

Starting Date: July 2017

Proposal for Student Project
***“Designing decentralized multi-energy systems:
Sensitivity analysis to cope with uncertainty”***

The increasing share of decentralized intermittent renewable power reinforces the relevance of flexibility to balance local production and consumption. Decentralized energy systems (DES), that is, systems based on renewable energy sources (RES) and integrating multiple energy carriers (e.g., electricity, heat) allowing for energy conversion and storage, are promising options to cope with this challenge. While many studies have evaluated the potential contribution of such systems, all of them are based on delicate assumptions in terms of, e.g., market interaction, policy framework, and technical features.

Within the framework of an interdisciplinary project, we developed a tool for the optimal design of decentralized multi-energy systems grounded within the Swiss context. The primary goal of the DES is to provide different services to various end users at the minimum cost and/or environmental impact. The project aims at investigating the modelling assumptions behind the design of DES, as well as at evaluating their impact on the optimal system design. Examples of such assumptions involve (i) electricity prices, (ii) policy schemes, (iii) technological learning of the considered technologies, and (iv) reliability of the considered technologies.

The student's tasks may comprise of (preliminary):

- Literature review of the frameworks adopted to design DES.
- Modelling activity using and expanding the aforementioned tool to perform a sensitivity analysis on the most relevant assumptions made to design DES.
- Deriving implications for business and policy makers regarding the support of DES.

The project is a collaboration between SusTec and the Separation Process Laboratory, within the Institute of Process Engineering, where the DES design tool has been developed. The project aims at addressing considerations for business and policy makers at national and international levels. Hence, through your research, you will have the unique opportunity to contribute to climate change mitigation by influencing policy as well as managerial agendas. Our research on DES is embedded within the Swiss Competence Centre for Energy Research (SCCER) on Future Energy Efficient Buildings and Districts (FEED&D), and the National Research programme Energy Turnaround (NRP 70).

We are looking for excellent students who are highly motivated, are able to work independently, and have a passion for sustainability and technology. Strong communication and project management skills, industry experience as well as a background in engineering or economics are additional assets. The selected student will be an integrated part of the dynamic SusTec team in Zurich and supervised by one PhD student, as well as a PhD student from the Institute of Process Engineering. Starting date for this three-month project will be July 2017.

Please send your CV, a short letter of motivation (max. one page), and transcripts of obtained degrees to David Grosspietsch (dgrosspietsch@ethz.ch). Applications from non-ETH students are welcome.

We look forward to receiving your application.

David Grosspietsch
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Paolo Gabrielli
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Zurich, June 2017