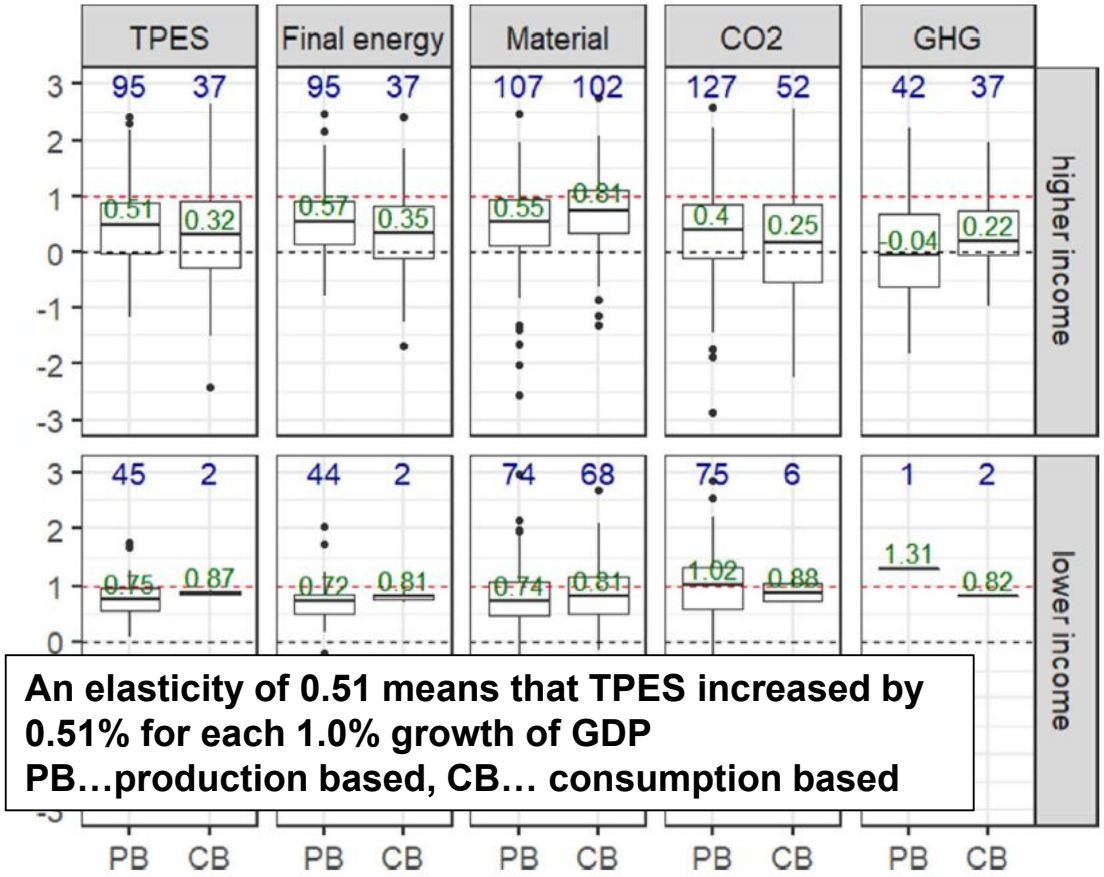
Observed GDP elasticities in the last decade



An elasticity of 0.51 means that TPES increased by 0.51% for each 1.0% growth of GDP
PB…production based, CB… consumption based

Current sustainability strategies rely on promoting a „decoupling“ of GDP from resource use or emissions

The 1.5°C target requires a linear absolute reduction of CO2 by 3.3%-5% of the emissions in 2020 per year. This requires a *qualitatively new approach* for socio-ecological transformation

Haberl *et al.*, 2020, *Environmental Research Letters* **15**, 065003

TPES… total primary energy supply, GHG… greenhouse gas

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Towards sustainability?
Reshaping the stock-flow-service nexus

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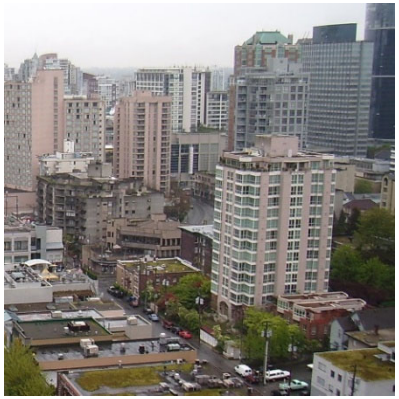

Stocks Buildings, infra-structures, machinery

Stocks shape social practices of everyday life (mobility, shelter, etc.)

Flows Energy, materials

Services Contributions to social well-being

Fotos: Helmut Haberl

Haberl *et al.* 2017, *Sustainability* **9;** Kalt *et al.* 2019, *Energy Res. & Social Sci.*, **53**, Haberl *et al.* 2021, *Ecol. Econ.* **182**

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Stocks and flows vs. social progress

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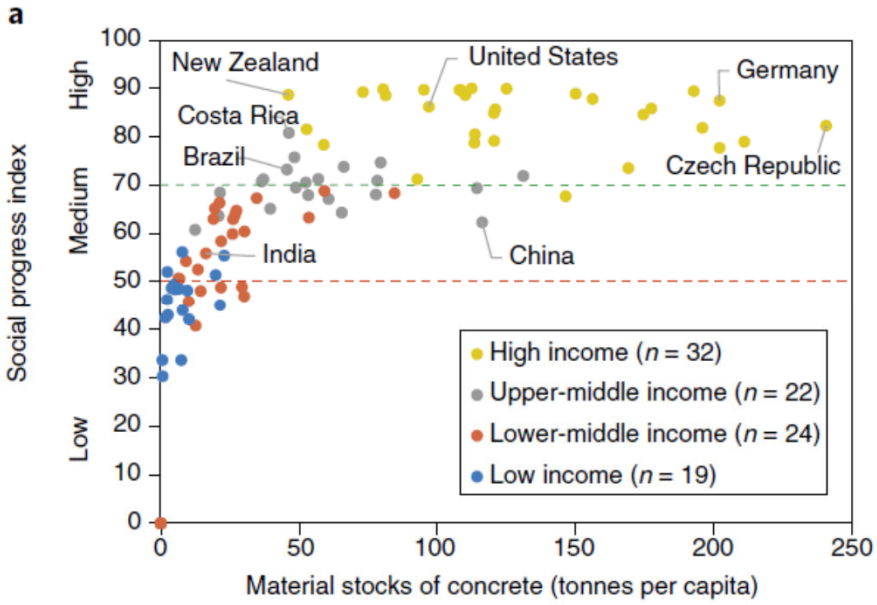
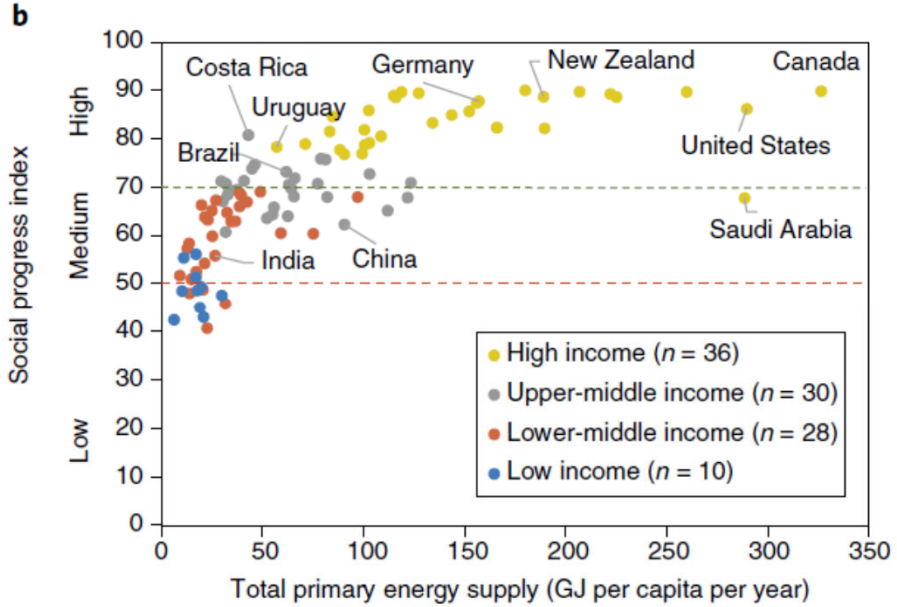
Concrete stocks



Primary energy supply



The Social Progress Index (SPI) is an outcome-based index of social wellbeing con-sidering nutrition, shelter, water, sanitation, safety, access to knowledge, freedom, human rights, environmental quality, but no monetary indicators such as GDP

Haberl *et al* 2019. *NatureSust.* **2**, 173–184

Conceptualizing services: the energy service cascade

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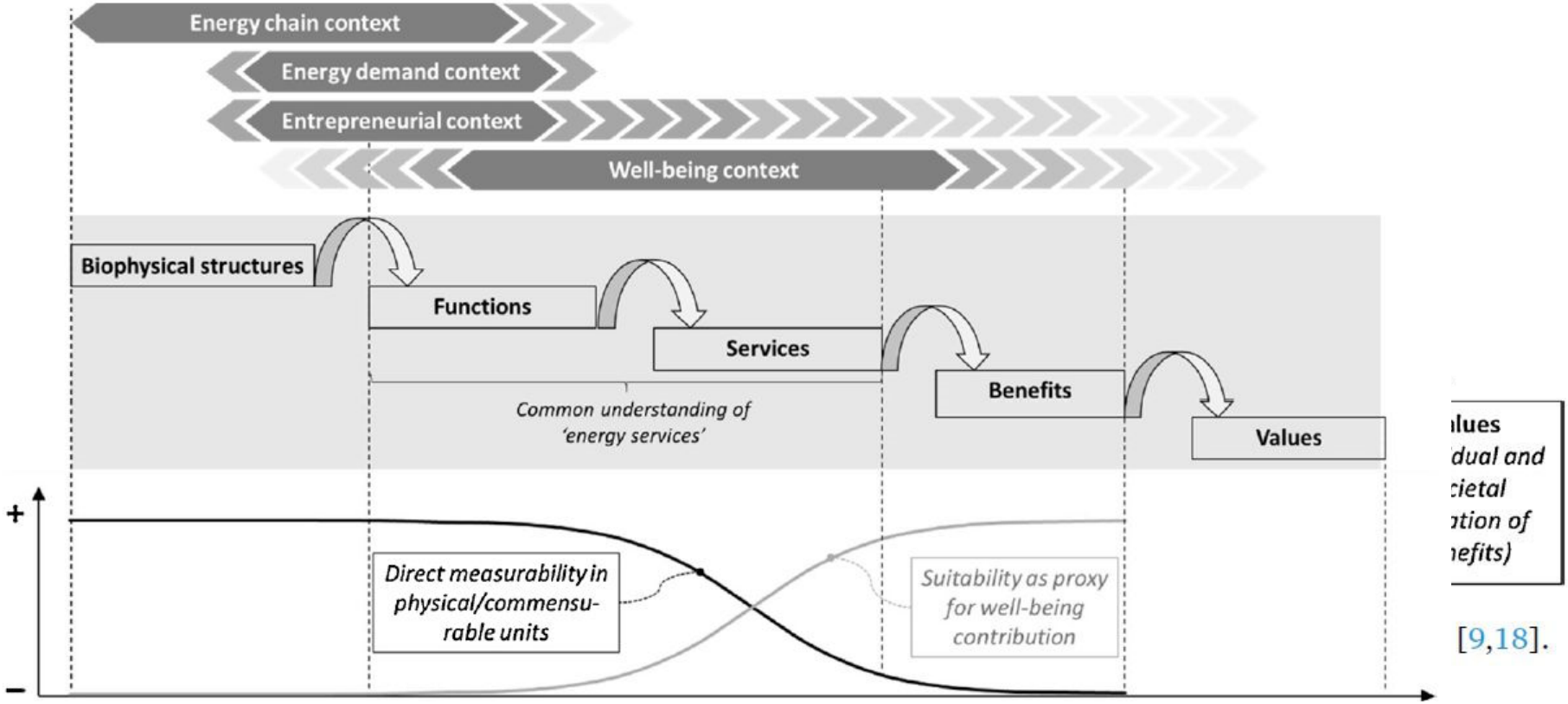

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[9,18].

Understanding contributions to social well-being requires more than just counting contributions to GDP

Kalt *et al.*, 2019. *Energy Research & Social Sciences* **53**, 47-58

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Why material stocks are important

- They transform resources into services such as shelter, nutrition or mobility.
- Building up and maintaining stocks requires large amounts of resources.
- They shape social practices (including production and consumption), thereby creating path dependencies for future resource use (“lock-in”)

Most material stocks are in buildings and infrastructures

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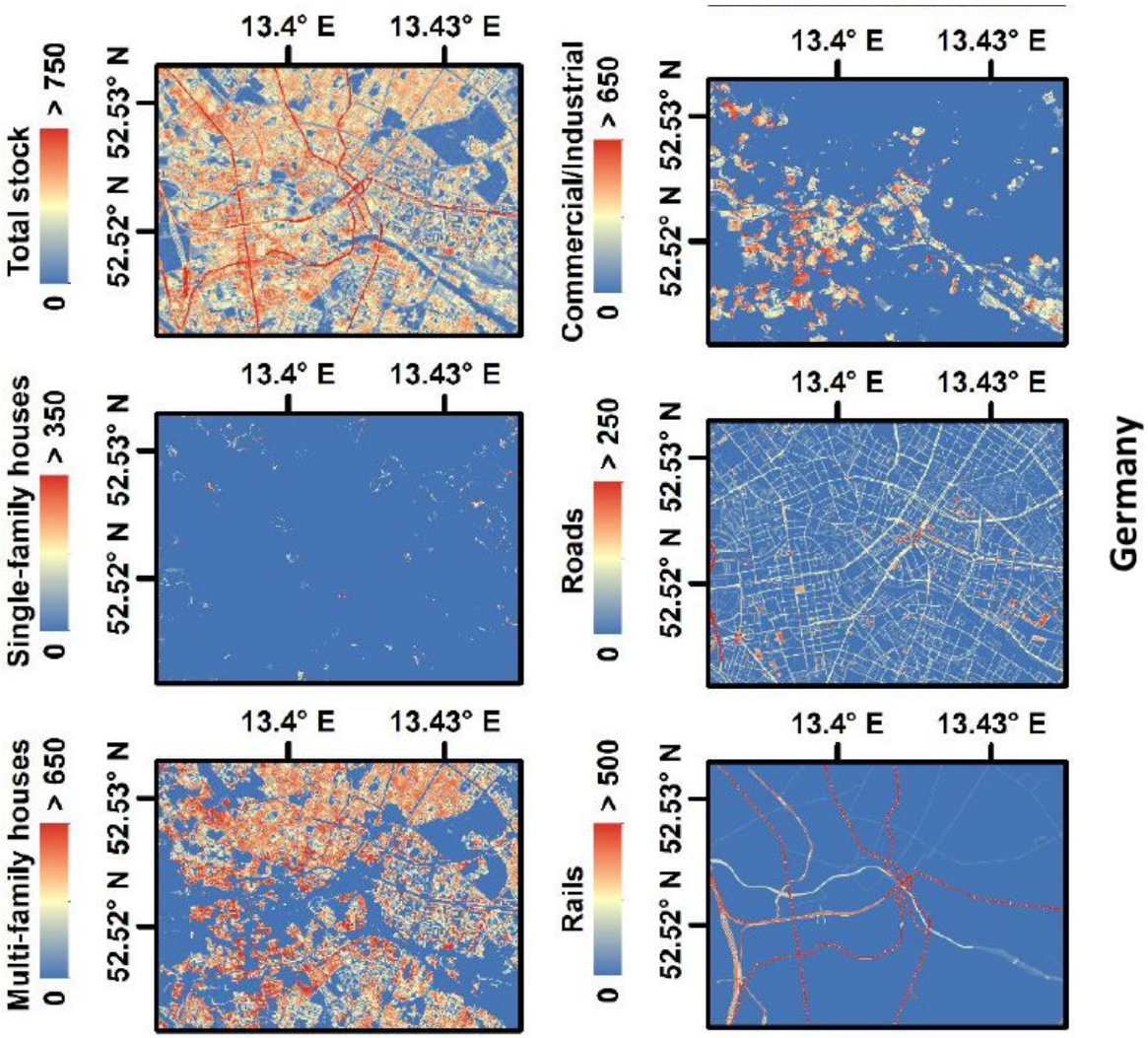
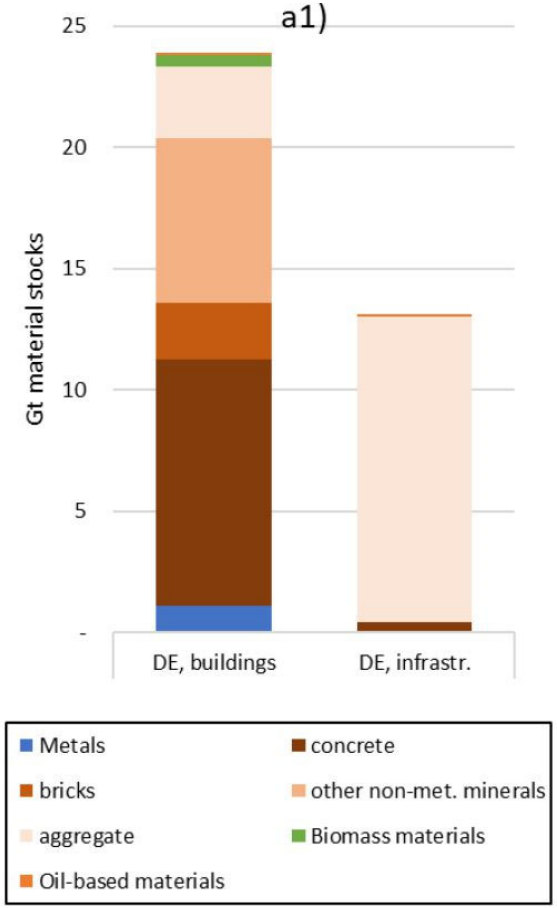
Berlin, 2018



Haberl *et al.* 2021, *Env. Sci. Tech.*, **55**, 3368-3379



Example: The SFS nexus of personal mobility in Vienna

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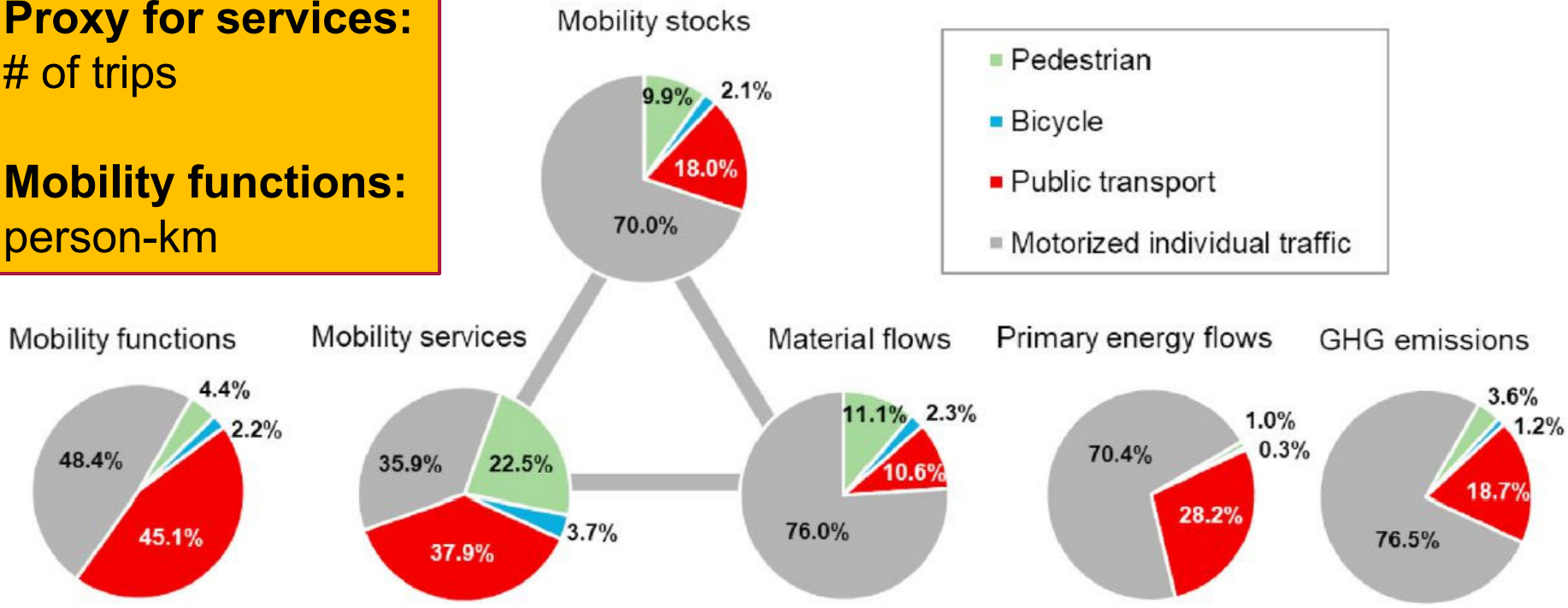
Proxy for services:
# of trips

Mobility functions:
person-km



Virág *et al.* 2021, *Environm. Develop.*
10.1016/j.envdev.2021.100628

Nexus approaches relating social metabolism to services and practices

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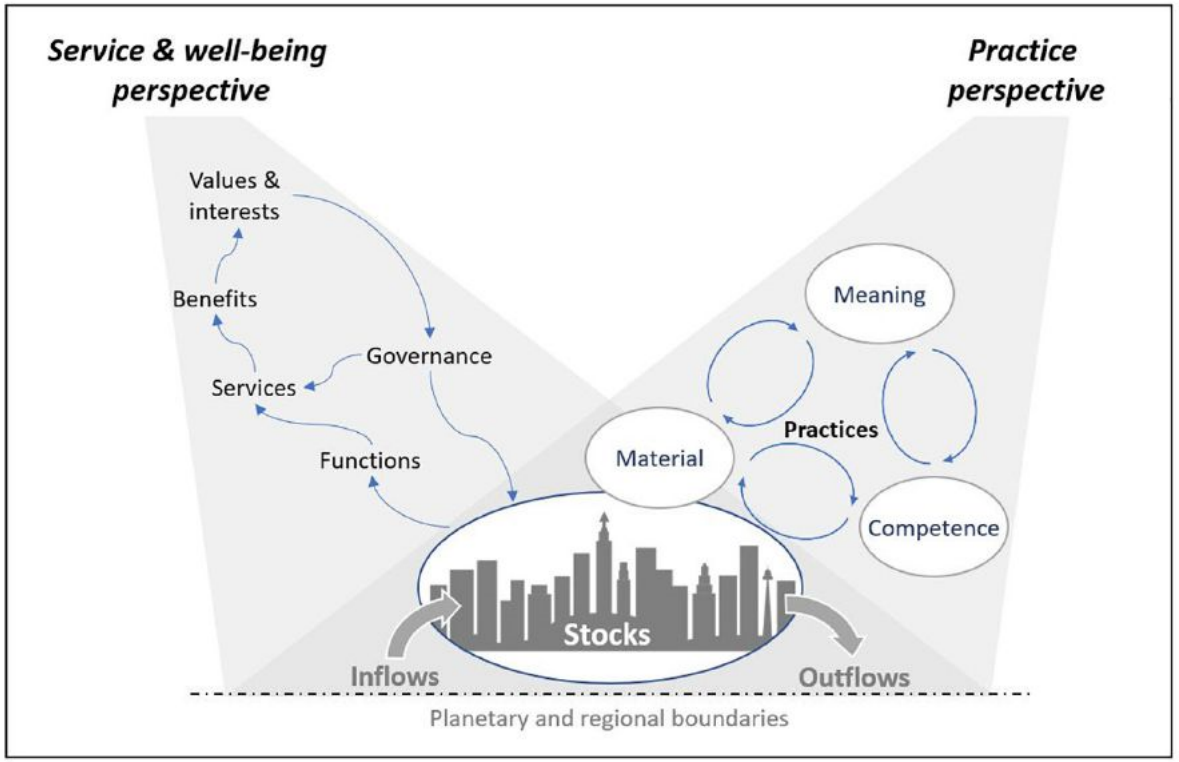
The stock-flow-service nexus: services are derived from specific stock-flow combinations. Purposes of ‚resource use' are diverse and potentially conflicting. Broadens concepts of eco-efficiency.

The stock-flow-practice nexus: focuses on the interrelations between the routines of everyday life and stock-flow constellations. Connects theories of practice with social metabolism thinking.

Both nexus approaches provide heuristic models for interdisciplinary sustainability research to analyze the key role of material stock patterns for (un)sustainability.



Haberl, H., M. Schmid, W.Haas, D. Wiedenhofer, H. Rau, V. Winiwarter 2021. *Ecological Economics*, **182**, 106949. https://doi.org/10.1016/j.ecolecon.2021.106949

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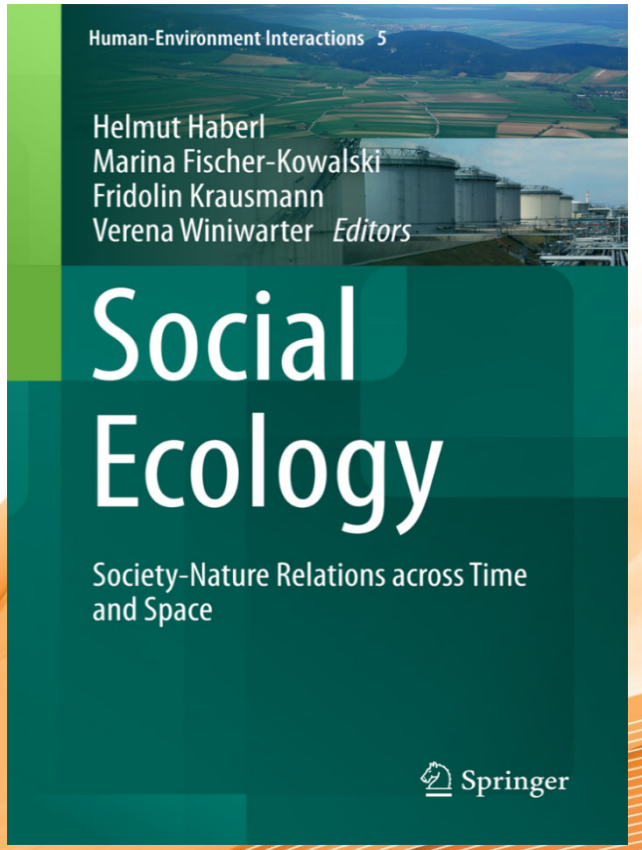

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