

# Master-Thesis: Modeling and model predictive control of hybrid energy systems



## AEE INTEC

AEE – Institute for Sustainable Technologies (AEE INTEC) is an independent research association which was founded in 1988. Currently over 60 employees from 8 different nations are working at AEE INTEC. Furthermore, the institute regularly awards dissertations, master theses and internships. The activities of AEE INTEC include:

- fundamental as well as applied research
- national and international R&D projects
- cooperation with universities, technical colleges, other research facilities and industry

The three major departments of AEE INTEC are “Thermal Energy Technologies and Hybrid Systems”, “Buildings and Renovation” as well as “Industrial Processes and Energy Systems”.

## Research Project

The design of flexible energy systems integrating large shares of fluctuating renewables while improving the overall system efficiency is a major challenge for future energy systems. Multi-domain (power- heat – gas) modeling and optimization tools allow researchers to analyze optimize and assess different system solutions. The aim of this thesis is to extend and validate models of a framework for modeling and model predictive control of hybrid energy systems on a city scale. The framework is based on the modeling language Modelica and a high-level dynamic optimization method implemented in Python.

## Outline of the Master-Thesis

- Extension and improvement of an existing Model-Predictive-Control framework
  - Extending network (heat, power, gas) representation in Python and Modelica code translation
  - Integration of storage technologies in the framework
- Validation of the simulation and optimization models based on measured data

## We expect...

- Master program Computer Science, Control Engineering or a comparable study
- Knowledge/practical experience in Python, Matlab, or similar

## We offer...

- Salaried position with a master-thesis embedded in a current (international) research-project
- Supervision by experienced researchers and highly qualified technical support
- Period: WS 2016 / SS 2017 (6 months)
- *Contact:* Gerald Schweiger, phone +43 (0)3112 5886-220, [g.schweiger@aee.at](mailto:g.schweiger@aee.at)