UNIVERSITÄT LEIPZIG

Wirtschaftswissenschaftliche Fakultät
Institut für Infrastruktur und Ressourcenmanagement
**Professur für Energiemanagement und Nachhaltigkeit**
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# Call for thesis:
# Modelling the Diffusion of Rooftop PV Systems: Model Exploration and Scenario Analysis

## 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.

Discourse and expectations on modelling often focus on prediction of model behaviour, adoption paths and precise estimates of policy instruments. Behavior of complex social systems, however, is notoriously hard to predict. Here, explorative approaches suggest more potential to yield relevant results to modelers.

## Background

In order to address this issue, the chair of Energy Management & Sustainability developed the agent-based innovation diffusion framework IRPact, aimed at easy and flexible development of models on the diffusion of sustainable products.

Based on a flexible process model and different model configurations, we have explored several decision factors and their influence on the model behaviour overall. However, this is but a start and the tip of the iceberg.

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## Goal

The goal of this thesis is to design, execute, evaluate and analyse different scenarios for the use within the PVact model in residential rooftop PV diffusion. The chair offers the models, the required infrastructure to execute and evaluate them, guidance in the development of own research questions, as well as research avenues pursued in conjunction with the researchers.

The focus of this thesis lies in in-depth investigation of the model behaviour with different decision factor combinations and weights as well throughout scenarios encapsulating different system assumptions. These synthetic potential models are simulated within a real municipal context to understand the agent behaviour under these influences and their combinations. This would be investigated both in a static and in a stochastic environment where agents influence another under random influences.

## 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. While developing a model is not part of the thesis, creative and analytical work on an extensive model is.