

Demonstrator GE Haliade X - 12 MW offshore windturbine

Publieke samenvatting / Public summary

Present day offshore wind turbines have a maximal 164m in rotor diameter and 9.5 MW in generator capacity. These existing offshore wind turbines in GE's assessment are insufficient to support project business cases without government subsidies. Larger wind turbines are required at a lower cost per installed MW and at a lower cost per produced MWh. Completed relevant research and development works have shown that certain core theoretical regimes change significantly above 10MW. GE has recently completed the basic design for its 12MW wind turbine. Final engineering and detailed design need to be completed to resolve final issues before launching serial production. An onshore demonstration plant with offshore wind conditions will enable a viable time to market. The Project focuses on technology demonstration in the Netherlands of the largest offshore wind turbine in the world: Haliade X-12MW. Equipped with a 220m rotor diameter, the Haliade-X is designed to have an industry leading capacity factor of 63%+. Other product features are a gross AEP of around 67 GWh, a wind class of IEC Class IB, for a 25-year's design life, expected to be ready for certification by the 2nd half of 2020.

Objective

The project anticipates a high contribution to the energy transition cost reduction in the Netherlands, towards zero subsidy scheme through a technology development de-risking of the largest and most efficient offshore wind turbine generation, ahead of

Projectinformatie / Project information

Projectnummer / Project number
TEHE118004

Subsidiebedrag / Grant amount
€ 6.000.000,00

Algemene informatie / General information

Penvoerder / Secretariat
GE Renewable Holding B.V.

Publicaties en materialen / Publications and attachments

- 15.11.2023

Eindrapport TEHE118004

Links

- [GE Haliade X product page](#)

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Dutch Offshore wind projects. The technologies which the project aims to demonstrate are expected to decrease LCOE by up to 8,7%.

The demonstration plant should achieve the following sub-goals:

- Validate aerodynamical models to enable a stable and verified power curve, guaranteeing the lowest Levelized Cost of Energy (LCOE).
- Validate design and load models, components functionality, O&M and installation procedures.
- Solve all remaining engineering issues before launching full serial production ahead of upcoming tenders.

Short description of activities

The focus of the project is the construction and installation of a demonstration plant of one turbine of what GE believes is the world largest offshore wind turbine Haliade X-12MW as an SDE+ technology aimed at reducing significantly offshore wind LCOE. This is done by breaking through the 10MW ceiling, validating ground breaking aerodynamic and wind turbine models, and significantly reducing the cost for balance of plant investment. The proposal is related to target 2: reducing the cost of offshore wind.

Results

The final results of the project involve:

- 12MW offshore wind turbine certified, ready for serial production, in the context of subsidy free construction of offshore wind farms in North Europe.
- Validated Installation and O&M procedures, contributing to lowest LCOE.
- Validated knowledge required for designs of wind turbines > 10 MW.
- Validated grid integration solutions.

This is an increase of 80% rotor swept area, and 15% in capacity factor increase compared to the current leader yet at prototype level only (V 9.5 MW 164m).

In November 2020, the prototype GE Haliade-X offshore wind turbine has produced 312 MWh of electricity in a single 24-hour period, once again setting a new world record.

GE plans to start the serial production of the Haliade-X at the Saint-Nazaire factory in France during the second half of 2021. The Haliade-X 13 MW offshore wind turbine will be used in the first two phases of the Dogger Bank Wind Farm, with a total of 190 units to be installed off the UK starting in 2023. The Haliade-X technology has also been selected by Ørsted as the preferred wind turbine for the 120 MW Skipjack and the 1,100 MW Ocean Wind projects in the US.

De data in deze applicatie is afkomstig van de Rijksdienst voor Ondernemend Nederland (RVO) en wordt in samenwerking met de Topsector Energie ontsloten.

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