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As a research facility for applied energy research, the Institute of new Energy Systems (InES) is located at the Technische Hochschule Ingolstadt. InES currently has five professors and more than 40 research assistants working on pioneering technologies in the field of renewable energies and the rational use of energy. The focus is on Industrial Energy Systems, Domestic Energy Systems, Energy Systems Technology as well as technology transfer and international cooperation. Details on current InES research projects in a national and international context can be found at: www.thi.de/go/energie. Excellent Bachelor's and Master's students find outstanding development opportunities at

Investigation of the influences for increasing the efficiency of air-source heat pumps

Research project and background:

As part of a research project, a predictive controller for air-source heat pumps is being developed and tested on a real building. The aim of the controller is to shift the operation of an air-source heat pump to higher outside temperatures to increase efficiency. Various aspects must be considered when shifting operation. In addition to the outside air temperature, the degree of modulation of inverter-controlled heat pumps has a significant influence on efficiency. This goes so far that the advantages of the operating time shift can be compensated for or even negated.

Objective of the work:

The aim of the work is to compare the influence of higher outside air temperatures and the degree of modulation. This is intended to identify useful areas of application for predictively controlled air source heat pumps.

Tasks:

1. Research and evaluation of the data sheets of air-source heat pumps
2. Definition of operating scenarios for exemplary locations
3. Derivation of meaningful applications for predictive control of air-source heat pumps

Target group:

Students of the departments/degree programs:

- (Mechanical) Engineering
- (Renewable) Energy Technologies / Energy Systems
- ...

Time period:

From April 2025

Bachelor thesis ~3 months

Master thesis ~6 months

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