Smart energy system efficiency improvement through CHP flexibility increase

Summary

PhD position in Mechanical Engineering, with the field of Thermal Power Engineering

Research field:	Mechanical engineering
Supervisors:	Prof. Dr. Anna Volkova Andres Siirde
Availability:	This position is available.
Offered by:	School of Engineering Department of Energy Technology
Application deadline:	Applications are accepted between June 01, 2020 00:00 and July 03, 2020 23:59 (Europe/Zurich)

Description

Smart energy systems include smart thermal and electricity grids. One of the connecting link between them is the combined heat and power (CHP) plant, which provides both heat and power to the grid.

The proportion of renewable energy sources (RES) in the energy mix has been quickly increasing because of the considerable focus on the current issues, such as climate change and energy security. When the proportion of RES is high, CHPs become crucial for power grid stabilisation that is, ensuring and maintaining frequency and voltage in the power supply. CHPs operate best at full load, but they are also efficient at covering the base load of heat and power demand. The distribution of heat and electric loads leads to a decrease in the working time of the CHP and reduced energy efficiency.

The goal of PhD studies is to explore solutions aimed at increasing CHP flexibility, helping in transforming the existing energy system into a smart energy system and making RES integration into existing networks easier. The examined solutions include coupling CHP with district cooling, electric boilers, and thermal energy storage for balancing heat and power loads and allowing to introduce RES to the system.

Responsibilities and tasks:

- Prepare a research plan with the help of the supervisor and carry out research according to the plan
- Actively present and publish research results

Qualifications

The applicants should fulfill the following requirements:

- Master degree in thermal engineering or mechanical engineering
- Good speaking and writing English
- Practical experience with TRNSYS, EnergyPro, Solvo is a plus

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