SMart Wind and the UK Round 3 Wind-Energy Generation Programme

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The UK Round 3 offshore wind-energy generation programme ultimately aims to deliver approximately 25 GW – one quarter of the UK’s total electricity needs – by 2020. This significant expansion of electricity generation from an already buoyant offshore wind market represents a massive long term investment opportunity with the potential to generate thousands of jobs in the UK.

In December 2009, the successful bidders were announced for each of the nine Round 3 offshore wind zones within UK waters. The SMart Wind consortium, based in London and led by Mainstream Renewable Power and Siemens Project Ventures, was awarded a contract to develop 4 GW of UK offshore wind farms by 2020.*

* Further details of the project can be found at [http://www.smartwind.co.uk](http://www.smartwind.co.uk).

Figure 1 - Round 3 Offshore Wind Zones in the United Kingdom
This 4 GW zone, named the Hornsea zone, is shown in Figure 2. The zone lies between 34 km and 190 km off the northeast coast of England, with a total area of 4,735 km². Once complete, this zone will provide enough electricity to meet 4 percent of all electricity demand in the UK and power approximately three million homes.

A modular approach to the entire 4 GW zone has been adopted by SMart Wind, and various subzones have been identified. In mid-2010, grid connection was secured for the first 1 GW of the Hornsea zone with connection to the existing 400 kV Killingholme substation, which is owned by National Grid.

The first 1 GW of the Hornsea zone, referred to as Project One, will comprise two 500 MW wind farm blocks, situated within “Subzone 1” located in the centre of the Hornsea zone and covering an area of 620 km² (see Figure 3), and will commence in 2014. Each block will be approximately 500 MW in capacity and will include offshore substations, a converter station and cable routes to shore. Onshore works will include a landfall site, a cable route from the coast to an onshore converter station, and a short cable connection between the converter station and grid substation. Siemens Energy is expected to supply wind turbines and offshore substations.
The SMart Wind consortium recently awarded Siemens PTI UK a consulting project to perform an “Optioneering & Power System Analysis Study,” effectively a conceptual design of the electrical power system for Project One. Various AC and DC configurations will be assessed in terms of lifecycle costs, technical performance, losses, reliability, operation and maintenance, supply chain constraints/risks, etc., with the primary objective of identifying an optimum and standard configuration for the grid connection to shore, the offshore platform(s) and the wind farm array structure. The goal is to split the overall project into modules, whereby a module of standard size can be repeatedly installed.

The project is a collaborative effort, with a team comprised of consultants from Siemens PTI UK and engineers within the Siemens Energy High Voltage division. The unique knowledge set of this team incorporates lessons learned from the design and build of the world’s largest offshore wind grid connections, along with unrivalled network modelling capabilities, and knowledge of manufacturers’ equipment and of the National Grid network. This knowledge and expertise is crucial in assisting SMart Wind in their aim to be the first consented (whereby all necessary technical, commercial and environmental permissions are granted) and operational Round 3 offshore wind farm. We are optimistic for a successful outcome in providing SMart Wind with a balanced and comprehensive view of the potential design options.