Problem Description:

Business Goal

The essential objective of this investigation is to adopt the perspective of an electricity trading company and to develop data-based recommendations to support its profit generation by electricity trading. The business goal in this case is to maximize the turnover of the total amount of electricity, which is offered on sequential markets and is deliverable by the electricity provider for a period of time. This shall be achieved by following a smart approach in order to split the sales between the sequential short-term markets, here the day-ahead and intraday auctions of the German market, more effectively. Therefore, arbitrage opportunities could be exploited. Such an approach needs to seek for systematic price differences, fluctuations and deviations in sequential markets to be able of evaluating which trading possibility is advantageous for the provider concerning a certain time spot. In concrete terms, an electricity provider can generate additional profits by offering more electricity on the market with the better to be expected conditions. Hence an electricity trader can significantly benefit from analysis and predictions of price differences, fluctuations and volatilities. The here presented study especially addresses the challenges created by parallel participation in several markets, which has become essential mostly due to the incalculability of renewable energy generation. As a growth for the ratio of renewable energy sources over the next couple years is planned, it can also be assumed that short-time trading of electricity will be of in increasing importance in the soon future and therefore will gain relevance for providers. Identifying a systematism in the price differences of sequential markets and deriving a recommendation for pricing auction offers would be considered a success. This would increase the effectiveness of dealing with the electricity market’s price volatility and decrease current opportunity costs.

Data Mining Goal

To achieve the overall business goal, the exploitation of systematic price differences, it is necessary to identify parameters which influence the price differences between the day-ahead and intraday auctions. These features can be used to build a model that is able to explain the relationship between the price for both auctions at a given time. Another part of the data mining goal is the development of a predictive model, which should be capable of forecasting the direction of price differences. Both models solve a supervised task, due to the availability of price data. The first model is retrospective, whereas the second is both retrospective and predictive as it uses historic data for training, but its objective is to predict the direction of price difference. The main outcome variables of interest are the parameters which influence the prices of both auctions, including the quantification of each variable’s influence and the resulting price differences.