

# Norfolk Boreas Offshore Wind Farm

# Chapter 1

## Introduction

## Environmental Statement

## Volume 1

Applicant: Norfolk Boreas Limited  
Document Reference: 6.1.1  
RHDHV Reference: PB5640-006-001  
Pursuant to APFP Regulation: 5(2)(a)

Date: June 2019  
Revision: Version 1  
Author: Royal HaskoningDHV

*Photo: Ormonde Offshore Wind Farm*

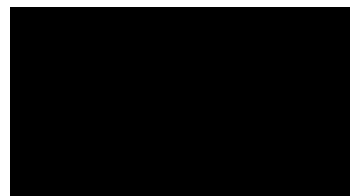
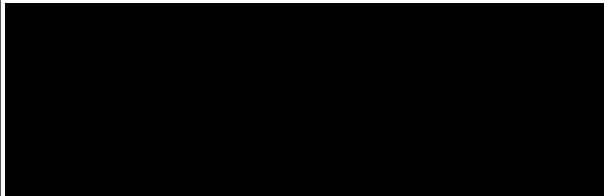
# Environmental Impact Assessment Environmental Statement

June 2019

For and on behalf of Norfolk Boreas Limited

This Environmental Statement has been approved by: Graham Davey and Jake Laws

Signed:

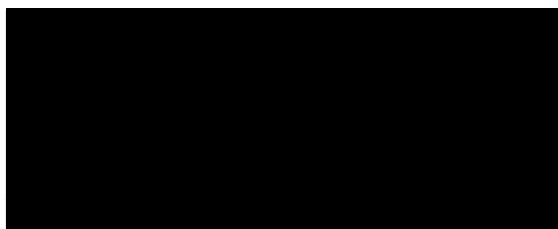


Date: 13/05/2019

For and on behalf of Royal HaskoningDHV

This Environmental Statement has been approved by: Alistair Davison

Signed:



Date: 01/05/2019



Date	Issue No.	Remarks / Reason for Issue	Author	Checked	Approved
01/02/2019	01D	First draft for Norfolk Boreas Limited review	RA	CD/JL	DT/JL
11/02/2019	02D	Second draft for Norfolk Boreas Limited Review	RA	BH/RA/JL	AD/JL
16/04/2019	01F	Final for DCO submission	RA	RA/CD	JL

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## Glossary of Acronyms

AfL	Agreement for Lease
DCO	Development Consent Order
EAOW	The Consortium Company, East Anglia Offshore Wind Limited
EIA	Environmental Impact Assessment
ES	Environmental Statement
EU	European Union
GW	Gigawatt
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IEMA	Institute of Environmental Management and Assessment
MW	Megawatt
NSIP	Nationally Significant Infrastructure Project
NTS	Non-Technical Summary
PEIR	Preliminary Environmental Information Report
SPR	ScottishPower Renewables
VWPL	Vattenfall Wind Power Limited
ZDA	Zone Development Agreement

## Glossary of Terminology

Ducts	A duct is a length of underground piping, which is used to house electrical and communications cables.
Landfall	Where the offshore cables come ashore at Happisburgh South.
National Grid overhead line modifications	The works to be undertaken to complete the necessary modification to the existing 400kV overhead lines.
Necton National Grid substation	The grid connection location for Norfolk Boreas and Norfolk Vanguard.
Norfolk Vanguard	Norfolk Vanguard offshore wind farm, sister project of Norfolk Boreas.
Offshore export cables	The cables which transmit power from the offshore electrical platform to the landfall.
Onshore cables	The cables which take power and communications from landfall to the onshore project substation.
Onshore cable route	The up to 35m working width within a 45m wide corridor which will contain the buried export cables as well as the temporary running track, topsoil storage and excavated material during construction.
Onshore project area	The area of the onshore infrastructure (landfall, onshore cable route, accesses, trenchless crossing zones and mobilisation areas; onshore project substation and extension to the Necton National Grid substation and overhead line modifications).
Onshore project substation	A compound containing electrical equipment to enable connection to the National Grid. The substation will convert the exported power from HVDC to HVAC, to 400kV (grid voltage). This also contains equipment to help maintain stable grid voltage.
The project	Norfolk Boreas Wind Farm including the onshore and offshore infrastructure.

## 1 INTRODUCTION

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### 1.1 The purpose of this document

1. This document is the Environmental Statement (ES) for the Norfolk Boreas Offshore Wind Farm (herein 'Norfolk Boreas' or 'the Project'). A full project description is given in Chapter 5 Project Description.
2. This ES describes the potential environmental impacts associated with Norfolk Boreas including the associated infrastructure both onshore and offshore, which may arise from construction, operation (including likely planned maintenance activities) and decommissioning of the project.
3. The purpose of this ES is to provide the necessary information and environmental impact assessments undertaken as required by the Environmental Impact Assessment (EIA) Directive (85/337/EEC) as amended and more specifically under 'The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017' (the EIA Regulations 2017).
4. This ES has been informed by a Scoping Opinion that was provided by the Planning Inspectorate in June 2017. This ES also builds upon, and updates the information previously provided within the Preliminary Environmental Information Report (PEIR) for Norfolk Boreas, which was submitted for stakeholder consultation in October 2018 under Section 42 of the Planning Act 2008. Feedback from this consultation such as the views and opinions expressed by communities, stakeholders and individuals has been used to inform the final design and impact assessment of the project and the associated ES.
5. This ES is submitted as part of an application for a Development Consent Order (DCO) as required under Section 37 of the Planning Act 2008. Further information on the legislative context for Norfolk Boreas is provided in Chapter 3 Policy and Legislative Context.

### 1.2 Background

6. In December 2009, as part of the UK Offshore Wind Round 3 tender process, The Crown Estate awarded the joint venture company East Anglia Offshore Wind (EAOW) Limited the rights to develop Zone 5 (later called the 'East Anglia zone'). These rights were granted through a Zone Development Agreement (ZDA). EAOW Limited. was a 50:50 joint venture owned by Vattenfall Wind Power Limited (VWPL) and Scottish Power Renewables (UK) Limited (SPR).
7. Under the ZDA, the joint venture consented East Anglia ONE, and commenced the EIA process for East Anglia THREE (prior to the project being taken forward to DCO



application submission by SPR) and East Anglia FOUR (up to submission of a request for Scoping Opinion in 2012).

8. In December 2014, a decision was taken to split the zone, with VWPL having development rights within the north of the former East Anglia Zone, and SPR continuing to develop the southern part. In agreement with The Crown Estate, the ZDA was effectively dissolved in 2016 and subsequently, new Agreement for Lease (AfL) areas have separately been awarded by The Crown Estate within the former Zone, to VWPL and its affiliate companies, and SPR and its affiliates.
9. This ES is for Norfolk Boreas, one of the AfL areas in the north of the former Zone. The Norfolk Boreas AfL comprises of a 725km<sup>2</sup> area located offshore approximately 73km at its closest point from the Norfolk coastline within which wind turbines will be located. The offshore wind farm will be connected to the shore by offshore export cables installed within the offshore cable corridor (Chapter 5 Project Description, Figure 5.1). A full project description is given in Chapter 5 Project Description.
10. The onshore project area comprises a landfall (where the offshore cables come ashore and jointed to the onshore cables within transition pits), the onshore cable route (within which the onshore export cables will be located), an onshore project substation and an extension to the existing Necton National Grid substation (Chapter 5 Project Description, Figures 5.3 to 5.6).
11. A subsidiary of VWPL also holds an AfL for a second offshore wind farm, Norfolk Vanguard. Norfolk Vanguard is a 'sister project' to Norfolk Boreas which is subject to a separate DCO application and EIA process. Norfolk Vanguard comprises two distinct offshore areas, Norfolk Vanguard East and Norfolk Vanguard West which are adjacent to the Norfolk Boreas site.
12. Norfolk Vanguard's development schedule is approximately one year ahead of Norfolk Boreas and as such the Development Consent Order (DCO) application was submitted in June 2018. As the two windfarms are located next to each other and both would connect to the Necton National Grid Substation, VWPL has adopted a strategic approach to the planning of the transmission infrastructure for the two projects with the aim of optimising overall design and reducing impacts where practical.
13. In order to minimise impacts associated with onshore construction works for the two projects, Norfolk Vanguard are seeking to obtain consent to undertake enabling works for both projects at the same time. As such Norfolk Vanguard Limited, as part of its DCO application, is seeking to obtain consent to undertake some enabling works for Norfolk Boreas, these include:



- Installation of ducts to house the cables along the entirety of the onshore cable route from the landward side of the transition pit at the landfall to the onshore project substation;
  - A47 junction works and installation of access road to onshore project substation;
  - Overhead line modifications at the Necton National Grid substation for both projects; and
  - Strategic landscape and planting schemes designed to mitigate the impacts of both projects where possible.
14. If both projects secure consent these enabling works will be provided for within the Norfolk Vanguard DCO. Whilst it is fully anticipated that Norfolk Vanguard will proceed to construction Norfolk Boreas also needs to consider the possibility that the Norfolk Vanguard project does not proceed. In order for Norfolk Boreas to stand up as an independent project, this possibility must be provided for within the Norfolk Boreas DCO. Thus, there are two alternative scenarios to be considered in the context of the EIA and this ES:
- **Scenario 1** – Norfolk Vanguard proceeds to construction, and installs ducts and other shared enabling works for Norfolk Boreas.
  - **Scenario 2** – Norfolk Vanguard does not proceed to construction and Norfolk Boreas proceeds alone. Norfolk Boreas undertakes all works required as an independent project
15. Appendix 5.1 contains a detailed comparison of what is included in the two different scenarios across all elements of the project.
16. The cumulative impacts of Norfolk Boreas and Norfolk Vanguard are summarised within each technical chapter (Chapter 8 – 31), and summarised in Chapter 33 Offshore Cumulative and Transboundary Impacts and Chapter 34 Onshore Cumulative Impacts.
17. Norfolk Boreas and Norfolk Vanguard each have a capacity of up to 1800 Megawatts (MW), providing a total, combined offshore wind farm generation capacity of up to 3600MW (3.6 Gigawatts (GW)), enough for 2.6 million UK households.

### 1.3 The Developer and Project Team

18. Norfolk Boreas Limited (an affiliate company of VWPL) is the Applicant undertaking the development of Norfolk Boreas.
19. Vattenfall AB (Vattenfall), the ultimate parent company of VWPL and Norfolk Boreas Limited, is the Swedish state-owned utility company and one of Europe's largest generators of electricity and heat. Vattenfall is also the second largest developer in the global offshore wind sector. Vattenfall's purpose is to power climate smarter

living with the goal to be fossil free within one generation. The company is strongly committed to significant growth in wind energy, both onshore and offshore.

20. Vattenfall has invested over £3bn in the UK, mainly in onshore and offshore wind, since 2008 and now has nearly 1GW of generation capacity in operation onshore and offshore. Vattenfall plans to invest a further €5bn in renewables, mainly offshore wind, in Northern Europe by 2020 with an overall ambition to have 4GW of operational capacity by 2020 and 7GW by 2025 (Vattenfall, 2016). The company has the ambition that the UK will continue to be a growth market for Vattenfall, with Norfolk Boreas and Norfolk Vanguard providing a very significant next step representing an additional 3.6GW of electricity generation from offshore wind.
21. Vattenfall has world leading experience in offshore wind, as owner of Kentish Flats, Kentish Flats Extension and Thanet Offshore Wind Farms, all operating in the southern North Sea, Dan Tysk and Sandbank in the German North Sea and Ormonde Offshore Wind Farm in the Irish Sea. Vattenfall is also developing a number of European offshore wind farms.
22. Vattenfall is committed to supporting continued innovation and research in offshore wind. As part of this commitment Vattenfall own and operate the European Offshore Wind Deployment Centre located in Aberdeen Bay; this innovative offshore wind scheme is trialling next generation technology and is hosting pioneering scientific research and monitoring projects.
23. Royal HaskoningDHV has been commissioned by Norfolk Boreas Limited as the consultant to lead the Norfolk Boreas EIA. Royal HaskoningDHV is supported through the EIA process by many additional consultants who are responsible for particular specialist topics. Royal HaskoningDHV is an environmental and engineering consultancy with significant expertise in offshore renewable energy.
24. Royal HaskoningDHV has provided environmental, development and consenting support on over 14GW of renewable energy projects across 26 UK offshore wind farms over the last 15 years. Their EIA activities and ESs are accredited by the Institute of Environmental Management and Assessment (IEMA) under the EIA Quality Mark Scheme. This demonstrates Royal HaskoningDHV's expertise in the field and commitment to ensuring EIA is maintained at high quality and in accordance with best practice.

#### 1.4 Purpose of the Project

25. Climate change is a global issue resulting from the anthropogenic increase of carbon emissions into the atmosphere. Generating energy from low carbon, renewable sources, such as offshore wind, is one of the solutions available to substantially

reduce carbon emissions whilst answering the challenges of meeting energy demand as part of a balanced energy portfolio. The UK has an ambitious target of reducing greenhouse gas emissions by 57% relative to 1990 levels by 2030, and by 80% by 2050. In 2017 offshore wind generated 6.2% of the UK's electricity, up from 5% in 2016 (Renewable UK, 2018).

26. Norfolk Boreas would make a significant contribution both to the achievement of UK decarbonisation targets and to global commitments to mitigating climate change. By generating low carbon, renewable electricity in the UK, Norfolk Boreas will also help to reduce the UK's reliance on imported energy. Further detail is provided in Chapter 2 Need for the Project and Chapter 3 Policy and Legislative Context.

## 1.5 EIA Process

27. The overall objective of the EIA is to identify potentially significant adverse impacts resulting from a project in order for them to be avoided or minimised where possible, as well as identifying opportunities for beneficial impacts.
28. Norfolk Boreas is defined as a Nationally Significant Infrastructure Projects (NSIP) as it has a planned capacity of up to 1,800MW which is above the threshold (100MW) for offshore development projects to be considered within this category.
29. EIA is a procedure required under the terms of European Union (EU) Directive 85/337/EEC (as amended by Directive 97/11/EC), on assessment of the effects of certain public and private projects on the environment. It has been transposed into English law for NSIPs by The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009, which have since been revised to 'The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017' (the EIA Regulations 2017).
30. Whilst it is considered that the project benefits from the EIA transitional provisions of the 2009 EIA Regulations, following good practice this ES presents the findings of an EIA which has been completed in accordance with the EIA Regulations 2017. This is explained in further detail in Chapter 6 Environmental Impact Assessment Methodology.

## 1.6 ES Structure

31. The ES covers Norfolk Boreas, including the onshore and offshore infrastructure. The ES comprises three volumes:
  - Volume 1: ES chapters (chapter list shown in Table 1.1);
  - Volume 2: Figures; and
  - Volume 3: Appendices.

**Table 1.1 ES Volume 1 chapter list**

Section	Chapter Headings
Introductory	Chapter 1 Introduction Chapter 2 Need for the Project Chapter 3 Policy and Legislative Context Chapter 4 Site Selection and Assessment of Alternatives Chapter 5 Project Description Chapter 6 EIA Methodology Chapter 7 Technical Consultation
Offshore	Chapter 8 Marine Geology, Oceanography and Physical Processes Chapter 9 Marine Water and Sediment Quality Chapter 10 Benthic and Intertidal Ecology Chapter 11 Fish and Shellfish Ecology Chapter 12 Marine Mammals Chapter 13 Offshore Ornithology Chapter 14 Commercial Fisheries Chapter 15 Shipping and Navigation Chapter 16 Aviation and Radar Chapter 17 Offshore and Intertidal Archaeology and Cultural Heritage Chapter 18 Infrastructure and Other Users
Onshore	Chapter 19 Ground Conditions and Contamination Chapter 20 Water Resources and Flood Risk Chapter 21 Land Use and Agriculture Chapter 22 Onshore Ecology Chapter 23 Onshore Ornithology Chapter 24 Traffic and Transport Chapter 25 Noise and Vibration Chapter 26 Air Quality Chapter 27 Human Health Chapter 28 Onshore Archaeology and Cultural Heritage
Scheme Wide Aspects	Chapter 29 Landscape and Visual Impact Assessment Chapter 30 Tourism and Recreation Chapter 31 Socio-economics
Summary chapters	Chapter 32 Offshore Cumulative and Transboundary Impacts Chapter 33 Onshore Cumulative Impacts Chapter 34 Summary

32. In addition, a separate stand-alone Non-Technical Summary (NTS) is available which summarises the key baseline data and findings of the ES.

## 1.7 References

RenewableUK (2018). Record year for wind energy – Government releases official figures. Available at: <https://www.renewableuk.com/news/393182/Record-year-for-wind-energy--Government-releases-official-figures.htm> [Accessed: 19/12/18].

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