Catherine Cleary - CV

Catherine has 8 years experience working as an electrical engineer and grid connection specialist. She is an excellent communicator with significant project management experience, and a common sense approach to problem solving. She has a strong academic background with a good knowledge of electrical design principles and hands on site experience.

KEY SKILLS

- Grid connection strategy and network operator liaison
- Offshore wind farm electrical system design & power system studies
- Line management & mentoring
- Team leadership, including recruitment and business plan setting

EDUCATION

Master of Engineering (MEng), 2:1, Wadham College, University of Oxford, UK, 2006 - 2010

Wind Energy Storage Optimisation Research, Princeton University, USA, 2010

EXPERIENCE

2012 – 2018: TNEI Services Ltd

TNEI Grid Connection & Offshore Wind Lead, Principal Consultant (Jan 2016 - April 2018)
After building up the grid connection team at TNEI, Catherine also took on joint leadership of the Offshore Wind team, bringing her grid connection and regulatory expertise to this sector. In this role, Catherine was responsible for reviewing and project managing the work of up to 10 power system consultants in the team. Some typical projects are outlined below:

Rentel Offshore Wind Farm Electrical Studies Designer
Responsible for overall grid compliance and power systems studies, as well as coordination with the consortium design team to produce an optimised design proposal for the electrical infrastructure of the 308MW offshore wind farm in Belgium. Catherine project managed the detailed design studies, including harmonics, dynamic voltage control, transient studies and load flow and represented the studies team at key project meetings with the balance of plant contractor, the wind farm developer and the transmission operator. Rentel is now well under construction, with all study work completed on time and compliance agreed with grid operator ELIA.

DC Arrays – Carbon Trust Offshore Wind Accelerator
Technical lead on this project for the Carbon Trust's Offshore Wind Accelerator to review the latest position and ongoing developments in the field of DC array technology. Catherine undertook the assessment of the business case for DC arrays by considering the overall lifecycle costs a benchmark wind farm using different electrical topologies, including HVAC, HVDC, and MVDC direct to shore. This is an approach that TNEI have developed over a number of years and Catherine has published a paper on this life cycle cost assessment technique.

Electrical Due Diligence on Offshore Wind Farms
Catherine has undertaken a number of these due diligence projects, providing specialist power system support to our partner undertaking technical due diligence studies for offshore wind

farms, including HVDC interconnected assets in Germany and several round 3 wind farms in the UK. Catherine's contribution includes review of the electrical transmission design, grid code compliance studies, equipment specifications, availability and reliability data.

TNEI Grid Connection Team Lead, Senior Consultant (April 2013 - Jan 2016)
Catherine built up the TNEI grid connection team from 2013, recruiting 6 team members over the following 3 years and increasing the revenue for the company from these services from approximately £50k to £500k each year. Catherine was responsible for engaging with clients, winning work, setting team targets and managing and training the team. Over the years Catherine has become expert on grid connection issues in the UK, sitting on grid connection working groups & presenting at conferences on a regular basis. The list below gives some examples of typical projects and work undertaken:

Grid Connection Training
Providing grid connection training and workshops to a range of clients across the renewable energy sector. Catherine is a confident speaker and has detailed knowledge of current grid constraints and recent innovations and changes to the grid connection process, including the impact of transmission works on embedded generation.

Grid Connection Feasibility Studies (various)
Analysing grid connection options for over 500 renewable energy projects, providing connection cost estimates, developing cost tools for generation connection up to 132kV, and transmission connection strategy. Through this work, Catherine developed an expert understanding of the specific grid issues affecting the UK transmission and distribution networks, as well as the best practice design principles for connecting renewables.

TNEI Technical Consultant (April 2012- April 2013)
Catherine joined TNEI as a Technical Consultant, working with others on a number of onshore and offshore renewables projects and network design reviews. During this time, Catherine developed a solid grounding in power systems analysis using programmes such as **DigSilent Power Factory, IPSA Power,** and **SKM PTW.**

2010 – 2012 quietRevolution Electrical Development Engineer

Wind Turbine Grid Compliance
Catherine was responsible for grid connection compliance of the turbine control system to G59/2 and G83/1. This included conducting type tests for harmonics, flicker, protection settings and loss of mains behaviour. Catherine led project coordination with DNOs and sub-contractors on larger multi-turbine sites, including the connection of QR5 turbines at the 2012 Olympic Park in London.

G59/2 Relay Design and Product Approval
Catherine led a programme to develop a digital G59/2 two-stage protection relay for the 6MW turbine. This included derivation of the mathematical and data processing requirements for each protection function, working closely with a software and hardware design team to ensure the relay provided robust LoM, OV/UV, OF/UF protection. In addition, Catherine undertook the certification of the relay to the relevant EMC, LV and product standards.

Wind Turbine PMG Design
Catherine was the lead engineer in the specification, design development, testing and manufacture of a 6kW permanent magnet generator, with external machine design consultants based in Finland. The generator torque-speed curve was optimised for efficiency when coupled with a back to back full converter arrangement.