Internship at Elia: Calculating the RES shares in multi-hybrid offshore systems

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.

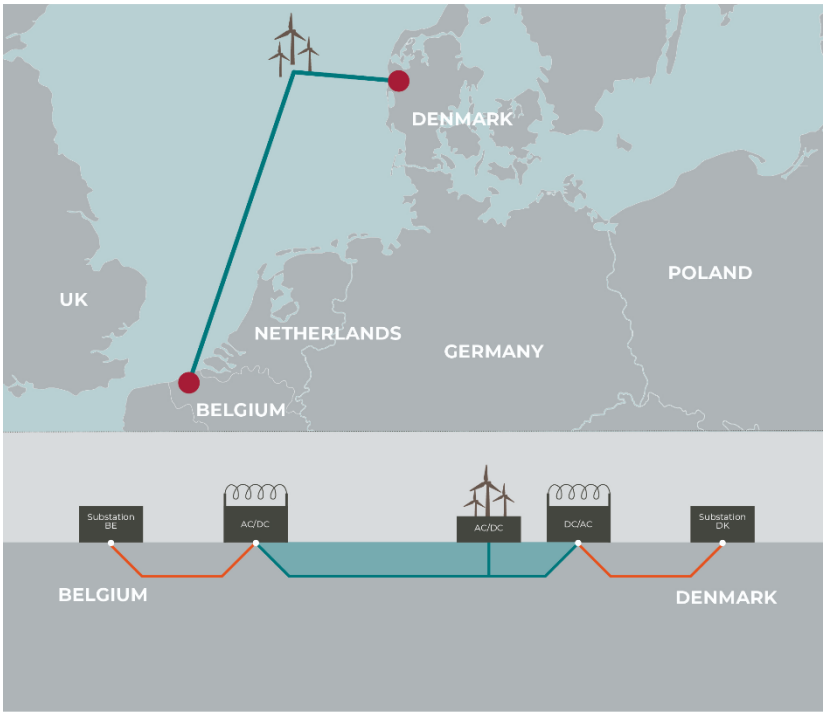
On top of the development of the grid, asset and system management and market facilitation above mentioned, the TSO in Belgium is also responsible to conduct several security of supply studies (short, medium and long term), vision studies, cost benefit analysis of future grid projects... Those studies 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.

With the increasing interconnections and complex offshore systems (hybrid interconnections, multi-terminals…), it becomes more difficult to calculate several indicators which can be relevant for the policy makers. One of them is the country RES share. Indeed, the RES shares are usually a target set by the EU or on a national level. It is therefore key to know what is the effective RES that could be accounted for each country in such systems.

Example of an hybrid interconnector:



2 Work description

- Understand how RES shares are calculated nowadays
- Identify theoretical use cases and reflect on the way to assign the RES generation in offshore nodes to the different countries to which they are linked
- Discuss with colleagues and look in the literature whether such methodologies were already tested or implemented
- Set-up the methodology (after discussing it and approving the way with Elia colleagues)
- If time: create an R scrip that can be used to derive the RES share of areas in an interconnected system with hybrid offshore nodes

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.

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