UNIVERSITÄT LEIPZIG

Wirtschaftswissenschaftliche Fakultät
Institut für Infrastruktur und Ressourcenmanagement
Professur für Energiemanagement und Nachhaltigkeit
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Call for theses:
Modelling the Diffusion of Rooftop PV Systems: Replication the State of the Art

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Motivation

In 2020, the primary energy consumption of private households amounted to 27.4%, showing the importance of household-level decarbonization for successful energy infrastructure transformation. Arguably, technological innovation and their adoption by private households can have a large impact on the environment and climate change mitigation.

While institutional change largely depends on (rational) arguments and the influence of ‘green’ behavior on an institutions’ image, the behavior of private consumers is a complex amalgamation of opinion dynamics, societal and peer pressure, perceptions, preferences, advertisement and a large range of cognitive factors.

Understanding the behavior and decisions of consumers is not only important for successful product launch planning, but also for actors in the public sphere promoting climate change mitigation. Agent-based modelling (ABM) of innovation diffusion has shown to give insight in these dynamics and to assess strategies to address these questions. Many models for studying the diffusion of rooftop photovoltaic (RPV) exist. Yet, hardly any attempts have been made to replicate existing models, providing an essential contribution to the discourse

Background

In order to address this issue, the chair of Energy Management & Sustainability developed the modular agent-based innovation diffusion framework IRPact, which is suitable to quickly generate different process models for the study of the diffusion of sustainable energy innovations. It offers a rich array of research avenues for policy instruments, behavioural drivers, socio-demographic and geographical structures, as

well as many other research questions. Preceding thesis have focused on data collection and reviewing existing models.

Goal

The goal of this thesis is to build on a review of different ABM approaches on municipal RPV adoption in order to replicate the results presented in the papers or uncover issues in replication.

In a second step, the thesis would analyse the simulation behaviour for different model instances and cluster the behaviour into diffusion behaviour classes. By analysis of the design of these traits it would then attempt to derive insight into the (more theoretical) design components and reflect these back to the scientific discourse as a rather theoretical contribution.

Your profile

You should be interested in transdisciplinary questions, most preferably in an environmental field. You should be willing to have both a view for the system as a whole and identifying its constituents, as well as their interconnections. You should not be averse to numbers and formulas, but at the same time have an integral view of the social and environmental aspect of a system. Writing the thesis in English is strongly preferred; however, it is possible to write the thesis in German as well.

It is strongly advised that you would’ve attended the course ‘Modeling in Resources Management’ or have comparable background in agent-based modelling or practical modelling experience.