



Institute of New Energy Systems (InES)

As research institution for applied energy research, the Institute of new Energy Systems (InES) forms part of Technische Hochschule Ingolstadt. At InES, five professors and more than 40 researchers are working on future-oriented technologies in the field of renewable energies and rational use of energy. They focus on industrial and domestic energy systems, energy systems technology as well as on technology transfer and international projects. Bachelor and master students will find excellent career opportunities with InES. For more details about our research activities please visit <https://www.thi.de/energie>.

Experimental investigation of a novel non-invasive method to measure the volume flow in pipes

Research project and background:

Optimizing and retrofitting heating systems of buildings can reduce the worldwide CO₂-emissions significantly. The so-called heat load of a building is used to dimension and parametrize a heating system. One way is to calculate the heat load via equations. Identifying the necessary parameters of the building is time consuming and sometimes not possible. Errors in the calculation can lead to over dimensioning or wrong parametrization of the heating system which then results in high costs and increased CO₂-emissions. To tackle this challenge, the heat load can be evaluated by measuring the heat demand of the building. For that, the volume-flow of the heating water needs to be measured. Existing volume flow measurements require an invasive installation of the equipment, are high in costs, or are inaccurate. Within the institute the idea of a novel non-invasive method to measure the volume flow in pipes was developed which can fill the gap of existing measurement solutions.

Objective of the thesis:

Investigation of the novel non-invasive method based on experiments in the laboratory. The goal of the thesis is to find out, if it is possible to measure the volume flow within pipes. In the next step, the uncertainties should be investigated to find out the measurement accuracy of the technology.

Tasks:

1. Development and set up of an experimental test procedure.
2. Analysis of the measurement results to give recommendations regarding the development of a method to estimate the volume flow within pipes.
3. Develop evaluation scripts to calculate the volume flow.
4. Investigate measurement uncertainties.

Target Group:

Students of the subject areas/study courses:

- (mechanical / electrical) Engineering
- Energy Technologies
- ...

Period of time:

From October 2023

Master Thesis ~6 months

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