Internship at Elia: Improving the representation of combined heat and power in economic dispatch models used at Elia

1 Context & objectives

Elia is the operator of the Belgian high-voltage grid from 380 kV to 30 kV with the mission to lead the way in the energy transition by developing diversified, sustainable and reliable on- and offshore electricity systems that open up new possibilities.

ELIA's network is a key link between France, Europe's largest electricity exporter, and markets in Northern Europe. ELIA's main activities are as follows:

- asset management: maintaining and developing the network, as well as connecting electrical installations to the network;
- system management: granting access to the network in a straightforward, objective and transparent way, providing full services for transporting electricity, monitoring flows on the network to ensure that it runs smoothly and managing the balance between electricity consumption and production 24 hours a day;
- market facilitation: developing initiatives to improve how the electricity market operates.

On top of the development of the grid, asset and system management and market facilitation above mentioned, the TSO in Belgium is also responsible to conduct several security of supply studies (short, medium and long term), vision studies, cost benefit analysis of future grid projects... Those studies are based on economic dispatch tools, which evaluate the need for additional capacity, the economic outputs or the margin available in the system for every hour of the year.

Performing these studies are amongst the main tasks of the team 'SMA – Scenarios, Market & Adequacy analysis' within the Grid Development (GD) department in Elia.

The models used by the SMA team comprise a large amount of assumptions, methodological choices, input data… that are required to model the electricity markets and estimate their dispatch in the future. One aspect that might requires further improvements is the way CHP (Combined Heat and Power) units are modelled. Those units are both generating electricity and steam or heat. Their operating mode is not only linked to the electricity market prices which makes it more complex to estimate their dispatch.

2 Work description

- Understand the current modelling of CHP units in the model
- Identify possible improvements to the modelling based on a literature research, other studies, past analysis already performed or discussions with colleagues
- Compare historical unit dispatch with the output of the modelling used at Elia
- Propose improvements to the modelling and test them
- Assess the impact it might have on other aspects of the outputs (economic viability…)

3 Procedure for selection

This internship proposal is sent to several universities in Belgium. As there might be several applicants for this internship, Elia will set-up small interviews via Teams to perform the selection.

4 Timing for the internship

During summer months: June, July, August, September – depending on the student availability and the internal university rules for the internship.

Contact:
Rafael.feitokiczak@Elia.Be
Louis.Magein@elia.be
Gauthier.Kluft@elia.be