DONG Energy successfully installed the world's first offshore wind turbine foundation based on the Suction Bucket Jacket (SBJ) technology in August 2014. NGI was responsible for geotechnical design, instrumentation, and monitoring system.

The installation took place during 26th August at 25 meters water depth in the Borkum Riffgrund 1 offshore wind farm, 37 km off the German island Borkum.

Until then, most offshore wind turbines were founded on monopiles. DONG Energy installed the first jacket with suction buckets as a proof-of-concept full-scale prototype, to be tested and monitored over several years. The SBJ technology, previously used for offshore oil and gas platform foundations, has several economic as well as environmental advantages.

The British based Carbon Trust Offshore Wind Accelerator program, together with DONG Energy and the five other developers Statoil, Statkraft, E.ON, Scottish Power and Mainstream supports this prototype.
Foundation loads and soil stiffness

Rambøll was responsible for the design of both primary and secondary steel for the wind turbine foundation and buckets, working in close cooperation with NGI (Norwegian Geotechnical Institute), who delivered the geotechnical design. The cooperation between DONG Energy and the two experienced consultants focused on establishing foundation loads and corresponding soil stiffness, which are mutually dependent.

This in order to assess the short and long-term global interaction between jacket and soil, to determine the local soil/bucket interaction to ensure that the strong suction pressure required for installation could be applied safely, and that long-term condition will be satisfactory.

NGIs tasks

Prior to the design phase, NGI performed laboratory tests of the soils to provide necessary data for structural and geotechnical analyses for the design of the SBJ foundation.

Furthermore, NGI also designed and successfully installed instrumentation for overall monitoring of the prototype, which includes more than 100 instruments, more than 7 km of cables and a data collection system.
Further information

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