

## **Study into innovative routing options across the Wadden Sea region**

The Netherlands Enterprise Agency (RVO) commissioned Royal HaskoningDHV to survey low-impact options for routing cables and a hydrogen pipeline across the Wadden Sea area. This included a review of current techniques and innovative approaches for laying power cables and a hydrogen pipeline and bringing energy generated by offshore wind projects to shore. The study explored seven representative routes, out of 20 alternatives identified.

### **Process**

In order to ensure a high-quality study, consultations included a range of parties and experts, and intensive collaboration within a project team. This included the Ministry of Economic Affairs and Climate Policy, the Ministry of Agriculture, Nature, and Food Quality, Rijkswaterstaat (the Directorate-General for Public Works and Water Management), the Groningen provincial authority, Gasunie, TenneT, the Omgevingsberaad Waddengebied environmental consultative forum, the municipality of Het Hogeland, and Groningen Seaports. The study was also discussed during a number of environmental consultation sessions organised as part of the '[Exploration of Offshore Wind Energy Landing 2030](#)' (VAWOZ 2030) process.

### **Reason for the study**

This study was a direct response to the recommendations of the [Joint Fact Finding for a cable corridor for the offshore grid to the north of the Wadden Islands](#). The study aimed to explore innovative techniques that would minimise any impact to the Wadden Sea of bringing offshore wind energy to shore in the northern Netherlands. The focus here was on the connection between two major challenges in the Wadden Sea region – protection of this UNESCO World Heritage site, on the one hand, and the landing of offshore wind energy on the other, which has an important role to play in tackling the national climate challenge and regional sustainability improvement efforts.

### **Research method**

Royal HaskoningDHV elaborated and assessed seven alternative cable corridor routes for a total capacity of 6.7 GW (3x 2 GW DC and 2x 350 MW AC cables). The route options were partly based on VAWOZ 2030 and the project for the offshore grid to the north of the Wadden Islands, supplemented with alternative options based on the input of stakeholders. As a first step, a range of innovative techniques for minimising ecological impacts were identified and applied to the various routes. The natural values and subsoil morphology for each route were then mapped out. As a final step, the assessment framework was completed for each route. The assessment framework is a summary table in which all routes are scored for environmental impact, construction and maintenance impacts, technical aspects, use of space, costs, and planning.

### **Conclusions of the study**

The study offers a comprehensive overview of techniques for landing electricity generated by future offshore wind projects in the area north of the Wadden Sea. Experience gained in Germany and Denmark is included. A guiding principle will be to route cables along a corridor, running multiple cables parallel to each other. This will avoid unnecessary cable crossings and make provision for future developments, including the addition of further cables and a hydrogen pipeline.

Although each route investigated comes with technical, ecological, and legal challenges, all seven routes appear feasible in theory, with a distance of 50 metres between each cable. However, it is not yet possible to say whether this will be achievable in practice. Further research is required. Another finding is that each route will impact the environment negatively to a greater or lesser extent and will be subject to permitting restrictions. In light of this, Royal HaskoningDHV emphatically states that, in order to be able to choose where to land the electricity cables from wind farm zones, the routes will require further refinement and assessment.

The results of this study will be included in the overall decision-making in relation to the spatial planning procedures to be launched in the context of VAWOZ 2030.