

Energy Sufficiency

the Role of Energy Sufficiency in Energy Transition and Society

How can energy consumption decrease in absolute terms?

How can societal change be integrated in energy modelling?

In order to be able to achieve the 1.5° target, three strategies of the energy transition are needed:

sufficiency – absolute reduction of energy consumption through social innovations, by phasing out unsustainable structures and by changing social practices
efficiency – using relatively less energy for the same purposes and
consistency – using renewables instead of fossils.

Energy system modeling is largely blind to sufficiency options as models have so far only depicted what is easy to quantify. Since these models are often the basis for energy and climate policy, sufficiency measures do not find their way into policy. The group wants to change this by including sufficiency options in models and scenarios.

Junior research group Energy Sufficiency – a collaboration between Energy- and Environmental Management (EUF), Norbert Elias Centre (EUF), Wuppertal Institute (WI) and Öko-Institut (ÖI)



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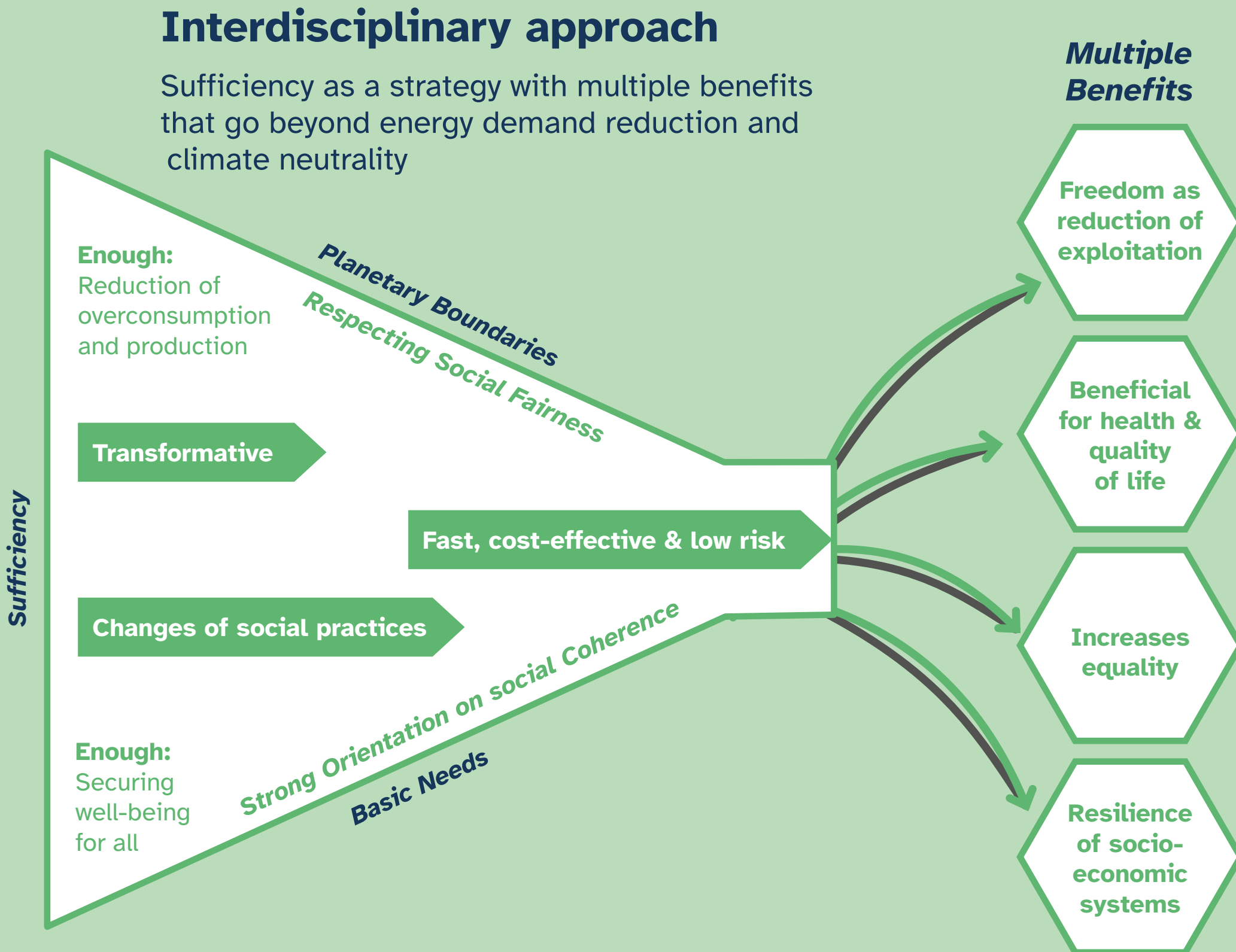
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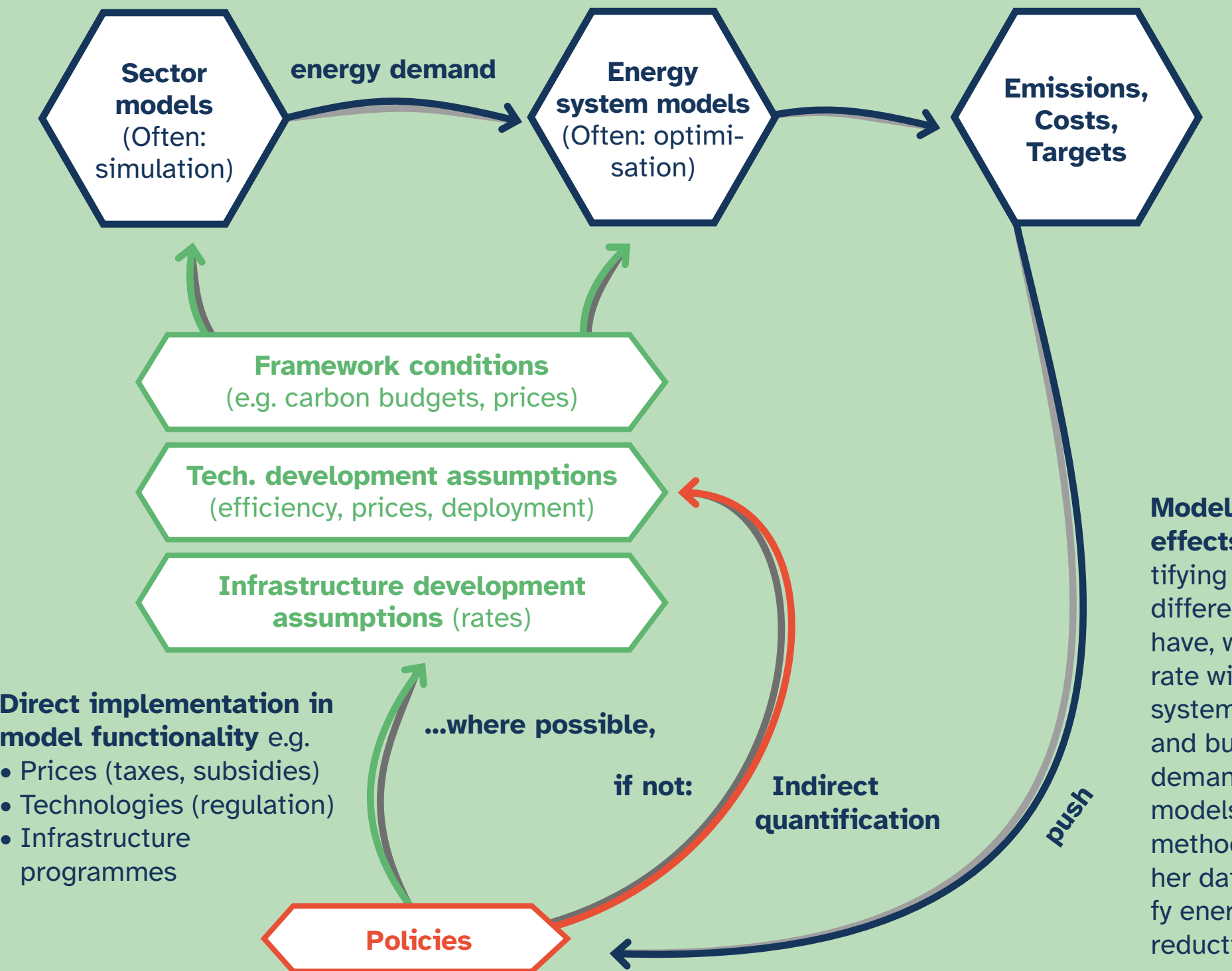


Sufficiency policy

The junior research group wants to explore what sufficiency policies are needed to enable people to consume fewer resources.

Sufficiency policy database: The Energy Sufficiency Policy Database compiles and categorizes numerous sufficiency policy instruments for all sectors. It addresses decision makers from politics, administrations, the civil society as well as energy system modelers.

Modelling effects of energy and climate policy

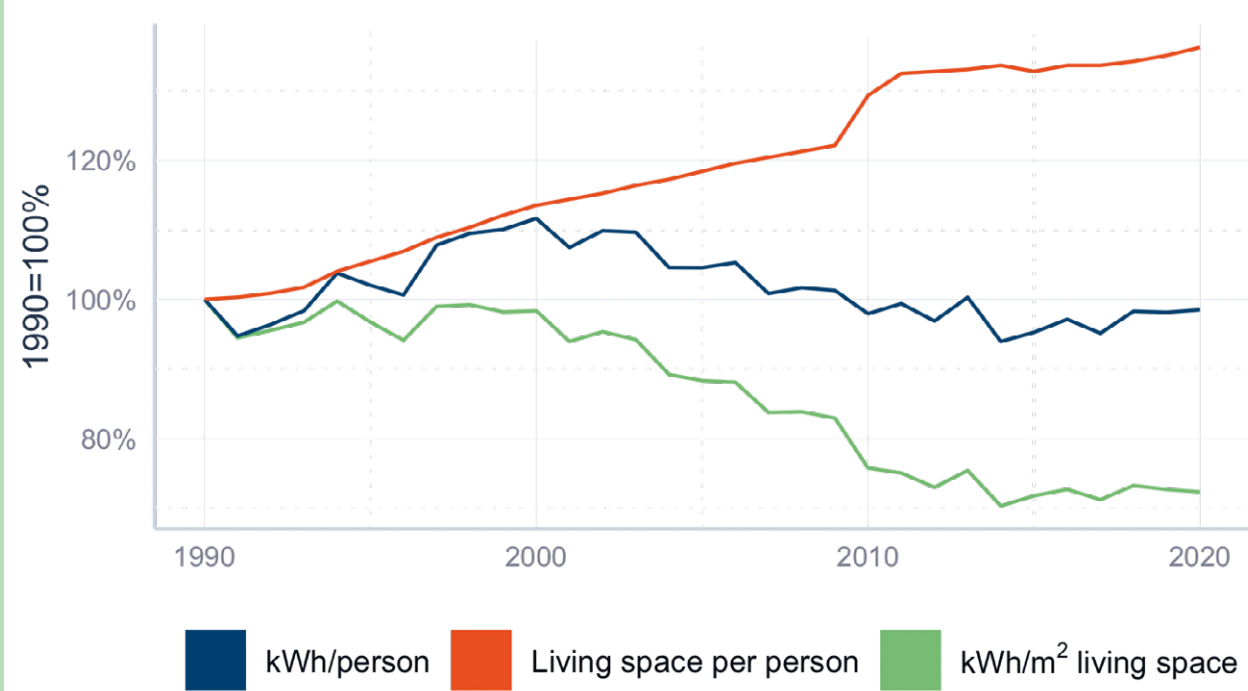


Energy system modeling - Focus demand side

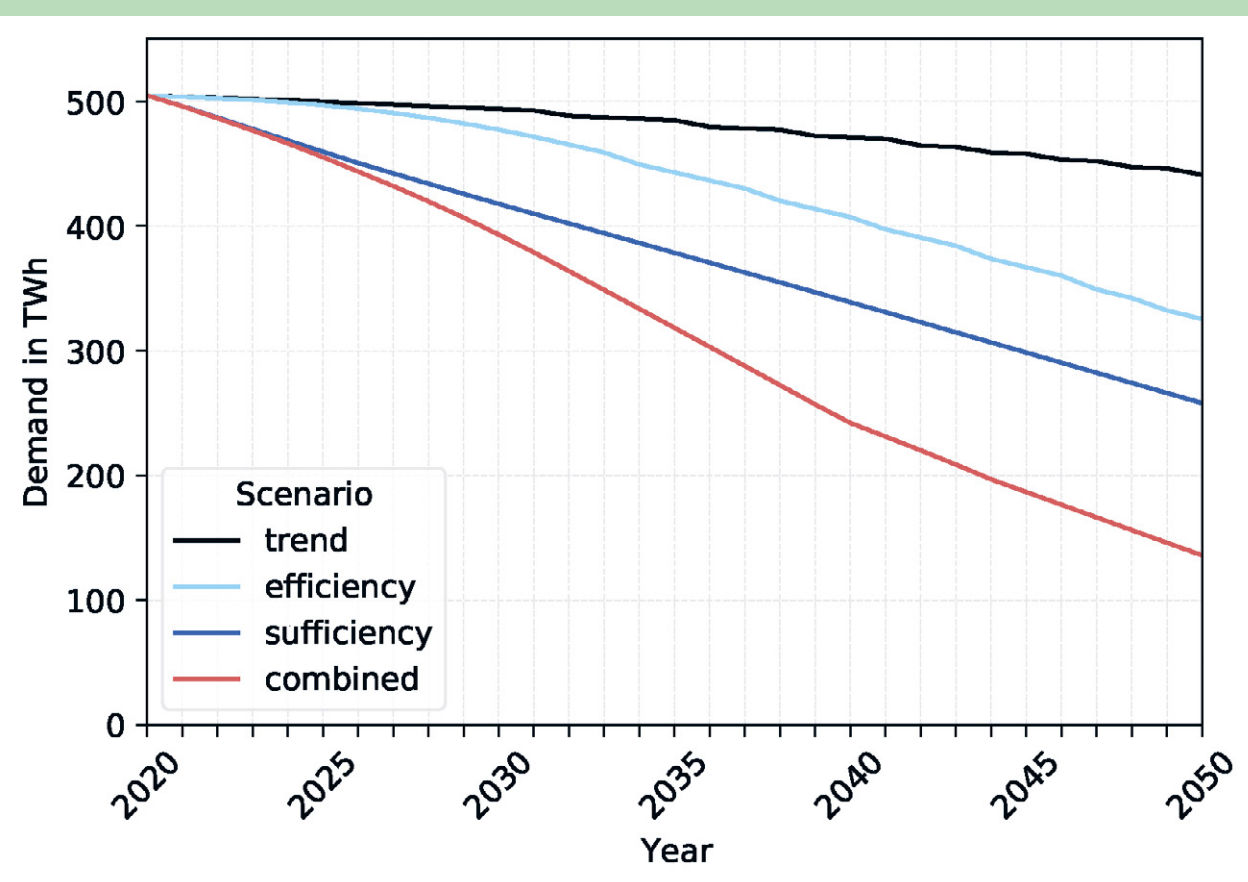
Modelling changes of social practices and their effect on energy demand and emissions requires a multitude of approaches. On the one side, we work with simulation models covering the demand sectors buildings and transport. On the other side we integrate demand side approaches into energy system modelling and thus contribute sufficiency-oriented scenarios for climate neutrality.

Building sector

The rebound-effect in the housing sector:



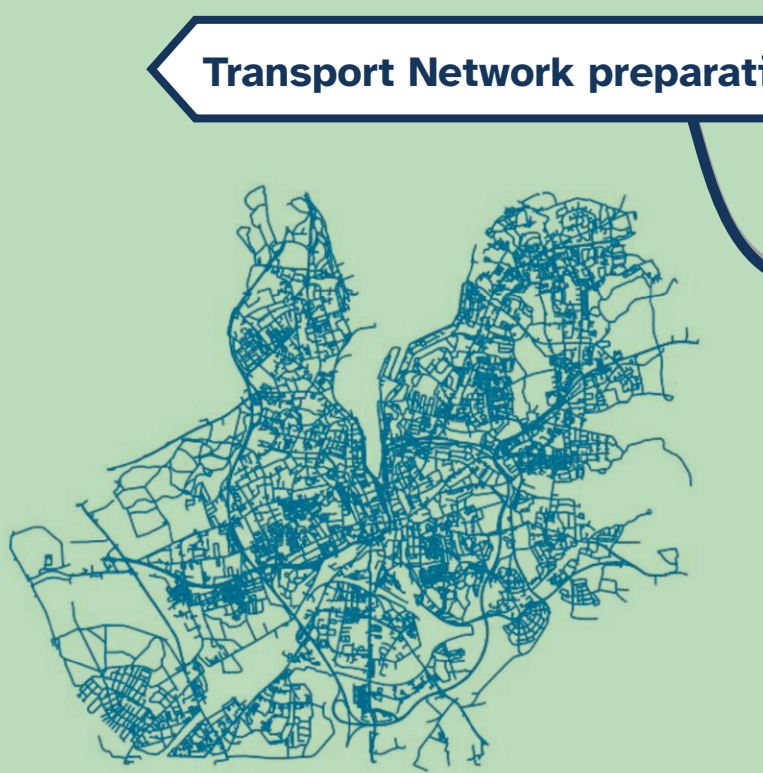
Problem analysis: Historical development shows that success in efficiency, thus less energy per square meter is compensated by increase in living space. Thus, size of living space is crucial for climate mitigation.



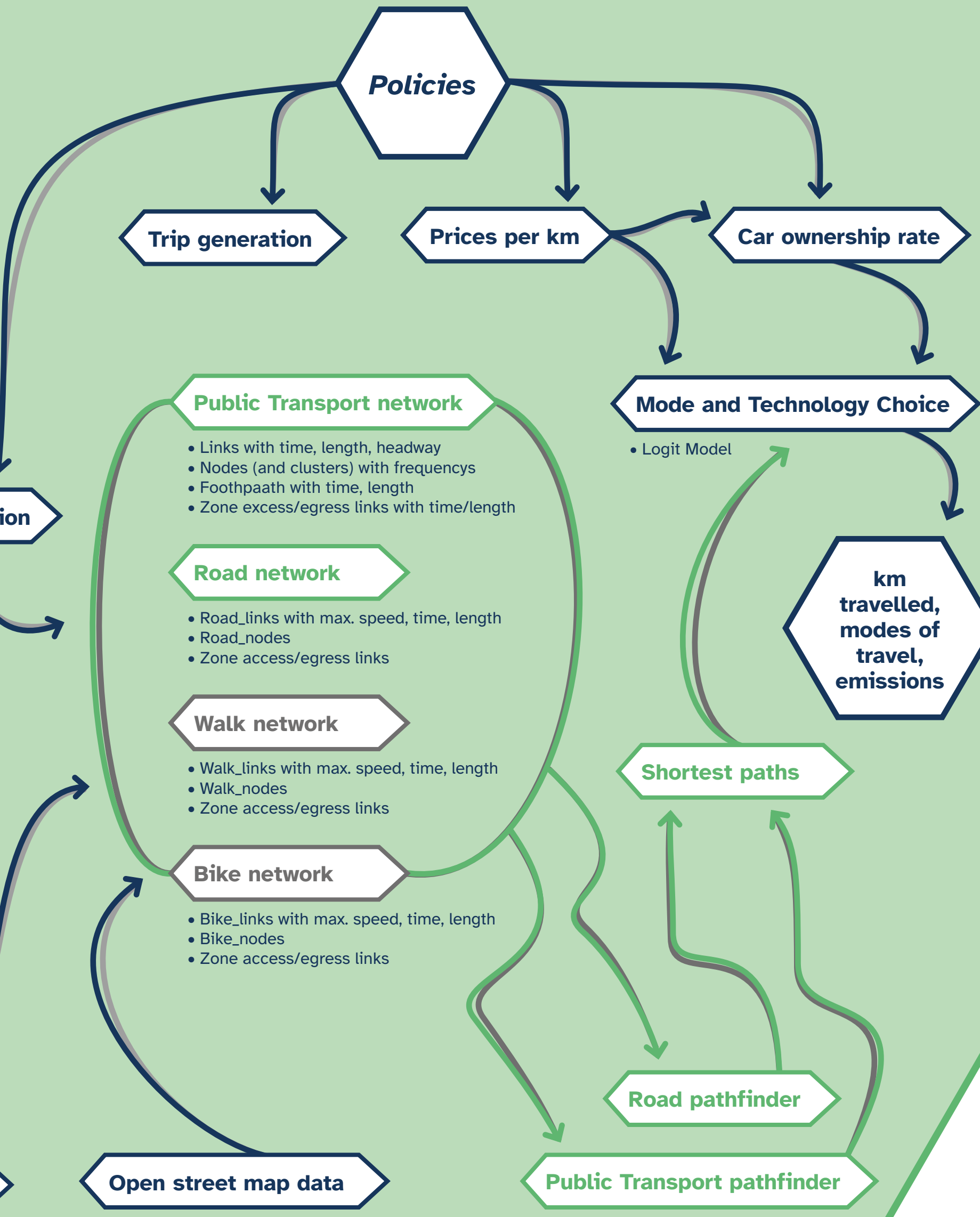
Scenarios & Modelling: Energy Demand of the German building sector in four modelled scenarios. Climate neutrality can only be reached fast enough when combining all options for efficiency and sufficiency.

Transport sector

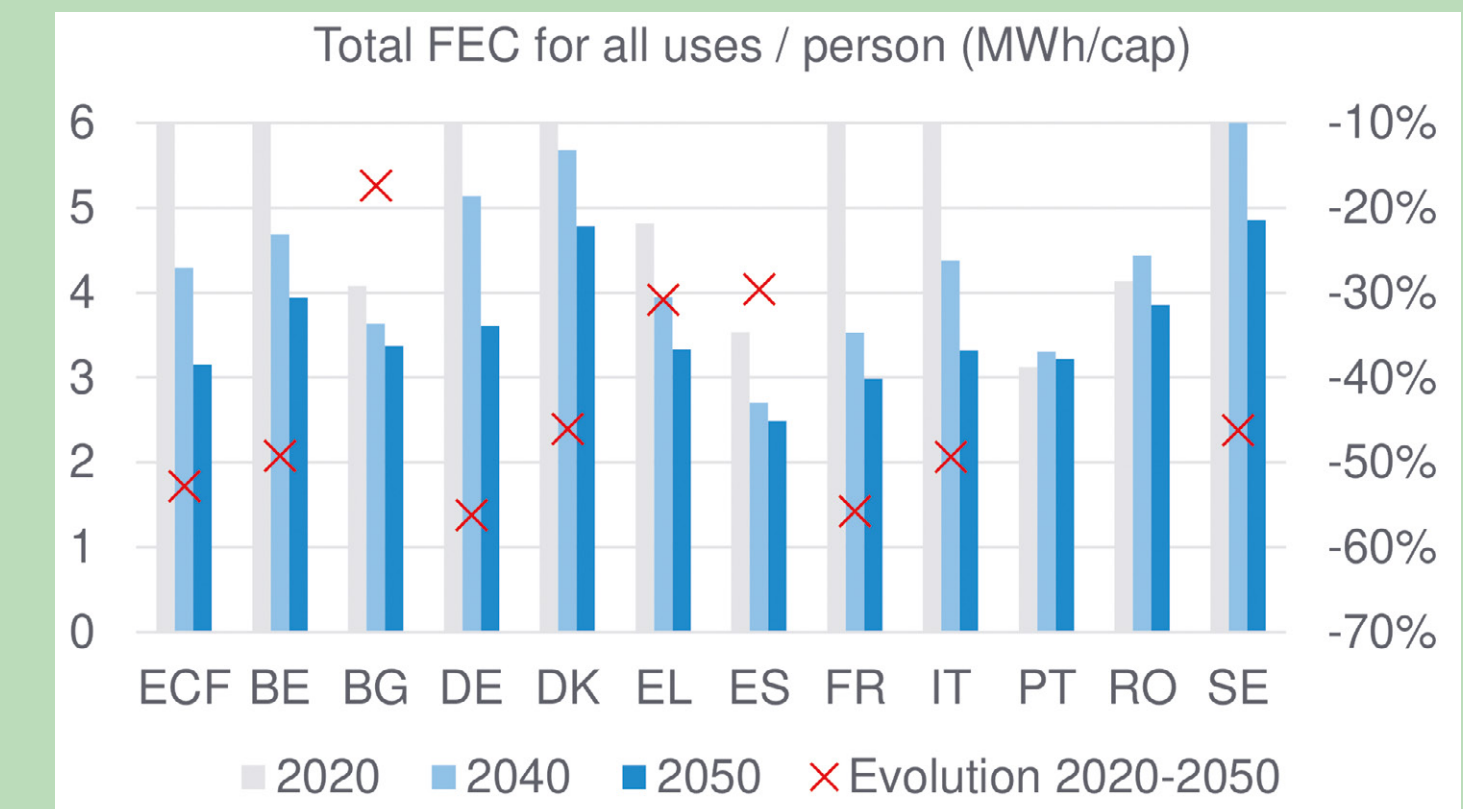
Transport modelling: The transition of the mobility sector is crucial for climate neutrality. We integrate framework conditions for sufficiency (e.g. policies for reduced motorized individual transport) in transport models to estimate potentials for shift to climate-friendly modes and reduction of car travel.



Local and national: Transport demand and mode choice is modelled on national and on local level. Picture: Example of local transport modelling: Flensburg's footpath network.



European energy sufficiency scenario



Bottom-up collaborative modelling: In the CLEVER-project, we contribute to a sufficiency scenario for Europe. Graph: Resulting final energy consumption (FEC) of an EU sufficiency scenario, average MWh/capita for each country

Results and Recommendations:

- Combining sufficiency, efficiency and renewables increases the chance for a successful energy transition.
- The demand side is currently underrepresented in energy system modelling.
- Sufficiency has a huge potential for reducing climate emissions and policy is crucial for enabling changes of social practices for energy demand reduction.
- Different methods are required for modelling the effect and potential of sufficiency policy options.
- Sufficiency can address multiple crises simultaneously by finding a balance between respecting planetary boundaries and securing everybody's needs.
- Further research is required into the barriers faced by sufficiency and its compatibility with economic principles.

References and selected academic publications

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