



### **Institute of New Energy Systems (InES)**

*The Institute of New Energy Systems (InES) is one out of three institutes for applied research at Technische Hochschule Ingolstadt (THI). The research activities of InES are focusing on the following fields of research: Bio-Energy Technology, Energy Systems Technology, Geothermal Energy, Networking & International Projects and Solar Energy Technology. Six professors and about 20 researchers and Ph.D. students carry out applied research projects in the field of renewable energy technologies. Bachelor and master students will find excellent career opportunities at the InES.*

## **Bachelor/Master Thesis Comparison of heat storage models in Modelica/Dymola**

### **Research project and background:**

The *Competence Center Wärme&Wohnen* focuses on technologies for decentralized heat generation and storage in residential buildings. A central objective of the *Competence Center Wärme&Wohnen* is the investigation of decentralized heat storages in local and district heating networks. The technology transfer between the *Institute of new Energy Systems* of the *Technische Hochschule Ingolstadt* and small and medium-sized enterprises (SMEs) will promote technology-oriented regional development.

### **Objective of the thesis:**

The major objective of this thesis is the comparison of already existing heat storage models from different Modelica libraries. These models should be compared regarding their structure, characteristics, computing time and accuracy. The basis for this evaluation are pre-defined load profiles as well as different heat sources. The models should be design in a way that they are expandable. Furthermore, a comparison with measurement results on a test rig as well as cooperation with a company is planned.

### **Tasks:**

1. Self-Introduction into Modelica / Dymola
2. Review of different heat storage models in various Modelica libraries
3. Research of substations in Modelica
4. Modelling of a virtual test rig for the comparison of the storage models in Modelica / Dymola
5. Analysis of the simulation results
6. Documentation of your work
7. Presentation of your results within our institute`s colloquium

### **Target Group:**

Students of the subject areas/study courses:

- Renewable Energy Systems
- Electrical engineering
- Mechanical engineering
- Physics
- or similar courses

**Earliest start:** As soon as possible

**Supervision:** Prof. Dr.-Ing. Tobias Schrag

**Contact:** Abschlussarbeiten\_InES@thi.de

