Karlsruher Institut für Technologie

Institut für Industriebetriebslehre und Industrielle Produktion
Lehrstuhl für Energiewirtschaft

Masterarbeit

Time Series Forecasting of Key Indicators for European Industry

Background

With the European Green Deal and the Fit-for-55 package, ambitious European targets in energy policy are being set. This not only leads to a transformation in the field of energy supply with the expansion of renewable energies, but also brings demand sectors into focus in order to achieve complete decarbonization. The industry, accounting for 22% of European CO2 emissions, is one of the largest emitters, with very heterogeneous production processes.

- To assist with decision-making in politics and economics, simulation models can support the consideration of long-term scenarios. A European industrial model – iSTEDS – for modeling the future development of final energy demand in various industrial sectors exists at the Chair of Energy Economics.
- The primary goal of this work is to forecast historical trends of key industrial indicators, (e.g. gross value added, energy intensity) for some of the main industrial sectors (e.g. iron and steel, chemicals) currently implemented in iSTEDS.
- A secondary goal is the comparison of the classical time series methods (e.g. STL, ARIMA) with machine learning methods (e.g. LSTM, XGBoost) for time series forecasting for these types of indicators.

Content of the thesis

- Research and pre-processing of data (from Eurostat, Odyssee etc.)
- Forecasting and comparison of models
- Integration in iSTEDS, comparison to currently-implemented scenarios

Requirements

- Independent, motivated, and structured working style
- Familiarity with time series analysis and forecasting
- Good knowledge and enjoyment of programming in Python

Begin / Length / Language

As soon as possible / 6 Months / German or English

Contact

Anthony Britto| 0721 608-44578 | anthony.britto@kit.edu