

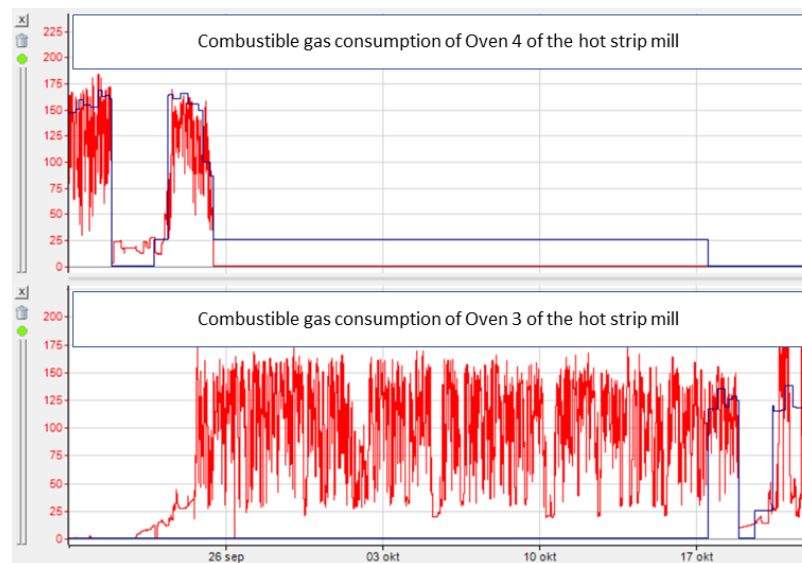
## SUMMER APPRENTICESHIP: DEVELOPMENT OF AN AUTOMATED MONITORING TOOL FOR ENERGY FORECASTING

### KEY WORDS OF ASSIGNMENT:

- Energy management system
- Programming
- Data analysis

### CONTENT OF ASSIGNMENT:

The ArcelorMittal site in Ghent produces flat steel products from cruder materials, iron ore, and coal, via the classic blast furnace route totaling 4.4 million tonnes annually. Steelmaking is an inherently energy-intensive process requiring adequate contractual agreements with suppliers. One such contractual agreement is the daily forecasting of the consumption of electricity, natural gas, and industrial gases, for which an in-house energy management system (EMS) exists... Overall, the better the forecast, the lower the cost of energy. This work involves the development of an automated tool for monitoring the quality of the sent forecasts which would allow for rapid anomaly detection. Additionally, the tool is an incentive towards improving the overall quality of the available forecasts, ultimately reducing production costs and providing stability in volatile energy market conditions. The assessment of the quality of a forecast involves statistical analyses of available data, which should be clearly summarized. Furthermore, the tool should be transferable yet adjustable for different forecasting signals, as different quality criteria are at stake for various sources of energy. Figure 1 illustrates a typical scenario caused by unmonitored signals. A wrong setting in the operations schedule of the hot strip mill was left unnoticed for several weeks, leading to significant deviations between the forecasting model and reality.



**FIGURE 1:** COMBUSTIBLE GAS CONSUMPTION (IN MW) OF TWO HOT STRIP MILL OVENS IN 2022. BLUE: FORECASTED CONSUMPTION, RED: MEASURED CONSUMPTION. WRONG AND UNMONITORED OPERATIONS SETTINGS LEAD TO SIGNIFICANT DEVIATIONS OF THE COMBUSTIBLE GAS CONSUMPTION FOR SEVERAL WEEKS.

### OBJECTIVES:

- Development of an in-house tool for monitoring the quality of energy consumption forecasts

### EXPECTED COMPETENCES:

- ✓ Basic knowledge of at least one programming language (preferably Python)

### NUMBER OF STUDENTS:

- 1

**TARGET GROUP: BACHELOR/MASTER/ ... & SPECIALIZATION(S):**

- Bachelor or Master in Science of Engineering

**LOCATION:**

- ArcelorMittal Gent, John Kennedylaan 51, 9042 Gent.

**PROMOTORS:**

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