

PROJECT SHEET

**ABERDEEN BAY OFFSHORE WINDFARM PROJECT,
UNITED KINGDOM**

BOSKALIS

Royal Boskalis Westminster is a leading global marine contractor and services provider. With safety as our core value, we offer a wide variety of specialist activities to the oil & gas and renewables sectors. These activities include marine installation and decommissioning, seabed intervention, marine transport and services, subsea services and marine survey. In addition, Boskalis is a global dredging contractor, provides towage and terminal services across the globe and delivers marine salvage solutions.

By understanding what drives our clients we are able to provide the solutions that enable them to meet their specific business goals. For this reason we are constantly looking for new ways to broaden and optimize our offering and are committed to expanding our proposition, supported by our financial strength.

With our committed professionals in engineering, project management and operations, 900 specialized vessels and an unprecedented breadth of activities in 90 countries across six continents we help our clients in the offshore industry push boundaries and create new horizons.

ABERDEEN BAY OFFSHORE WINDFARM PROJECT

The Aberdeen Offshore Wind Farm is also known as the European Offshore Wind Deployment Centre. The Windfarm is located approximately 3 kilometers off the coast of Aberdeen, United Kingdom. With its eleven wind turbines it has a total capacity of 93.2 MW (2 * 8.8 + 9 * 8.4 MW).

The wind farm features the world's most powerful wind turbine at date, exporting power through 66 kV cables and supported on suction bucket jackets. This novel foundation type constitutes one of the major innovations of the Aberdeen Offshore Wind Farm project, which is being used here on a large scale for the first time. In essence, a suction bucket jacket is a steel structure welded to three large, inverted steel buckets which are lowered onto the seabed. The water is pumped out of the steel buckets, creating negative pressure driving the buckets to the desired penetration into the seabed.

FEATURES

Client	Vattenfall
Operator	Vattenfall
Location	Scotland, United Kingdom
Period	2016 - 2018
Water depth	19-32 m
Vessels	Main vessel: Asian Hercules III, NDurance, NDeavor, Rockpiper, Pacific Orca, Aegir, Smit Kamara, Anchor Handling Tugs: (Union Bear, Union Boxer, Union Princess, Union Diamond Union Fighter, Union Lynx, Dian Kingdom), Multi-Purpose vessels: (Constructor, EDT Hercules, EDT Jane).

BALANCE OF PLANT CONTRACT

The Aberdeen project is a so-called Balance of Plant/Engineering, Procurement, Construction and Installation (EPCI) contract. Boskalis was responsible for the eleven suction bucket jacket foundations, scour protection, 66 kV inter array and export cables and the installation of the wind turbine generators.

A suction bucket trial campaign was performed to prove the foundation concept and gather essential design parameters. The concept design was developed by Boskalis and further designed by Ramboll and SPT. The UXO identification survey and removal were performed by Boskalis Hirdes with the Smit Kamara vessel. The scour protection, consisting of a single grading, was pre-installed by the Boskalis vessel Rockpiper. The foundation design was managed by Boskalis and subcontracted to various consultants such as Rambøll and SPT, foundation fabrication was subcontracted to Smulders. The foundations were installed by the Asian Hercules III and the Aegir. The export cables and infield cables were installed by the NDurance and NDeavor. The Wind Turbine Generators (WTG's) were installed with the Pacific Orca. Furthermore, several Anchor Handling Tugs, Crew Transfer Vessels (CTV's) and Multi-Purpose vessels of Boskalis were used for the works.



A At the fabrication Yard in Newcastle



PROJECT CHALLENGES

The project was challenged by a short time schedule in relation to a fixed milestone that was granted for obtaining the ROC financial support system for the project. During the development, several amended input parameters had to be adapted, leading to design changes. Boskalis managed to incorporate in the design the new type of wind turbine in time, resulting in timely delivery of the project to enable grid connection.

Furthermore, the design and installation method were subject to challenging soil conditions at the site, which were showing glacial till covered with rocks in the nearshore cable zone to deep soft silt layers.

CONCLUSION

The foundation fabrication and installation and the WTG installation and commissioning were completed in time allowing our Client to achieve first power well in advance of the subsidy milestones. The suction bucket foundation design has proven to be a reliable alternative for piling or drilling of foundations. Advantages of this method are amongst others the very fast offshore installation (only a few hours) and the very low level of underwater noise. The overall results prove once more that Boskalis is capable of managing the Balance of Plant/EPCI delivery of large deep-water wind turbine generator foundations.



- B** Cable and WTG Installation Scope
- C** Asian Hercules installing the Suction Bucket Foundation
- D** Loading of the Pacific Orca for Wind Turbine Installation at Esbjerg
- E** Suction Bucket Transport

