



# HOW WE HARNESS WIND

COMBINING INNOVATIVE THINKING  
WITH OFFSHORE AND WIND EXPERIENCE

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# HOW WE HARNESS WIND

Over the years Ramboll has participated in several national and international onshore and offshore wind parks. Innovative thinking combined with years of offshore and wind experience play an important part in this line of work. At Ramboll we offer our services to developers, wind turbine vendors as well as to contractors. Experience, references, environmental concern and economic awareness are typical factors that control our consultancy services.

A wind project from A to Z constitutes a multitude of disciplines and assignments which all need proper coordination and cooperation. With a background as an international and multidisciplinary consultant we provide all these services:

## Energy planning

We establish and review national and regional energy planning and incorporate wind energy into the planning schemes.

## Trade and transportation of energy

The trade possibilities for wind energy are reviewed and established.

## Project finances

We provide a financial risk analysis incorporating all elements of wind projects and consultancy concerning project financing.

## Wind studies

The wind resource, wind measurements and macro/micro siting of the turbines are assessed.

## Environmental impact

We establish baselines for flora and fauna and estimate the impacts on the environment from the wind project leading to Environmental Impact Statements.

## Assessment of met-ocean data

We assess wave and current data for input to the structural design and to the numerical modelling of morphological processes such as erosion and scour.

## Geophysical investigations

Geophysical investigations and underwater video recording are specified and performed. These investigations provide input to archaeological investigations, environmental impact assessment and to the base of the structural design.

## Geotechnical investigations

Geotechnical investigations are specified, performed and interpreted in order to provide a base for the structural design of the foundations of the turbines and the laying of cables.

## Navigational risk analysis

We estimate the navigational risk for passing vessels during the construction and during the operational life of the offshore wind farm. The risk analysis provides input to the environmental impact statement, the financial risk analysis and to the base of the structural design.

## Structural design

We perform conceptual or detailed designs of all parts of the wind project including towers, foundations and structures of transformer platforms. The design will amongst others include inplace analysis, spectral and time-domain dynamic analysis, fatigue analysis and driveability of piles. Analysis of transportation and installation is also a natural part of the Ramboll services.

## Electrical design

We provide overall grid analysis in connection with the implementation of the wind project, electrical design options for the turbines and the interconnection of turbines, and design of cabling to landfall.

## Decommissioning

We consider the decommissioning of the wind project as an integral part of the design as well as an important element within the life-cycle-analysis. This element therefore needs proper attention, which we offer as part of our services.

## Contracting of wind projects

We perform the prequalification of tenders, develop the enquiry documents, tender evaluation and contracting.

## Construction management and supervision

On behalf of the owner we manage the construction and the contract for the wind project, and perform commissioning and supervision of all site works and tests.

## For further information please contact

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## OUR AIM

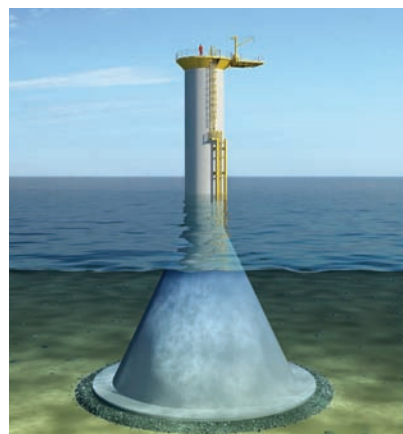
We strive to provide some or all of these services and to play a proactive part in the development of wind projects for the benefit of the involved parties.

## REFERENCES

Our references include onshore as well as offshore wind projects in Europe, Asia, South America and Africa. For a list of specific references please look up our addresses on the last page.



Bahrain world trade center.



Example of gravity based foundation.



## ABOUT RAMBOLL

Ramboll is a leading engineering, design and consultancy company founded in Denmark in 1945. Today, we employ close to 9,000 ambitious experts and have a significant presence in Northern Europe, India, Russia and the Middle East. With almost 200 offices in 20 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 operates within the areas of: Buildings & Design, Infrastructure & Transport, Energy & Climate, Environment & Nature, Industry & Oil/Gas, IT & Telecom and Management & Society.  
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