

Silent Installation of MonoPiLEs (SIMPLE-III)

Publieke samenvatting / Public summary

Aanleiding

The costs of the support structure and the installation of the support structure account for a substantial amount of the total CAPEX of offshore windfarms. A substantial part of these costs is attributed to a sub-optimal installation method for monopiles. The current installation method with impact hammers, called piling, has the following major downsides: 1. Each hammer blow creates high noise levels that are harmful to marine life. Several European governments have introduced regulations that result in the mandatory use of expensive noise mitigation measures such as bubble curtains. 2. Monopiles of continuously bigger size may require much bigger hammers for installation, however although it is feasible to manufacture bigger piles this is not the case for hammers, that take years to scale up, if possible at all. 3. The blows from the hydraulic hammer on the top of the pile cause fatigue damage to the foundation pile. Although several innovations are in progress, eliminating fatigue damage during installation is not yet achieved which leads to oversized, heavier and thus more expensive monopiles.

Doelstelling

The SIMPLE programme focusses on reducing the cost of offshore wind energy and noise measurements during installation. The combination of vibro technique and water injection on the inside of the monopile, called the Vibrojet® technology of GBM Works, is a major step forward in reducing costs and removing negative effects that accompany the installation of foundation piles for

Projectinformatie / Project information

Projectnummer / Project number

HER+22-02-03441592

Subsidiebedrag / Grant amount

€ 5.558.901,00

Algemene informatie / General information

Penvoerder / Secretariat

GBM Works B.V.

Volg Topsector Energie op X / Follow Topsector Energie on X

@TSEnergie

offshore wind turbines such as harmful noise to marine life and carbon emissions of the bubble curtains. The project “SIMPLE III” (Silent Installation of MonoPiLEs III) aims to prove that with the Vibrojet® large cost reductions can be achieved while eliminating harmful noise to the environment. During the SIMPLE III project the Vibrojet® technology will be further developed for installation in sand from TRL 6 to TRL7.

Korte omschrijving

The main project activity is to test the Vibrojet® technology under large scale conditions in an offshore environment. The design of the Vibrojet® prototype is made in the SIMPLE IIB project based on the knowledge obtained in the SIMPLE I and SIMPLE II projects by GBM Works. The offshore tests will be designed in close cooperation with the partners from the whole value chain; research institutes (Deltares & TNO), the equipment supplier (CAPE Holland) and GBM Works, the offshore contractor Van Oord, the offshore windfarm developer Ecowende. Furthermore, lab tests will be designed and executed to confirm and enhance the fluidisation model (soil behavior) inside the pile and the soil-state outside the pile. SHELL, ENECO, Vattenfall, Atlantic Shores and DEME Offshore will provide a cash contribution and will also participate in the steering committee to provide their expertise and guidance the project. Prior to the offshore tests, the prototype will be commissioned and functionally tested onshore at the marshalling yard to ensure correct performance.

Resultaat

The results of the SIMPLE III project are: 1. Bringing the jetting technology to TRL7; 2. Obtaining a Technology Qualification from DNV for the Vibrojet® technology; 3. Comparison of refusal depth between the Vibrojet® and vibro installation methods; 4. Cost comparison of installation and foundation costs of Vibrojet® installation compared to vibro and impact driving; 5. Comparison of underwater noise generated by the different installation methods Vibrojet®, vibro and impact driving; 6. Comparison of fatigue damage generated in the pile by the

different installation methods Vibrojet®, vibro and impact driving; 7. Impact assessment and comparison of the underwater noise on marine mammals generated by the different installation methods Vibrojet®, vibro and impact driving.

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

Voor meer informatie over de Topsector Energie, ga naar www.topsectorenergie.nl.

Voor meer informatie over de TSE / Energie-Innovatie regelingen die RVO aanbiedt, ga naar www.rvo.nl/tse.