Technische Hochschule Ingolstadt
Institute of new Energy Systems

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# Investigation of Forecast Approaches for the heat demand of Single-Familiy Homes

## *Research project and background:*

Within a research project, a predictive controller will be developed. The goal of the controller is to optimally schedule the operation of an air-source heat pump. To optimally schedule the heat pump operation, a precise forecast of the heat demand is required. Usually, standard load profiles are used to estimate the demand in the future. This lacks on precision especially for Single-Family Homes as the demand depends strongly on the personal behavior of the inhabitants. Machine Learning approaches can be used to adapt to the individual behavior and therefore forecast the heat demand in the future.

## *Objective of the thesis:*

The goal of the thesis is to find out, how well a machine learning approach can forecast the heat demand for the given case within the research project. Also, the performance of the ML-approach and other boundaries should be investigated (e.g. training time and amount of training data).

## *Tasks:*

1. Research on heat demand forecast approaches and machine learning approaches in the field of domestic energy systems
2. Develop a machine learning approach to forecast the heat demand.
3. Perform forecasts and compare with standard profiles / measurement data.

## *Target Group:*

Students of the subject areas/study courses:
- Engineering
- (Renewable) Energy Technologies
- Energy Systems
- Computational/Simulative Engineering
- …

## *Period of time:*

***From October 2023***
***Bachelor Thesis ~3 months***
***Master Thesis ~6 months***

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