Internship at Elia: Improving the maintenance draws of thermal units in the economic dispatch tool used by 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.

Nowadays, the maintenance of units is based on a random draw (double Markov chain) by the economic dispatch tool used by Elia. The goal of this assignment is to improve the ex-ante maintenance draw of the units to better take the residual load into account. The goal would be to do this outside of the economic dispatch tool and insert the maintenance profiles for each unit once calculated.

2 Work description

- Understand the current way of creating maintenance profiles
- Identify possible improvements to the modelling based on a literature research, other studies, past analysis already performed or discussions with colleagues
- Compare historical maintenance with draws performed by the economic dispatch tool
- Propose a methodology to be implemented and implement it in R
- If time: take into account the nuclear unit maintenances and known forecasted maintenances

3 Procedure for selection

This internship proposal was 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.

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