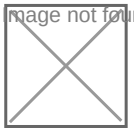
# CoPro: Optimal operation of sterilisation processes in food production

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



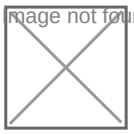

**The goal of the CoPro project** was to develop and to demonstrate methods and tools for process monitoring and optimal dynamic planning, scheduling and control of plants, industrial sites and clusters under dynamic market conditions, to provide decision support to operators and managers and to progress 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:

# Engineering

Summary:

## The Problem

- Sterilisation is a crucial process in order to fulfill sanitary constraints in the food industries.
- At Frinsa, the sterilisation process is performed in a set of parallel batch sterilisation units that are placed between continuous processing lines.
- Being an energy-intense process, steam is a limited common resource for the sterilisers, and its availability influences their processing times.
- Due to food safety constraints, there is a maxi mum waiting time for every sterilisation process starting-time. Failure in proper coordination results in bottlenecks or impaired food safety.

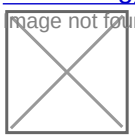
## The Solution

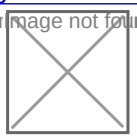
- An on-line closed-loop scheduling tool was developed that gathers and distributes the carts with cans among the sterilisers, and schedules the sterilisation processes in real time.
- The solution was integrated within ASM MES system, adapting in real-time to the real state of the sterilisation section.
- An HMI was developed to communicate to the operators which actions to take.

Theme:
Plant-wide monitoring - SPIRE02-2016
Keywords:
Closed-loop scheduling; Real-time scheduling; Mixed continuous-batch process; Shared resources; Redundant equipment; Load allocation; Food safety constraints; MES system integration; Decision support system
Type:
**Case study**
**Software**
**Poster**

## Resources

Link:
Technology Short Description: Optimal operation of sterilisation processes in food production





**Complementary Material:**

Poster: Optimal operation of sterilisation processes in food production

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