

Project Title: 'Sustainability Energy Infrastructure and Supply Technologies – Offshore HVDC Grids'
Principle Investigator: Prof. M Barnes (University of Manchester)
Project duration: 01/01/09 – 31/08/09
Grant Value: £74047

In order for the UK to meet its ambitious targets for energy production from renewable sources (10% of electricity by 2010, 15% by 2020) it needs to expand its capacity to generate all forms of renewable energy and the largest proportion of this is expected to come from wind. The UK currently generates more energy than any other country in the world from wind (700MW) and the third stage of the UK Governments wind energy plan is expected to deliver another 25GW by 2020.

The majority of the energy will come from wind farms which will be located some distance from the UK mainland. This presents a problem in finding the most effective and efficient way to connect the farms to the national grid. The UK national grid mainly runs on an AC current system however for farms further off-shore DC technology is known to be more cost effective, efficient and reliable. However very little research has been done into



finding the most suitable and cost effective way of connecting off-shore wind farms using DC technology. Currently there are a number of proposed solutions to the problem of connecting off-shore wind farms to the national grid and this project involved modeling and assessing the most promising. The development of these technologies is important to help maximize the amount of energy planned off-shore wind developments feed into the grid.

This project involved carrying out a critical assessment of prior and developing technology in the field, it also involved developing a mathematical and software model of an off-shore wind farm connected to shore by a HVDC grid.

This project was carried out in collaboration with TNEI, who produce a commonly used software tool for utility companies, and it has helped expand their capability into HVDC grids. This puts the company in an ideal place to capitalize on what is an extremely fast growing market both in the UK and internationally. A total of £4.88m funding has been obtained, from the Engineering and Physical Sciences Research Council and the Northern Wind Innovation Programme (in partnership with Siemens T&D), for follow on projects. It was only possible to obtain this funding because of the initial funding for this project from the Joule centre.