



Floating Offshore Wind



The capacity ambitions of offshore wind globally can only be met with floating technology, yet this approach brings with it unique engineering challenges in terms of seabed risks, geohazards, foundation/anchor design and dynamic cable management. Cathie, with decades of experience in deepwater oil and gas and conventional offshore wind, are ideally positioned to help make floating wind a reality.

The water depth is a key parameter which dictates the installation methodologies available, and thus the particular engineering solutions for maintaining a secure mooring and getting power to seabed and shore. Delivering effective and value-adding geoscience and geotechnical consultancy requires a deep knowledge of these technologies used for floating assets, and how these specific solutions interact with the huge variety of geological and geotechnical conditions present offshore.

For floating wind, expertise in existing technologies and approaches are only part of the picture. Innovation is essential to bring down costs and Cathie are committed to delivering R&D focussed on the sector's challenges.

Feasibility

Desk Top Study and Geohazard Assessment

- Bespoke, site-specific geological, geotechnical and geohazard studies
- Ground risk registers specific to floating wind anchor/foundation solutions
- Comparative site analysis and selection studies.

Preliminary Design

- Optioneering of suitable foundation technologies for catenary, semi-taut and taut mooring arrangements
- Feasibility and cost-benefit analysis of new approaches, such as shared anchor points.

Development

Survey Design and Management

- Nearshore and intertidal geophysical and geotechnical survey design for cable landing
- Offshore geophysical and geotechnical survey design
- Novel techniques and bespoke approaches, tailored to the project and the preliminary design
- Procurement support, 24-7 management and remote and on-site supervision.

Data Management and GIS

- Manage, interrogate and visualise project data sources
- Reprocessing and analysis of geophysical data, derivation of analogous geotechnical data
- Integration of offshore and onshore survey data, development of GIS based geostatistical ground models
- Online remote data and ground model hosting.

Design

Foundations

- Technology agnostic design of piles, suction caissons, GBS, drag anchor, novel/hybrid solutions and screw-piles
- Integration of technical design with 3rd party and client considerations, HSE considerations and local legal regulatory frameworks
- Asset lifetime interaction with the marine environment, including nearshore seabed change
- Seismic assessment and design.

Subsea Cables

- Routing assessments, CBRA and Burial Assessments
- Cable Protection Analysis Reports (CPAR)
- Assessment of cable touch-down and the cable/soil dynamic system
- Design of shore approach and cable landing, including trenchless technologies (HDD, microtunneling).

Installation

- Specialist Owners Engineer, Package Management and offshore management for subsea cables and foundations
- Pile driveability, GBS settlement or suction caisson installation assessment
- Technical oversight and review of contractor's construction plans
- Management of change and maintenance of seabed risk registers
- Seabed risk management and contract claim support.



Operation

- Risk based inspection (RBI) approaches for the marine environment
- Cable integrity risk assessment (CIRA)
- Remedial works design, lifetime risk management
- Seabed risk management and contract claim support.

Representative Track Record

Cathie have delivered our integrated geoscience, geophysical and geotechnical services for floating offshore wind projects in an expansive range of geographies and ground conditions. The track record below provides a representative sample of our experience:

Confidential Sites, South Korea

Geological, geotechnical and geohazard desk studies across multiple project zones examining engineering feasibility and floating OWF layout constraints. Concept level design of anchoring solutions.

Viana do Costelo – Owners Engineer for WindFloat Export Cables, Offshore Engineering

Holistic geoscience and geotechnical engineering solution for export cable landing, negotiating sea defences and a river crossing. Engagement spanned from initial desk studies and geohazard assessment through to detailed design of the export cable routing, CBRA, burial assessment and HDD required for shore landing. Cathie provided complete ITT specification, budget and programme support, procurement management and on-site supervision and management for the offshore cable installation and HDD operations. Activities offshore included desk top studies, survey consultancy and data interpretation.

Groix Floating OWF – Development Phase Support

Holistic geoscience and geotechnical support spanning desk study, geological interpretation and modelling, conceptual foundation design and geotechnical reporting.

Provence Grand Large Floating OWF

Geophysical and geotechnical survey consultancy leading into geotechnical interpretative reporting and foundation design. Detailed geotechnical design of the anchors.

EOLINK – FOWT demonstrator at SEMREV test site

Detailed geotechnical design of the anchors, including installation analyses.

RCAM and Carbon Trust – Novel Design of 3D Printed Suction Caisson Anchors

Research and development project in support of RCAM's development of concrete 3D printed foundation technologies. This project examined specifically the application and design of suction caissons for floating wind.

Complimentary and Interfacing Cathie Solutions

As part of our complete 'expertise, seabed and below' consultancy offering, Cathie provide the following complimentary and interfacing solutions for floating offshore wind farm projects:

- Trenchless shore landing design
- Onshore cable routing, planning and design.

