

Bachelor Thesis

Development of machine learning based forecasting methods for grid state estimation

Today's challenges at grid level are mainly the increasing amount of additional renewable sources in the system as well as more demanding customer requests. This goes hand in hand with shorter planning horizons and high uncertainties.

The presented topic investigates the interactions between flexibilities provided by energy market players and the grid, with a focus on the interplay between transmission system operators (TSOs) and distribution system operators (DSOs). Particularly, the thesis deals with identifying and laying the basis for the development of machine learning algorithms for:

- Customer load forecasting and grid state forecasting



The targeted machine learning method should enable to forecast the expected consumption in the flexible resources in order to identify available capacity. This is a requisite to manage and plan the use of available flexibility on DSO level.

The grid status forecast is a necessary input to understand potential need of flexible resources to optimize the grid situation.

Based on this the following subtasks can be formulated:

- Literature research:
 - Machine learning methods
 - Flexible resources at the LV level
- Integration of forecasts on load and generation side
- Modelling forecasting methods that operate on a time horizon from the next hour up to next 2-3 days at hourly resolution
- Optionally, the identified methods could be tested on a Swedish test site

For further information, please contact: