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Institut für Infrastruktur und  
Ressourcenmanagement  
**Professur für  
Energiemanagement und  
Nachhaltigkeit**  
Prof. Dr. Thomas Bruckner

## Call for thesis: Heat Technology Adoption Behaviour of Heterogeneous Households

### Motivation

Historically, carbon emission reduction efforts have focused on the electricity sector, in particular electricity generation. Recently, increasing attention has been paid to decarbonization efforts in the heat sector. The public debate on the *Gebäudeenergiegesetz* (building heating act) in the German public has shown the importance of residential heat transformation in the public; simultaneously, it has been very illustrative of the challenges on decarbonizing the residential heat sector.

While investment decisions in the public sector can be influenced politically rather directly, decarbonizing decentral actors requires regulatory measures or investment incentives that make the adoption of sustainable heating technology attractive to private actors. The public debate in Germany has shown that regulatory measures are not very controversial when they affect private companies, but are politically very delicate when it comes to residential actors.

This makes understanding acceptance questions and investment decision factors for households ever more important in sustainable heat system transformation efforts.

An effective tool to understand adoption behaviour of households is seen in agent-based modelling of residential investment behaviour, making it an important tool to study policy instruments and their effect on residential heat technology adoption behaviour.

In the past, the chair of Energy Management & Sustainability developed the agent-based innovation diffusion framework IRPact, aimed at easy and flexible development of models for the diffusion of sustainable products. Within the scope of the project 'T!Raum', the chair strives to develop an agent-based model for household adoption for renewable residential heating technologies.

Supervisor:  
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## **Model State**

The tools developed around IRPact offer a rich array of research avenues for policy instruments, behavioural drivers, socio-demographic and geographical structures, as well as many other research questions.

While the framework has been applied to the context of residential rooftop photovoltaic adoption, the adaptation to residential heating technology has not yet been done. Within the scope of the T!Raum project, this model will be developed (be it conceptually or in code) based on literature research and focus groups analyses of the milieu-dependent behaviour of decentral actors in energy-related investment decisions and quantitative empirical research building on this research.

## **Goal**

The goal of this thesis is to contribute to the model foundation of the described endeavours by conducting an in-depth literature analysis and to work out the system components involved in the decision of residential households on renewable heat technologies and electric assets relevant for this.

Depending on the scope and timeline of the thesis, it would also entail the preparation and execution of the focus group research together with the research team at the chair and the preparation of the empirical survey conducted within the project.

## **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. Due to the focus on literature analysis of the topic, experience with (systematic) literature reviews or experience with qualitative research would be beneficial.

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 attend the course 'Modeling in Resources Management' in the winter semester (or would have attended it before) in order to understand how your work fits in with the conceptual model developed within the project.