**Introduction**

* The Short term desk of Eneco Energy Trade (EET) manages the portfolio of Eneco on short term markets (horizon up to 1 month ahead).
* The portfolio is optimized on four markets:
  + The over the counter market (OTC). Forward contracts are traded with maturity months, weeks and weekends. The granularity is baseload (all hours of the day) and peak load (08:00 until 20:00).
  + The hourly day ahead market (APX). This an hourly auction at 12:00 before delivery. The granularity is 1 hour.
  + The intraday market. On the day itself hourly contracts can be traded.
  + Imbalance market. Any position not closed will be sold/bought automatically by the grid operator (Tennet) in the imbalance market against **imbalance prices**. Example. If Eneco has a surplus of wind (and this is not sold in the market) than Tennet will steer down other power plants at a price they bid in to steer down (could be negative). The price Eneco receives for it’s surplus wind position is than the price other power plants are willing to steer down (the imbalance price)

**Objective**

The objective is to predict at 10:00 in the morning the imbalance prices for all 96 15 min intervals (PTU’s) the next day.

Thus at 30-05-2016 10:00 you have to forecast the imbalance prices for delivery 31-05-2016 0:00 until 31-5-2016 23:45.

There are two imbalance prices. One for utilities who have an energy surplus and one for utilities who have a shortage. The task is to predict both imbalance prices.

**Why is this important?**

The imbalance bill of Eneco is around 15,000,000 EUR/year. If we’re able to predict imbalance prices then we reduce the imbalance bill. For example if we predict very high imbalance prices for the next day we might buy a little bit more extra MWh’s to cover any possible shortages.

**Data**

The data set spans a period from May 2015 until May 2016.

The main sources are:

* Tennet: The Dutch transmission system operator (TSO). They provide data about imbalance prices, volumes steerable volume
* Reuters: forecast of wind, solar, demand West Europe
* PriceHub: EET data about spot and fuel prices
* Gen: EET data about wind farms
* APX: Amsterdam Power Exchange. Data about at which price utilities want to trade

**Dependent variable**

Features [Afnemen] and [invoeden]

This is located in:

\Tennet\verrekenprijzen\verrekenprijzen\_clean.csv,

**Data timings**

One should consider the following data timings

**Data available after the fact**

This is data that is known only after realization. Examples are:

* The amount of imbalance that is steered by tennet
* The imbalance price itself
* The actual wind production

So if you want to use actual wind to predict the imbalance price at 30-5-2016 10:00 for delivery 31-5-2016 23:00 you can only use the actual wind production of 30-5-2016 09:45

For data available after the fact you can only use lags as a feature.

**Data available before the fact**

This is data known before realization. Examples are:

* Day ahead forecast of wind, solar and demand
* …

**Performance benchmark**

The benchmark will be the Mean Absolute Prediction Error of both dependent varaibles [Afnemen] en [invoden] on the hold out set (=100 days).