

A Case Study:

WIND TURBINES NO OBSTACLE TO DEVELOPMENT OF IMPORTANT BIRD AREA (IBA)

A case of positive long-term coexistence between wind turbines and the development of an important bird area over a 20 year period at Sneum Enge, in the Danish part of the Wadden Sea, shows possibilities for significant compensatory measures in future nature management. This can guide better planning solutions for integration of wind farms into the landscape, and raises the question if bird/biodiversity-neutral wind energy production may become possible with more innovative nature management?

INTRODUCTION

The impact of wind turbines on birds have been assessed mostly on bird species and wind farm level. Commonly such assessments are limited to short- or medium term impact, with geese as the probably best example of decreasing impact over time and thus longer-term habituation. Other studies have focused on possible scare-off solution and mitigation measures to reduce the impact of wind turbines on birds. Rarely, if ever, the long-term impact of a wind farm has been assessed in order to understand how compensatory measures can counteract eventual losses of birds and biodiversity at landscape level.

This case study is elaborated based on four elements from Sneum Enge in the Danish Wadden Sea Area: 1) The construction and operation of the largest Danish wind turbine; 2) A three year bird impact assessment conducted at the site; 3) the design and re-establishment of a 50 ha. excavation site as an Important Bird Area (IBA), and 4) the construction and operation of a 17 MW wind farm next to the IBA.

The findings may provide important understanding to planning authorities, non-governmental organisations and wind farm developers, on how to develop nature management methods to improve the coexistence between wind farms and biodiversity and thus if bird/biodiversity-neutral wind energy production is possible.

STUDY AREA

Sneum Enge is located in southwest Denmark and is a mix of meadow and farmland areas separated from the Wadden Sea

by a dike. The study area (Figure 1. on page 3) is app. 300 ha. The main part of the area is a Natura 2000, designated by three international protections zones (Ramsar, EU habitats - /EU Birds Directive). The figure combines the major infrastructure changes (2 MW test turbine, artificial Lake Sneum Digesø, Sneum wind farm), which in different ways have made impact in the area over a 20 year period.

TJÆREBORG WIND TURBINE (1987-2001)

The Tjæreborg wind turbine was 2 MW /90 metres test turbine. It was built and put in operation between 1987-90 in the middle of the study area, approximately 800 metres from the dike, which separates the meadow from the Danish Wadden Sea.

Due to its close vicinity to this internationally important wetland (Ramsar Convention), a 3-year bird impact assessment was conducted. The wind turbine was removed in 2001, when the test period was ended, and the area should be available for new types of wind turbines.

TJÆREBORG BIRD IMPACT ASSESSMENT

The Tjæreborg Bird Impact Assessment (BIA) was conducted ¹⁾ by the Danish National Environmental Research Institute, 1987-1990.

In summary it was concluded that the wind turbine had a "vacuum effect", preventing birds from exploiting the area closest to the turbine. The density of breeding waders decreased from the nearest surroundings 0-200 metres from the turbine, but increased in the study area. The wind turbine

was evaluated as having local impact in addition to already existing disturbance factors in the area e.g. farming, power line and road traffic. In total 15 fatalities were found, whereof 4 were killed at the turbine, 3 at the meteorological masts, 3 at power lines, and 4 were either shot, poisoned or diseased. Radar studies showed that diurnal and nocturnal migrating birds in general were able to detect and avoid collisions with the wind turbine.

The Tjæreborg BIA was not able to evaluate longer-term effects including possibilities for habituation, due to the 3-year limitation. Since the turbine was removed the opportunity to study long-term effects has vanished.

LAKE SNEUM DIGESØ (1991-2011)

In 1991 a large infrastructure project required excavation of app. 325.000 m³ marine clay. It was required to re-establish the area, after excavation in 1991-94, as an attractive bird habitat. Based on the experience from the Tjæreborg BIA a new lake - Sneum Digesø - was designed on basis of sustainable landscaping and nature management. Read about the design and history of the area and the lake Sneum Digesø in a separate article ²⁾ (in Danish only).

Today, 20 years after its birth, the lake Sneum Digesø has become an ornithological hotspot, the most successful Danish man-made lake for birds, and an internationally Important Bird Area (IBA) ³⁾.

TJÆREBORG ENGE WIND FARM (1996-2008)

The wind farm that is in operation in the Sneum/ Tjæreborg area today consist of 8 wind turbines with total effect of 17 MW. The farm is owned by Vattenfall, the first turbine was erected in 1996 and the farm was finalized in 2008 ⁴⁾. The turbines have different height (hub 50-60 metres, rotor diameter 54-80 meter). After completion the total MW effect in the study area equals an 8 fold wind energy production output in comparison with the 2 MW Tjæreborg wind turbine. The wind farm is located within the range of 500-1500 metres from Sneum Digesø.

DISCUSSION

The case study has three main findings. Firstly, wind turbines have not been a barrier to development of an internationally important bird area in Denmark. Secondly, an artificial lake, when re-established appropriately, can be a significant contribution to bird and biodiversity conservation in the

vicinity of a wind farm. Finally, a positive coexistence between wind turbines and birds is possible over time when assessed on the landscape level, beyond the territory of the wind farm.

If the findings in this study is approximately correct, bird/biodiversity-neutral wind energy production may become possible at landscape level over time under certain conditions.

The case study reveals a remarkable viewpoint - the output of 20 years development at Sneum Enge is increased wind energy production and more bird species at the same time.

It is important to underline this study only presents some conditions in a retro perspective, and the issue remains to be researched more in depth.

However, in follow up to the global and EU Biodiversity Strategy for 2010-2020, it has been recommended to pursue partnerships for best practice in sustainable design of wind farms by supporting interdisciplinary and open collaboration between wind farm developers, organisations, research and specialists to engage in a more integrative approach to biodiversity conservation ⁵⁾.

This stresses a need for innovation in nature management, where wind energy production will not only become more sustainable, but also help to alleviate climate change - a principal cause for biodiversity loss.

References

- 1) Brinch-Pedersen, M. & Poulsen, E. (1991): En 90 m/2 MW vindmølles indvirkning på fuglelivet. Fugles reaktioner på opførelsen og idriftsættelsen af Tjæreborgmøllen i Det Danske Vadehav. (*English summary: Avian responses to the implementation of the Tjæreborg Wind Turbine in the Danish Wadden Sea*). Danske vildtundersøgelser, Hæfte 47, Danmarks Miljøundersøgelser. www.avitec.dk/publ/neri1991.pdf
- 2) Sneum Digesø i 20 år (2011). Avitec, Denmark. www.avitec.dk/publ/sneumdesign.pdf
- 3) Search performed in the Danish Ornithological Society's database. In total 239 different species observed (status March 2011), where several species warrant designation under Natura 2000. <http://www.dofbasen.dk/statistik/arter.php?lokalitet=561008>
- 4) Description of Tjæreborg Enge Wind Farm, see: <http://produktionsanlaeg.vattenfall.dk/powerplant/tjaereborg-enge>
- 5) Brinch-Pedersen, M. & Friis, P. 2010. Wind Energy and Biodiversity Conservation in Europe – Conflict or Convergence towards 2020? A Policy Research Paper. Avitec, Denmark.

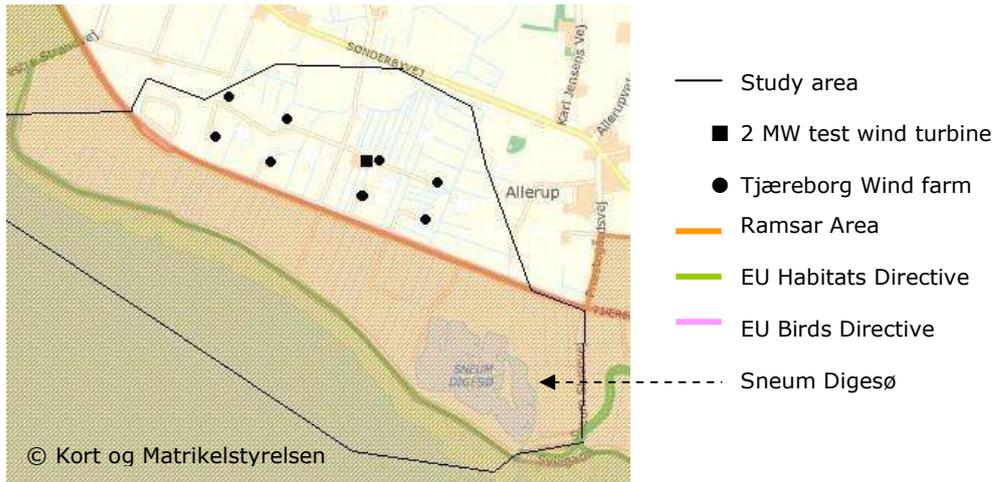


Figure 1. - The study area at Sneum Enge in southwest Denmark