



OFFSHORE SUBSTATION DESIGN

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RAMBOLL

OFFSHORE SUBSTATION DESIGN

COMPLETE SUBSTATION DESIGNS TAILORED FOR YOUR OFFSHORE WIND FARM

Ramboll is the world leader in offshore foundation design for wind turbines. Our specialised engineers carry vast expertise within development and design of offshore facilities.

This covers minimum facilities with low manning frequency as well as larger facilities that are permanently manned with frequent access via sea or air.

Offshore substations

More and larger wind farms are being located offshore. The capacity of these wind farms spans from several hundreds of MW to 5-10 GW. To minimise the electrical transmission losses and the cable costs, the turbines in such wind farms are electrically connected to an offshore substation provided with a step-up transformer. The transmission to shore is then achieved by an HV AC connection or an HVDC link.

With Ramboll as your partner, our extensive offshore experience will be implemented into the design of

your substation with strong focus on safety, O&M and cost effective design. The development and design of the substation is highly dependent on the actual location and the operation and maintenance philosophy for the substation and for the wind farm.

Multi-discipline services

Ramboll provides multi-disciplinary engineering consultancy for all areas of the offshore substation:

- Definition of design standards and codes
- General layout development with consideration of safety, mechanical handling, operation and maintenance
- Implementation of electrical equipment such as step-up transformer, reactors, GIS switchgear, LV-switchgear, UPS system and control system
- Substructure design including j-tubes for cables, boat landings and foundation

- Specification of all auxiliary equipment such as cranes, emergency diesel systems and workshops
- Accommodation facilities and heli deck if required
- Installation engineering for topside and substructure as well as cable pull-in planning

Substructure design

The substructure design can be a simple steel mono pile, a larger jacket for deeper waters and higher topside loads or it can be a concrete gravity base structure. At Ramboll we have more than 30 years of experience within offshore substructure design.

The structural design is carried out using Ramboll's own state-of-the-art software programme ROSAP. All topsides and substructure design are performed within a fully integrated multi-discipline 3D system (e.g. PDS, PDMS, Tekla, Solidworks or SmartPlant 3D).

Selected offshore wind farm substation projects

- Hornsea One – topside and substructure – Concept and detailed design (UK)
- Burbo Bank extension – topside and substructure – Conceptual Design (UK)
- Westermost Rough – topside and substructure – Detailed design (UK)
- Anholt substation – topside and substructure – Detailed design (DK)
- Horns Rev 2 substation – topside and substructure – FEED (DK)
- Robin Rigg substation – topside and substructure – Detailed design (UK)
- Sheringham Shoal – substation substructure – Detailed design (UK)
- London Array – Monopile foundation and cable deck (UK)
- Bligh Bank – Monopile foundation and cable deck – Detailed design (B)
- NordSee Ost – substation substructure – Concept study (D)

More information and contact

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Design codes

The designs can be performed according to any acknowledged standard e.g. DNV, Germanischer Lloyd, IEC, NFPA, ISO or other international codes, as required to have the project certified by a Certifying Authority.

Optimum solutions

Ramboll is the ideal partner for carrying out studies to determine the kind of facility that is most advantageous at a given location.

Our long track record of feasibility studies, front-end engineering design and detailed designs for clients' operating facilities offshore will ensure that we will develop the optimum solution.

Significant projects

Our most recent substation projects count the two UK projects Westermost Rough and Burbo Bank Extension, which are estimated to make a significant contribution to the UK government goal of installing 33GW of wind production by 2020. Further Ramboll designed the substation for the major landmark project in Denmark; the Anholt Offshore Wind Farm, which is one of the largest offshore wind farms worldwide.



WHO ARE WE?

Ramboll is a leading engineering, design and consultancy company founded in Denmark in 1945. We employ close to 10,000 experts and have a significant presence in Northern Europe, India and the Middle East. With close to 200 offices in 18 countries we emphasise local experience combined with a global knowledge-base. We constantly strive to achieve inspiring and exacting solutions that make a genuine difference to our customers, the end-users and society as a whole. Ramboll works across the markets: Buildings, Transport, Environment, Energy, Oil & Gas and Management Consulting.

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