

European Offshore Wind Deployment Centre Environmental Statement

Chapter 1: Introduction



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1 INTRODUCTION

1.1 The European Offshore Wind Deployment Centre (EOWDC)

- 1 Aberdeen Offshore Wind Farm Limited (AOWFL) is proposing to develop an offshore wind farm and deployment centre off the coast of Aberdeen, known as the European Offshore Wind Deployment Centre (EOWDC) (see Figure 1.1).
- 2 The proposed project would combine a small commercially operated wind farm with a test and research centre, allowing manufacturers to test “first of run” wind turbines and innovative foundation solutions along with related operation and maintenance access logistics.

1.2 The Applicant

- 3 This application is being made by Aberdeen Wind Offshore Wind Farm Limited (AOWFL). AOWFL is an established legal entity owned by Vattenfall Wind Power Ltd (VWPL) (75 %) and Aberdeen Renewable Energy Group (AREG) (25 %).
- 4 The project is being part-funded by a grant under the European Union [Economic Recovery Programme in the field of Energy]. Consortium members in this grant action are AOWFL, VWPL, AREG and Technip UK Ltd.

1.2.1 Vattenfall

- 5 VWPL’s ultimate holding company is Vattenfall AB (Vattenfall). Vattenfall is owned by the Swedish state. Vattenfall is Europe’s fifth largest generator of electricity and the continent’s largest producer of heat.
- 6 Vattenfall currently operates over 500 mega watts (MW) of onshore wind and almost 700 MW of offshore wind across northern Europe. This portfolio includes Kentish Flats Offshore Wind Farm and Thanet Offshore Wind Farm, both located off the UK’s Kent coast.
- 7 Vattenfall is currently constructing Ormonde Offshore Wind Farm off Barrow-in-Furness which will be completed during 2011. An application to build Kentish Flats Offshore Wind Farm Extension is planned for August 2011. Vattenfall is also in partnership with ScottishPower Renewables to develop the Round 3 East Anglia Offshore Wind Farm. This project is expected to deliver around 7,200 MW of wind capacity which would provide clean electricity for the equivalent annual demand of around 4 million UK homes.
- 8 The north-east of Scotland is an important region for VWPL with the planned EOWDC, the Clashindarroch onshore scheme approved for consent in December 2010, and the proposed Aultmore onshore scheme.

1.2.2 Aberdeen Renewable Energy Group (AREG)

- 9 AREG is an incorporated company representing the interests of over 170 member organisations. Established in 2001, AREG aims to ensure that Aberdeen City and Shire and its businesses play a major role in the energy

revolution. AREG has been supported by the Energising Aberdeen Fund of Aberdeen City Council. The Fund represents a £22.25 million investment in the future of Aberdeen over five years by the Scottish Government.

1.2.3 Technip

- 10 Technip is a world leader in the fields of project management, engineering and construction offering innovative solutions to the global oil and gas industry.
- 11 With 23,000 employees, integrated capabilities and proven expertise in underwater infrastructure, offshore facilities and large processing units and plants on land, Technip is a key contributor to the development of sustainable solutions for the energy challenges of the 21st century.
- 12 Through its Aberdeen based operating centre, Technip provides best-in-class subsea products and services to oil and gas companies operating offshore UK, Denmark, the Netherlands and West Coast of Ireland. Further to its established subsea business, Technip is rapidly developing capability to support the growing offshore wind sector.

1.3 External Consultants

- 13 A number of external consultants have supported this Environmental Statement (ES). Table 1.1 summarises the consultants' participation and a summary of their qualifications and experience can be found in Appendix 1.1 (Volume 4).

Coastal Processes	ABPmer
Geology and Bathymetry, Meteorological Conditions, Geology and Bathymetry	HarmoniQuay
Cultural Heritage	Headland Archaeology
Ornithology, Marine Mammals, Bats, EMF, Energy and Emissions, Other Marine Users and Technical Review	Genesis Oil and Gas Consultants
Shipping and Navigation	Anatec UK Ltd
In Air Noise	Hayes McKenzie
Seascape, Landscape and Visual Impact	LDA Design
Offshore Archaeology	Wessex Archaeology
Marine Ecology	Institute of Estuarine and Coastal Studies (IECS)
Commercial Fisheries	Brown and May Marine
Underwater Noise Modelling	Subacoustech Environmental Ltd
Socioeconomics, Recreation and Tourism	DTZ

1.4 Introduction of the Project

1.4.1 Background to the Proposal

- 14 In 2005 there was an intention to develop a project comprising 33 commercially operating wind turbines off the coast of Aberdeen. Due to constraints on the layout which became apparent at an early stage, the size

of the project was reduced considerably. Recent rapid developments in technology and the need for further research in key areas led, in 2008, to the development of the project to its current form. The project is now known as the European Offshore Wind Deployment Centre (EOWDC), which is both a small (11 wind turbine) commercially operated wind farm and a test and research facility.

- 15 As well as delivering renewable electricity to the National Grid, the Deployment Centre would allow supply chain companies to test a variety of products and applications in a real time offshore environment before commercial deployment, with the aim of reducing large scale development risks and capital costs to industry. The Deployment Centre also provides a platform for environmental research and development.

1.4.2 Support under the European Economic Plan for Recovery in the field of Energy

- 16 The project is part-funded by the European Union (EU) under the European Economic Plan for Recovery in the field of Energy.
- 17 The origin of the European Energy Programme for Recovery (EEPR) is the global €200 billion European Economic Recovery Plan presented by the Commission on 26 November 2008. The focus of the Plan is on containing the impact of the global financial crisis: protecting jobs and purchasing power, boosting infrastructure and creating jobs in the low carbon sectors of the future. The Recovery Plan sets out how Member States and the European Union could coordinate their policies in order to provide new stimulus to the European economy and increase Union spending in strategic sectors. Investments in energy projects were considered an important tool to support the economic recovery.
- 18 The EEPR helps to speed up and secure investments in the energy sector, which will have a direct impact on the EU economy and employment. It will also help to improve the security of supply of the most vulnerable Member States and link 'energy islands' to the rest of the EU energy market.
- 19 The EEPR Regulation created the basis for providing substantial co-financing from the Union budget to key energy projects. Never before has the EU agreed to dedicate such a significant amount to energy infrastructures. The €3.98 billion budget for the implementation of the Regulation is allocated as follows:
- gas and electricity infrastructure projects: €2.365 billion (60 % of budget)
 - offshore wind energy projects (OWE): €0.565 billion (14 % of budget)
 - carbon capture and storage projects (CCS): €1.05 billion (26 % of budget)

1.4.3 The Project Vision

- 20 Thanks to financial support from the European Union, the EOWDC would provide a platform to deploy and demonstrate new concepts, products and services in offshore wind whilst enabling research in this new sector – ideal for a partnership with Europe's renewables industry, academia and research community.

- 21 The vision is:
- “To deploy new equipment, systems, processes and initiate R&D to improve the competitiveness of Offshore Wind Energy production, whilst generating environmentally sound marketable electricity and to increase the supply chain capabilities in Scotland, the wider UK and Europe.”*
- 22 This project is targeted at both enabling and encouraging increased competition into the European wind turbine supply chain by providing sites for manufacturers both to prove new and innovative solutions and also to allow the acquisition of offshore “hands-on” design, build and operational and maintenance experience, in advance of Round 3.
- 23 This project would allow “first of run” production wind turbine systems to be operated in the marine environment so that developers, owners and financiers can gain confidence in wind turbine manufacturer’s new machine designs, allowing the development of the supply chain in this area. The intention is to highly instrument the equipment to provide maximum learning opportunity.
- 24 The EOWDC has the potential to promote and enable the deployment of pre-production innovative foundations, or foundation production methods. It may also be available as a platform to test energy storage and/or Flexible Alternating Current Transmission Systems (FACTS) devices.
- 25 In addition and as indicated, the Applicant will also look at increased monitoring which would improve understanding of wind farm design and operation to ensure increased efficiency and operation.
- 26 There is potential for an Ocean Laboratory that could hold meteorological masts, environmental monitoring equipment and be used for access training. The inclusion of an Ocean Laboratory would allow environmental monitoring during and after deployments but would be subject to a separate application. Environmental data may also be collected through a series of planned surveys. The environmental effects of the deployment centre could be closely monitored and data collected prior to Round 3 offshore wind farms being installed.
- 27 Environmental monitoring would provide stakeholders with information on associated environmental impacts prior to large scale deployments ie Scottish Territorial Waters or Round 3. Via the EU grant, a proposal has been made to allocate in excess of £2.7 million, funded jointly by the Applicant and the EU to environmental studies over the project lifetime including the development of environmental research with external partners. Details of exact activities, and confirmation of EU matched funding, will be achieved as research proposals and requirements are received and selected.

1.4.4 Environmental Research and Development Opportunities

- 28 A key aspect of the proposed EOWDC is to encourage and enable environmental monitoring through ongoing research and development in advance of the larger build and operational experience of Scottish Territorial Water Developments and Round 3.

- 29 The agreed environmental monitoring programme would be in excess of the industry norm and would seek to answer outstanding questions on environmental impacts of offshore wind, which will be of benefit to all stakeholders. The programme would provide stakeholders with information on the environmental impacts of new technologies, processes and operations, and the Applicant hopes to encourage University level research especially that from nearby Aberdeen and Robert Gordon Universities.
- 30 As part of the Environmental Impact Assessment (EIA) for the EOWDC, advice has been sought from the relevant consultants as to future research and monitoring opportunities for the site. These opportunities are provided in the Environmental Statement in addition to any monitoring put forward for the purposes of consent.
- 31 The Applicant will shortly embark on an exercise to scope out the potential environmental research opportunities for the site and will encourage input from interested parties including statutory nature conservation agencies and research organisations and external Consultants working in the offshore wind sector.

1.4.5 Supply Chain Participation

- 32 The proposed EOWDC is keen to attract pre-commercial deployment of offshore wind turbines and other associated technologies. The proposed EOWDC could provide the opportunity to deploy technologies, goods and services ahead of the major development of the Round 3 offshore wind farms.
- 33 The Applicant is therefore keen to speak to wind turbine manufacturers, component manufacturers, installation contractors, other supply chain companies, universities and research establishments about their participation.
- 34 The Applicant is engaging with the supply chain to identify how the project could add value. This will be carried out via number of events and other methods of consultation. Interested parties are likely to include:
- wind turbine manufacturers
 - foundation manufacturers
 - cable manufacturers
 - cable installers
 - offshore construction companies
 - vessel suppliers
 - offshore wind turbine access solution providers
 - universities and research establishments

1.4.6 The Proposed Development

- 35 The Applicant is proposing to construct 11 wind turbines off Aberdeen Bay each with a nominal output of up to 10 MW and a maximum output for the wind farm of up to 100 MW. A summary of the key project characteristics associated with the proposal is provided in Table 1.2.

TABLE 1.2 Key Project Characteristics	
Maximum Capacity	100 MW
Maximum Number of Wind Turbines	11
Lease Boundary Area	20 km ²
Approximate Distance to Shore	2.4 km
Water Depth across the Wind Turbine Locations	20 – 30 m below Lowest Astronomical Tide
Individual Wind Turbine Capacity	4 to 10 MW
Maximum Rotor Diameter	150 m
Maximum Hub Height	120 m
Maximum Tip Height	195 m
Minimum Clearance Above Sea Level	22 m above mean high water springs level (MHWS)
Indicative Spacing between Wind Turbines	Between 790 m and 1050 m
Foundation Types	Potential foundations include monopiles, jackets, tripods, gravity base structure, suction caisson/ buckets
Inter-array Cables	Maximum number of 12. Total length of 13 km.
Export Cables	Maximum number of 4 would run from the wind turbine array back to Mean High Water Spring (MHWS) Total length of 26 km

- 36 The proposed EOWDC site can be seen on Figure 1.2. The onshore works for the project are currently unknown but they are likely to comprise the following:
- onshore cables
 - miscellaneous cable joints/ cable protection and cable/pipeline crossings
 - temporary pre-assembly construction facilities onshore (location currently unknown)
 - Onshore substation and deployment centre
- 37 The onshore works will be applied for separately under the Town and Country Planning (Scotland) Act 1997 as amended. The Local Planning Authorities in proximity to the site are Aberdeenshire Council and Aberdeen City Council. The boundaries of the two jurisdictions are shown on Figure 1.3. Once the onshore works are defined a planning application will be made to the relevant authority. Both of the two councils will be consultees in the Section 36 and Marine Licence process.



Plate 1.1 A 5 MW Installed Wind Turbine at the Ormonde Offshore Wind Farm

38 A full description of the proposed construction, operation and decommissioning of the development is given in Chapter 3 Description of the Proposed Project.

1.5 The Purpose of this Environmental Statement

39 This ES presents the findings of the EIA of the proposed EOWDC. The document is in 4 volumes as outlined in Table 1.3.

TABLE 1.3
Structure of this ES
Volume 1 Non Technical Summary
Volume 2 Environmental Statement
Chapter 1 Introduction
Chapter 2 Site Selection
Chapter 3 Description of the Proposed Project
Chapter 4 EIA Methodology, Scoping and Consultation
Chapter 5 Meteorological Conditions
Chapter 6 Geology and Bathymetry
Chapter 7 Offshore Ordnance
Chapter 8 Coastal Processes
Chapter 9 Marine Ecology, Intertidal Ecology, Sediment and Water Quality
Chapter 10 Ornithology
Chapter 11 Bats
Chapter 12 Marine Mammals
Chapter 13 Electromagnetic Fields
Chapter 14 Statutory Designations and Conservation
Chapter 15 Shipping and Navigation
Chapter 16 Aviation
Chapter 17 Ministry of Defence
Chapter 18 Maritime Archaeology
Chapter 19 Seascape, Landscape and Visual Assessment
Chapter 20 Cultural Heritage
Chapter 21 Commercial Fisheries
Chapter 22 Salmon and Sea Trout
Chapter 23 Socioeconomics, Recreation and Tourism
Chapter 24 In Air Noise
Chapter 25 Energy Use and Emissions
Chapter 26 Electromagnetic Interference
Chapter 27 Other Marine Users
Chapter 28 Mitigation, Management and Monitoring
Chapter 29 Information to Inform the Habitats Regulation Appraisal
Chapter 30 Summary
Volume 3 Figures
Volume 4 Technical Appendices

1.5.1 Data Gaps and Uncertainties

1.5.1.1 Data Gaps

- 40 The Applicant acknowledges that there is still a requirement from statutory bodies for further bird and marine mammal boat-based survey data. AOWFL contracted further monthly boat-based surveys which started in August 2010 and which will run until July 2011. Four months of this survey data has been analysed and is included in the bird and marine mammal impact assessments within this ES. The remaining eight months of data will be analysed and

submitted to Marine Scotland as an Addendum to this Environmental Statement as soon as practicable.

1.5.1.2 Uncertainties

- 41 As the project is a deployment centre there is still a need to obtain a certain degree of flexibility when applying for consents as there is still uncertainty as to the size and type of foundations to be installed. It should be noted that, in defining the project that has been assessed during the EIA, the “Rochdale Envelope” approach (see Chapter 4) has been adopted. By adopting this approach, it will be possible to conclude that the environmental impact of the proposed development will be no greater than set out in this ES.
- 42 The Applicant has undertaken an EIA, which is based on the optimum design and layout information available to the project when making the application, involving an assessment allowing for different types of wind turbines and foundations.
- 43 As not all the details of the proposed development are known at this time, a worst case approach has been undertaken, according to the principles described as the “Rochdale Envelope”. What is considered to be the worst case is different depending on the receiving environment affected (eg birds, shipping & navigation etc) and the activity undertaken (construction/de-commissioning or operation). It should be noted that when carrying out the assessment the possibility of mixed foundation types within the development has been considered, however, in each case a single foundation type at each location has been identified as the worst case ie for the coastal processes assessment 11 gravity bases structures are considered.

1.6 Development Context

1.6.1 The Need for Offshore Wind Energy

- 44 Climate change represents one of the greatest environmental threats faced by the world today with far reaching implications for the global environment and economy. Renewable electricity generation is vital for decarbonising the global energy system and hence global climate change mitigation. Wind energy is one of the most competitive technologies in renewable energy. However, large scale implementation offshore, whilst offering potential for significant opportunity to develop vast wind resource capacity, also poses huge challenges, requiring technological innovation, industrial & market development and, in parallel, significant cost reduction to become cost competitive with other forms of energy sources.
- 45 The UK, and specifically Scotland, has some of the best wind resource in Europe.
- 46 The Scottish Government aims to achieve a target of 100 % of Scottish demand for electricity from renewable sources by 2020. The Scottish Parliament passed the Scottish Climate Change Act in 2009. It demanded a 42 % cut in greenhouse gas emissions by 2020 and 80 % cuts by 2050, based on a 1990 baseline. The development of Scotland's offshore wind

potential will be crucial to the delivery of Scotland's legal obligations on climate change.

- 47 The rapid development of offshore wind capacity is central to the delivery of the UK's share of the EU target of 20 % renewable energy by 2020. The Crown Estate, as the seabed owner, has announced proposals to deliver up to 25 Giga Watts (GW) of new offshore wind farm sites by 2020 through the Round 3 licensing. This is intended to provide a stimulus throughout the EU and to provide an important contribution to both reducing CO₂ emissions and improve security of energy supply to the wider EU. This builds on the 8 GW of offshore wind farm projects currently under development and to be delivered by Rounds 1 and 2. If successful, the addition of the capacity from Round 3 and the Scottish Territorial Waters Round together with any additional smaller sites, could lead to a potential total of 39.5 GW of offshore wind energy.
- 48 The scale of the challenge in delivering such a large programme means that the equipment and services supply chains need to be dramatically enhanced in a very short timescale. The central requirement of the industry is for live operational experience of the various wind farm components with validated data. This requires an area to deploy novel technologies to gain data during actual operational hours in a controlled offshore environment.
- 49 The EOWDC's focus is on proving new technology, processes and operations, and improving existing technology, processes and operations with the key objectives of increasing reliability, efficiency and reducing cost. As such, the EOWDC would directly contribute to the delivery of not only the UK Round 3 and Scottish Territorial Water Rounds, but also the wider European programme of offshore development.
- 50 The maximum output of the EOWDC, as governed by The Crown Estate lease conditions, is 100 MW. Assuming a 35 % capacity factor, the EOWDC could provide enough capacity to meet the demand of over 68,400 homes, equating to a supply large enough to meet over 65 % of the domestic need of the Aberdeen City population¹. The 2013 household estimate for Aberdeen is 108,150 (See Appendix 1.2).

1.6.2 Creation of Employment from Wind Energy

- 51 Estimates vary as to the global job creation potential for wind power (on and offshore). However a middle case scenario suggests 462,000 by 2010 and 1.3 million by 2020 with a potential maximum recognised as 572,000 by 2010 and 2.2 million by 2020 (GWEA, 2008). As Europe is a particularly intensive area for wind development, it is to be expected that the proportion of global employment secured could be significantly higher than implied by the population or land mass and sea area. The European Wind Energy Association estimates that European employment in wind power will increase to almost 330,000 in 2020 and to 375,000 by 2030, 57 % of the latter figure being accounted for by offshore wind (EWEA, 2008).

¹ This assumes number of households in Aberdeen was 102,900 in 2008. This is based on the "Household Projections for Scotland 2008-based" from the General Register Office for Scotland (2010).

1.7 Statutory and Regulatory Framework

- 52 The construction and operation of the EOWDC will require a consent under Section 36 of the Electricity Act 1989 (as amended). The Electricity Act 1989 (Requirement of Consent for Offshore Generating Stations) (Scotland) Order 2002 requires Section 36 consent for the installation of any offshore generating station with a permitted capacity of 1 MW or above.
- 53 Section 57(2) of the Town and Country Planning (Scotland) Act 1997 provides that the Scottish Ministers can direct that planning permission for development of the Section 36 application or ancillary development can be deemed to be granted. The requirement for planning permission may apply to only a small portion of the export cable.
- 54 In formulating an application for a Section 36 consent the Applicant is obliged to have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and in protecting sites, buildings and objects of architectural, historic or archaeological interest. Furthermore the Applicant is obliged to do what he reasonably can to mitigate any effects which the proposal would have on such matters. In considering any proposals the Scottish Ministers are obliged to have regard to the desirability of preserving the list of assets and also the extent to which the Applicant has complied with their duty reasonably to mitigate any effects. The applicant is also obliged to avoid so far as possible causing injury to fisheries or to the stock of fish in any waters. These matters have been addressed in this ES.
- 55 In addition to a Section 36 Consent the EOWDC will also require a marine licence in terms of the Marine (Scotland) Act 2010. This Act imposes a number of duties upon the Scottish Ministers in respect of the grant of any marine licence. It includes obligations under Section 3 to act in a way which is best calculated to further the achievement of sustainable development, including the protection or where appropriate the enhancement of the health of that area, and under Section 4 to act in a way best calculated to mitigate, and adapt to, climate change so far as consistent with the purpose of the function concerned. In terms of Section 15 all public authorities are obliged to take authorisation decisions in accordance with appropriate marine plans unless relevant considerations indicate otherwise. Furthermore, in the determination of a marine licence application, Section 27 implies certain statutory requirements on the determination process. The Scottish Ministers must have regard to the need to protect the environment, human health and prevent interference with legitimate uses of the sea and such other matters as the Scottish Ministers consider relevant. These are all matters which have been considered and assessed within the ES.
- 56 The Applicant has determined that the development is an EIA development and this Environmental Statement has been produced to comply with the requirements contained in the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000 (as amended) and the relevant marine regulations, The Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended).
- 57 The Conservation (Natural Habitats, & c.) Regulations 1994 (as amended) provide the requirement to consider the potential effects of the project on European sites and species. The Scottish Ministers will be the appropriate

authority in determining the extent to which an appropriate assessment will be required, or issuing any European Protected Species licences. These matters have been considered in terms of the relevant chapters of the ES. The regulations also regulate activities which could potentially disturb European protected species.

- 58 More information on the applicable statutory and regulatory framework may be found in the Appendix 1.3 to this ES.

1.8 Legislative Policy

- 59 The determination of both a Section 36 Consent and a marine licence potentially involve a wide range of material considerations. This is likely to include Energy Policy, published and emerging Marine Policy, relevant Development Plans and National Planning Policy. Where the policies are relevant to a particular assessment they have been referred to as the relevant material in the ES. It should be noted that the planning policies would only directly be applicable to support a small portion of the onshore export cables from the mean low water mark up until the mean high water spring tide level. In addition a number of the effects of the offshore elements of the EOWDC will potentially have impacts onshore. Planning policy may assist in carrying out an assessment of the potential affects on such onshore receptors. Where relevant to a particular assessment these have been referred to.
- 60 The overall determinations will have to have regard to a wide range of policy and they will be important in evaluating the consenting balance having regard to both the positive, neutral and negative aspects arising from the EOWDC.

1.8.1 Energy Policy

- 61 There are three levels of applicable renewable energy legislation and policy: (1) European, (2) UK, and (3) Scottish. Common to each level is a presumption that offshore wind can make a significant and meaningful contribution to environmentally friendly electricity production, which is a key priority for the European Community and the UK and Scottish Governments. More information on renewable energy legislation and policies may be found in Appendix 1.3 to this ES.

1.8.2 Marine Policy

- 62 In Scotland, the legislation allows for three levels of planning – a UK wide Marine Policy Statement, a Scottish National Marine Plan and regional plans. Consistent throughout each is a presumption in favour of sustainable marine development. Underlying this presumption is a key marine planning policy objective to maximise sustainable economic and social growth, which the Scottish Government believe to be intrinsically linked to such development. The North East Region is highlighted as having favourable conditions for marine development, particularly in the offshore wind context, which is noted as being critical to the future security of energy supply in Scotland. More information on the relevant legislation and guidance may be found in the Appendix 1.3 to this ES.

1.8.3 Planning Policy

- 63 In terms of the offshore elements of the EOWDC project only a small section of the proposal will directly engage the onshore planning system. That relates to the area between the low water mark and the mean high water spring tide. This represents the overlap between the Marine and Onshore Licensing Regimes. More information on the relevant planning policy may be found in Appendix 1.3 to this ES. It is not the subject matter of the Annex to assess the development proposals against development plan policy but to identify the relevant policy elements. Some of the impacts of the EOWDC will affect land based receptors and where relevant these have been referred to within the technical appendices and assessment chapters.

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