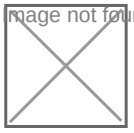
CoPro: Modelling concept and model library for large-scale optimisation in chemical plants

Project:
Improved energy and resource efficiency by better coordination of production in the process industries



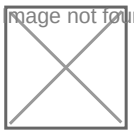
The goal of the CoPro project was to develop and to demonstrate methods and tools for process monitoring and optimal dynamic planning, scheduling and control of plants, industrial sites and clusters under dynamic market conditions, to provide decision support to operators and managers and to progress to automated closed-loop solutions to achieve an optimally energy and resource efficient production.

CoPro brought together 17 partners from 8 EU countries, including 5 industrial end users and 6 technology providing SMEs. The project developed solutions for the **plant-wide optimisation of large plants, for balancing production and consumption in industrial parks for industrial symbiosis**, and addressed **power plant scheduling** and **demand-side response**. It further developed online data analytics for **anomaly detection**, and **decision support** for plant operators and managers. The solutions can be integrated into the IT infrastructure of the plants via an **integration platform** that supports the connection to different IT systems. CoPro developed **model libraries** for the efficient development of advanced optimisation-based solutions and techniques and software for **hybrid modelling** and **model management**.

The developments of CoPro were motivated by and applied to challenging use cases from different sectors of the process industries:

- (Petro-)chemical production;
- Cellulose fiber production;
- Production, formulation and packaging of consumer goods;
- Sterilisation and packaging of food.

CoPro demonstrated that significant savings of energy and resources are possible by using advanced technologies for monitoring, decision support, optimisation, and planning and scheduling.



Sector:

Chemicals

found or type unknown

Non-ferrous metails

found or type unknown

Steel

found or type unknown

Water

Summary:

The Problem

- Modelling is a major step in constructing optimisation-based solutions.
- In large-scale optimisation of coupled chemical production sites, many models for plants and pieces of equipment have to be generated, implemented and maintained.
- Many possible choices for the level of detail and the objective increase the necessary effort to implement optimisation-based solutions.

The Solution

- Development of generic plant and equipment models of different modelling depth that can be parameterised for the application at hand.
- A central database for model parameters as user front end.
- Automatic generation and solution of the optimisation problem from the stored model information and user generated input describing the optimisation scenario.

Theme:
Plant-wide monitoring - SPIRE02-2016
Keywords:
Site-wide optimization, production planning, demand side management, logistics planning, inventory management, petrochemical industry, model library
Type:
Other
Software
Poster

Resources

Link:
Technology Short Description: Modelling concept_model library_large-scale optim_chemical plants

Image not found or type unknown Image not found or type unknown

Complementary Material:

Poster: Large-scale optimisation of production and logistics in chemical plants

Poster: Modelling concept and model library for large-scale optimisation in chemical plants

Contact Name:
Project Coordinator : Prof. Sebastian Engell - TU Dortmund, Germany
Email:
sebastian.engell@tu-dortmund.de