

Provision of housing services within planetary limits: A methodological framework for the urban circular economy

Relevance

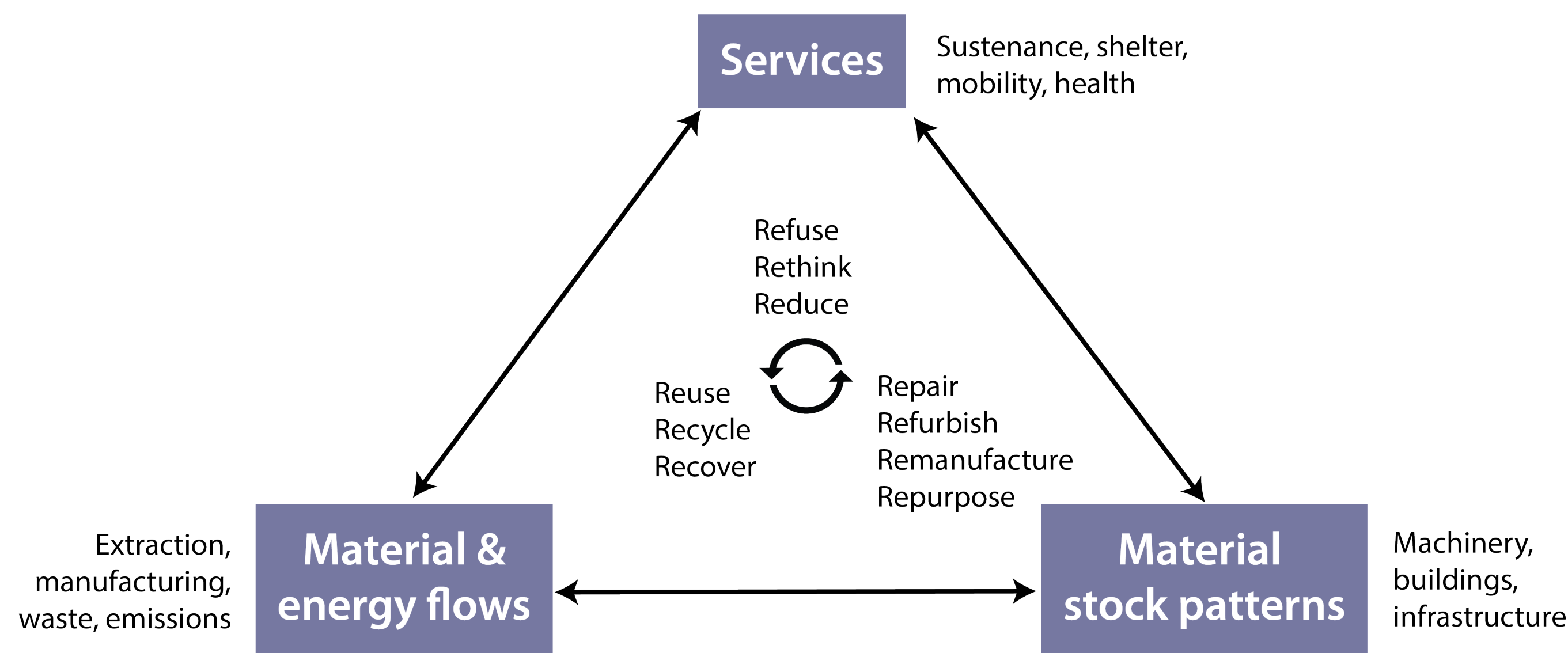
- Decent housing is a core sustainable development goal and a fundamental human right. It is currently not met for a quarter of the global population
- Construction sector is the world's largest consumer of raw materials, and 40% of global CO₂ emissions are attributed to housing and construction
- The challenge of providing decarbonised, decent housing differs per urbanisation context

Circular city ≠ Circular economy

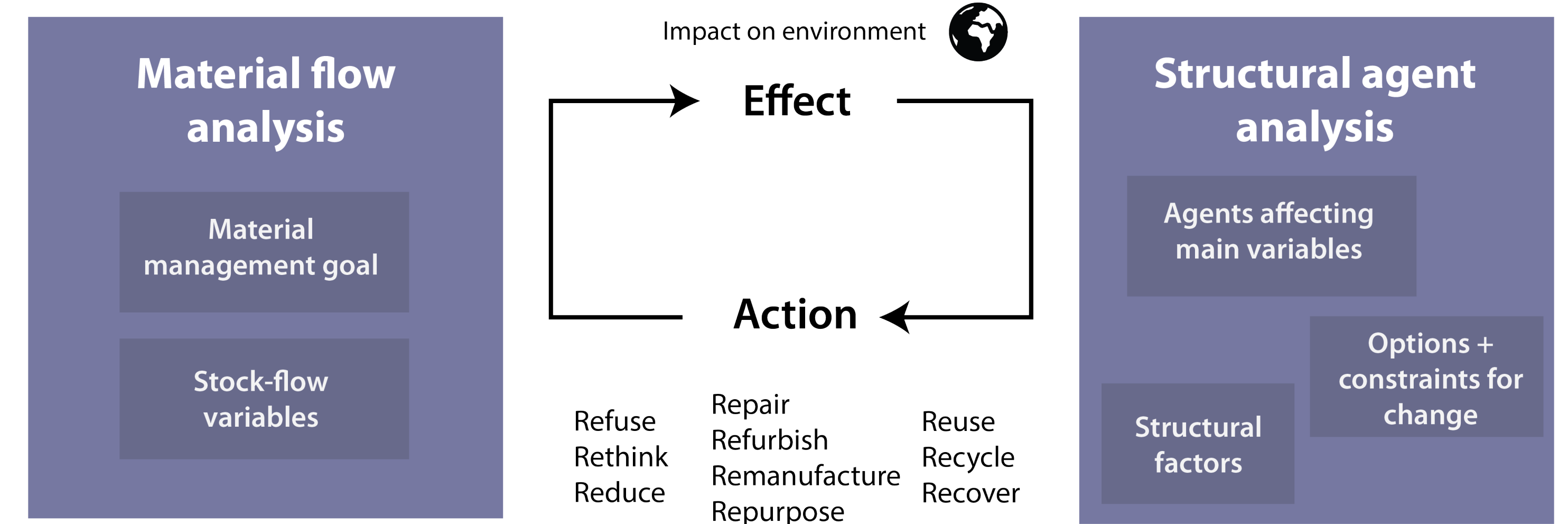
- Circular economy proposes strategies to reduce resource use, reuse buildings, and recycle construction and demolition waste
- However, meeting housing needs within climate targets requires attention to more than material and energy stocks and flows
- A circular city must consider trade-offs in the configuration of stocks and flows in providing urban services

Theoretical basis: Stock-flow-service nexus

Resource flows combined with material stocks provide the urban services necessary for societal well-being (Haberl et al., 2017).

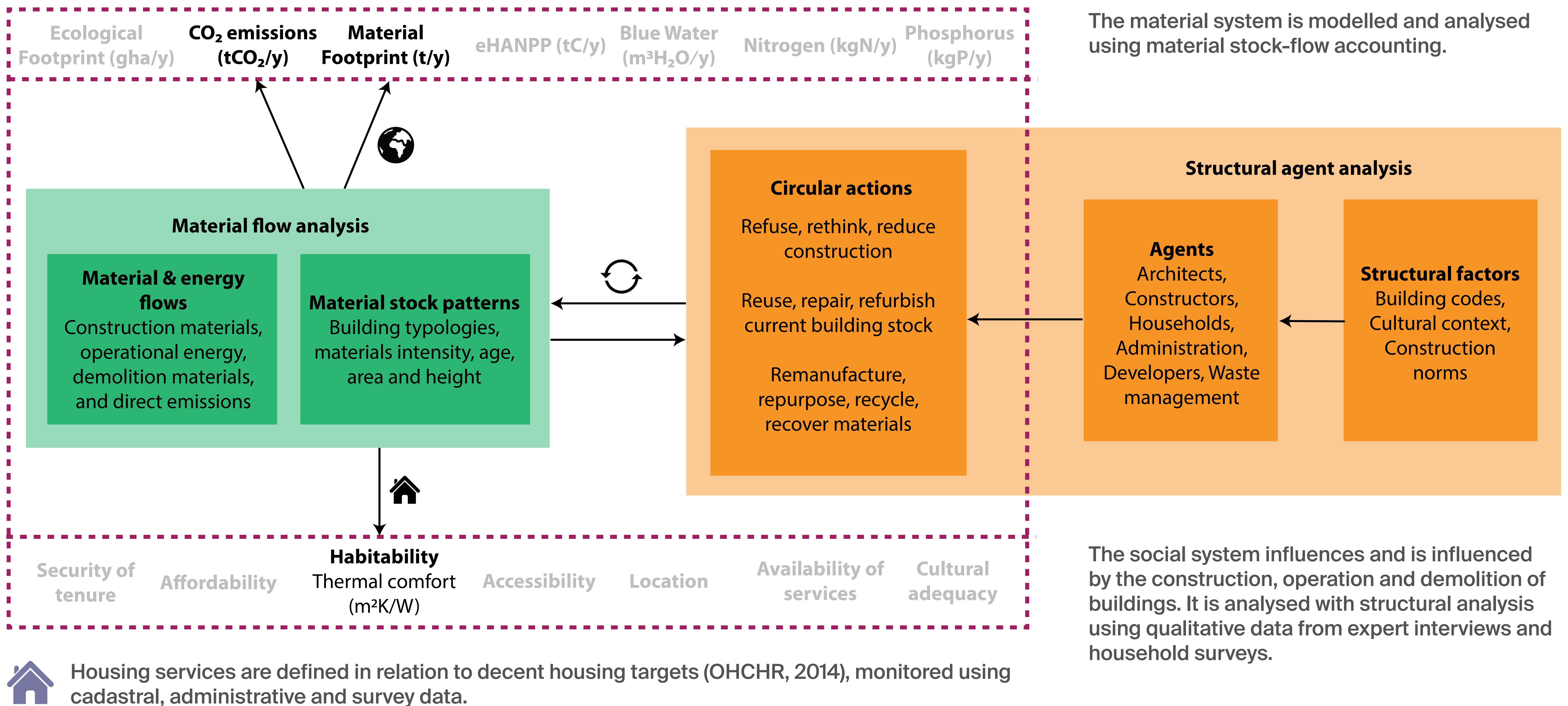


Social structures, actors and their actions restrict or enable strategies for managing material stocks and flows (Binder, 2007).



Methodological framework: Housing services in the urban circular economy

Planetary boundaries (O'Neill et al, 2018) are defined in relation to climate targets, monitored using biophysical indicators (i.e. carbon and material footprint) based on life cycle inventory data.



The material system is modelled and analysed using material stock-flow accounting.

The social system influences and is influenced by the construction, operation and demolition of buildings. It is analysed with structural analysis using qualitative data from expert interviews and household surveys.

Housing services are defined in relation to decent housing targets (OHCHR, 2014), monitored using cadastral, administrative and survey data.

Next steps

- I will operationalise the framework for provision of decent housing services within climate targets for Geneva, Switzerland
- Housing services are defined as thermal habitability and planetary limits defined by climate targets (GHG emissions)
- System dynamics (right) allows the integration of housing stock-flow analysis, GHG emissions, and the circular actions that restrict or enable the meeting of targets
- Key contribution: Recentring urban circular economy around the objective of providing necessary urban services

