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The stock-flow-service nexus: new directions for social-ecological transformation research

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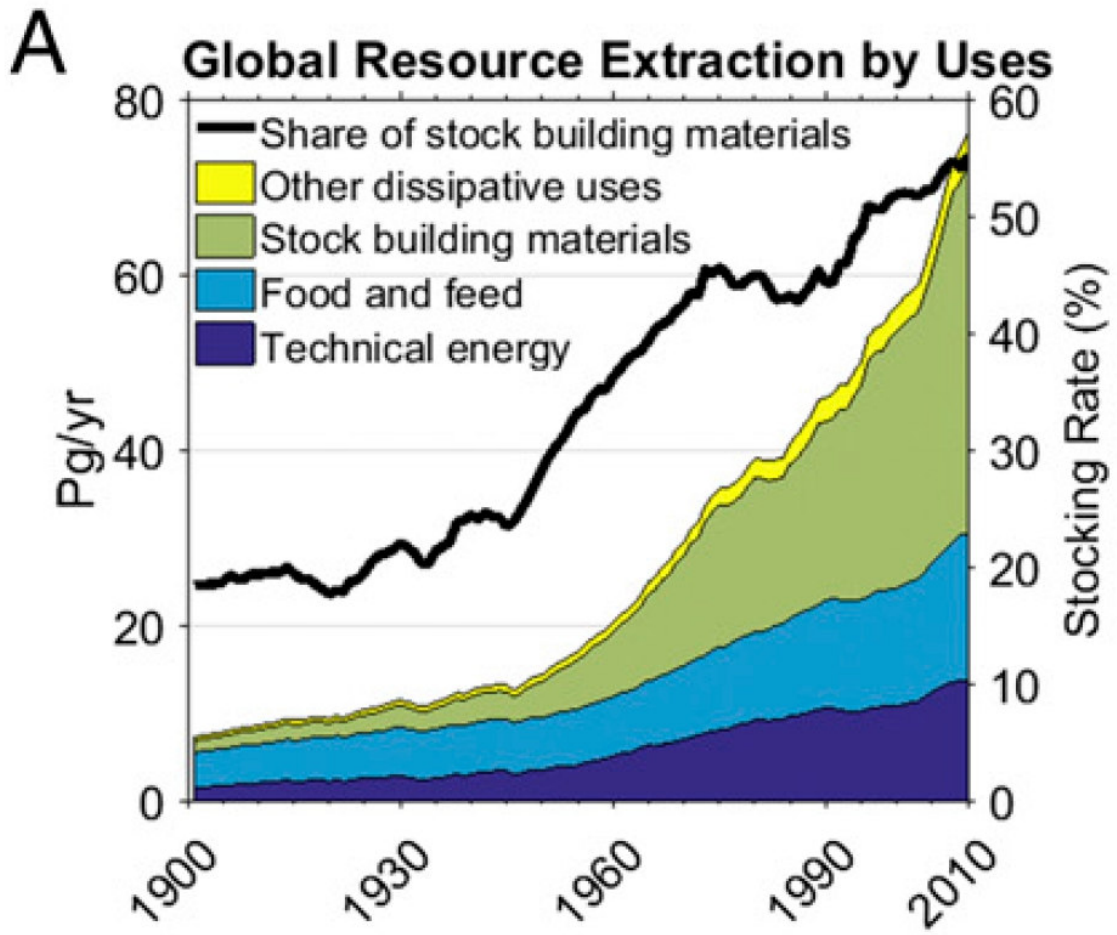
Toward stockpiling society (*not* throwaway society)



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FWF Der Wissenschaftsfonds.

Krausmann, Wiedenhofer et al. 2017. PNAS 114(8), 1880-1885

The Challenge

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- **material stocks** (e.g. infrastructures, buildings, dams) **enable certain modes of production and living**
- but **determine further resource use** (e.g. energy)
- and **restrict alternative pathways** => **lock-in** effects
- current trajectories **major obstacle for sustainable resource use** levels
  - **no evidence** that **resource efficiency** is effective
  - **more recent transformations even more challenging** (no absolute decoupling, 2. “Great Acceleration” since 2004?)
- how to **identify alternative pathways?**
  => **Stock-Flow-Service-Nexus** as conceptual approach

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The stock-flow-service-nexus

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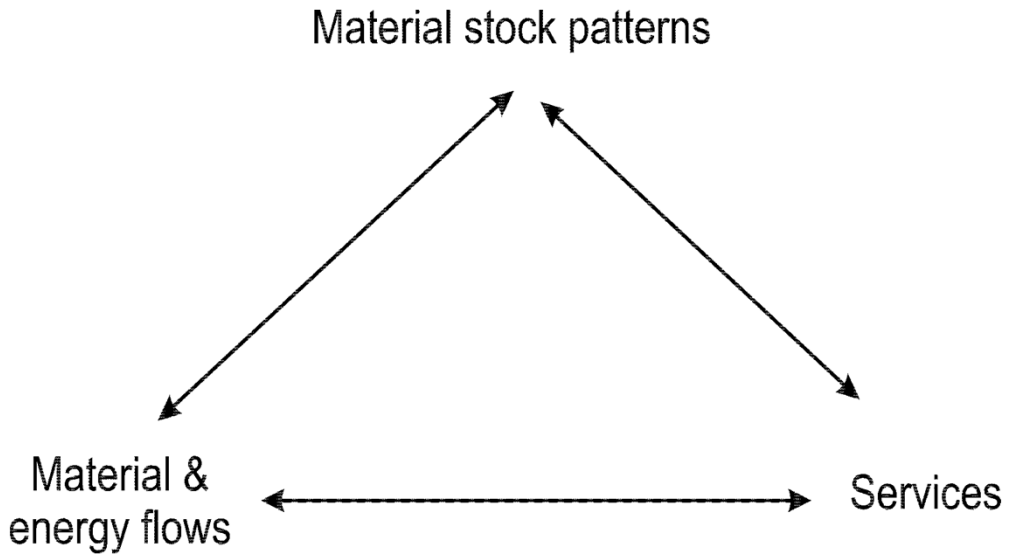

the idee: **reducing** resource use by determine **alternative options** for **service provisioning**

- needs clarity about **services**
- calculate their **relations** to **flows** and **stocks**
- how to determine **alternatives?**
- what **possibilities or obstacles** exist for **implementing** alternative options?

The Energy-Service-Cascade

(Kalt et al. 2019 in: Energy Research and Social Sciences 53, 47-58)

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services **distinct**

- from **stocks** and **functions**
- and from **benefits** and **values** (and **interests**)
  - **who benefits?**
    - and **why?**

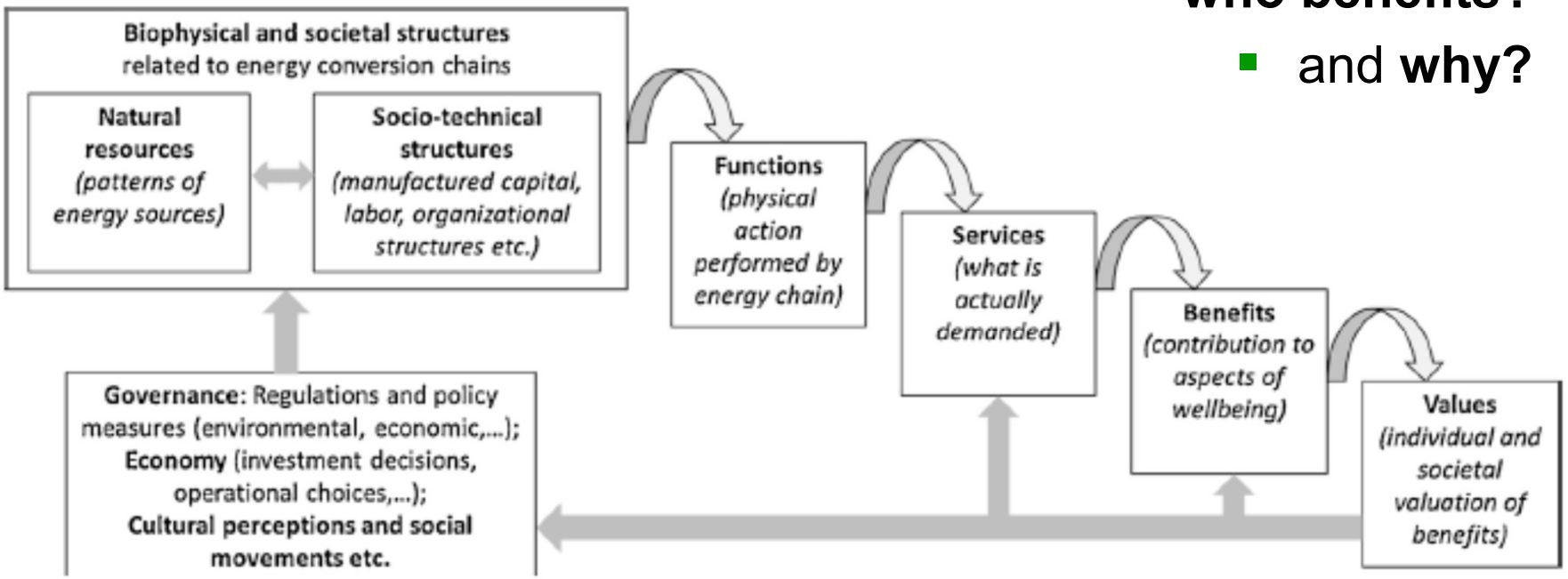

Fig. 1. The 'Energy Service Cascade' (ESC) as adapted and expanded from Haines-Young and Potschin [9,18].

Basic characteristics of services

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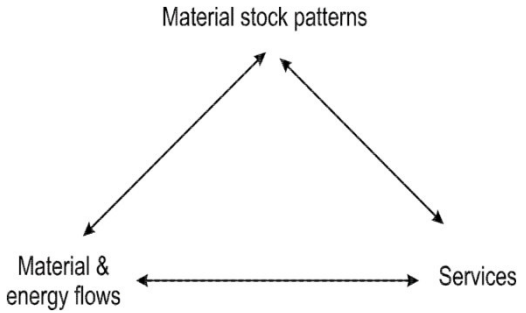
- different from functions:
  physical work/energy ≠ societal service
- but also from benefits:
  specific for certain **social groups**
  - **privileges** some while **discriminating** others (e.g. mobility: road construction, energy provision: construction of dams or power plants, energy grids etc.)
- building of stocks very often **contested**
  - **domestic** ("Stuttgart21", Vienna Airport etc.)
  - **international**: geopolitical strategies (oil & gas pipelines, Belt-Road-Initiative etc.)



➢ **spatially explicit: restructuring of societies**

➢ **state(s) play an important role**

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Biophysical and societal dimensions

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- **Provisioning systems** as a **bridging concept***
- developed within **Political Economy** (Ben Fine: Systems of provisions – linking consumption to production)
- applied also in **social-ecological** projects: **LiLi** (J. Steinberger et al.: Living Well Within Limits)
- and **Institute of social-ecological Research** (ISOE, Frankfurt/M.)
  - **mediating the provision** of services
  - **social-ecological systems (SES)**
  - focus on **actors, knowledge, technologies, institutions** (state)

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* Plank, C., Liehr, S., Görg, C.: Provisioning systems and their implications for the transformation of the stock-flow-service nexus.paper presented at the 2. Austrian Resource Conference, Innsbruck 1. March 2019

ISOE Concept of Provisioning Systems

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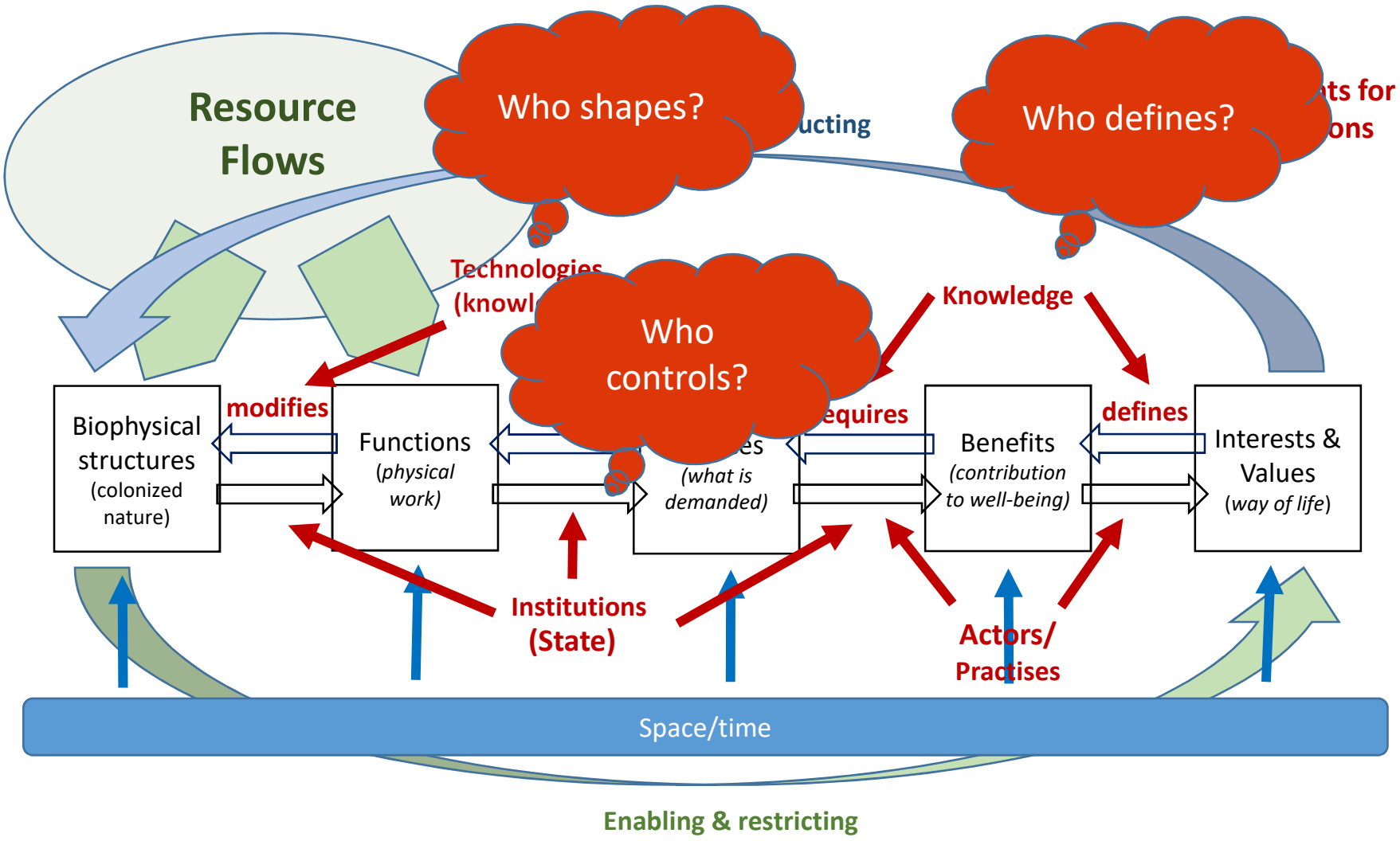
Hummel, D. (Ed.) (2008): Population dynamics and supply systems. A transdisciplinary approach. Campus
Liehr, S et al. (2017): How the Social-Ecological Systems Concept Can Guide Transdisciplinary Research …. Sustainability 9(7):1109



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Conclusions and way further

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- Stocks, i.p. infrastructures highly **contested** due to **spatial restructuring** of societies involved in their building (D. Harvey: temporal-spatial fix)
- **Provisioning Systems** as entry point for empirical analysis
  - systemic approach, but including **actors, knowledge, institutions, power relations**
- **States** not only an actor but also an **authority** for **conflict "resolution"**
  - **strategic selectivity** towards economic growth
  - Today: shifts towards **geopolitical-territorial logic**
- **possible empirical focus**: **urbanization and mobility**
  - focus on the twin capitals: Vienna and Bratislava?
  - building of roads, public transport, airports, also housing
  - conflicts e.g. on airport and highways

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Thank you very much
for your attention!
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