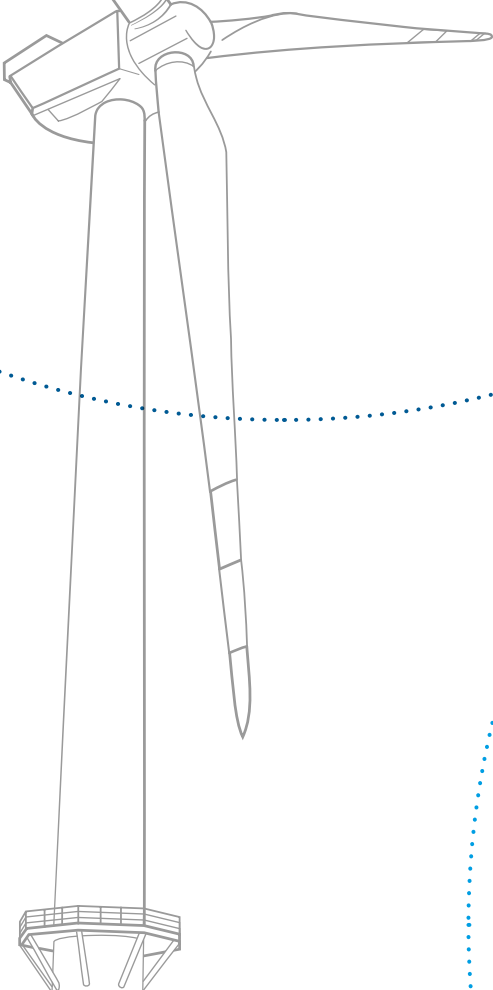


Offshore

Consulting and Engineering



DEUTSCHE
WINDGUARD

WHERE SCIENCE TEAMS WITH EXPERIENCE

International offshore references

BARD OFFSHORE 1

- ▶ Integral load assessment
- ▶ Technical project support for OSS design verification
- ▶ Technical project support for turbine foundation verification
- ▶ Technical support for offshore inspection program

BUTENDIEK

- ▶ Technical due diligence
- ▶ Technical project support for integral load assessment and monopile design

GALLOPER

- ▶ Technical project support for integral load assessment and monopile design

GLOBAL TECH I

- ▶ Technical project support
- ▶ Concept for verification of power curves
- ▶ Manufacturing surveillance for rotor blades and castings
- ▶ Supervision of commissioning and 500h maintenance
- ▶ Concept for inspection and monitoring
- ▶ Consulting during due diligence process
- ▶ Concept for periodic inspections

HOHE SEE

- ▶ Commissioning concept

NORDSEE TWO + NORDSEE THREE

- ▶ Wind farm optimisation
- ▶ Wind farm layout and energy yield assessment
- ▶ Predesign of monopile foundations

XIANGSHUI (CHINA)

- ▶ Installation surveillance
- ▶ Technical due diligence





MERKUR

- ▶ Consulting during due diligence process
- ▶ Technical project support for integral load assessment and monopile design
- ▶ Technical Advisor:
 - Support package management
 - Preparation, annotation and amendment of technical documentation and employer requirements
 - Coordination of technical interfaces with other packages

NORDERGRÜNDE

- ▶ Predesign for monopile foundation
- ▶ Technical project support for integral load assessment and monopile design

OWF MEERWIND SÜD / OST

- ▶ LiDAR leasing
- ▶ Support for O&M concept

TRIANEL WINDPARK BORKUM

- ▶ Technical project support
- ▶ Manufacturing surveillance
- ▶ Verification of structural integrity due to influence of neighbouring wind farms

WIKINGER

- ▶ Technical project support for integral load assessment and jacket design

Wind & Marine Engineering

Construction works offshore are a challenge. As your reliable partner for all demanding technical interfaces, we understand the particular requirements of this special environment.

INTEGRAL LOAD ASSESSMENT

We take charge of the interface management and prepare the concept for an integral load assessment. Finally, we assess the loads of the turbines, as well as structures and foundations, for onshore and offshore installations.

STRUCTURAL DESIGN AND ANALYSIS

We allow you to profit from our long-lasting experience. Leave the design of tower and foundation of your offshore-structure to us. We can provide feasibility studies and cost analysis, as well as tenders and final design.

TECHNICAL SPECIFICATION OF THE TURBINE

We define the project-specific requirements of the turbine and offer support during all stages – from preliminary planning to cost estimation, tender and, finally, project execution.

WIND FARM LAYOUT

We optimise your layout based on applicable technical and economical limits. We increase the efficiency of your planning process and, thus, optimise the yield of your wind farm by taking site-specific parameters into account, such as soil conditions, turbulence from neighbouring wind farms, grid layout, and the costs of foundations and electrical cable.

ENERGY YIELD ASSESSMENT

We analyse the site-specific design parameters of your planned wind farm. We predict the energy yield of your project, taking turbulence effects into account. Thus, your financing is based on independent, scientific calculations, not guesswork.

CALCULATION OF AVAILABILITY/ LOSS CALCULATIONS

As independent experts, we calculate the technical availability of your wind turbines. Based on operational data from your wind farm, we calculate the achieved availability. On this basis, we provide loss calculations in accordance with the requirements of the TSO.

SIMULATION OF LOGISTICS AND INSTALLATION PROCESSES IN THE LARGE-SCALE R&D WIND TUNNEL

We use our acoustically-optimized large-scale wind tunnel to simulate the influence of critical wind speeds on the transport and installation of your offshore turbine. At realistic Reynolds numbers of up to 6 000 000 and wind speeds of up to 100 m/s.



Inspections & Quality Assurance

A good inspector knows where to look. Our experienced experts understand exactly where the potential soft spots are. Deutsche WindGuard's accredited inspection body ensures high quality standards, so you get the service you need.

INSPECTIONS

We can perform all technical inspections of your offshore turbine – from commissioning and warranty inspection to condition-based gearbox endoscopy and periodical inspections.

MANUFACTURING SUPERVISION

Our certified visual inspectors accompany the production process of your project – from casting to rotor blades and all other critical components.

INSTALLATION SUPERVISION

We monitor installation, transfer of ownership, and commissioning. We make certain that everything works as it should and that there are no unpleasant surprises.



"The combination of experience and comprehensive know-how is one of the keystones of the WindGuard philosophy. The numbers speak for themselves: 3.000 inspections on 70 different turbine types, energy yield assessments for 14 GW installed capacity in the North and Baltic Seas, as well as the realisation of a multitude of domestic and international offshore projects, in cooperation with well-known manufacturers and developers. This is how we guarantee the trust of our customers."

At home in the complex world of offshore engineering, structural design, simulation, and load calculations, with more than 15 years experience in offshore wind:

Sven Bicker

Managing Director of Deutsche WindGuard Offshore



Project Support

Due to their inherent complexity, offshore projects need know-how from diverse fields of expertise. We have access to interdisciplinary knowledge and more than 15 years of experience working closely with certification bodies and authorities.

TECHNICAL MANAGEMENT

We monitor the technical condition of your wind farm and implement a pro-active maintenance management strategy – in compliance with all guidelines and requirements, 24-7 (around the clock).

INTERFACE MANAGEMENT

We assist you in all contract negotiations with your suppliers. We generate a scope-split-matrix (by identifying interfaces and assigning the scope of supply and services) and monitor the smooth handover at each interface of the entire project.

TECHNICAL PROJECT SUPPORT

As your “on-call” expert, we prepare technical reports, assessments and optimisations to meet all of your turbine and foundation needs. If needed, we can take over the project management – from specific parts to the full project.

O&M CONCEPTS

We provide advice on the preparation and optimisation of your O&M concept, always keeping your site requirements in mind.

SAFETY AT WORK

For your peace of mind, we make sure your project complies with H&S requirements. We provide you with a conclusive H&S concept, workplace definitions/ training requirements, and process descriptions.

SUPPORT WITH CERTIFICATION AND PERMISSION

We are at your side during the certification of your project and help you comply with the requirements of certification bodies and approval authorities.



Science



Experience

Technical Rating & Verification

Putting offshore wind projects into effect involves high financial risks. It's a complex interaction of site conditions, technology, and logistics. If you're not careful, financial disaster is a very likely possibility.



"We help you to protect your investment. With our experience from technical assessments for offshore projects with a total capacity of 8 GW, we are your reliable partner."

Add our experts to your team, whenever you find you need additional competence. We will support you – as external 'on-call' consultants or as project staff working directly at your site."

Project planner, analyst, and strategist with more than two decades of experience in the wind energy market:

Niels Erdmann
Managing Director of Deutsche WindGuard Offshore

TECHNICAL DUE DILIGENCE

We assess the risks tied to the realisation of your offshore portfolio – from the technical risks of each component and the full turbine to those of the entire project. Considering the technical, logistical, certification- and license-related, and legal requirements, we subject your project to detailed scrutiny.

TECHNICAL CONTRACT SPECIFICATION

We advise you during negotiations with your suppliers and provide you with the relevant technical specifications and requirements.

RISK ASSESSMENT

We identify potential risks and provide you with a qualitative and quantitative assessment – from each component to the entire project.

POWER CURVE MEASUREMENT

We verify that your turbine delivers the warranted power. Whether you choose a traditional met mast or an approach with LiDAR and nacelle anemometer – our power curve measurement is tailored to the site conditions and to your needs.

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