



Accelerating your journey to Net Zero

Blake Clough Consulting is a specialist energy consultancy with a focus on the electricity networks. We cover a range of areas relating to power systems analysis, feasibility studies, project engineering, innovation, regulation and technical strategy, with a strong emphasis on our customer relationships.

We are passionate about the decarbonisation of the energy system and the transition to "Net Zero" and aim to support our clients to accelerate this change as effectively as possible, whether that be local authorities, large network companies, or private developers.

Our work is underpinned by solid analysis and modelling, including techno-economic assessment, cost benefit analysis, power systems analysis and network modelling.

Our consultants and associates can provide a range of power systems analysis studies, using industry-standard software such as DigSILENT, IPSA and PSCAD.

We carry out full sets of compliance studies for onshore (wind/solar/battery storage) and offshore wind developers. This includes design of mitigation solutions, such as harmonic filters, pre-insertion resistors and point on wave controller.

We have a solid understanding of the grid code requirements as well as our clients' needs and are able to deliver the highest quality work in a timely manner.

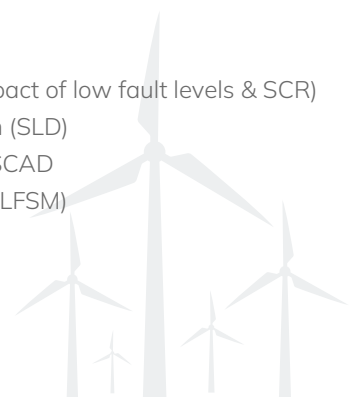
Typical onshore studies packages include:

- Load flow study
- Reactive power capability & compensation equipment sizing & specification
- Short-circuit / fault level study and equipment rating
- Voltage Control and Reactive Power Stability
- Frequency Response (LFSM-O, LFSM-U, FSM)
- Fault Ride Through (FRT)
- Fast Fault Current Injection (FFCI)
- G5/4 or G5/5 harmonics, including filter design
- Electromagnetic transients, transformer energisation, voltage fluctuations and flicker
- AC System voltage variations
- Insulation Coordination
- Protection coordination
- Arc flash
- Earthing Study

We also carry out extensive and detailed studies for offshore wind farms.

Typical offshore studies include:

- Load flow
- Reactive power and cable loading, including voltage profiles
- Steady state reactive power
- Quasi static reactive power (voltage control)
- Sensitivity analysis looking at potentially different configurations including different cable assumptions, 275kV versus 220kV etc
- Short circuit analysis (including impact of low fault levels & SCR)
- Preparation of Single Line Diagram (SLD)
- Energisation and P28 studies in PSCAD
- Frequency response studies (FSM/ LFSM)
- Fault Ride Through and FFCI



We have carried out the full set of studies that are required by National Grid for the Stability Pathfinder tenders.

nationalgridESO

This has included responding to questions and clarifications raised by NGENSO. These simulations were carried out in PSCAD (EMT studies). The scope of work included the following:

- Support on initial Synchronous Condenser sizing
- Support with sizing other electrical equipment (cables, transformer) and preparation of SLD
- Power systems feasibility studies
 - Technical study report for each solution
 - Demonstration of compliance with the technical specification provided by NGENSO.
 - Excel/ CSV files of measured results provided for every test
 - Test results shown at the Grid Entry Point (GEP) with the equipment between the GEP and the solution included in the power systems model. For every test, the following was recorded:
 - voltage magnitude and phase angle at the Grid Entry Point and solution terminal.
 - active power and reactive power at the Grid Entry Point and solution terminal.
 - active, reactive and total current at the Grid Entry Point and solution terminal.
 - frequency and RoCoF at the Grid Entry Point.
 - The following tests were carried out following the guidance in the NGENSO documentation:
 - Test 1: Short-circuit events
 - Test 2: Frequency events
 - Test 3: Voltage angle change events

Mitigation Strategies

The output of our studies seeks to recommend any mitigation strategies where these are required, and to suggest pragmatic and cost-effective solutions. We have recently carried out a full filter design to provide mitigation to a harmonics issue.

We have also supported our clients with negotiations with the DNO, in order to agree on sensible approaches to connection. For P28 studies, we can recommend a range of mitigation solutions with their various advantages and disadvantages, and work closely with our clients to identify the best solution for their needs.

Customer Focused

Our team is extremely customer focused, flexible and efficient. We are able to respond quickly and ultimately to deliver work in compressed timescales, to a high quality.

Our clients range from electricity network operators, regulators and public sector organisations through to private developers, both onshore and offshore, looking to develop projects connecting into the electricity networks.

Our power systems studies clients know that we will work hard to provide an excellent service. For example, we will look to check and de-risk certain studies items (e.g., reactive power compliance) prior to running the full set of studies, which is much more efficient and cost effective for our clients as any issues can be resolved without wasted effort.

