



Biodiversity protection through applied science

For over two decades, Vattenfall has worked with scientists to build the evidence-base on environmental impacts of wind farms through its unique research and development program.

At Vattenfall Business Area Wind, we have a dedicated team of experts who work with our development, engineering, and operational teams to ensure that scientific insights are effectively integrated into our renewable energy projects, allowing us to maintain our position as a frontrunner in biodiversity protection. Our objective is on achieving coexistence with nature and integral to this objective is closing knowledge gaps to mitigate our impact, and testing innovative solutions.

A primary ecological concern in the build-out of offshore wind is bird mortality. This can result from collisions with wind turbines or the potential displacement of birds from critical habitats such as feeding grounds.

For bats, substantial knowledge gaps persists regarding the understanding of specific migration routes and behaviors of various bat species, especially in offshore environments. This information is crucial for mitigating potential collisions with offshore wind turbines.

Within this brochure, we present a selection of projects led or supported by Vattenfall, with a focus on safeguarding birds and bats found in the offshore environment.

Resolving key uncertainties

Ensuring the reliability of predictive models and realistic assessments for bird collision risk requires a comprehensive understanding of bird flight behavior and how it changes in the presence of wind turbines.

The Seabirds Collision Avoidance study at Vattenfall's Aberdeen Bay wind farm used state of the art combined radar and camera technology to document 3D flight statistics for Northern gannet, Black-legged kittiwake, Herring and Great black-backed gulls.

Conducted over a two-year period by RPS Group and DHI, this study provided novel insights into these species' responses to wind turbines at close range. Analysis of hundreds of high resolution flight tracks revealed that avoidance responses were shown to start at 100-150 meters from the turbines. Remarkably, birds very rarely crossed the plane of the rotor without making necessary adjustment. [More information](#)

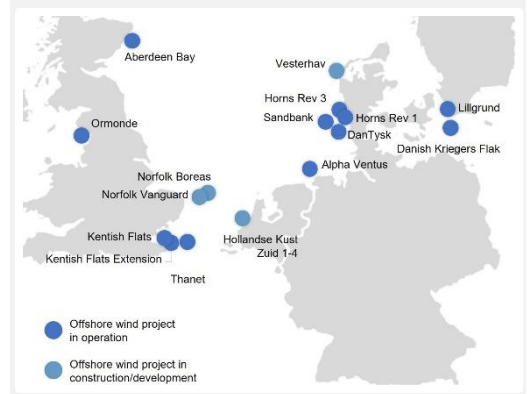
Our purpose: To enable the fossil freedom that drives society forward

Vattenfall is a leading European energy company with approximately 20,000 employees. The parent company of the Vattenfall Group, is a non-listed company, 100 per cent owned by the Swedish state and its headquarter are based in Solna, Sweden.

With a rich history spanning over a century, Vattenfall has been instrumental in electrifying industries, providing energy to countless households and revolutionizing our way of life through innovation and cooperation. We are committed to building a future where everyone can choose fossil-free ways to move, make and live.

In 2024, Vattenfall is a European leader in offshore wind and operates 12 offshore wind, totaling 2.6 GW of capacity and are constructing an additional 1.8 GW capacity. Our offshore wind farms span across Denmark, Germany, the Netherlands, Sweden and the United Kingdom. We have secured an extensive pipeline of offshore wind project towards 2035 of more than 13 GW from within our current markets and in Finland.

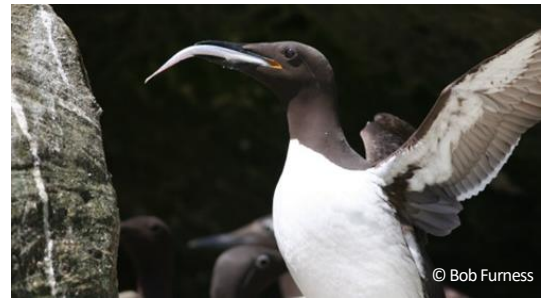
[More information](#)



Non-breeding season movements of guillemots and razorbills

Guillemots and razorbills have been observed to experience partial displacement due to offshore wind farms. Improving the understanding of the consequences for the affected individuals and identifying their respective colonies and populations are essential in predicting impacts and guide responsible wind farm development.

In this study lead by MacArthur Green hundreds of adult guillemots and razorbills were fitted with geolocator tags across eleven colonies in the UK. The results document for the first time the wintering areas of these two species in the North Sea. Additionally they shed light on the levels and patterns of energy expenditure during winter period, key knowledge for the assessment and management of offshore wind farms. [More information](#)



Unveiling bat offshore distribution pattern

The Kattegat West Baltic Bats Project (KABAP) is the most comprehensive coordinated effort to investigating bat behavior in offshore wind farms development areas in the Kattegat – SW Baltic Sea region. The project spans across several countries including Sweden, Denmark, Germany, and Norway. With over 140 bat detectors throughout the area, KABAP maps the geographical variation in bat migrations, activity patterns, phenology, and their responses to weather conditions.

KABAP's partners include the Danish Energy Agency, Energinet, and data collection and analyses are carried out by universities and consultancies. The findings will provide robust basis to inform impact assessments for future offshore wind farm and evaluate appropriate mitigation measures to support coexistence with offshore renewable energy projects. [More information](#)



Enhancing seabird population productivity

In the UK, we have implemented a number of measures aimed at increasing the productivity of local seabird species, particularly those affected by the wind farm such as kittiwakes and lesser black-backed gulls - two species of particular concern.

For kittiwakes, this involves the construction of artificial breeding structures in the harbour of Lowestoft, also known as "kittiwake hotels". Developed in collaboration with experts from Natural England, RSPB, East Suffolk Council, and the Marine Management Organization, these structures have been meticulously designed to provide optimal breeding conditions for kittiwakes, accommodating up to 430 breeding pairs.

For lesser black-backed gulls, we have taken proactive step to establish predator proof fencing at the breeding colony at the Alde-Ore Estuary bird protection area to help reduce predation pressure from e.g. foxes. [More information](#)



Working towards Net Positive Impact on biodiversity by 2030

Good mitigation practise and proactive actions

Supported by the best available science, we rigorously apply the mitigation hierarchy to effectively manage our impact on biodiversity. Beyond addressing our direct impact, we implement a broad range of voluntary proactive actions, both on and off-site to enhance and restore nature. We collaborate with external experts, non-governmental organisations and authorities in the design and implementation of these actions. Extensive monitoring help us to accurately track the outcomes of these measures. Our combined efforts in mitigation and proactive actions will lead us towards Net Positive Impact on biodiversity by 2030. [More information](#)

Data and knowledge sharing

In our pursuit of maximizing the positive impact of our research, we are dedicated to making our results and data publicly available. Our research programmes have delivered more than 40 scientific reports including more than 30 papers published in scientific peer-reviewed journals. [See full list](#)

Continue to be a leader in biodiversity R&D

As science and technology continue to advance at a rapid pace, we are fully committed to investing resources and fostering collaboration to test and apply the insights gained from science to the benefit of biodiversity.