

GeoWin: Geophysical Windfarm surveys to reduce cost

Publieke samenvatting / Public summary

Aanleiding

For the development of an offshore windfarm, it is mandatory to assess the location's geotechnical feasibility. This is conventionally done with classical geotechnical approaches like cone penetration tests, borehole investigations as well as high resolution seismic surveys to structurally image the near subsurface. Ground modelling is a critical step in offshore windfarm development as it provides essential insights to the seabed properties, allowing engineers to design reliable and costeffective foundations for the wind turbines. With more accurate data on the soil properties and seabed loadings, windfarm developers can optimize dimensions, foundation depth, wall thickness and overall monopile design of the windmills. This will allow saving steel and installation costs. Moreover, detailed geotechnical surveys scan for geohazards and also assure that there are no pipelines, cables or other infrastructure in the way, including unexploded ordnances (UXOs), or other objects on or within the seafloor where the windfarm should be developed.

Doelstelling

The goal is to develop and build a (largely) non-invasive, compact, environmentally friendly, autonomy-ready geophysical system to map topography, structure and properties of the oceanfloor up to geotechnically relevant depths below the seafloor. Measuring shear components using non-invasive seismic techniques allows the estimation of elastic soil properties. This will

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Algemene informatie / General information

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augment and largely replace existing invasive techniques, with equal or better description of the subsurface, and it will allow the use on small remotely operated/autonomous surface and underwater systems. For this we plan to combine two related techniques which we dubbed 'Silent Seismic' and 'SASV'. They complement each other, with different resolutions and penetration depths, allowing a close to perfect characterization of the geotechnically relevant zone, and consequently a significant improvement in the design and operation of offshore windfarms.

Korte omschrijving

The project is implemented by execution of in total 5 work packages: 1. Concept definition 2. Silent Seismic: a. Design hardware and software b. Validation on an underwater vehicle 3. Design and prototyping of SASV 4. Pilot testing a. Validation of GeoWin method in near shore sea conditions b. Wind tower design simulations 5. Technical steering of the project

Resultaat

- A GeoWin proof-of-concept: Silent Seismic and Synthetic Aperture Sonar on an (Autonomous Surface) Vessel combined in a prototype system in sea conditions
- Silent Seismic and SASV hardware, software algorithms and data processing systems
- A cost/impact analysis tool for wind tower optimization

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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