
Subject R&D innovation theme 4.4. from the Innovation Contract (page 28).
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4.4 Transport, Installation & Logistics

4.4.1 The importance

New ships and equipment are required for installing larger turbines and foundations faster and in difficult sailing conditions. Standard foundations such as monopiles can be installed quicker, while construction noise levels must be reduced. Scouring must be controlled in order to avoid rock placement. Connecting electricity cables to the foundation/wind turbines and the offshore substation has often proved to be a challenge. Cables must be laid and buried more effectively. Alignment and reduction must take place of the components to be installed offshore, modifying the design in such a way that the assembly can take place onshore as much as possible. The assembly should take place onshore as much as possible.

Harbours should be enlarged and/or rebuilt. It might be cost-effective to construct additional harbours at sea, for the operational phase as well. A good infrastructure and an optimal supply chain contribute to cost reduction. Harbours should be enlarged and/or rebuilt.

4.4.2 The R&D activities

1. Designing and testing new specialized ships and equipment for installation and O&M. For example: ships for transporting complete wind turbines, ships for new foundation methods such as drilling, and ships that can perform installations faster and in difficult sailing conditions
2. Developing and testing greatly improved installation methods of standard foundations such as monopiles; driving piles faster, noise reduction, alternative insertion methods (drilling, vibrating), developing methods for controlled scouring
3. Developing and testing better and more reliable methods of burying (or drilling) and connecting electricity cables
4. Improving the interfaces between components installed offshore
5. Conducting research into better infrastructure (including harbours) and a better logistical chain.

4.4.3 The parties involved

Companies	Knowledge institutes
2-B Energy, Ampelmann, Ballast Nedam, BOC MetOcean, Callidus, CPNL Engineering, CWC, Damen, De Vries & Van de Wiel, DHV, Essent, ESI Group Geo Plus, GL Garrad Hassan, Grontmij, GustoMSC, Hertel, Huisman, Hulst Innovaties, IHC Merwede, Jack-up Barge, LOC Noorderpoort, MECAL, No Limit Ships BV, NNOW, Peterson SBS, RRME, SeaZip Offshore BV, SPT, Van Oord, We@Sea, Wiertsema & Partners, Wind Power Center, XEMC Darwind	Deltares, ECN, KEMA, Marin, MCN, University of Groningen, TU Delft