# Information for Master Students

Johannes Schmidt, Institute for Sustainable Economic Development

December 2020

## 1 Introduction

We very much welcome master students in our interdisciplinary research group on energy systems. To ease the process of starting a master thesis with us, please read this document carefully before you proceed. This will save you and us a lot of effort - and makes it easier for you to decide if we are the right host for you.

## 2 Research

To make your master thesis as interesting as possible for you and as fruitful as possible for us, we want to integrate students as much as possible in our ongoing research. Our research output is structured around the following five main topics:

- Quantitative modeling of energy systems (in particular power systems and power markets). In particular, we apply traditional optimization models, but also reinforcement learning algorithms to understand strategic behaviour on energy markets
- Simulation of wind power and solar PV generation from climate data using simulation and machine learning models
- Assessments of the potentials of renewable energies and their land-use impacts using quantitative methodology (i.e. GIS, image recognition on satellite photos)
- Assessments of how renewable energies reconfigure human-nature relationships applying mixed qualitative-quantitative research methods

Before you get in touch, we recommend to skim through our recent publications which can be found here. Please also check recently completed master theses here. If your research interest is linked to what we do, there is a good chance, we can work together. If you cannot relate to any of these topics and publications, we would recommend to look for other supervisors.

# 3 Topics

We are open for your research topics: if you have a very concrete idea or just some general thought related to one of our areas of research, please get in touch.

# 4 Qualification

In terms of your background, if you took some of the following classes, this will help you to quickly catch up with our work:

- Computer Simulation in Energy & Ressource Economics
- Operations Research & Systems Analysis
- Interdisziplinäres Seminar Umwelt-Informationsmanagement
- Energiewirtschaftspolitik
- Scientific Computing
- Ressourcennutzung und Ressourcenmärkte

Additionally, to work with us, we expect you to have experience in one of the following:

- Programming experience in Python or R
- Experience in using GIS Software
- Experience in applying qualitative research methodology

The thesis can be written in German or English, although we prefer English. Knowledge of Portuguese is an asset, as a lot of our research concerns Brazil. Our research is embedded in international research projects and if necessary, field studies abroad may be part of your thesis.

## 4.1 Process

If you are interested to work with us, please get in touch via e-mail. We will meet personally and discuss opportunities for a collaboration. After that, we expect you to write a research proposal and after finishing the proposal, you can formally submit the thesis topic to the university's administration. We also expect you to present your work in our - rather informal - institute seminar. Partly, your work is going to be co-supervised by several members of our team and of course we welcome co-supervisors from outside our institute.