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The Institute of New Energy Systems (InES) is a research centre for applied energy research at Ingolstadt University of Applied Sciences. At InES, six professors and more than 40 research associates are currently working on pioneering technologies in the field of renewable energies and rational energy utilisation. The focus is on industrial energy systems, building energy systems, energy system technology as well as technology transfer and international co-operation. 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 InES.

Bachelor thesis or master thesis

Validation of software solutions for the network dimensioning of municipal heating networks

Research project/background:

The energy transition is largely dependent on the decarbonization of the energy supply, with the heating sector playing a key role, accounting for almost 50% of final energy consumption. With only 18.8% renewable energies in heat generation, Germany is still a far from reaching its climate targets. Heating grids offer great potential for de-carbonization as they enable the integration of a flexible energy mix. One challenge lies in the dimensioning of the network, especially when determining the pipe routing and the pipe diameters. The large number of similar software tools makes it difficult to choose the right tool. The aim of the master's thesis is to evaluate and validate various software tools for network dimensioning of heating grids in order to support planners in making the optimal selection and to enable more efficient planning.

Research question/aim of the work:

Which software tools are suitable for the network dimensioning of communal heating networks? What are their strengths and weaknesses in different applications? The aim is to create a well-founded basis for selecting the optimum software solution for specific planning situations.

Tasks:

- Literature research on existing software tools in the field of network design for communal heating grids
- Selection of particularly relevant tools for a detailed analysis
- Planning and performing network dimensioning with the selected tools for a defined area of application
- Development of a validation methodology to evaluate the accuracy and practicality of the tools
- Analyzing the results and discussing the strengths and weaknesses of the tools with regard to different use cases

Target group:

Students in the field of engineering and computer science as well as comparable courses of study with an interest in energy-related topics.

Start: immediately

Duration: 3 months – 6 months

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