

## Electricity Optimization - Work Package 5

ABB Corporate Research Germany, Imperial College London, Acciai Speciali Terni

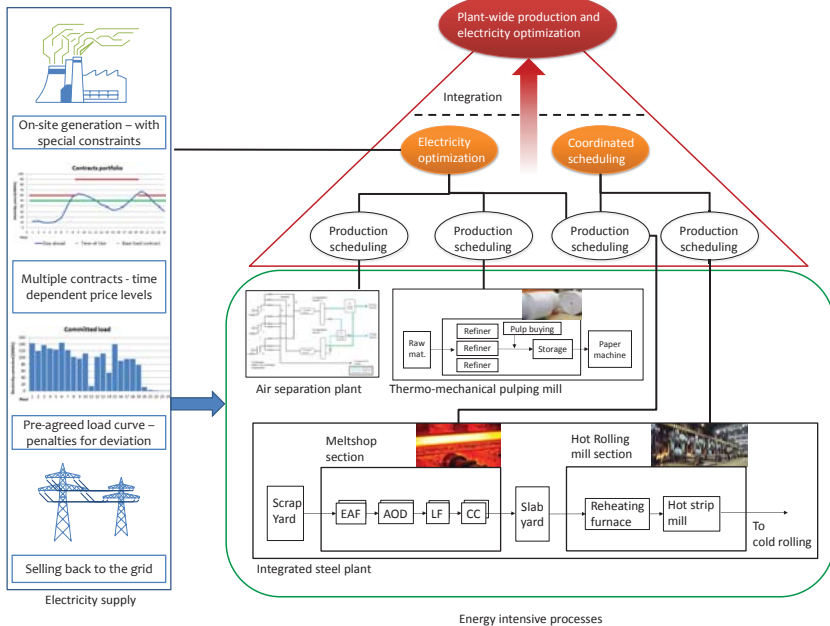
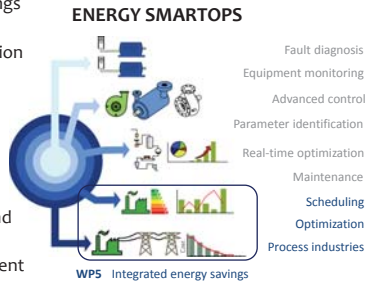
### Work package 5 in Energy-Smartops

**Aim:** Deliver technology prototypes for energy/cost savings at the scale of production processes:

- By developing and implementing scheduling optimization methods to integrate the production
- By developing a framework and methods for demand response of energy-intensive processes

**Expected outcome and benefits:**

- Deal with increasing volatility in production, energy, and raw material availability
- Bridge the gap between production, energy management and maintenance
- Enable energy and cost savings through optimization



### EARLY STAGE RESEARCHERS IN WORK PACKAGE 5

**Robin Cartoux**



ABB-DE

Plant-wide optimization in the stainless steel industry

**Dragoljub Gajic**



ThyssenKrupp AST

Production scheduling optimization in the stainless steel industry

**Hubert Hadera**



ABB-DE

Electricity demand-side management in process plants

**Dionysios Xenos**



Imperial College

Electricity optimization of a centrifugal compressor station

### Production scheduling optimization in the stainless steel industry

- Develop, test and implement creative solutions for energy (cost) savings in stainless steel industry focusing on melt shop and hot rolling mill area

Meltshop scheduling:

- Optimal grouping, assignment, sequencing and timing of heats
- Ensure continuous caster feed
- Minimize production makespan, thus waiting times and energy consumption
- Considering maintenance tasks and energy purchase strategy

- Integration with other plant IT systems and real-time monitoring



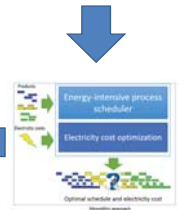
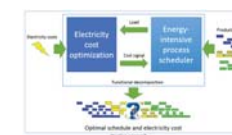
### Optimal coordination between meltshop and rolling mill in a steel plant

- Reduce waiting times in inventory to save reheating energy
- Integration of the scheduling across the steel plant to provide a centralized order management workflow
- Reuse and control existing scheduling systems
- Direct natural gas savings potential



### Electricity demand-side management in process plants

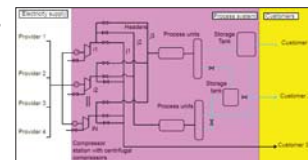
- Extension of continuous-time scheduling models with **energy-awareness**
- Optimization of complex time-sensitive electricity **price structures** and load deviation problem within continuous and discrete-time scheduling approaches
- Functional decomposition** of production and energy optimization aspects
- Application to stainless steel **Melt Shop** and evaluation of **Thermo-mechanical Pulping Mill**



### Scheduling of a centrifugal compressor station considering electricity supply

- The optimal operation and maintenance of compressors is studied in WP2.
- The integration of operational and energy aspects involves several steps:

- Investigation of the electricity suppliers characteristics, constraints and parameters which influence the operation of the compressors.
- Combination of different time scales, a time horizon of few weeks (maintenance time scale) and a time horizon of few days (variation of electricity prices time scale)



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Energy-SmartOps consortium investigates equipment and process monitoring, integrated automation and optimization for energy savings. <http://www.energy-smartops.eu/>