

## Study Regions

Two Austrian energy regions *ökoEnergieLand* in the district Güssing and *Energieregion Weiz-Gleisdorf*, which show significant differences in their initial conditions, applied strategies and transition processes, have been selected as case study regions. The town Güssing started in 1990 with the decision of the town's mayor to withdraw from fossil fuels, which resulted in a successful transition with a functioning local energy system, significant increase in regional value-added, and creation of new jobs. This model has been extended to 14 neighbouring municipalities forming today's ökoEnergieLand. Energieregion Weiz-Gleisdorf, established in 1996, records a number of concluded energy projects, demonstrating innovations in passive house building, high-quality energetic renovation of large-scale buildings, and applications of solar technologies. Recently, it started concentrating on e-mobility. Both regions have been awarded several times in national and international competitions.

## Project Organisation

Figure 3 presents the research partners involved in the project. The project is headed by the University of Graz, Institute for Systems Science, Innovation & Sustainability Research and the Ludwig-Maximilians Universität München, Chair for Human-Environment Relations. The project partners are the University of Technology Delft, Section Energy & Industry, Policy & Management, the European Centre for Renewable Energy Güssing, and Energieregion Weiz-Gleisdorf.

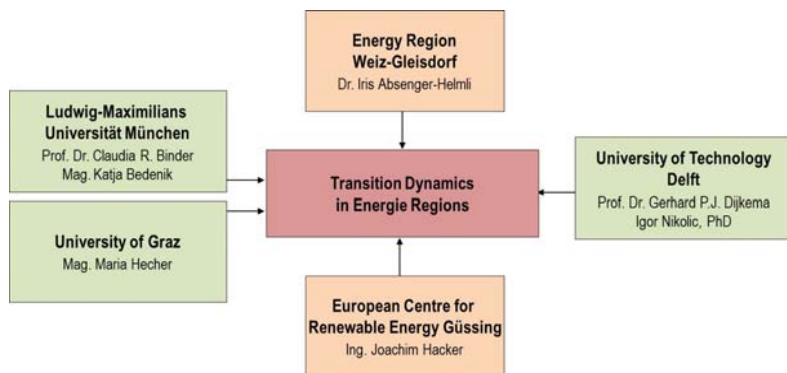


Figure 3: Organisational structure

This project receives financial support from the Austrian Climate and Energy Fund and is carried out within the framework of the "ACRP" Programme.

## Contact

Prof. Dr. Claudia R. Binder, Project lead  
Mag. Katja Bedenik, Co-ordinator  
Ludwig-Maximilians Universität München, Department of Geography,  
Chair for Human-Environment Relations, Luisenstrasse 37, 80333 Munich, Germany  
Web: <http://www.uni-graz.at/terim>  
Email: [katja.bedenik@lmu.de](mailto:katja.bedenik@lmu.de) / [www.geographie.uni-muenchen.de](http://www.geographie.uni-muenchen.de)



# TERIM Project

CHAIR FOR HUMAN ENVIRONMENT RELATIONS

## TRANSITION DYNAMICS IN ENERGY REGIONS: AN INTEGRATED MODEL FOR ENERGY POLICIES

*Energy regions provide one answer for climate change mitigation and adaptation. This project aims at understanding and simulating the transition dynamics in Austrian energy regions. The results are concrete policy recommendations at a regional and national scale for establishing new, supporting current and maintaining successful transitions in energy regions.*

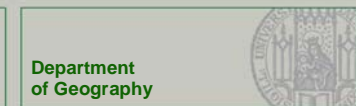
### Context

Energy regions are regional initiatives, which usually envision energy self-sufficiency by using regional renewable energy sources and building a decentralized energy infrastructure. Studies on energy regions have mostly looked at the technical-operational characteristics and informed policy-makers on how to improve energy infrastructure. However, they have missed out in providing and understanding the dynamics of the transition process, in particular the role of policies, social norm, and culture in stakeholders' decision-making and thus, on the transition process itself.

### Objectives

The main objectives of this project are to simulate the transition dynamics of energy regions and derive policy recommendations. Specifically, we will:

- analyse the transition dynamics in two Austrian energy regions from their establishment until today.
- develop an integrated simulation model for studying transition dynamics in energy regions including interrelations and feedbacks between the social system and the energy infrastructure, as well as the impact of policies and external boundary conditions.
- derive policy recommendations for energy regions.



## Conceptual Framework

Our conceptual approach combines elements of transition theory, policy design and improvement, human-environmental systems research and modelling. Figure 1 shows how stakeholder perceptions and decision-making affect through their action the environmental system, here resources and energy flows. The changes in the environmental system, in turn, are perceived by the stakeholders, who balance the perceived effect with the goals they want to reach. This balance leads to new actions. The human-environment interaction is influenced by external boundary conditions, such as climate change, or regulated by national or EU policies, such as fuel prices, subsidies or educational programmes.

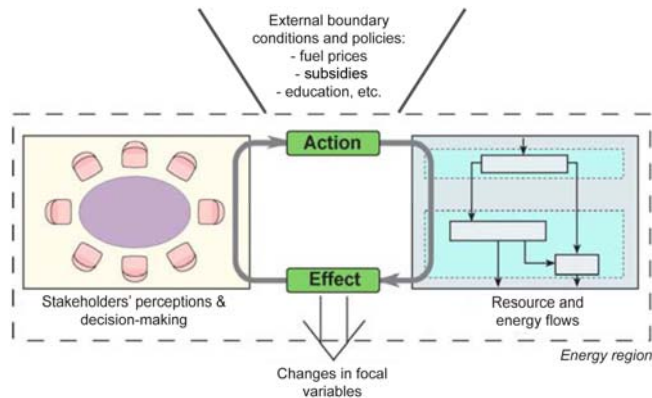


Figure 1: Interaction between human and environmental system

## Project Structure and Methods Applied

The research plan (Figure 2) is structured into a kick-off workshop and three modules. Project duration is 36 months, starting in April 2011.

**Module 1** characterises the transition dynamics in the study regions which will include: (i) development of the physical resource base of the region, (ii) development of energy demand, (iii) industrial development in the region, (iv) socio-economic factors affecting households' investment and consumption decisions, (v) policies and external boundary conditions, and (vi) the development of a stakeholder map and network.

**Module 2** models and simulates the energy transition in the two energy regions. The quantitative model integrates physical, technical, social and individual aspects and identifies critical feedbacks and delays among them. It combines a dynamic energy flow model with a behavioural model to simulate the effect of policies on stakeholders' decision-making and on the energy infrastructure.

**Module 3** develops and assesses policies, which should be able to support the development, the establishment, and the long-term maintenance of energy regions. These policies will be simulated and assessed with the developed model and the outcomes assessed in a transdisciplinary workshop.

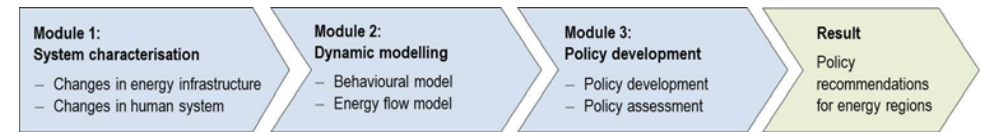


Figure 2: Overview of research plan

## Expected Results

Our project will contribute to overcome disciplinary boundaries and show how transitions theory and modelling methods can be combined with transdisciplinary research on socio-technical transitions. Specifically, we expect the following results:

### Module 1: System characterisation

- a quantitative database of the energy transitions in the two study regions ökoEnergiewelt and Energieregion Weiz-Gleisdorf.
- set of indicators, which characterises the transition process and analyses the effect of policies on the transition process.

### Module 2: Dynamic modelling

- a quantitative model that represents decisions of different stakeholders and its consequences.
- a simulation model that allows testing various policies for energy regions.

### Module 3: Policy development

- policy recommendations for establishing new, supporting current and maintaining successful transitions in energy regions.



Study region ökoEnergiewelt



Study region Energieregion Weiz-Gleisdorf