OFFSHORE WIND ENERGY
CAPABILITY STATEMENT
WWW.RAMBOLL.COM/WIND-ENERGY
CONSULTANCY SERVICES WITHIN OFFSHORE WIND ENERGY

The advantages of placing wind farms at sea are numerous. They are able to produce up to 100% more electricity than onshore wind turbines due to higher and steadier wind speeds across open water. Other advantages include greatly reduced visual impact and the possibility of installing larger turbines producing more energy.

Ramboll offers a full range of services on offshore wind projects from planning and project development, to design, implementation and follow-up on operation and maintenance, and finally decommissioning. Our unparalleled track record in the design of offshore foundations for wind turbines enables us to produce cost optimal designs using any relevant foundation concepts in steel or concrete.

**Project Development**
Ramboll is experienced in evaluating project feasibility via estimates and assessments of life time costs and income, usually performed on a probabilistic basis, and often in connection with the complete time schedule.

**Turbine technology**
We are capable of estimating aeroelastic loads for all stages of the foundation design and performing fully integrated load simulations on in-house software. In addition we perform controller design and provide software for condition monitoring.

**SELECTED PROJECT REFERENCES**

- **SPIC Binhai North Phase 2**, Huadong Engineering Corporation, China, 400 MW, 2016
- **Norther Offshore Wind Farm**, Van Oord Offshore Wind Projects, Belgium, 352MW, 2015-2016
- **Horns Reef 3**, Vattenfall, Denmark, 400MW, 2015-2017
WHY CHOOSE RAMBOLL FOR YOUR PROJECT?

World leader in offshore foundation design for wind turbines.

Have performed designs for more than 40 offshore wind farms around the world, totaling more than 60% of all installations.

Offer full-range services.

25 years of experience from offshore oil and gas structures, which is applied for detailed design of substations.

RAMBOLL’S SERVICES

Once an offshore wind farm has been decided, Ramboll typically provides support and advice as the owner’s engineer throughout the development process on relevant technical, environmental and financial matters or support the various vendors for the project. Our clients include project developers, utilities and contractors, and our services include:

OUTLINE DESIGN / FEASIBILITY
- Feasibility studies
- Due diligence
- Risk assessment
- Environmental impact assessment
- Budgeting and time scheduling
- Geotechnical, geophysical and met-ocean studies
- Permitting

BASIC DESIGN
- Conceptual and tender design
- Preliminary turbine loads
- Layout and design of transformer platforms
- Supervision of detailed site investigations

DETAILED DESIGN
- Detailed design of foundation concepts
- Detailed design of transformer platforms
- State-of-the-art in-house software
- Project certification and authority approval
- Procurement

MANUFACTURING & CONSTRUCTION
- Fabrication supervision
- Construction management and supervision

POST CONSTRUCTION
- Planning and specification of O&M
- Follow-up on O&M
- Decommissioning
- Structural health monitoring systems
- Structural reassessment

TEST & COMMISSIONING
- Acting on behalf of the developer during testing, commissioning and handing over of the project.

MANUFACTURING & CONSTRUCTION
- Fabrication supervision
- Construction management and supervision

Basic project data
Based on factors such as the choice of turbine and site conditions, Ramboll carries out all the necessary analyses to select the foundation type best suited for the project. These analyses include modeling and assessment of met-ocean data, geophysical and geotechnical investigations, wind studies, EIS and EIA, and navigational risk analyses.

World-leading foundation design
Ramboll is the only company in the world that has carried out detailed design for more than 30 offshore wind farms for 11 different turbine types, and we are currently one of the few design firms capable of performing load iterations with the turbine manufacturers. The designs are carried out by means of advanced state-of-the-art software developed in-house.

Project approval and certification
Most projects require a project certification, and some require e.g. the German BSH approval, in order to have them approved by the financial community and the insurers. We have obtained certification of more than 30 offshore wind projects. Further, we have obtained approvals of projects by both the German BSH and the Prüfungsingenieur institution.

Contract management
We contribute with engineering and design services to all phases of the construction work and perform supervision of fabrication of elements for the project.
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