



**DOGGER BANK
TEESSIDE A & B**

**March
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Environmental Statement Chapter 4 Environmental Impact Assessment Process




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Cover photograph: Installation of turbine foundations in the North Sea

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1 Introduction

- 1.1.1 The purpose of Environmental Impact Assessment (EIA) is to provide an independent assessment of a project's likely environmental impacts, to enable authorities to understand the potential impacts of a project before making decisions on granting development consent. This chapter of the Environmental Statement (ES) outlines the statutory requirement for the EIA, provides detail on other influencing European Directives, and sets out Forewind's approach to undertaking the EIA for Dogger Bank Teesside A & B.
- 1.1.2 It should be noted that although this chapter sets out Forewind's overall approach to EIA using (for example) magnitude and sensitivity to determine the level of impact, individual chapters may take their own approach where appropriate. Where a different approach is taken, this is explained in the methodology section of the chapter in question.

2 Requirement for Environmental Impact Assessment

- 2.1.1 The European Commission (EC) requires an EIA to be carried out before consent can be granted for certain public and private development schemes. The requirement for EIA was introduced by Directive 85/337/EEC. This Directive was amended by Directives 97/11/EC, 2003/35/EC and 2009/31/EC. The Directives were subsequently codified by Directive 2011/92/EU issued on 13 December 2011. This codification did not make any relevant amendments to the law represented by the four previous Directives. It is important to note this because current EU Law on EIA was transposed into UK law for Nationally Significant Infrastructure Projects by the Infrastructure Planning (Environmental Impact Assessment) regulations 2009 (SI 2009/2263) (the EIA Regulations). Thus the EIA Regulations adequately represent the requirements of EU Law.
- 2.1.2 On 26 October 2012 the EC adopted a proposal to develop a new Directive to amend the current EIA Directive. The aim of the proposal is to lighten unnecessary administrative burdens and make it easier to assess potential impacts, without weakening existing environmental safeguards. The quality of the decision-making process will be reinforced, current levels of environmental protection will be improved, and businesses should enjoy a more harmonised regulatory framework. The changes are also forward looking, and emerging challenges that are important to the EU as a whole in areas like resource efficiency, climate change, biodiversity and disaster prevention will now be reflected in the assessment process (European Commission 2012). Forewind have assured that this ES will have regard to and take in to account the proposed new requirements.
- 2.1.3 Dogger Bank Teesside A & B is an offshore wind farm development of over 100 megawatt (MW) installed capacity and thereby qualifies as a Nationally Significant Infrastructure Project (NSIP) under the United Kingdom (UK) Planning Act 2008 (see **Chapter 3 Legislation and Policy**). Therefore Dogger Bank Teesside A & B may require EIA under the EIA Regulations.
- 2.1.4 As an offshore wind farm development, Dogger Bank Teesside A & B is considered under Schedule 2 of the EIA Regulations as: “*Industrial (energy) installations for the production of electricity, steam and hot water (projects not included in Schedule 1)*” and Annex II of the EIA Directive, as “*installations for the harnessing of wind power for energy production (wind farms)*”.
- 2.1.5 Such developments require EIA where they are likely to have significant impact on the environment by virtue of factors such as their nature, size or location.

- 2.1.6 Forewind accepts that Dogger Bank Teesside A & B has the potential to have significant impacts on the environment, and have therefore not submitted a request for a screening opinion as to whether or not EIA is required. Instead, Forewind advised the Planning Inspectorate of its intention to submit an ES, and they have confirmed that the development is considered EIA development under Regulation 6(1) (b) of the EIA Regulations (Scoping Opinion, Planning Inspectorate 2012a).

3 Environmental Impact Assessment Guidance

- 3.1.1 The ES has been prepared in accordance with the EIA Regulations and takes into account key guidance and advice, including the following:
- Planning Inspectorate (April 2012b). Advice Note 6 - Preparation and submission of application documents;
 - Planning Inspectorate (April 2012c). Advice Note 7 – Good Practice;
 - Planning Inspectorate (April 2012d). Advice Note 9 – Rochdale Envelope;
 - Planning Inspectorate (April 2012e). Advice Note 12 – Developments with Significant Transboundary Impacts Consultation;
 - Planning Inspectorate (August 2013). Advice Note 10 – Habitats Regulations Assessment;
 - Communities and Local Government (CLG) (September 2009). Planning Act 2008: Nationally Significant Infrastructure Projects Application Form Guidance;
 - Department of Energy and Climate Change (DECC) (formerly the Department of Trade and Industry (DTI) (2004). Guidance Note “Offshore Wind Farm Consents Process”;
 - DECC (2011). Overarching National Policy Statements for Energy EN-1, Renewable Energy Infrastructure EN-3, and Electricity Networks Infrastructure EN-5 (as adopted in 2011);
 - Centre for Environment, Fisheries and Aquaculture Science (Cefas) (2004). Guidance note for Environmental Impact Assessment in respect of Food and Environment Protection Act 1985 and Coast Protection Act 1949 requirements;
 - Cefas (2012). Guidelines for data acquisition to support marine environmental assessments of offshore renewable energy projects;
 - Department of Environment Food and Rural Affairs (Defra) (2005). Nature conservation guidance on offshore wind farm development;
 - The Conservation of Habitats and Species Regulations 2010;
 - The Wildlife and Countryside Act 1981;
 - The Offshore Marine Conservation (Natural Habitats, &c.) (Amendment) Regulations 2010;
 - King et al. (2009). Developing guidance on ornithological cumulative impact assessment for offshore wind farm developers. Collaborative Offshore Wind Research In to The Environment (COWRIE) CIBIRD Stage 2;
 - Maclean et al. (2009). A Review of Assessment Methodologies for Offshore Wind Farms COWRIE METH-08-08;

- Institute of Ecology and Environmental Management (IEEM) (2006). Guidelines for Ecological Impact Assessment in the United Kingdom (version 7 July 2006); IEEM (2010). Guidelines for Ecological Impact Assessment in Britain and Ireland – Marine and Coastal; and
- Institute of Environmental Management & Assessment (IEMA) (2004). Guidelines for Environmental Impact Assessment.

- 3.1.2 It is noted that this list of guidance is not exhaustive and new guidance is frequently published. Forewind aims to draw on all available relevant guidance as the project develops.
- 3.1.3 In following the IEMA Guidelines and a commitment to delivering a high quality product, the EIA has been undertaken by an accredited corporate member of IEMA Royal HaskoningDHV (membership number 0001189), a Registrant to IEMA's EIA Quality Mark scheme and a compliant member of the EIA Quality Mark.
- 3.1.4 The EIA Quality Mark Scheme highlights an important commitment to ensuring EIA activities are maintained to a high quality and that accredited firms are ready and able to manage and improve standards in practice across the UK.

4 Strategic Environmental Assessment Context

- 4.1.1 Strategic Environmental Assessment (SEA), including a Habitats Regulations Assessment (HRA) (as required by EU Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna (the ‘Habitats Directive’)), is required under the EC Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (the SEA Directive) and is transposed in England under The Environmental Assessment of Plans and Programmes Regulations 2004. The SEA’s purpose is to provide consideration of the environmental implications of a draft plan or programme (encompassing public and stakeholder consultation), in order to inform Government’s decision making process on the plan / programme.
- 4.1.2 The Offshore Energy SEA carried out in 2008/2009 was undertaken with a view to enabling further rounds of offshore wind farm leasing (Round 3) in the UK Renewable Energy Zone (beyond 12 nautical miles (nm) of the coast) and the territorial waters of England and Wales (within 12nm), with the objective of achieving 25 Gigawatts (GW) of additional generation capacity by 2020 (DECC 2009).
- 4.1.3 The SEA concluded that “...*there are no overriding environmental considerations to prevent the achievement of the offshore oil and gas, gas storage and wind elements of the plan/programme, albeit with a number of mitigation measures to prevent, reduce and offset significant adverse impacts on the environment and other users of the sea.*” The SEA included within its spatial scope the area of sea which includes Dogger Bank Teesside A & B and indeed the whole of the Dogger Bank Zone described in Section 5.
- 4.1.4 Where relevant, the context of the project in relation to SEA is provided within the technical chapters of the ES.

5 Zonal Development Process

- 5.1.1 As set out in **Chapter 1 Introduction**, Forewind's zone appraisal work identified the possibility for up to eight Dogger Bank projects, with a total capacity of more than 9 gigawatts (GW). The organisations current priority is to secure consent for the first six projects, each up to 1.2 GW, or a total installed capacity of 7.2 GW.
- 5.1.2 To ensure that the work associated with meeting this objective is managed effectively, and to more evenly distribute demands on stakeholders and the supply chain, a phased approach has been taken to the development of the Zone, as part of the Forewind Zone Appraisal and Planning process (ZAP). This allows Forewind to identify the technical, economic and environmental considerations to inform the identification of particular sites for offshore wind farm development. Although the ZAP process is non-statutory and separate to the EIA, the studies and consultation work undertaken alongside the EIA process and have been used to inform this document.
- 5.1.3 Forewind has identified four 'tranches' within the Zone (A, B, C and D), the original aspiration was for each to contain three individual 1.2GW wind farm projects. However as detailed EIA work was undertaken areas of the zone were identified to be less developable, therefore this was reduced to two 1.2 GW projects per tranche. The ongoing Zonal Characterisation (ZoC) and ZAP processes use information from targeted surveys, public reports and stakeholder consultations and have identified the optimum location and boundaries of all the tranches.
- 5.1.4 The relatively large area of each tranche has been purposefully selected to ensure that the exact location of the individual wind farm projects remains flexible throughout the data collection, assessment and stakeholder consultation phases.
- 5.1.5 The information collected through the ZAP process is reported within the ZoC available on the Forewind website (<http://www.forewind.co.uk/downloads/zone.html>). Two versions of the ZoC have been published to date. An initial version was published in October 2010 (Version 1, Forewind 2010) in order to inform the development of the first project applications and the ongoing tranche identification process. An updated version was subsequently published in December 2011 (Version 2, Forewind 2011) capturing the latest available information and to inform the ongoing development of the Zone.

6 The Dogger Bank Teesside A & B Environmental Impact Assessment Process

- 6.1.1 EIA is an iterative tool for systematically examining and assessing the impacts and effects of the construction, operation and decommissioning phases of a development on the environment. The formal reporting mechanism for an EIA is the ES. As per Schedule 4, Part 1 of the EIA Regulations the applicant is required to produce an ES assessing the environmental effects of the development (and of any associated development of the Planning Act 2008). The ES should include all information as can reasonably be required. Information for inclusion in the ES includes:
- A description of the development;
 - An outline of the main alternatives;
 - A description of the aspects of the environment likely to be significantly affected by the development;
 - A description of the likely significant effects of the development on the environment;
 - A description of mitigation measures proposed to “prevent, reduce and where possible, offset any significant adverse effects on the environment”; and
 - An indication of any difficulties encountered when compiling the required information.
- 6.1.2 In accordance with Schedule 4, Part 2 of the EIA Regulations, the ES is required to contain the following information as a minimum:
- A description of the development comprising information on the site, design and size of the development;
 - An outline of the main alternatives studied by the applicant and an indication of the main reasons for the applicant’s choice, taking into account the environmental effects;
 - The data required to identify and assess the main effects, which the development is likely to have on the environment;
 - A description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects; and
 - A non-technical summary (NTS) of the information provided.
- 6.1.3 The following stages may be included in an EIA:
- Screening – determining whether a development needs an EIA;
 - Scoping – determining the issues that the EIA should address;
 - Ongoing consultation with stakeholders;

- Desk based data collection to establish the baseline environment;
- Original data collection and surveys where necessary to supplement desk based information and to fill any data gaps;
- Impact identification and evaluation;
- Identification of mitigation measures where required, to reduce or avoid any identified impacts;
- The evaluation of impacts, post mitigation to determine the residual impacts anticipated; and
- Identification of monitoring requirements, if required.

6.1.4 Under the process set out by the Planning Act 2008 for NSIP, the following steps are also relevant to Dogger Bank Teesside A & B:

- Submission of Preliminary Environmental Information (PEI) to the relevant statutory stakeholders as part of the consultation required under Section 42 of the Act (and made available to the community under Section 47 and the general public under Section 48);
- Liaison with stakeholders to resolve matters arising from representations on the PEI – as part of the consultation process, Forewind has engaged with all stakeholders in an effort to work together to agree Statements of Common Ground. Statements of Common Ground have most commonly been used as part of the public inquiry process for planning applications; however, in the case of the development of the Dogger Bank Zone, Forewind sees them as an opportunity to support the examination process by facilitating a focus on key issues;
- Completion of ES and submission of application;
- Representations received on the ES during the examination of the application; and
- Final decision by the Secretary of State on whether the application should proceed in the light of all environmental information.

6.2. Statutory screening and scoping opinions

6.2.1 At the start of the development process, in March 2012¹ Forewind notified the Secretary of State of its intention to undertake an EIA and provide an ES in respect of Dogger Bank Teesside.

6.2.2 In May 2012, Forewind submitted a Scoping Report to the Secretary of State. The description of the proposed development provided for in the Scoping Report comprised up to four projects, each with a generating capacity of up to 1.2GW, by way of the submission of one or a number of Development Consent Order (DCO) applications. In parallel, Forewind consulted on the Preliminary Environmental Information², and issued a Statement of Community

¹ Under Regulation 6 (1) (B) of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (as amended).

² Under Section 42 'Duty to consult' of the Planning Act 2008 (as amended).

Consultation³ encompassing all four Dogger Bank Teesside projects. In June 2012, the Secretary of State issued the Dogger Bank Teesside Scoping Opinion.

6.2.3 The Scoping Opinion, received in June 2012 (Planning Inspectorate 2012a), identified a number of potential issues which have been considered during the EIA undertaken to date.

6.2.4 For the offshore environment the issues identified include:

- Scale of the proposals;
- Transboundary impacts;
- Cumulative impacts with other developments in the area;
- Ecological impacts – including disturbance during construction, impacts on birds, impacts on marine ecology;
- Construction noise impacts – disturbance of fish and marine mammals;
- Socio-economic impacts – not only the displacement of fishing fleets to other fishing areas, but other socio-economic impacts; and
- Archaeology – disturbance to known and unknown archaeological sites.

6.2.5 For the onshore environment the issues identified include:

- Coastal erosion at the landfall;
- Flooding;
- Ecological impacts – loss of and disturbance to habitats;
- Landscape impacts – from the construction of the proposed converter stations;
- Noise impacts – from construction, including traffic;
- Air quality impacts arising from the emission of dust from construction activities; and
- Archaeology – disturbance to known and unknown archaeological sites.

6.2.6 The comments received through the scoping process were used to inform the selection of survey methodologies for the EIA and are detailed and considered throughout the chapters of this ES. A copy of the full Scoping Opinion is available on the project website (Forewind 2012).

6.2.7 In December 2012 Forewind informed the Planning Inspectorate and all consultees prescribed by the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 that the optimum consenting strategy for Dogger Bank Teesside is to split the development into two separate DCO applications. The first DCO application (this application) seeking consent for Dogger Bank Teesside A & B (as provided for in the Scoping Opinion, Preliminary Environmental Information 1 and Statement of Community Consultation).

³ Under Section 47 'Duty to consult local community' of the Planning Act 2008 (as amended).

- 6.2.8 In July 2013, Forewind notified the Secretary of State⁴ and issued a Statement of Community Consultation⁵ specific to Dogger Bank Teesside A & B.
- 6.2.9 By the second (final) stage of statutory consultation on the Draft ES, Forewind had refined its proposals, seeking consent for Dogger Bank Teesside A & B, each with a generating capacity of up to 1.2GW, connecting into the national grid at Lackenby substation.
- 6.2.10 Forewind considers that all consultation undertaken on Dogger Bank Teesside is relevant to this application.

6.3. Preliminary Environmental Information

- 6.3.1 There have been two stages of statutory pre-application consultation (in accordance with the Planning Act 2008) on Dogger Bank Teesside A & B, PEI 1 and PEI 3.
- 6.3.2 PEI 1 was produced to support the first stage of statutory consultation and was published in May 2012. The overarching PEI 1 consultation document provided an overview of the status of Forewind's development proposals and the site selection process that had been followed to date. It was supported by technical appendices that provided more detail on the project description, the approach to the EIA and the site selection process.
- 6.3.3 Following the first stage of statutory consultation and as part of the ongoing consultation process, Forewind presented available data and EIA methodologies to key stakeholders in a number of meetings and correspondence throughout 2013 (collectively termed PEI 2). This part of the process was designed to provide key stakeholders with an update on the latest development proposals and to request feedback on the survey and assessment work that had been conducted to date. The comments received were fed back into the EIA process, influencing the further progression of the EIA phase and leading to the second stage of statutory consultation.
- 6.3.4 At the second stage of statutory consultation, PEI 3 consists of the draft ES. This stage provides stakeholders with the opportunity to comment on the latest proposals and assessments prior to the final application being submitted to the Planning Inspectorate.
- 6.3.5 The consultation undertaken throughout this process, along with information on the relevant environmental, technical and commercial considerations associated with the delivery and operation of offshore wind farm projects, has informed the decisions and the information presented in this document. Further information detailing the consultation process is presented in **Chapter 7 Consultation**.

6.4. Original data collection and surveys

- 6.4.1 Specialist studies and site surveys have been undertaken to inform the EIA, the approaches and details of which have been agreed through the consultation process (see **Chapter 7**). Further detailed information on the specific studies undertaken is provided within the relevant technical chapters of the ES.

⁴ Under Section 46 'Duty to notify Commission of proposed application' of the Planning Act 2008 (as amended).

⁵ Under Section 47 'Duty to consult local community' of the Planning Act 2008 (as amended).

6.5. The Rochdale Envelope approach

- 6.5.1 For many large infrastructure projects it is not possible to establish a final form of development until sometime after a development consent has been granted. Such is the case with Dogger Bank Teesside A & B, where important detailed design issues relating to matters such as wind turbine foundations cannot be finalised until further detailed investigation and post consent commercial procurement activities have taken place, which could not reasonably be required at this stage.
- 6.5.2 It is accepted practice for offshore wind farm projects that the scope of EIA should reflect uncertainties in final design through a realistic worst case approach to the assessment. This is achieved by assessing the maximum parameters for key metrics and elements of infrastructure within which the development must be constrained. By assessing the realistic worst case for each parameter or metric, the EIA can be shown to be robust despite the lack of certainty over the final design so that the potential significant effects of the development are adequately captured. The term used to describe the process and set of parameters adopted for a specific project is sometimes referred to as the Rochdale Envelope.
- 6.5.3 The Planning Inspectorate has produced an advice note on the use of the Rochdale Envelope, which seeks to address potential implications of using this methodology on NSIP projects (Advice Note 9) (Planning Inspectorate 2012d). The advice note outlines the key areas where the level of detail needs to be addressed and provides guidance on how to approach these appropriately. Forewind requires flexibility during the pre-application stage and within the eventual project consents in order to allow the eventual owner of the individual projects the ability to place contracts and build out the project in the most appropriate manner.
- 6.5.4 This is largely driven by the fact that the supply chain offers a range of different solutions to:
- The design of the wind farm components (such as foundation type, wind turbine type and rated capacity, number of export cables and the arrangement of the onshore converter station); and
 - The construction process (such as transportation methods and component installation techniques).
- 6.5.5 The range of options available and anticipated for Dogger Bank Teesside A & B are detailed in **Chapter 5 Project Details**, the final choice of which is subject to competitive tendering.
- 6.5.6 The Planning Inspectorate advice note on the Rochdale Envelope raises a number of key questions for developers to consider whilst preparing the DCO application:
- Is the level of detail sufficient;
 - Is the degree of design flexibility appropriate; and

- Will the inter-relationships be assessed so that impacts of the proposal as a whole are addressed.
- 6.5.7 The Planning Inspectorate recognises that, in practice, many of the issues are likely to be project specific.
- 6.5.8 This ES has been produced in accordance with the requirements of the EIA Regulations (with particular reference to Schedule 4, the minimum requirements as stated in Part 2 - Information for inclusion in Environmental Statements) and what can be reasonably expected under Part 2 (see Sections 6.1.1 – 6.1.3). Forewind has given careful consideration to all potential impacts that may result from Dogger Bank Teesside A & B, for each parameter, and ensured that the assessment made for each potential impact is reflective of the realistic worst case scenario for the specific parameter under investigation.
- 6.5.9 The definition of what is considered the realistic worst case scenario is detailed within each technical chapter of the ES. Forewind has ensured that only 'realistic' development scenarios are considered when defining these. For example, whilst different sizes of foundation are included in the application, the largest foundations may not be required to support the smallest wind turbine. In this case, the assessment seeks to identify and describe a realistic worst case for undertaking the assessment. An onshore example would be for the flexibility in the way ditches may be crossed along the onshore cable route (open trench, horizontal directional drilling or culverting). For onshore ecological receptors trenching may prove to be the worst case, whereas for traffic generation horizontal directional drilling may prove to be the worst case. Within each chapter the realistic worst case is defined for that receptor.
- 6.5.10 Where necessary, the specification of the realistic worst case scenario for a particular parameter has been backed up by a dedicated study. Furthermore, for certain parameters a different worst case development scenario may exist for individual impacts (taking fish and shellfish resources as an example, the realistic worst case scenario for disturbance from noise is different to that from loss of habitat). Where this is the case, the scenario that has been used within the assessment, complete with appropriate justification, has been clearly defined within the technical chapter.

7 Impact Identification and Evaluation

- 7.1.1 Forewind has carried out the EIA process within a framework that allows for a transparent approach to EIA. This section sets out the assigned definitions that are used in the assessment process for the majority of topics. Each parameter of the EIA includes a description of the approach to impact assessment so that it is clear to the reader exactly how impacts have been defined.
- 7.1.2 EIA provides an assessment of the impacts on sensitive receptors as a result of the effects of a development upon the environment. The terms ‘effects’ and ‘impacts’ have, in the past, been used interchangeably, but they are in fact different and one drives the other. Effects are physical changes in the environment that are set in motion as a consequence of a particular development or activity. Effects do not impact all receptors as some receptors are not always sensitive to them.
- 7.1.3 Effects are measurable physical changes in the prevailing environment (e.g., volume, time, and area) arising from construction, operation and decommissioning activities. Effects can be classified as primary (e.g. the physical presence of turbines) or secondary (e.g. a resultant change in the local hydrodynamic and sediment transport processes).
- 7.1.4 Impacts consider the possible changes in potentially sensitive receptors as a result of an effect. Impacts can be classified as direct or indirect, and beneficial or adverse.
- 7.1.5 The relationship between effects and impacts is not always straightforward. For example, a secondary effect may result in both a direct and indirect impact on a single receptor.
- 7.1.6 Forewind’s EIA framework is based on the ‘Source-Pathway-Receptor’ model (see **Figure 7.1**) to provide a systematic and auditable approach to understanding the potential for effects to arise, the spatial extents of the effect-receptor interactions, impact pathways and potential impact significance. The conceptual ‘source-pathway- receptor’ model is effective at identifying potential effects and the means by which these manifest themselves on the receiving environment and its sensitive receptors.
- 7.1.7 The term ‘source’ describes the origin of potential effects (e.g. pile driving, cable installation) and the term ‘pathway’ as the means (e.g. underwater noise and suspension and deposition of sediment via the water column to the seabed) by which the effect reaches the receiving sensitive ‘receptor’ (e.g. benthic organisms, habitats, fisheries, maritime archaeology). If the source, pathway or receptor is absent, no linkage exists and thus there will be no potential for an impact to manifest.

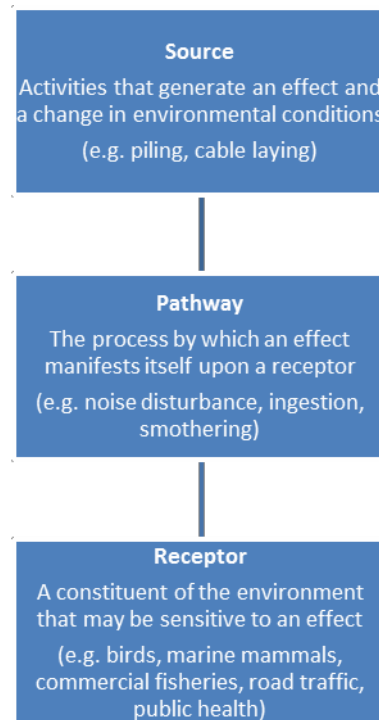


Figure 7.1 Source pathway receptor model

7.1.8 For each effect, the assessment identifies receptors sensitive to that effect and implements a systematic approach to understand the impact pathways and the level of impacts on given receptors. The process considers the following:

- The magnitude of the effect;
- The sensitivity of a receptor to an effect;
- The probability that an effect-receptor interaction will occur;
- The determination and qualification of the level of impact on a receptor, considering the probability that the effect-receptor interaction will occur, the spatial and temporal extents of the interaction and the importance of the resulting impact; and
- The level of certainty at all stages.

7.2. The magnitude of the effect

7.2.1 The magnitude of an effect provides a useful initial measure of the likelihood of an impact arising. Magnitude is defined via four factors:

- Extent – The area over which an effect occurs;
- Duration – The time for which the effect occurs;
- Frequency – How often the effect occurs; and
- Severity – The degree of change relative to existing environmental conditions.

7.3. The sensitivity of a receptor

7.3.1 The sensitivity of the receptor is a function of its capacity to accommodate change and reflects its ability to recover if it is affected. The sensitivity of the receptor is therefore quantified via the following factors:

- Adaptability – The degree to which a receptor can avoid or adapt to an effect;
- Tolerance – The ability of a receptor to accommodate temporary or permanent change without a significant adverse impact;
- Recoverability – The temporal scale over and extent to which a receptor will recover following an effect; and
- Value – A measure of the receptors importance, rarity and worth.

7.4. The determination and qualification of impact

7.4.1 The level of an impact be it beneficial or adverse, is determined as a combination of the above measures of magnitude of the effect and the sensitivity of the receptor. Impact statements carry a degree of subjectivity, as they are based on experienced judgement of the effect-receptor interaction that occurs and the data available. As such, impact statements should be qualified appropriately. Traditionally, the probability of an effect occurring has also been considered in the assessment process. This is important but does not entirely capture the true nature of the effect- receptor relationship. Consideration of the following factors is equally relevant:

- The probability that an effect-receptor interaction will occur (capturing the probability that the effect will occur and also the probability that the receptor will be present);
- The spatial extent of the effect-receptor interaction; and
- The temporal duration of the effect-receptor interaction.

7.4.2 For example, the magnitude of the effect and the sensitivity of the receptor may have been established, and it may be highly probable that the effect will occur; however, the probability that the receptor will be present at the same time should also be acknowledged.

7.4.3 Probability that an effect-receptor interaction will occur can be defined in a number of ways, all of which carry a large degree of subjectivity, when being informed by the characterisation style studies that form much of the EIA process. Forewind has used, wherever practicable, the Intergovernmental Panel on Climate Change's (IPCC) approach to defining probability, as shown in **Table 7.1**.

Table 7.1 IPCC likelihood scale (IPCC 2005)

Terminology	Likelihood of occurrence
Virtually certain	>99% probability
Very likely	>90% probability
Likely	>66% probability
About as likely as not	33 to 66% probability
Unlikely	<33% probability
Very unlikely	<10% probability
Exceptionally unlikely	<1% probability

Table 7.2 Example impact matrix

Receptor Sensitivity	Magnitude of Effect			
	High	Medium	Low	Negligible
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Minor	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

7.4.4 Potential impacts identified within the ES as major or moderate can be regarded as significant in terms of the EIA Regulations. The potential for mitigation has been considered in relation to such impacts.

7.5. Mitigation and monitoring

7.5.1 Mitigation measures have been described in terms of whether they avoid, reduce or compensate for significant adverse impacts. Appropriate mitigation measures will be established in conjunction with the Regulatory Authorities and relevant stakeholders where the EIA process has identified an adverse impact on a receptor. It is recognised that this ‘mitigation by design’ approach is an important factor ensuring environmental impacts are minimised.

7.5.2 Forewind has worked closely with the relevant authorities and followed best practice and relevant guidance to ensure that the mitigation measures put forward in the EIA are practical both in terms of implementation and reducing the potential impact.

7.6. Acknowledging levels of certainty

7.6.1 A robust assessment will seek to establish and take into account the uncertainty in the data that are used to predict the magnitude of effects and the vulnerability of receptors, as the level of confidence in the decisions made on the predicted level of impact depend on it. There are three levels of uncertainty, namely:

- Low uncertainty: Interactions are well understood and documented. Predictions are modelled and maps based on interpretations are supported by a large volume of data. Information/data has very comprehensive spatial coverage/resolution;
- Medium uncertainty: Interactions are understood with some documented evidence. Predictions are modelled but not validated and/or calibrated. Mapped outputs are supported by a moderate degree of evidence. Information/data has relatively moderate spatial coverage/resolution; and
- High uncertainty: Interactions are poorly understood and not documented. Predictions are not modelled and maps are based on expert interpretation using little or no quantitative data. Information/data has poor spatial coverage/resolution.

7.7. Inter-relationships

7.7.1 The requirement to consider inter-relationships within the EIA is set out under the following legislation, policy and guidance:

- Council Directive 2011/92/EU of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment (the EIA Directive), where it is stated (in Annex III) that an ES should include: *“A description of the aspects of the environment likely to be significantly affected by the proposed project, including, in particular, population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the inter-relationship between the above factors”*;
- Section 4.2.6 of EN-1 states that: *“The Infrastructure Planning Commission (IPC) should consider how the accumulation of, and inter-relationship between, effects that might affect the environment, economy or community as a whole, even though they may be acceptable when considered on an individual basis with mitigation measures in place”*; and
- The Rochdale Envelope advice note (Planning Inspectorate 2012d) states: *“The ES should not be a series of separate unrelated topic reports. The inter-relationship between aspects of the proposed development should be assessed and careful consideration should be given by the applicant to explain how inter- relationships have been assessed in order to address the environmental impacts of the proposal as a whole. It need not necessarily follow that the maximum adverse impact in terms of any one topic impact would automatically result in the maximum potential impact when a number of topic impacts are considered collectively. In addition, individual impacts may not be significant but could become significant when their inter-relationship is assessed. It will be for the applicant to*

demonstrate that the maximum significant adverse impacts for the project as it will be constructed have been properly assessed”.

- 7.7.2 The Dogger Bank Teesside A & B ES therefore gives due consideration to the combined residual impacts and how they relate to the identified key sensitive receptors. The objective is to identify where the accumulation of residual impacts on a single receptor, and the relationship between those impacts, gives rise to a need for additional mitigation.
- 7.7.3 When considering the potential for impacts to inter-relate it is assumed that any residual effect determined as having no impact will not result in a significant inter-relationship when combined with other effects on receptors. However, where a series of negligible or greater residual impacts are identified, they are duly considered further.
- 7.7.4 Inter-relationships are assessed within the relevant sections of the technical chapters of the ES, and are summarised in **Chapter 31 Inter-relationships**.

7.8. Transboundary effects

- 7.8.1 The Convention on Environmental Impact Assessment in a Transboundary Context is a United Nations Economic Commission for Europe (UNECE) convention signed in Espoo, Finland, in 1991 and entered into force in 1997.
- 7.8.2 The Espoo (EIA) Convention sets out the obligations of Parties to assess the environmental impact of certain activities (that have the potential to have transboundary impacts) at an early stage of planning. It also lays down the general obligation of States to notify and consult each other on all major projects under consideration that are likely to have a significant adverse environmental impact across boundaries.
- 7.8.3 Regulation 24 of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 implements the Conventions described in paragraphs 7.8.1 and 7.8.2 for NSIPs. Against the background of these Regulations the Planning Inspectorate published advice in April 2012 relating to the screening of likely transboundary effects for NSIP projects. The Planning Inspectorate Advice Note 12 advocates the use of a ‘screening matrix’ by applicants as a way of indicating to the Planning Inspectorate, prior to application and normally at the time of scoping, the likelihood of significant transboundary effects so that the Planning Inspectorate can decide on the need for consultation with potentially affected European Economic Area (EEA) member states. Forewind has submitted a screening matrix as a part of this application (see **Chapter 32 Transboundary Effects**).
- 7.8.4 The consideration of transboundary effects encompasses the following:
- Impacts that might occur on the environment within other EEA member states (i.e. not within the UK Renewable Energy Zone (REZ)); and
 - Impacts that might occur on interests of another EEA member state within the UK REZ.

- 7.8.5 The EIA provides sufficient information (in accordance with the requirements as set out in Annex II of the Espoo Convention) to enable subsequent assessment of transboundary effects, comprising:
- A description of the proposed activity and its purpose;
 - A description, where appropriate, of reasonable alternatives (for example, locational or technological) to the proposed activity and also the no-action alternative;
 - A description of the environment likely to be significantly affected by the proposed activity and its alternatives;
 - A description of the potential environmental impact of the proposed activity and its alternatives and an estimation of its significance;
 - A description of mitigation measures to keep adverse environmental impact to a minimum;
 - An explicit indication of predictive methods and underlying assumptions as well as the relevant environmental data used;
 - An identification of gaps in knowledge and uncertainties encountered in compiling the required information;
 - Where appropriate, an outline for monitoring and management programmes and any plans for post-project analysis; and
 - A non-technical summary including a visual presentation as appropriate (maps, graphs, etc.).
- 7.8.6 Transboundary effects are assessed within the relevant sections of the technical chapters of the ES, and are summarised in **Chapter 32**.

7.9. Cumulative impacts

- 7.9.1 Cumulative impacts may occur where impacted receptors (from Dogger Bank Teesside A & B in isolation) also have the potential to be impacted by other existing, consented and/or proposed development / activity (other than where impacts from existing development / activity are considered to be part of the baseline).
- 7.9.2 Based on the nature of impacts of Dogger Bank Teesside A & B, the potential cumulative impacts associated with the proposed development are considered at the following levels:
- Interactions with other wind farms within the Dogger Bank Zone;
 - Interactions with other wind farms outside the Dogger Bank Zone; and
 - Interactions with other regulated activities occurring in the region, both onshore and offshore.
- 7.9.3 Forewind recognises that the cumulative impact of its own proposals has the potential to be significant, both in isolation and in the context of other development proposals, plans, projects and activities. As a result, Forewind has

worked with other offshore wind farm developers and stakeholders to develop a mutually acceptable and feasible approach to the CIA.

7.9.4 In order to address the challenges associated with conducting CIA in the offshore environment, Forewind has developed a strategy for the assessment of offshore cumulative impacts, known as the CIA Strategy, **Appendix 4A**. The strategy sets out Forewind's approach to CIA based on the overall capacity of the Dogger Bank Zone and establishes a framework by which other plans, projects and activities can be selected to be taken forward in the assessment.

7.9.5 Cumulative impacts are assessed within the relevant sections of the technical chapters of the ES, and are summarised in **Chapter 33 Cumulative Impact Assessment**.

7.10. Requirement for decommissioning

7.10.1 Under the conditions of The Crown Estate Lease and the Energy Act 2004, plans for the decommissioning of the project need to be considered. There are a number of key issues that should be addressed as part of any decommissioning plan, to ensure the reinstatement of the wind farm site and ensure the availability of adequate funds to undertake decommissioning. The Energy Act 2008 updated the decommissioning provisions, strengthening the statutory decommissioning requirements to minimise the risk of liabilities falling to the Government.

7.10.2 Throughout this ES the environmental issues relating to the decommissioning activities have been assessed within the relevant technical chapters and a decommissioning statement is to be submitted with the DCO application. Following award of consent, and prior to the commencement of construction, a decommissioning plan including funding proposals will be agreed with the Planning Inspectorate and The Crown Estate, taking into account the statutory provisions under the Energy Acts 2004 and 2008.

8 Habitat Regulations Assessment

- 8.1.1 The Habitats Directive provides legal protection for habitats and species of European importance. Article 2 of the Directive requires the maintenance or restoration of habitats and species of interest to the EU in a favourable condition. This is implemented through a network of protected areas referred to as Natura 2000 sites. Natura 2000 sites comprise both Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).
- 8.1.2 EU Directive 2009/147/EC on the conservation of wild birds (the 'Birds Directive') provides a framework for the conservation and management of, and human interactions with, wild birds in Europe. Article 3 of the Directive requires the preservation, maintenance and re-establishment of habitats and species of interest to the EU. It is up to the discretion of each EU member state to make sure these objectives are met. In the UK the Birds Directive is implemented through, amongst other legislation, the Wildlife and Countryside Act 1981 (as amended), The Conservation of Habitats and Species Regulations 2010 and the Offshore Marine Conservation Regulations 2007.
- 8.1.3 Under The Conservation of Habitats and Species Regulations 2010 the competent authority must consider whether a plan or project has the potential to have an adverse effect on the integrity of a Natura 2000 site (including candidate and proposed sites). This process is known as HRA. Under Regulation 61 of the Conservation of Habitats and Species Regulations 2010, 'Appropriate Assessment' (stage two of the HRA) is required for a plan or project, which either alone or in combination with other plans or projects, is likely to have a significant effect on a European site and is not directly connected with or necessary for the management of the site.
- 8.1.4 HRA is a four stage process (Defra 2010):
- Screening (Step 1): The process of identifying potentially relevant European sites and the likely impacts of a project upon the designated features of a European site, either alone or in combination with other plans and projects, and considering whether the impacts are likely to be significant;
 - Appropriate Assessment (Step 2): The consideration of the impacts on the integrity of the European site, either alone or in combination with other plans and projects, with regard to the site's structure and function and its conservation objectives. Where there are adverse impacts, an assessment of mitigation options is carried out to determine adverse effect on the integrity of the site. If these mitigation options cannot avoid adverse effects, then development consent can only be given if the tests set out in Stages 3 and 4 can be passed;
 - Assessment of Alternative Solutions (Step 3): Examining alternative ways of achieving the objectives of the project, to establish whether there are solutions that would avoid or have a lesser effect on European sites; and

- Imperative Reasons of Overriding Public Interest (IROPI) (Step 4): This is the assessment where no alternative solution exists and where adverse impacts remain. It is the process to assess whether the development is necessary for IROPI and, if so, the identification of any necessary compensatory measures needed to maintain the overall coherence of the site or integrity of the European site network.
- 8.1.5 It is important to note that where priority habitats or species are present, the imperative reasons need to be "...reasons relating to human health, public safety or beneficial consequences of primary importance to the environment, or other reasons which in the opinion of the European Commission are imperative reasons of overriding public interest", whereas for non-priority habitats and species, imperative reasons of a social or economic nature may be acceptable, as long as they are considered to be sufficient to override the harm to the site.
- 8.1.6 HRA screening for Dogger Bank Teesside A & B was undertaken in 2013. Forewind consulted on the HRA Screening Report (Forewind 2013b) (**HRA Report**, Appendix A) and the outcome of this consultation is being taken forward in the subsequent stages of the assessment.
- 8.1.7 In accordance with Regulation 5 (2) (g) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (APFP) and, also Planning Inspectorate Guidance Note 2 on preparation of application documents under section 37 (s37) of the 2008 Act, an HRA Report will be submitted alongside the DCO application. The requirement for an Appropriate Assessment will be determined by the competent authority, following assessment of the information presented in the final ES and HRA Report. The HRA Report will contain sufficient information to enable the competent authority to carry out an Appropriate Assessment should it determine that one is required.
- 8.1.8 An **HRA Report** has been submitted alongside this ES to support the DCO application.

9 References

Cefas. 2004. Guidance note for Environmental Impact Assessment in respect of Food and Environment Protection Act 1985 and Coast Protection Act 1949 requirements.

Cefas. 2012. Guidelines for data acquisition to support marine environmental assessments of offshore renewable energy projects.

Communities and Local Government (CLG). September 2009. Planning Act 2008: Nationally Significant Infrastructure Projects Application Form Guidance [Online]. Available at: <http://www.communities.gov.uk/publications/planningandbuilding/applicationformguidane> [Accessed 29 May 2013].

Department of Energy and Climate Change (DECC). 2009. The UK Offshore SEA 2 Environmental Report [Online]. Available at: http://www.offshore-sea.org.uk/site/scripts/consultation_download_info.php?downloadID=241 [Accessed 29 May 2013].

Department of Energy and Climate Change (DECC). 2011. Overarching National Policy Statements for Energy EN-1 [Online]. Available at: http://www.decc.gov.uk/en/content/cms/meeting_energy/consents_planning/nps_en_infra/nps_en_infra.aspx [Accessed 29 May 2013].

Department of Energy and Climate Change (DECC). 2011. Renewable Energy Infrastructure EN-3 [Online]. Available at: http://www.decc.gov.uk/en/content/cms/meeting_energy/consents_planning/nps_en_infra/nps_en_infra.aspx [Accessed 29 May 2013].

Department of Energy and Climate Change (DECC). 2011. Electricity Networks Infrastructure EN-5 [Online]. Available at: http://www.decc.gov.uk/en/content/cms/meeting_energy/consents_planning/nps_en_infra/nps_en_infra.aspx [Accessed 29 May 2013].

Department of Energy and Climate Change (DECC) (formerly the Department of Trade and Industry (DTI)). 2004. Offshore Wind Farm Consents Process Guidance Note.

Department of Environment Food and Rural Affairs (Defra). 2005. Nature conservation guidance on offshore wind farm development. A guidance note on the implications of the EC Wild Birds and Habitats Directives for developers undertaking offshore wind farm developments.

Department of Environment Food and Rural Affairs (Defra). 2010. UK Marine Policy Statement: Habitats Regulations Assessment [Online]. Available at: <http://www.defra.gov.uk/corporate/consult/marine-policy/100721-marine-policy-hra-report.pdf> [Accessed 29 May 2013].

European Commission. 2012. *Review of the Environmental Impact Assessment (EIA) Directive* [Online]. Available at: <http://ec.europa.eu/environment/eia/review.htm> [Accessed 19 June 2013].

Forewind. 2010. Dogger Bank Zonal Characterisation (Version 1) [Online]. Available at: <http://www.forewind.co.uk/downloads/zone.html> [Accessed 29 May 2013].

Forewind. 2011. Dogger Bank Zonal Characterisation (Version 2) [Online]. Available at: <http://www.forewind.co.uk/downloads/zone.html> [Accessed 29 May 2013].

Forewind. 2012. Dogger Bank Scoping Report [Online]. Available at: <http://www.forewind.co.uk/downloads/dogger-bank-teesside-downloads.html> [Accessed 29 May 2013].

Forewind. 2013. Offshore Tranche, Array Boundary and In-Zone Export Cable Corridor Selection Report, Tranches C and D Dogger Bank Teesside C & D. Available at: [http://www.forewind.co.uk/uploads/Final%20Tranche%20C%20and%20D%20selection%20and%20boundary%20report\[1\].pdf](http://www.forewind.co.uk/uploads/Final%20Tranche%20C%20and%20D%20selection%20and%20boundary%20report[1].pdf) [Accessed 05 December 2013].

Forewind. 2013b. HRA Screening Report.

Institute of Ecology and Environmental Management (IEEM). 2006. [Online]. Guidelines for Ecological Impact Assessment in the United Kingdom (version 7 July 2006) Available at: <http://www.ieem.org.uk/ecia/index.html> [Accessed 29 May 2013].

Institute of Ecology and Environmental Management (IEEM). 2010. Guidelines for Ecological Impact Assessment in Britain and Ireland – Marine and Coastal [Online]. Available at: <http://www.ieem.net/ecia.asp> [Accessed 29 May 2013].

Institute of Environmental Management & Assessment (IEMA). 2004. Guidelines for Environmental Impact Assessment [Online]. Available at: http://www.iema.net/readingroom/all_documents?aid=16805 [Accessed 29 May 2013].

King, S., Maclean, I., Iyla, N., Norman, T. and Prior, A. 2009. Developing guidance on ornithological cumulative impact assessment for offshore wind farm developers. Report commissioned by COWRIE Ltd.

Maclean, I., Wright, L., Showler, A. and Rehfisch, M. 2009. A review of assessment methodologies for offshore wind farms. Report commissioned by COWRIE Ltd.

Planning Inspectorate 2012a. Scoping Opinion Proposed Dogger Bank Teesside Offshore Wind Farm. June 2012.

Planning Inspectorate. April 2012b. Advice Note 6 - Preparation and submission of application documents [Online]. Available at: <http://infrastructure.planningportal.gov.uk/legislation-and-advice/advice-notes/> [Accessed 29 May 2013].

Planning Inspectorate. April 2012c. Advice Note 7 – Good Practice [Online]. Available at: <http://infrastructure.planningportal.gov.uk/legislation-and-advice/advice-notes/> [Accessed 18 June 2013].

Planning Inspectorate. April 2012d. Advice Note 9 – Rochdale Envelope [Online]. Available at: <http://infrastructure.planningportal.gov.uk/legislation-and-advice/advice-notes/> [Accessed 29 May 2013].

Planning Inspectorate. April 2012e. Advice Note 12 – Developments with Significant Transboundary Impacts Consultation [Online]. Available at: <http://infrastructure.planningportal.gov.uk/legislation-and-advice/advice-notes/> [Accessed 29 May 2013].

Planning Inspectorate. August 2013. Advice Note 10 – Habitats Regulations Assessment [Online]. Available at: <http://infrastructure.planningportal.gov.uk/legislation-and-advice/advice-notes/> [Accessed 03 October 2013].