DESCRIPTION FOR THE GENERAL PUBLIC (IN ENGLISH)

Since the early 1990s, the process of deregulation and the introduction of competitive markets have been reshaping the landscape of the traditionally monopolistic and government-controlled power sectors. In many countries worldwide, electricity is now traded under market rules using spot and derivative contracts. However, electricity is a very special commodity. It is economically non-storable, and power system stability requires a constant balance between production and consumption. At the same time, electricity demand depends on weather and the intensity of consumer activities (industrial and residential).

What is remarkable, however, is that the price uncertainty is continuing to grow because of structural changes constantly taking place in the power markets. For instance, in its Climate Policy 3x20 the EU is pushing for a significant increase of renewable energy sources (RES; e.g., wind, solar) in the energy mix. In some European countries wind energy production already exceeds 30% of total generation, in Western Denmark it can reach as much as 100% on a few days in a year. Under such conditions forecasting electricity spot prices is becoming more and more challenging. In the era of active demand side management (smart meters, smart appliances), also electricity demand is more volatile and less predictable than ever before.

This has increased the importance of intraday electricity markets, where electricity is traded for short (from a few to 60 minutes) load periods during the same day. To the extent that many market participants see the intraday markets as the future of electricity trading. However, the vast majority of research has been in the context of day-ahead auction trading, the workhorse of power trading in Europe to date. With this project we want to fill the gap and adequately address two outstanding challenges:
- understanding the intraday market microstructure with its continuous trading for individual load periods up to a few minutes before delivery and direct influence of power system fundamentals, so different from the uniform price auction day-ahead markets, and
- developing innovative forecasting methods that meet the very specific characteristics of intraday electricity trading.

Summing up, the project will contribute to the development of econometrics by analyzing existing and introducing new methods for studying the fine structure of intraday markets (such as order flow and trading intensity), utilizing the relation of power market fundamentals (e.g., load and RES generation forecasts) and intraday trading, and working out efficient forecasting algorithms for high-frequency time series, tailored for intraday electricity markets. From the utilitarian point of view it will contribute to improving forecasting and risk management practices in the energy sector and in the longer run it may contribute to improving the financial stability of energy companies and the national energy security.