



Programme Area: Energy Storage and Distribution

Project: Offshore Connection 1

Title: One Page Summary

Abstract:

Large-scale offshore renewable energy farms, including wind, tidal stream and wave energy systems, are likely to play an increasingly significant role in enabling the UK to meet its long-term CO₂ emissions reductions targets. However, the development and installation of large renewable energy farms off the coast of the UK provides a number of challenges in terms of: - the collection of electrical energy offshore from individual and multiple renewable energy farms, - the transportation of bulk electrical energy generated by these offshore farms to the UK shoreline, - the connection and integration of these offshore farms into the onshore power system.

Context:

This project examined the specific challenges and opportunities arising from the connection of offshore energy to the UK grid system and considered the impact of large-scale offshore development. It also looked into the novel electrical system designs and control strategies that could be developed to collect, manage and transmit energy back to shore and identified and assessed innovative technology solutions to these issues and quantified their benefits. The research was delivered by Sinclair Knight Merz, a leading projects firm with global capability in strategic consulting, engineering and project delivery. The project was completed in 2010.

Disclaimer:

The Energy Technologies Institute is making this document available to use under the Energy Technologies Institute Open Licence for Materials. Please refer to the Energy Technologies Institute website for the terms and conditions of this licence. The Information is licensed 'as is' and the Energy Technologies Institute excludes all representations, warranties, obligations and liabilities in relation to the Information to the maximum extent permitted by law. The Energy Technologies Institute is not liable for any errors or omissions in the Information and shall not be liable for any loss, injury or damage of any kind caused by its use. This exclusion of liability includes, but is not limited to, any direct, indirect, special, incidental, consequential, punitive, or exemplary damages in each case such as loss of revenue, data, anticipated profits, and lost business. The Energy Technologies Institute does not guarantee the continued supply of the Information. Notwithstanding any statement to the contrary contained on the face of this document, the Energy Technologies Institute confirms that the authors of the document have consented to its publication by the Energy Technologies Institute.

ETI Programme: Energy Storage and Distribution

Project Name: Connection and Integration of Offshore Renewable Energy Farms into UK Power Systems

Contractor: Sinclair Knight Merz

Context

Large-scale offshore renewable energy farms, including wind, tidal stream and wave energy systems, are likely to play an increasingly significant role in enabling the UK to meet its long-term CO₂ emissions reductions targets. However, the development and installation of large renewable energy farms off the coast of the UK provides a number of challenges in terms of:

- the collection of electrical energy offshore from individual and multiple renewable energy farms
- the transportation of bulk electrical energy generated by these offshore farms to the UK shoreline
- the connection and integration of these offshore farms into the onshore power system.

Project

This project has assessed new technology solutions to these issues, quantified their benefits, and provided guidance in respect of technology development opportunities. It has delivered:

- a clear understanding of the key issues concerning the connection of individual and multiple renewable energy farms off the UK coast
- assessments of the likely technical limits concerning the integration of offshore renewable energy systems into the UK power system
- recommendations for new, optimised solutions for the grid connection of individual and multiple offshore renewable energy farms, including the provision of design concepts for offshore HVDC electrical systems
- identification of technology development opportunities for the industry, and specifically the ETI, and the preliminary identification of potential ETI development and demonstration activities in respect of the grid integration of offshore renewable energy farms.