Future Architecture of the Network
TE WHATUNGA HIKO

Future Architecture of the Network (FAN) – Te Whatunga Hiko

PhD Project

PhD project title: Interaction of large-scale wind farms with AC and DC collectors

This project is focussed on Workstream 2 (Topologies), which assesses the impact of different configurations and levels of possible hybridization (percentage of DC connections or systems within the AC grid) for potential application in the present New Zealand grid. The study shall focus on power flow modelling and analysis of AC/DC hybrid grids with grid-scale planned and future Wind farms.

The study shall develop use case scenarios in which DC and AC boundaries are defined and controlled to support optimal power flows, provide ancillary services, and prevent instabilities using real-life system models of New Zealand. The scenarios shall address power ranges from local to transmission grid level for optimal design AC/DC collector system for offshore and onshore wind farm integration in New Zealand's grid. This applies to both real contexts and future projects.

The study will focus on architecture, load flows, dynamic performance of the windfarm with interaction between the turbines AC Vs DC collector design. It shall include:

1. Steady state and dynamic behavior of different AC vs DC collector architectures and topologies through modelling and simulation in normal operation and in fault conditions.
2. Interaction studies of onshore and offshore windfarms with a DC corridor

This PhD project will work closely with other projects from FAN project.

Specific requirement

- Holds a Bachelor Honours or a master's degree in Electrical Engineering or a closely related field
- Good knowledge of power system grids and power electronics
- Experience with programming languages, e.g. MATLAB
- Familiarity with power system simulation tools e.g. PowerFactory DIgSILENT, PSCAD/EMTDC
- Excellent academic track record
- High proficiency in written and spoken English
- Enthusiastic applicants (any nationality) that want to make a positive impact in the world and can work in a collaborative environment
- Industrial or practical experience desirable
- A good knowledge on applicable mathematical analysis methods

Based in Wellington

Please send you application (CV and a short cover letter/email) to
futurearchitecturenetwork@canterbury.ac.nz