




DOGGER BANK
CREYKE BECK

August 2013

Outline Decommissioning Statement

Application reference: 8.3

Title: Outline Decommissioning Statement		Contract No. (if applicable) Onshore and Offshore
Document Number: F-DVC-SP-001	Issue No: 3	Issue Date: 27-07-13
Status: Issued for 1st. Technical Review <input type="checkbox"/> Issued for PEI3 <input type="checkbox"/> Issued for 2nd. Technical Review <input type="checkbox"/> Issued for Application <input checked="" type="checkbox"/>		
Prepared by: Michael Stephenson		Checked by: Melissa Read
Approved by: Gareth Lewis	Signature / Approval (Forewind)  Gareth Lewis	Approval Date: 09/08/2013

Revision History

Date	Issue No.	Remarks / Reason for Issue	Author	Checked	Approved
27-07-13	1	Internal review	MR	AR	01-08-13
01-08-13	2	Sign off	MR	GL	08-08-13
13/08/13	3	SMT sign off	MR	SMT	13/08/13

Contents

1	Introduction	1
1.1	Introduction	1
1.2	The purpose of this document.....	1
2	Background to the project	2
2.1	Background.....	2
2.2	Project description.....	2
2.3	Current site characteristics.....	3
2.4	Anticipated program	3
3	Legislation and guidance.....	4
3.1	Relevant legislation	4
3.2	Legislative framework – offshore.....	4
3.3	Legislative framework – onshore.....	5
4	Offshore decommissioning measures	6
4.1	Decommissioning of wind turbines.....	6
4.2	Decommissioning of offshore wind turbine foundations	6
4.3	Decommissioning of meteorological monitoring masts	8
4.4	Removal of scour protection and subsea protection	8
4.5	Decommissioning of offshore cabling.....	8
4.6	Decommissioning of offshore platforms	9
4.7	Offshore site restoration	9
5	Onshore decommissioning measures	10
5.1	Decommissioning of landfall infrastructure.....	10
5.2	Decommissioning of onshore underground cables	10
5.3	Decommissioning of onshore converter substations	10
6	Environmental assessment	11
6.1	Environmental assessment	11
6.2	Post-decommissioning surveys.....	11
7	Costs and financial security.....	12
7.1	Estimate of cost breakdown	12
8	Schedule	13
8.1	Anticipated decommissioning schedule	13
9	Summary of commitments.....	14
9.1	Works commitments.....	14
9.2	Other commitments.....	15

1 Introduction

1.1 Introduction

- 1.1.1 This statement is provided by Forewind Limited (Forewind) in relation to Dogger Bank Creyke Beck offshore wind farms.
- 1.1.2 Dogger Bank Creyke Beck comprises two proposed offshore wind farms to be located within the Dogger Bank Zone in the North Sea. As these wind farms both propose an installed capacity of more than 100 megawatts, under the Planning Act 2008 the project is classed as a Nationally Significant Infrastructure Project. Therefore, in order to gain development consent and deemed Marine Licences to construct and operate Dogger Bank Creyke Beck it is necessary to apply to the Major Applications and Plans Directorate of the Planning Inspectorate for a Development Consent Order (DCO).
- 1.1.3 This statement accompanies the final application and is submitted alongside a draft DCO, an Environmental Statement, a Consultation Report and other statutory and non-statutory documents.

1.2 The purpose of this document

- 1.2.1 Requirement 10 of the draft DCO states that no offshore works can commence until a written decommissioning programme has been submitted to the Secretary of State in accordance with section 105(2) the Energy Act 2004. In addition, for the onshore elements of the development Requirement 37 states that a decommissioning scheme must be submitted and implemented once operation of the wind farms has ceased. This must include detail of the demolition and removal of the onshore works, and the final proposed condition of the relevant land. In both cases the proposed scheme must be based on the outline decommissioning statement submitted with the application.
- 1.2.2 This document provides an outline of the principles and parameters within which the decommissioning of the development will take place and demonstrates the likely content of the final decommissioning statements for both offshore and onshore. The operators of Dogger Bank Creyke Beck will be required to adhere to the content of the decommissioning programme once this has been approved post-consent. This includes the method of decommissioning and any remediation or mitigation measures proposed.
- 1.2.3 The Environmental Statement for Dogger Bank Creyke Beck has informed the content of this statement.
- 1.2.4 The focus is predominantly on the offshore elements of the scheme (wind turbines, foundations etc), but reference is also made to the onshore cables and converter station.

2 Background to the project

2.1 Background

- 2.1.1 In January 2010, following a competitive tender process, The Crown Estate awarded Forewind the exclusive development rights for 'Zone 3 Dogger Bank'; the largest of the Round 3 offshore wind farm zones. The Dogger Bank Zone comprises an area of 8,660km², and is located in the North Sea between 125km and 290km off the coast of Yorkshire. Forewind is a consortium comprising four leading international energy companies (RWE, SSE, Statkraft and Statoil).
- 2.1.2 Dogger Bank Creyke Beck is the first application within the zone to be submitted to the Planning Inspectorate for consent. The application comprises two offshore wind farms; Dogger Bank Creyke Beck A and Dogger Bank Creyke Beck B, with a total generating capacity of up to 2.4 Gigawatts (GW).
- 2.1.3 Decommissioning is the final stage of the development and, under the 'polluter pays' principle, ensures that development sites are left, as much as is reasonably practicable, in the same as or better condition than they were initially found.
- 2.1.4 Decommissioning measures can range from leaving infrastructure in-situ after the development ceases operation, to complete removal and remediation measures. The method selected will aim to minimise significant negative environmental impacts, and will balance any disturbance of removal against the benefits.

2.2 Project description

- 2.2.1 Table 1 shows the key project components, both offshore and onshore, and thus the infrastructure that will need to be considered as part of the decommissioning statements. A comprehensive project description is provided in Chapter 5 of the Environmental Statement.

Table 1: Key Project Components

Parameters	Maximum for Dogger Bank Creyke Beck
Wind Turbines	400
Offshore Collector Substation Platforms	8
Offshore Converter Substation Platforms	2
Length of Inter-Array Cabling (km)	1,900 km
Offshore Accommodation or Helicopter Platforms	4
Number of Export HVDC Cable Pairs	2 pairs
Onshore Converter Stations	2
Number of Export HVAC Cables	6

2.3 Current site characteristics

2.3.1 Site characteristics are an important factor in determining appropriate decommissioning measures. The current site characteristics and an assessment of the significant environmental effects likely to arise from decommissioning are documented in the Environmental Statement submitted with the application.

2.4 Anticipated program

2.4.1 The anticipated construction programme for Dogger Bank Creyke Beck is shown in detail in Table 6.1 of Chapter 5 in the draft Environmental Statement. The maximum time period post-consent for completing offshore construction is estimated to be 13 years after the award of consent.

2.4.2 The design life for the wind turbines that will be installed at Dogger Bank Creyke Beck will be between 20 and 25 years. However, the lease term for the project area issued by the Crown Estate is for a 50 year period. It is therefore possible, although not certain at this stage, that the wind farms could be re-powered (also known as re-planting) midway through the lease term, which would require a new consent being sought to replace the existing infrastructure.

2.4.3 However, notwithstanding this possibility, Forewind acknowledges the need for installations to be decommissioned as soon as is reasonably practicable upon cessation of their operational life span.

3 Legislation and guidance

3.1 Relevant legislation

- 3.1.1 Any decommissioning activities may, where appropriate, need to comply with the following legislation, as advised by a guidance note produced by the Department of Energy and Climate Change (DECC) (2011)¹: the Coast Protection Act (CPA) 1949; the Marine and Coastal Access Act 2009; the Water Resources Act 1991, the Environmental Impact Assessment Regulations 2009, the Conservation (Natural Habitats etc.) Regulations 2010, Part II of the Environmental Protection Act 1990 (in relation to the disposal or recovery of waste on land), other legislation in relation to the carriage and transfer of waste and, where appropriate, the Hazardous Waste Regulations 2005; and relevant health and safety legislation. Decommissioning activities will also need to comply with any relevant international legislation, for example, the London Convention 1972 and the 1996 Protocol relating to the prevention of marine pollution by dumping of wastes.
- 3.1.2 The developers of Dogger Bank Creyke Beck, also have an obligation to produce a decommissioning statement under international agreements, set out by UNCLOS (United Nations Convention on the Law of the Sea) and OSPAR (Oslo/Paris convention (for the Protection of the Marine Environment of the North-East Atlantic)). These agreements operate under the ‘polluter pays’ principle, i.e. if any damage is done to the environment, it is the developer that must remediate this damage.

3.2 Legislative framework – offshore

- 3.2.1 Under Section 105 of the Energy Act 2004 the Secretary of State will notify the developers of Dogger Bank Creyke Beck of the requirement to prepare and submit a decommissioning programme, post-consent but prior to commencement of development. In addition, this will be secured through a requirement of the consent as set out in Section 3 of the DCO. Requirement 10 states that *“No offshore works shall commence until a written decommissioning programme in compliance with any notice served upon the undertaker by the Secretary of State/the notice pursuant to section 105(2) of the 2004 Act has been submitted to the Secretary of State for approval.”*
- 3.2.2 The legislation (Section 105(8)) requires that a decommissioning programme must include:
- i) the measures to be taken;
 - ii) an estimate of the expenditure;
 - iii) provision for determining times;

¹ DECC, 2011 (revised), Decommissioning of Offshore Renewable Energy Installations under the Energy Act 2004: Guidance notes for the industry

- iv) provision for restoring to original condition; and
- v) provision for monitoring and maintenance.

3.3 Legislative framework – onshore

- 3.3.1 Specifically in relation to onshore works, when commercial operation of the development ceases a decommissioning scheme is required. To secure this Requirement 37 in the DCO states that *“Upon the cessation of commercial operation of the onshore works (in whole or in part), a scheme for the demolition and removal of the onshore works (in whole or in part), and the final proposed condition of the relevant land, including a proposed timetable, shall be submitted to the relevant planning authority for approval. The proposed scheme shall be based on the onshore decommissioning statement submitted with the application. The scheme shall be carried out in accordance with the approved details, unless otherwise agreed in writing by the relevant planning authority.”*

4 Offshore decommissioning measures

4.1 Decommissioning of wind turbines

4.1.1 The removal of these structures is expected to involve the approximate reverse of the installation process (as documented in Chapter 5 of the Environmental Statement). The anticipated steps are as follows:

- i) assessment of the potential hazards during decommissioning and development of suitable procedures for mitigating them;
- ii) assessment of potential risk of pollutants entering the environment;
- iii) disconnecting of wind turbines from electrical distribution network and scada system (including any additional condition monitoring and communications systems);
- iv) mobilisation of decommissioning vessels;
- v) removal of any potentially hazardous or polluting materials from the turbine with the use of appropriate vessels, remove rotor blades, then nacelle, then tower sections; and,
- vi) transport all components to onshore facility for processing and reuse, recycling and/or disposal.

4.1.2 It should be noted that the decommissioning may not happen in the precise order outlined above. For example, in a wind turbine with a gearbox it may not be possible to remove the lubricating oil until after the rotor blades have been removed, as the gearbox may need to operate to position the rotor prior to removal of the blades.

4.2 Decommissioning of offshore wind turbine foundations

Piled Foundations

4.2.1 It is envisaged that piled foundations would be cut below seabed level, and the protruding section removed. Typical current methods for cutting piles are abrasive water jet cutters or diamond wire cutting. The final method chosen shall be dependent on the technologies available at the time of decommissioning.

4.2.2 The indicative methodology would be:

- i) deployment of remotely operated vehicles (ROVs) or divers to inspect each pile footing and reinstate lifting attachments if necessary;
- ii) mobilise a jack-up barge or heavy lifting vessel;
- iii) remove any scour protection or sediment obstructing the cutting process – it may be necessary to dig a small trench around the foundation;

- iv) deploy crane hooks from the decommissioning vessel and attach to the lift points;
- v) cut piles at just below seabed level;
- vi) inspect seabed for debris and remove debris where necessary;
- vii) considering the current technology, the decommissioned components are likely to be transported back to shore by lifting onto a jack-up or heavy lift vessels, freighter, barge, or by buoyant tow;
- viii) transport all components to an onshore site where they will be processed for reuse, recycling and/or disposal; and,
- ix) inspect seabed and remove debris.

Gravity Base Foundations

4.2.3 In the case of gravity base foundations, it may be preferable to leave gravity base structures on the seabed to preserve the marine habitat that has established over their life, subject to discussions with key stakeholders and regulators. In this case the central tubular section would be cut off and removed whilst the base remains in place. However, where removal of the entire base is considered necessary, for example if it is considered a navigational hazard or there is an environmental preference to remove it, it would probably be achieved in a manner similar to the following:

- i) deploy remotely operated vehicles (ROVs) or divers to establish the base structural integrity and reinstate lifting attachments if necessary;
- ii) mobilise suction dredging vessel to remove ballast from base and dispose of it appropriately;
- iii) deploy remotely operated vehicles or diver to inspect the base to ensure remaining ballast is removed;
- iv) disaggregate compacted sediments below gravity base;
- v) mobilise heavy lift vessel, to lift the bases completely out of the seabed and onto a transportation vessel;
- vi) transport to an onshore site, where it will be processed for reuse, recycling and/or disposal; and,
- vii) inspect seabed and remove debris.

Suction Foundations

4.2.4 Suction bucket foundations can be removed using approximately the reverse of the process required to install them. This could include use of a pump system to apply pressure inside the buckets, and allow the foundation to be released and extracted from the seabed. During the release process, any seawater or ballast inside the foundation shaft could be pumped out to make the structure buoyant, so that it can be recovered by an appropriate barge for transport from the site.

4.3 Decommissioning of meteorological monitoring masts

- 4.3.1 The removal of the structure is expected to involve the approximate reverse of the installation process. The methodology would be expected to be broadly similar to that described above for wind turbine generators and the appropriate foundation type described previously.

4.4 Removal of scour protection and subsea protection

- 4.4.1 In order to preserve the marine habitat that has become established over the life of the wind farm, it may be preferable to leave any scour or subsea protection around the turbine bases or covering cables in-situ. However, following consultation with stakeholders if it is considered preferable to remove the scour protection this could be achieved using the following techniques:
- i) Dredging of the scour protection with subsequent transportation to an approved site for appropriate disposal or re-use;
 - ii) For rock fill, the individual boulders may be recovered using a grab vessel, deposited in a hopper barge, and transported to an approved site for appropriate disposal or re-use; or,
 - iii) For other systems such as frond mats, concrete aprons, or proprietary cable protection systems, the components could be recovered onto a crane vessel for appropriate recycling or disposal.

4.5 Decommissioning of offshore cabling

- 4.5.1 Discussions with stakeholders and regulators may identify the need for cables to be wholly or partially removed. However, it is envisaged that, where appropriate, buried assets such as cables could also be left in-situ when the project is decommissioned. Where necessary, potential recovery of these cables may be possible using techniques including mass flow excavation, grapnels or other available future techniques.
- 4.5.2 An indicative methodology using current technology would be:
- i) identify the location where cable removal is required – this may require deployment of remotely operated vehicles;
 - ii) removal of seabed material or cable protection measure where necessary to allow access to the cable;
 - iii) mobilise suitable vessels for cable removal;
 - iv) raise cables from seabed using a grapnel; then,
 - v) the required sections of cables will be cut and the remaining ends weighted and returned to the seabed; and then,

- vi) transport cable to onshore facility for processing and reuse, recycling and/or disposal.

4.5.3 The question of whether or not cable crossing infrastructure should be left in-situ will also depend on the commercial arrangements and requirements in the individual crossing agreements.

4.6 Decommissioning of offshore platforms

Platform Topside

4.6.1 It is envisaged that any offshore platforms, (collector, convertor, or accommodation) will be removed at the end of the project life and returned to shore for decommissioning and disposal. The decommissioning techniques would be expected to be similar to the decommissioning method employed for the wind turbine structures, as follows:

- i) assessment of the potential hazards during decommissioning and development of suitable procedures for mitigating them;
- ii) assessment of potential risk of pollutants entering the environment;
- iii) disconnecting of offshore platform from grid and SCADA system (including any additional condition monitoring and communications systems);
- iv) mobilisation of decommissioning vessels – it should be noted that a heavy lift vessel may be required for some tasks;
- v) removal of any potentially hazardous or polluting materials from the offshore platform;
- vi) removal of the topside structure with the use of appropriate vessels; then,
- vii) transport all components to onshore facility for processing and reuse, recycling and/or disposal.

Platform Foundation

4.6.2 The decommissioning programme for any platform foundations will be dependent on the foundation type selected for the platform. The decommissioning of the platform foundations will be in line with the descriptions given for the wind turbine foundations.

4.7 Offshore site restoration

4.7.1 Generally it is considered that letting the sea self-settle post decommissioning of works limits the extent of impact on the seabed. For example, any scour pits that form due to the presence of the monopile structures acting on local hydrodynamic processes, upon removal of these structures it is predicted that the localised effects of these processes will no longer be present and the scour pits will infill naturally (self-settle).

5 Onshore decommissioning measures

5.1 Decommissioning of landfall infrastructure

- 5.1.1 Landfall infrastructure will be left in-situ where considered appropriate. Any requirements for decommissioning at the landfall will be agreed with statutory consultees.

5.2 Decommissioning of onshore underground cables

- 5.2.1 There is the potential for the removal of the cables to bring about some environmental impacts, which would be similar to those predicted during installation. There is currently no statutory requirement for decommissioned cables to be removed so it is possible that the cables will be left in-situ upon decommission of the wind farm. However, this will be reviewed over the operational life of the project and in consultation with key stakeholders at the appropriate time.

5.3 Decommissioning of onshore converter substations

- 5.3.1 The onshore converter substations for Dogger Bank Creyke Beck, and any associated equipment, will be removed at the end of the project life, and the land will be restored to its original state.

6 Environmental assessment

6.1 Environmental assessment

6.1.1 Forewind has undertaken an Environmental Impact Assessment (EIA) for Dogger Bank Creyke Beck, with the resulting Environmental Statement submitted with the application, alongside this outline decommissioning statement. This document includes an assessment of the likely significant effects upon the baseline environment arising from the decommissioning phase. However, it is recognised that the baseline environment may change over the time period during which the wind farm is constructed and operational. Therefore, further assessment work may be necessary, prior to decommissioning works taking place, to fill any gaps in relation to the key areas. Where necessary, any additional environmental assessment will:

- i) identify and assess potential impacts of the decommissioning process on the environment;
- ii) identify any surveys that will need to be carried out;
- iii) review designated conservation areas;
- iv) identify and assess potential impacts on the historic environment;
- v) assess the potential interference with other marine users;
- vi) identify and assess potential impacts on amenities, communities and future uses of the environment; and,
- vii) describe detailed measures envisaged to avoid, reduce and mitigate against any potentially significant adverse effects.

6.2 Post-decommissioning surveys

6.2.1 In order to confirm completion of offshore decommissioning works to a satisfactory standard, geophysical surveys will be carried out by an independent survey contractor following the completion of the works. Any results would then be issued to the operators of the wind farm and the Marine Management Organisation and DECC (or the appropriate statutory body) for review.

6.2.2 These surveys are likely to include side-scan, magnetometer and bathymetric surveys, with possible use of drop-down video or remotely operated vehicles to investigate and recover any potential hazards identified. The area to be covered will be determined prior to decommissioning.

7 Costs and financial security

7.1 Estimate of cost breakdown

- 7.1.1 The Energy Act 2004 provides that the Secretary of State may require a person responsible for an offshore renewable energy installation to prepare a costed decommissioning programme and ensure that it is (eventually) carried out. To achieve this, DECC's 2011 guidance on the structure of a decommissioning statement requires that detail is provided on costs and financial security.
- 7.1.2 These detailed costings and the provisions to ensure that sufficient funds will be available to meet the liabilities will be specified in the decommissioning programme to be produced pre-construction.

8 Schedule

8.1 Anticipated decommissioning schedule

- 8.1.1 As set out in Section 2.4 of this document, the latest predicted construction period for Dogger Bank Creyke Beck is for construction of the offshore works to be completed within 13 years of the award of consent at the latest, although it is likely to be sooner. The operational period is estimated at 25 years from commissioning, based upon the typical operational life of turbines; however as the lease period is for 50 years, full decommissioning may not take place until after that time. It is recognised that additional consents would be required to re-power or re-plant the wind farm after the estimated 25 years.
- 8.1.2 Whilst it is not possible to confirm a full decommissioning schedule for projects of this scale at this time, initial estimates suggest it would be approximately 2 years including project management, planning and procurement, offshore decommissioning works and onshore works (including dismantling and disposal).

9 Summary of commitments

9.1 Works commitments

9.1.1 Commitments documented through this outline decommissioning statement are summarised in Table 2.

Table 2: Summary of Commitments – Works

Works	Commitment
Wind Turbines	Removed
Wind Turbine Foundations	
- Piled	Cut below seabed level, and the protruding section removed
- Gravity Base	Removed unless preferable to leave gravity base structures on the seabed to preserve marine habitat, subject to discussions with key stakeholders and regulators prior to decommissioning. In this case the central tubular section would be removed with the base left in-situ.
- Suction Foundations	Removed
Meteorological Monitoring Masts (above sea level)	Removed
Scour and Subsea Protection	Left in-situ, unless preferable to remove
Buried assets, incl. offshore cabling	Left in-situ, or wholly or partially removed
Cable crossing infrastructure	Subject to individual crossing agreements
Offshore Platforms	
- Platform Topside	Removed
- Platform Foundation	Subject to foundation selected
Offshore Site Restoration	Self-settle
Landfall Infrastructure	Left in-situ
Onshore Underground Cables	Left in-situ or removed if preferable
Onshore Converter Substations	Removed

9.2 Other commitments

9.2.1 Other commitments documented through this draft outline decommissioning statement are:

- i) prior to commencement of construction, to provide an offshore decommissioning programme in compliance with any notice served by the Secretary of State;
- ii) prior to commencement of the onshore decommissioning works, a detailed decommissioning statement will be provided to the local planning authority for their written approval;
- iii) prior to commencement of decommissioning works there will be consultation with stakeholders; and,
- iv) the environmental baseline will be reviewed and relevant environmental assessment work will be carried out before and after the decommissioning phase, where updated information is required.