

R&D Engineer control & protection MTDC W/M

Established in 2014, SuperGrid Institute is an independent private company with over 150 employees of 21 different nationalities. The institute is a key player for energy transition in France and throughout Europe, specialising in innovative high and medium voltage direct current (HVDC and MVDC) power systems. SuperGrid Institute also develops new technologies for the integration of renewable energies into the electricity networks of the future.

SuperGrid Institute has been ranked every year since 2018, reaching the podium 3 times in the INPI prize list.

Find out more by visiting our website: www.supergrid-institute.com

General Context

Achieving multi-vendor multi-terminal HVDC interoperability is identified as a key target by the European Commission. The Horizon Europe InterOPERA project proposal is a unique initiative to define and validate the appropriate HVDC Interoperability frameworks, through the development of a Demonstrator. It encompasses functional design and specification frameworks, control and protection subsystems integration test frameworks, cooperation frameworks, procurement frameworks. The Demonstrator development consists of the specification, engineering development and HIL (Hardware-In-the-Loop) integration test of the full control system of a multi-terminal HVDC grid with sub-systems provided by at least three HVDC manufacturers. This is a four-year project gathering 21 partners (Transmission System Operators, Off-Shore Wind developers, HVDC converter manufacturers, Off-shore wind turbine manufacturers).

Objectives / Missions

Being a member of a dedicated team of 2-3 engineers in MTDC control and protection, your mission will fall in the following tasks:

Participation to the development of DC Grid functional framework

Starting from the functional specifications of the CENELEC standard, the development of the functional framework for HVDC Grid Systems will be based on "Model-based System Engineering methodology", which constitute an enabler for the necessarily collaborative development process between participants towards a multivendor setup:

Participation to the development of HVDC Grid System functional requirements

Using the functional framework as a baseline with the assignment of functions and responsibilities to sub-systems, the respective HVDC Grid modules, functional requirements and the interfaces between modules will be further discussed and defined. The distribution of functions across different subsystems will be optimized to minimize the complexity of interfaces. The functional requirements are expected to comprise requirements on the expected ratings of the converters, earthing and layout, control modes, dynamic performance, signals exchanged, start-up and shutdown procedure, protection strategies, fault-ride-through capability.

Participation to the development DC grid virtual mockup

Some of the control and protection functions are at the DC network level and others at the converter station or component level. Based on the models provided by the teams/colleagues working on MTDC networks, a complete virtual mock-up of the DC network, including the control and protection pre-designs, will be implemented in an off-line EMT simulation environment. The main objective of this mock-up will be to validate the definition of the functional framework and the development of the requirements.

Candidate Profile

Engineering degree (Master 2) or PhD degree.

Focus on HVDC systems.

- Technical skills:
 - o MMC converter controls
 - o Multi-terminal HVDC system control and protection
 - o Functional analysis, modelling, and design of control systems
 - o Wide area control system and telecommunication
 - o Functional design process and methodology
 - o EMT simulations
- Other skills:
 - o Good command of English language
 - o Teamwork ability
 - o Good communication skills
 - o Organizational skills