

SERVICE DE METROLOGIE NUCLEAIRE
RELIABILITY AND SAFETY OF POWER SYSTEMS

MASTER THESES

Academic year **2022-2023**

Asset Performance Management & Optimization (APMO) (in collaboration with Elia)

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For master thesis and internship

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.

We develop, build and maintain our transmission grid according to long-term needs. We heavily invest in the integration of renewable energy, the development of an on- and offshore high-voltage grid and the construction of interconnectors to facilitate the integration of the European energy market. By doing so, Elia Group drives the transition to tomorrow's energy system.

Work description

At Elia, we are currently implementing an “asset performance management & optimization” tool (APMO). The aim of this tool is to allow to define the best maintenance strategy (inspection/maintenance/replacement) to maintain a highly reliable and cost-effective grid. To this aim, a risk model is defined combining the asset health, the failure probability and the impact of a failure. The risk model allows to evaluate the expected improvement of each action that could be taken on the grid. Combining the expected improvement, the cost of each action and the constraints (annual budget, FTE, outage possibilities...), we need to define what is the optimized plan for the coming years.

We are currently implementing an optimization process to define the best action plan for the coming years, and the aim of the internship is to have preliminary results and create insights on the optimization process. The internship would comprise those steps:

- Discover the platform, the risk models and the existing optimization module
- Discuss with the different stakeholders of asset management to align on the concepts and data that will be used
- Analysis/modification of the code and data collection
- Optimization runs and analysis of the first results
- Presentation and discussion of the results with the stakeholders

This internship is standalone and should aim at delivering insight on the optimization process. It can also be followed with a master thesis that would dig more in some aspects of the optimization :

- Make a sensitivity analysis of the optimization process and define ways to tackle it

- Test other optimization procedures
- Add other constraints to the system
- Dig into other points that came from the first analysis during the internship