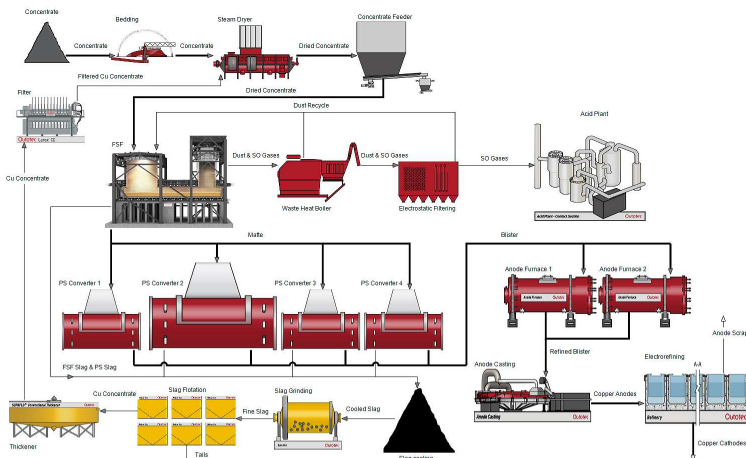# COCOP Copper Pilot Case

Copper Production Process

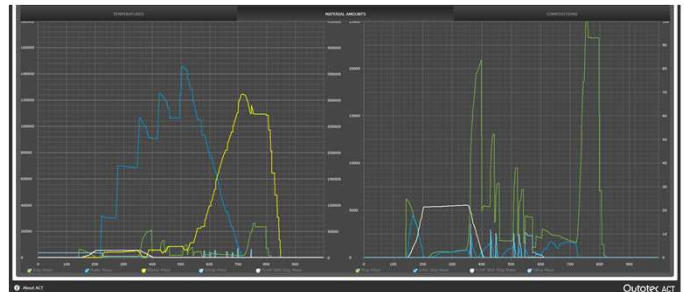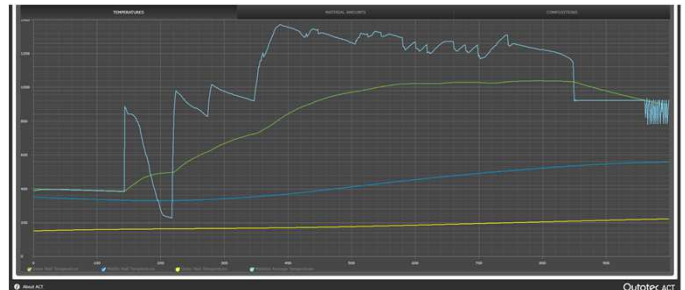**Scope**: From concentrate to anode copper

Optimised operation of the flash smelting furnace, Peirce-Smith converters and anode furnaces while considering the constraints imposed by the acid plant and other facilities
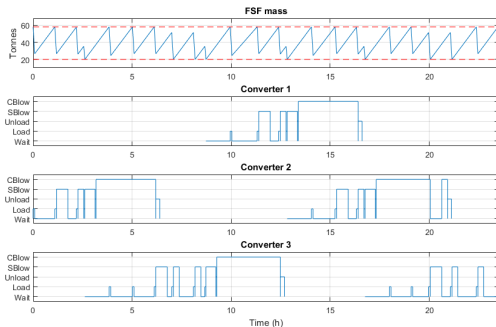
Overall objectives:

- Increase the capacity of the smelter
- Increase the recovery of copper
- Decrease the emissions per ton produced anode copper (SO_2, CO_2)
- Decrease the use of fossil fuels and raw materials producing CO_2
- Improve control of impurities in anode copper

Models

- New and improved **dynamic models** allow for prediction and better oversight of **temperature** and **composition** during operation
- The **information on process states** and parameters is improved by combining different information sources: continuous measurements and laboratory analyses
- **Data analysis and model fitting** is used to improve, for example, the detection of the endpoint of coppermaking blows

The results from a dynamic simulation, modelled in **HSC Sim**, of a converter batch implemented in **Outotec ACT** software

Optimised Scheduling

- The unit process operations share resources such as the acid plant for handling of off-gasses
- **Mixed batch-continuous** scheduling problem
- The continuous time - MILP calculation can quickly provide **optimised schedules** when process conditions change

Advisory Systems

- In the COCOP concept different unit process tools can communicate advisory values to **operators** and each other