Plans for world’s most powerful offshore wind turbine unveiled

HALIADE X | GE Renewable Energy is to invest more than USD 400 million over the next three to five years to fund the engineering, test and supply chain development of the world’s most powerful wind turbine, Haliade-X, which has a 12-MW generator rating. The first nacelle will be available for demonstration in 2019, the company said in a statement, with the first units installed from 2021.

The new turbine will stand 260m over the sea, slightly higher than the iconic Commerzbank Tower in Frankfurt, and will have a 220m rotor. The 107m-long blades will be longer than a football field. Producing 45% more energy than any wind turbine available today, one Haliade-X turbine will generate up to 67 GWh in a year. This is based on typical wind conditions prevailing at a German wind farm in the North Sea and is sufficient renewable power for up to 16,000 European households, the company claimed. A 750-MW wind farm could produce enough electricity to power one million European households.

John Flannery, chairman and CEO of GE, said: “We want to lead in the technologies that are driving the global energy transition. Offshore wind is one of those technologies and we will bring the full resources of GE to make the Haliade-X programme successful for our customers.”

Jérôme Pécresse, president and CEO of GE Renewable Energy, added: “The renewables industry took more than 20 years to install the first 17 GW of offshore wind. Today, the industry forecasts that it will install more than 90 GW over the next twelve years. This is being driven by lower cost of electricity from scale and technology. The Haliade-X shows GE’s commitment to the offshore wind segment and will set out a new benchmark for cost of electricity, thus driving more offshore growth.”

Larger turbines have several implications for offshore wind power generation. Firstly, more power from a single unit means a smaller number of turbines in the total farm. This reduces capital expenditure at the outset, cuts installation time, and simplifies operation and maintenance of the turbines during the life of the farm. The outcome is larger and more profitable wind farms and cheaper electricity for consumers. There are also important implications for companies which provide marine support services. Installation vessels will need to be larger, more powerful and have a greater lifting capacity. Service vessels are also likely to increase in size.

The Haliade-X is being designed to improve efficiency and generate more power from the wind than existing turbines. The turbine has a 63% gross capacity factor, five to seven points higher than the current industry benchmark. The capacity factor compares how much energy is actually generated against the maximum that could have been produced at continuous full power operation over a certain period of time. A higher capacity factor means that more energy is generated per MW installed, thereby raising efficiency and cutting the cost of generation.

The Haliade-X project is requiring a multidisciplinary strategy and will involve unprecedented collaboration across the GE portfolio, it is claimed. GE’s onshore wind team will participate, with 50,000 turbines in operation. Blade expertise will be provided by LM Wind Power. GE Power and GE Aviation engineers will provide peer reviews of component and systems design. The company’s Global Research Center will provide expertise in control systems and component validation. And GED Digital will support digital modelling, analytics and application development. The project, the company says, is a GE-wide effort.