

CASE STUDY

FALL OF POTENTIAL MEASUREMENT (FoP)



PROJECT BRIEF

The onshore substation was constructed as a part of the new extension for the offshore wind farm project, which is an extension to the existing offshore wind farm located in the Irish Sea. The offshore wind farm capacity is approximately 750MW, the power from said farm will be exported by undersea high voltage cables to the 400kV onshore substation. It is here the power is fed into the transmission network. ERM was engaged to test the new, onshore substation earthing system in order to verify the earthing system in order to verify the earthing installation and the CDEGS model used for earthing design.



CHALLENGES

Undertaking precise earth impedance at large sites is challenging and often cannot be accomplished using off-the-shelf equipment. The factors below were very important in achieving an accurate result at the substation:

- Obtaining accurate records of buried services (pipelines and cables) and overhead transmission lines and finding a test route that would avoid them.
- Large earthing system required a test route of approximately 1.3km.
- Securing a test route of sufficient length to give an accurate result for the extensive earthing system.
- Finding and contacting land owners for consent.
- Managing contractor and public access to the test area to maintain high levels of safety.
- Carrying out an earth impedance test in a live 400kV substation environment.
- Scanning the test route for cables.
- Testing using A.C. current injection rather than off-the-shelf battery-powered test units.
- Computer analysis of results to remove test lead coupling from raw results.

OUR APPROACH

ERM's expertise and experience with earth impedance measurements at large sites was instrumental in delivering this test. ERM was able to liaise effectively with the client and land owners to obtain a test route that would give accurate results and require minimal client planning input. ERM's uses only pedestrian access in line with our field test policy, which is to leave all third party land in a condition where our presence is undetectable.

PROJECT OUTCOME / DELIVERABLES

- Bespoke approach, thorough planning and liaison with land owners secured a test route of reasonable length that minimised interference from transmission lines and buried structures.
- Safety maintained throughout the test. No environmental footprint left.
- Accurate earth impedance measurement result achieved, which confirmed the CDEGS model and validated the EPR calculations, earthing design and safety recommendations.
- Client requirements met with delivery of the report in a timely manner.
- Positive feedback received from the client.