

Samsung Prototype Offshore Wind Turbine

Installing the world's largest 7MW wind turbine

£13.1m

/ Project value

January 2013

/ The build commenced

December 2013

/ The build was completed

Samsung Heavy Industries (SHI) appointed us as the principal contractor to construct and install one of the world's largest offshore 7MW prototype wind turbines at the Fife Energy Park in Methil, Scotland. Capable of powering 4,800 homes, the wind turbine has a nacelle height of 110m and tip of blade height of 196m from mean sea level. The complex project was part of SHI's initial £100m investment in the Fife Energy Park where it has based its European wind energy headquarters.

The Brief

Following our successful participation in the Early Contractor Involvement stage, and input into aspects of the design and environmental planning, we were contracted to construct and install the off-shore 7MW prototype wind turbine at the Fife Energy Park.



"The investment by Samsung Heavy Industries at Energy Park Fife is the next step in building the area's profile as a hub for innovation and heavy engineering,"

David Garry
Project Manager at Scottish Enterprise

“This is a unique project and one GRAHAM is tremendously proud to have delivered. The scale of the wind turbine has brought its own challenges, which required us to utilise some of the largest and most sophisticated equipment in the world during its construction,”

Leo Martin
GRAHAM Managing Director – Civil Engineering

The challenges

The scale of the prototype turbine, given the nacelle alone weighed 500 tonnes, presented numerous challenges and necessitated the utilisation of some of the most sophisticated equipment in the world during its construction. This included the application of the DEMAG CC12600 – the most powerful single bodied, lattice boom, crawler crane. In addition, the tolerances identified as part of the construction project were stringent and required tight dimensional controls while the water depth, within the intertidal zone, was negligible. Increasing the level of marine engineering difficulty, the rock-based consistency of the seabed created testing ground conditions.

GRAHAM's solution

Completed in less than 12 months, core elements of the programme consisted of marine works, the transportation and off-loading of components from the quayside, turbine installation, mechanical and electrical installations and all temporary works. The wind turbine was located on a steel jacket founded through drilled sockets, 37m deep into the underlying levels. The rock socket technique implemented also allowed for fabrication and verticality tolerances and contributed to noise reduction, which was important as the wind turbine is located close to shore. Showcasing our technical capacity, the installation of the steel jacket (500 tonnes), transition piece (500 tonnes) and wind turbine components required the employment of the DEMAG CC12600 crawler crane (1,600 tonnes) with the assistance of an additional crawler crane (600 tonnes).

Outputs & Benefits

- / **Industry Recognition:** GRAHAM and SHI were shortlisted for the 'Engineering Excellence' award at the Scottish Green Awards
- / **Stakeholder Engagement:** In compliance with Marine License conditions, we completed a series of engagement and consultation exercises with stakeholders such as the Crown Estate, Defence Estates Ministry of Defence and Marine Scotland
- / **Lessons Learnt:** We produced a health and safety case study to share with the industry. This documented how we reduced risk on the project and the initiatives we introduced to control/minimise/reduce risks
- / **Blade Repair:** Following the commission of the wind turbine, we worked with SHI to design a temporary covered structure to house a fractured blade that was subsequently repaired



For more information on how we're delivering lasting impact:

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