
The background of the entire page is a photograph of an offshore wind turbine. The turbine is a three-bladed design, silhouetted against a vibrant sunset sky with shades of orange, red, and yellow. The turbine's tower and nacelle are visible, and it stands on a dark, cylindrical foundation in the water. In the distance, a city skyline with lights is visible across the water. The overall mood is serene and industrial.

NIRAS WIND POWER

Services Throughout the Project Cycle

PROJECT DEVELOPMENT – EXTENSIVE EXPERIENCE



Wind models

We specialise in assessing wind capabilities, using models, such as WindPRO, which can optimise energy outcome, support turbine selection and optimise wind farm layout through micro-siting.

The development of a wind farm requires a high degree of technical competences. NIRAS works in close collaboration with its clients to obtain a successful technical and cost effective wind farm project.

Through the preparation of the FEED study NIRAS is able to ensure that our clients have an early understanding of the costs and contract strategy for an individual wind farm layout. The study identifies the CAPEX, OPEX, ROI figures and risks in the projects.

NIRAS project development services comprise:

- Due diligence
- Feasibility and FEED studies
- Supply chain
- Economical assessment and business cases
- Wind assessment
- Site selection and optimisation
- Planning, applications and legislation
- Environmental scoping
- Environmental impact assessment
- Consenting conditions

CONSTRUCTION – IDENTIFYING AND HANDLING RISK



NIRAS has extensive experience in risk assessment and management systems. From the initial stages of the project NIRAS will support the Client in contract strategy (EPIC, split contracts) based on market conditions, availability of components and project optimisation in accordance with client requirements.

In terms of project specifics, we have the ability and expertise to prepare detailed time schedules and plans for procurement, interface, construction, risk management, Quality assurance (QA) and Health, Safety, Security and Environment (HSSE).

NIRAS can provide technical support during manufacturing and construction to facilitate monitoring and process optimisation both onshore and offshore.

NIRAS management services:

- Environment
- Health & safety
- Quality assurance
- Risk assessment
- Interfaces register
- Contract management
- Time schedule
- Construction
- Vessel optimization
- Audits
- Work shops
- On-site inspections
- Site management
- Claims



Horns Rev Offshore Wind Farm

THE ENVIRONMENT – TIMELY MANAGEMENT



NIRAS works intensively in environmental management support on major wind farm developments. Our environmental expertise cover scoping, planning baseline investigations, modelling, mitigation measures, Environmental Impact Assessments (EIAs), monitoring programmes, authority negotiations, Habitats Regulations Assessment (HRA), legal framework and consenting.

We have worked on EIAs for a number of wind farm projects, providing both management and technical skills.

Strong project management is central to NIRAS' approach with a clear emphasis on process optimisation and solution oriented strategies. It is essential to us that we maintain a high degree of QA, risk management and a productive working relationship with the client, throughout the project.

Our main technical expertise covers the terrestrial as well as the marine environment:

Biological Environment

- Nature Designations
- Birds
- Mammals
- Flora
- Fish and Benthos

Physical Environment

- Geology
- Soil and Sediment Morphology
- Noise
- Metocean

Human Environment

- Visual Impact
- Cultural Heritage
- Tourism
- Fisheries



Visualisation of Troldhede Wind Farm

SITE INVESTIGATIONS – SURVEYS AND MODELLING



NIRAS design site specific investigation programmes based upon wind data and existing knowledge. Geophysical surveys are adapted according to the wind farm layout. Results from these surveys are used to plan geotechnical investigations, which are optimised according to time schedules and cost effectiveness.

As offshore wind farms move further offshore to deeper and less sheltered sites, the importance of high quality metocean data becomes increasingly important. Our models build on wind, wave, current and tidal data.

NIRAS process extensive datasets into an easily accessible database to be used by our clients - designers, authorities, decision makers and contractors.

Our expertise includes:

- Desk Studies
- Modelling based on input from site investigations
- Preparation of scope of works, contract documents etc.
- Laboratory supervision
- Preparation of design reports
- Preparation of QHSE site investigation documents
- Risk assessments related to site investigations
- Environmental surveys and modelling.
- Spill dispersion modelling and monitoring planning



Lillgrund Wind Power Plant

SAFE FOUNDATION DESIGN – TECHNICALLY AND FINAN- CIALLY SOUND PROJECTS



NIRAS offer detailed design of the primary and secondary offshore foundation structures, as well as gravity-based foundations and monopiles. NIRAS uses in-house software tools for detailed estimations.

Prior to foundation design, the seabed is analysed in order to optimise the foundation design and potential scour protection.

NIRAS can also provide detailed design of the offshore MET mast including cabin and equipment.

NIRAS has participated in several innovative wind farm technology development projects. For example, working in collaboration with the Danish company SPAENCOM, we developed a concept for a pre-stressed concrete foundation type, built using a combination of structural elements with pre- or post-tensioning, with the aim of reducing maintenance costs.

Types of detailed analysis:

- FEM analysis
- Stress and stability analysis of structural elements
- Eigenvalue analysis
- General dynamic analysis
- Driveability analysis
- Design for Ultimate Limit State (ULS)
- Design for Serviceability Limit State (SLS)
- Fatigue analysis for steel and concrete structures (FLS)
- Design of pre-stressing

Our expertise covers:

- Geotechnical design
- Hydrographical design
- Seabed design
- Scour protection design
- Foundation design
- Material properties
- Cathodic protection
- Lightning protection
- Preparation of drawings
- O&M documents
- Decommissioning

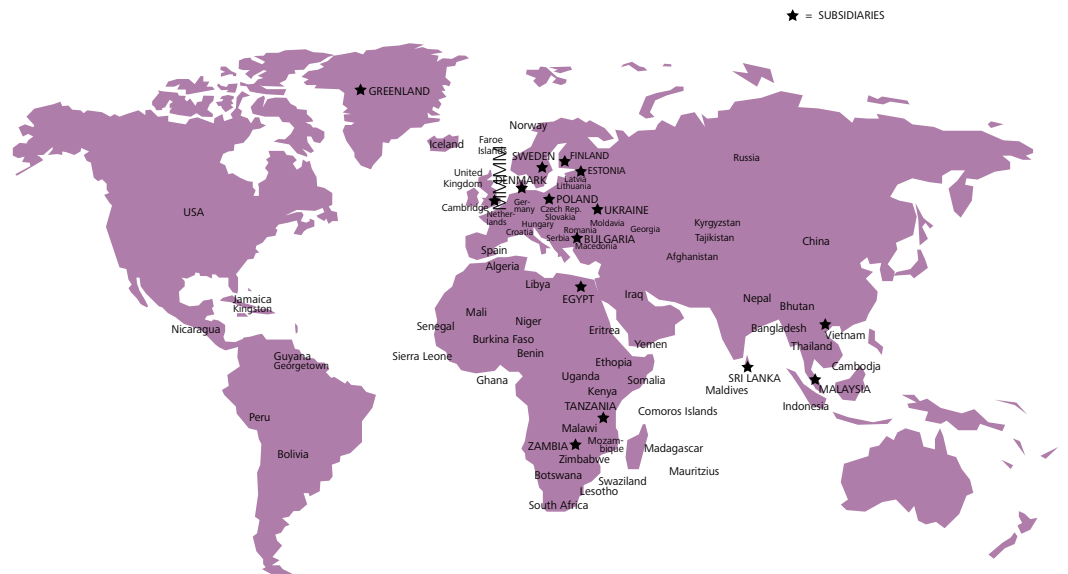


Walney Offshore Windfarm I & II

NIRAS

NIRAS is a large consulting engineering company founded in 1956. We have around 1300 employees based in offices around the world, with headquarters in Denmark. We provide services across a wide range of business areas including:

- Building and industry
- Civil works
- Energy
- Environment
- Management sciences
- Social sciences
- Transportation



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