
Evaluating the prediction quality for price developments in the chemical industry using bottom-up models

Our profile:

The efficient use of materials and energy in order to conserve natural resources requires the analysis and optimization of industrial processes. It includes the assessment of individual industrial plants as well as the system-wide analysis of regional or global production systems. To identify ecological advantageous processes, the working group Energy Systems Engineering of the Institute for Technical Thermodynamics (LTT) uses the method of Life Cycle Assessment (LCA). LCA is a holistic method for evaluating the environmental impacts of products. LCA considers the entire life cycle of a product, from the extraction of raw materials to the recycling or final disposal of wastes.

Background:

The manufacture of petrochemicals emits a significant share of the global greenhouse gas emissions and absorbs an increasing proportion of the world's oil and natural gas demand. To lower the dependency on fossil resources in a sustainable way, conventional feedstocks need to be replaced by renewable and environmental friendly feedstocks. However, in order to understand how individual new technologies can affect the chemical industry and in order to conduct this change in a cost efficient way, the interactions between different technologies has to be modelled.

Your research question:

The LTT has already developed a model to assess the effect new technologies have on the chemical industry, but this model is currently only used for environmental assessments. While economic assessments are in principle possible with this model, they have not yet been conducted. Therefore, the accuracy of this model to predict price developments in the chemical industry is not yet tested. Your task is to conduct economic assessments with this model and test the accuracy of its price prediction. This can be broken down into four major tasks:

1. Refine the existing environmental model to calculate price dependences in the chemical industry
2. Determine the accuracy of the prices predicted by the model by comparison with historical data
3. Identify reasons for divergence between historic price developments and calculated price developments
4. Propose and implement improvements to the model to increase the prediction accuracy

The result of your work should be a model of the chemical industry that allows to calculate the market price of various bulk chemicals.

Your profile:

- Bachelor in Engineering or Business Engineering with specialization in Energy or Chemical Engineering
- Interest in economics and market models
- Basic understanding of chemical processes
- Knowledgeable in the programming language Matlab

Our offer:

You will work in a nice team on an exciting topic and make an active contribution to the development of new methods and possibilities for the economic evaluation of industrial processes and can further deepen your knowledge in the field of process engineering. If you are interested, please contact us by e-mail (with CV and current overview of grades) or just come by.