



## TECHNICAL DUE DILIGENCE WIND ENERGY

**A comprehensive risk assessment ensuring compliance with technical, permit/regulatory, EHS and CSR requirements provides a solid basis for investment decisions and ensures a robust business case.**

To identify technical risks, evaluate their (financial) criticality and recommend appropriate mitigation measures to enable a successful transaction, is a multidisciplinary challenge that requires the highest level of experience and expertise. Ramboll has more than 30 years of experience in the wind industry and has performed technical, environmental and commercial due diligence on wind energy projects with capacities that exceed 30GW. Ramboll has local presence in the key wind markets and is familiar with the commercial and regulatory business environments.

### **Client specific due diligence studies**

At Ramboll, client-centricity is part of our culture. Therefore, we have developed a modular technical due diligence approach: TDD 1.0 – 3.0. This approach enables our clients to define the areas to be reviewed, the level of details of such reviews, and the kind of reporting and additional technical analyses our client might require, according to

their specific needs.

### **One covers all**

With our expertise in wind energy engineering and development, management consulting and environment & health, Ramboll offers a unique service range covering technical, structural and environmental aspects of wind energy. We can therefore provide both technical and strategic assistance to our clients in evaluating potential transactions.

### **Hands-on experience**

Ramboll has international experience in the development and design of wind farms and assessing energy yields. Ramboll is experienced in commercial strategies within wind energy, including organisational requirements, assessment of CAPEX/OPEX as well as business cases.

Our experience also includes manufacturing, planning, installation, commissioning and operation of wind energy projects.

Ramboll's experience provides the baseline for our unique competences in due diligence studies, as we are familiar with the pit-falls of wind energy project developments, how to mitigate them and how to evaluate them commercially.

For further information, please visit [www.ramboll.com](http://www.ramboll.com) or contact us directly:

### **CONTACT**

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### Permits & design

Correct analysis of permits in relation to their impact on design, construction and operation of wind energy projects, is the backbone of any technical due diligence.

Our strong in-house competences in civil and electrical designs enable us to identify technical and regulatory design errors. We provide state-of-the-art reviews of:

- Permits and licenses
- EIA reports
- Environmental & social DD
- Geotechnical studies
- Site layout
- Electrical design
- Civil works designs
- Turbine technology

### Contract review

The experience of our technical experts in review and negotiation of project agreements, enables us to validate all relevant aspects of contracts to perform gap analysis and to benchmark project agreements.

Many of our clients have entrusted us with the technical lead of the contract negotiation, such as:

- Land lease agreements
- EPC agreements
- Turbine supply agreements
- O&M agreements (SA)
- Operation management agreements
- Insurance policies
- Grid connection agreements
- Contract negotiation

### Energy yield

Ramboll provides high-quality energy yield assessments and wind measurements in compliance with international standards. Ramboll is certified according to DIN EN ISO/IEC 17025:2005 for both services. Profound knowledge of preparing such assessments is the key requisite to analyse energy yield assessments by third parties.

As a result of our reviews, we provide a recommendation of a net energy yield including a total uncertainty and related p50-p90 range. We provide top quality reviews of:

- Energy yield assessments
- Wind measurements
- SCADA data

### Economics & strategy

Ramboll's combined expertise in wind energy, management consultancy and environmental & health enables us to provide services that go beyond the offering of our competitors, as covering commercial and environmental aspects. Besides technical and commercial benchmarks, we identify up-sides and down-sides by e.g. modelling of life-time extension potential. Our services include:

- CAPEX/OPEX evaluation
- Decommissioning costs
- O&M cost modeling
- Cash flow modeling
- Life-time extension
- Company evaluations
- Strategic consultancy

### Projects in operation

We provide inspections of assets under construction or in operation. Our assessment of operating assets are based on:

- BoP & WTG inspections
- Gearbox video endoscopy
- Oil analyses
- SCADA performance checks



**TECHNICAL DUE DILIGENCE 144 MW  
ONSHORE WIND FARM RASKIFTET,  
OWNER'S ENGINEER**

#### CUSTOMER

Austri Raskiftet DA

#### LOCATION

Raskiftet, Norway

#### PERIOD

2016 - 2018

#### SERVICE PROVIDED

Full technical due diligence, including bankable energy yield assessment. Subsequently owner's engineer on site.



**TECHNICAL DUE DILIGENCE 288 MW  
OFFSHORE WIND FARM SANDBANK**

#### CUSTOMER

Stadtwerke München GmbH

#### LOCATION

German Bight, North Sea

#### PERIOD

2013

#### SERVICE PROVIDED

Full technical due diligence, including preparation of a bankable energy yield assessment and final technical contract negotiation.



**TECHNICAL DUE DILIGENCE 15 MW  
ONSHORE WIND FARM BAD HERS-  
FELD, PERFORMANCE ANALYSIS**

#### CUSTOMER

Stadtwerke Stuttgart GmbH

#### LOCATION

Bad Hersfeld, Germany

#### PERIOD

2014 - 2016

#### SERVICE PROVIDED

Full technical due diligence, including final technical contract negotiation. Subsequent performance check with nacelle LiDAR system.