



RAMBOLL

OFFSHORE DECOMMISSIONING - SALVAGE AND RECOVERY

Major component exchanges, re-powering and decommissioning are all important milestones in the project lifecycle. Decommissioning needs to be addressed early to contribute positively to the cost of energy.

The European offshore wind market is growing rapidly and an increasing number of large-scale and far-offshore wind farms are under construction.

To reduce the cost of energy (CoE) of future offshore wind energy power plants, operation and maintenance (O&M) topics including decommissioning need to be addressed comprehensively during the planning phase.

New, upcoming offshore wind projects can comprise 80 to 400 wind turbines per wind farm. These large amounts of singular structures require a strong focus on the related marine operations, in order to run a profitable decommissioning campaign.

Ramboll is an optimal partner for such multidisciplinary challenges, and with our extensive expertise we can assist already in the beginning of the project lifecycle.

Our experience and competences

As one of the largest consultancies in northern Europe, Ramboll covers all engineering aspects for offshore

infrastructure projects. Our home market is the Nordic countries which are known for their high standards and quality in offshore engineering. Due to our experience, Ramboll also offers technical advisory services related to all decommissioning and recovery topics and we have a broad track record including the following:

- Concept development, cost estimate and planning of the decommissioning of the SCHWEDENECK SEE A+B platforms
- Concept study for the removal of the wreck of the WEST GAMMA Jack-Up rig
- Technical advisor of the German delegation of the OSPAR-Commission and the Maritime Environmental Protection Committee (MEPC) of IMO.
- ARIANE 5 Boosters Recovery, development and supply of equipment, execution of missions as general contractor.

To date, only a few offshore wind farms have reached their end-of-

life phase or have been dismantled. Repowering and major component exchanges, however, are already important topics. Addressed accordingly in the early design phase, a precise decommissioning concept and cost estimate can support foundation selection progress as well as the amount posted to the decommissioning bond. Our extensive experience from the Oil & Gas sector in addition to our offshore wind background enables us to strongly support our partners in all decommissioning aspects.

Ramboll is also well-known for our emphasis and practice of minimum impact on the environment and our high standards in design and execution.

For further information, please visit www.ramboll.com or contact us directly:

CONTACT

Christopher Brons-Illing
Ramboll Energy
Tel +49 151 44 00 6235
christopher.brons-illing@ramboll.com

Technical engineering

Ramboll has expert knowledge in all aspects of decommissioning projects, from concept development to vessel selection.

We offer services within:

- Decommissioning concepts for offshore wind turbines, foundations and platforms
- Concept planning and cost estimation
- Seafasting, deck layout and logistics design
- Managing procurement of technical and logistic scope
- Market study, technical advisor and participation in the due diligence process for offshore project
- Equipment selection and specification
- Modeling of different technical scenarios
- Compliance with technical and safety regulations.



BASIC DECOMMISSIONING CONCEPT FOR VEJA MATE OFFSHORE WIND FARM

CUSTOMER

Veja Mate Offshore Holding GmbH

LOCATION

North Sea, German EEZ

PERIOD

2015

SERVICE PROVIDED

Decommissioning concepts and cost estimation for the offshore wind farm including wind turbines, foundations, platform and cables.

Project management

Ramboll offers wide-ranging support in project management. We handle all services from authority approvals, supply and procurement, site supervision and construction management:

- Prediction of workload for all lifecycle phases of an offshore wind farm project (T&I, O&M and decommissioning) and are experienced in economic modelling of offshore operations
- Creation of project plans incl. work breakdown structures and time scheduling, incl. adverse weather consideration
- Management of contract and project time schedules with regard to the technical scope.

Interdisciplinary services

Ramboll is a competent partner in delivering solutions for infrastructure and structural design, from arctic conditions to the rough North Sea environment.

Our services include:

- Foundation design
- Transport & installation
- engineering
- Operation & maintenance planning.



DECOMMISSIONING AND REMOVAL OF THE NORDSEE PLATFORM (FPN)

CUSTOMER

Federal Ministry for Research and Technology

LOCATION

North Sea

PERIOD

1992 - 1993

SERVICE PROVIDED

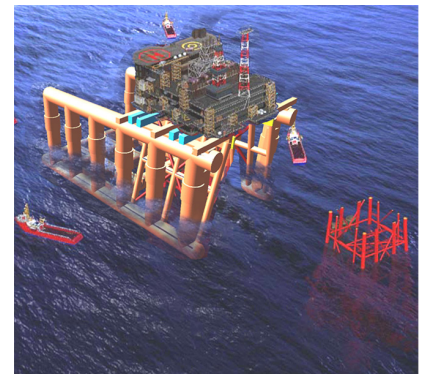
Development and assessment of alternative decommissioning concepts, tender documents, and negotiations, supervision and documentation of the offshore operations.

Offshore site supervision

We are experts and have extensive hands-on experience within areas such as:

- Coordination and supervision of preparatory works at the onshore yard, prior to load-out and sail-away
- Attendance of load-outs mobilisation
- Representing client during offshore campaigns
- Supervision of broad range of offshore work disciplines.

During construction and decommissioning, our main focus is on work place safety and delivering high quality on time and budget.



DUE DILIGENCE FOR THE OFFSHORE SHUTTLE PROJECT

CUSTOMER

Westdeutsche Landesbank AG

LOCATION

Offshore Oil & Gas worldwide

PERIOD

1999 - 2000

SERVICE PROVIDED

Market survey and analysis worldwide, technical consultancy and risk assessments, evaluation of potential competitors, case studies and cost analyses, due diligence process