EUROPEAN OFFSHORE WIND DEPLOYMENT CENTRE

A ground breaking new facility, which will enable the accelerated development of offshore wind power in Scotland, the UK and Europe is moving ever closer to reality.

The European Offshore Wind Deployment Centre is being developed by Aberdeen Offshore Wind Ltd, comprising current partners Vattenfall Wind Power UK, Aberdeen Renewable Energy Group (AREG) and the Scottish European Green Energy Centre (SEGEC). This innovative project, off the coast of Aberdeen, has been earmarked for possible support of up to forty million Euros from the European Commission.

The Deployment Centre will allow offshore wind farm developers and associated supply chain companies to test new designs, prove existing products and receive independent validation and accreditation before commercial deployment. This will reduce development risks and capital costs and provide an opportunity to test reliability and capacity in a real time, offshore environment. The project will provide electricity to the national grid and will disseminate lessons learned to the EU industry at large.

At the heart of the project is an interaction between research, testing and training facilities alongside a commercially operated, highly instrumented offshore wind farm.

In summary the Centre will provide:

- **An industrial scale offshore wind deployment centre**
- **A marine test site for new turbine and foundation designs including a production and development programme**
- **A test site for electrical grid connection technologies**
- **A centre of excellence in occupational training and emergency response**
- **A research hub with access to emerging, commercial scale, technologies**
- **A facility for public and commercial stakeholder education**
- **A hub from which to inform the offshore market and disseminate best practice**
- **A small commercial windfarm generating enough electricity to power two thirds of the domestic demand of Aberdeen**

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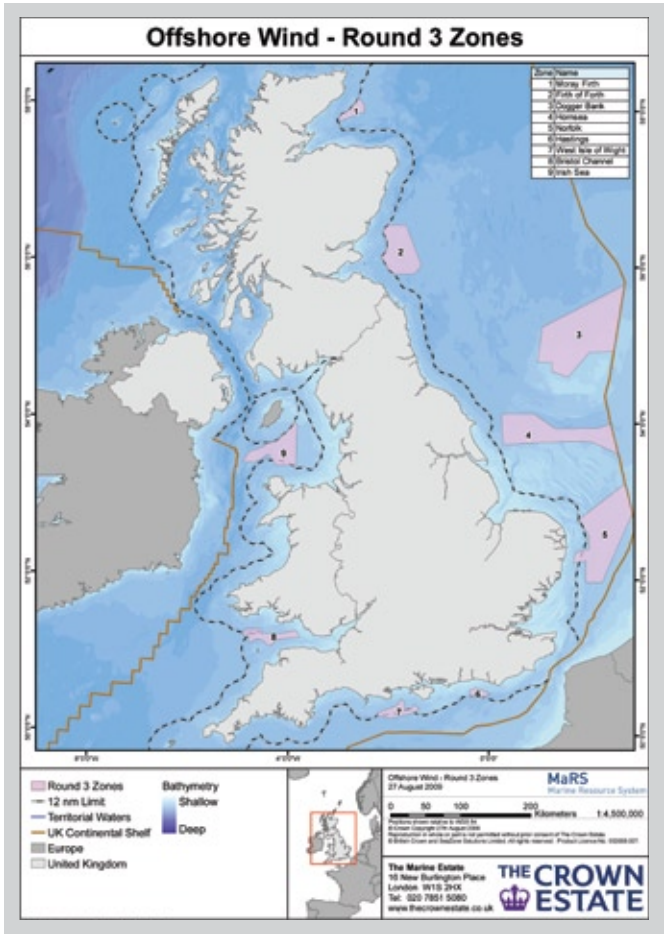
Delivering European Ambitions



Wind power is becoming one of the most competitive commercial technologies in renewable energy, but large scale implementation offshore, whilst offering significant potential for capacity, also creates huge challenges requiring technological innovation, industrial and market development and high levels of cost.

Cost reduction measures are critical to allow offshore developments to become more competitive in line with other forms of energy sources.

The UK, and specifically Scotland, has some of the best wind resource in Europe so the rapid development of offshore wind capacity provides a significant opportunity to the deliver the UK's share of the EU target of 20 per cent renewable energy by 2020.

The Crown Estate has recently announced proposals to deliver up to 25 GW of new offshore wind farms by 2020 through their 'Round 3' licensing. This release of offshore sites is intended to provide a stimulus for development throughout the 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 Round could lead to a potential total of 39.5 GW of wind energy coming from offshore.

The European Wind Energy Association's target for total installations in Europe by 2020 is now 230 GW, of which 40 GW will be offshore. This would produce approximately 600 TWh per year by 2020 providing power equivalent to the needs of 135 million average EU households (60% of EU households) and meeting between 14 and 18% of EU electricity demand (depending on total demand in 2020)(Source: EWEA).

The scale of challenge in delivering such a large programme means that the equipment and service supply chains need to be quickly and dramatically enhanced. The central requirement is for live operational experience with validated data, together with an area to deploy novel technologies to gain actual operational hours offshore in a controlled, yet real, environment. The European Offshore Wind Deployment Centre will ensure this is achievable and that European knowledge, know-how and deployment capability is built and delivered quickly.

European Energy Capital

Locating the Offshore Wind Deployment Centre in Aberdeen enhances its ability to deliver well-informed solutions built on years of offshore experience.

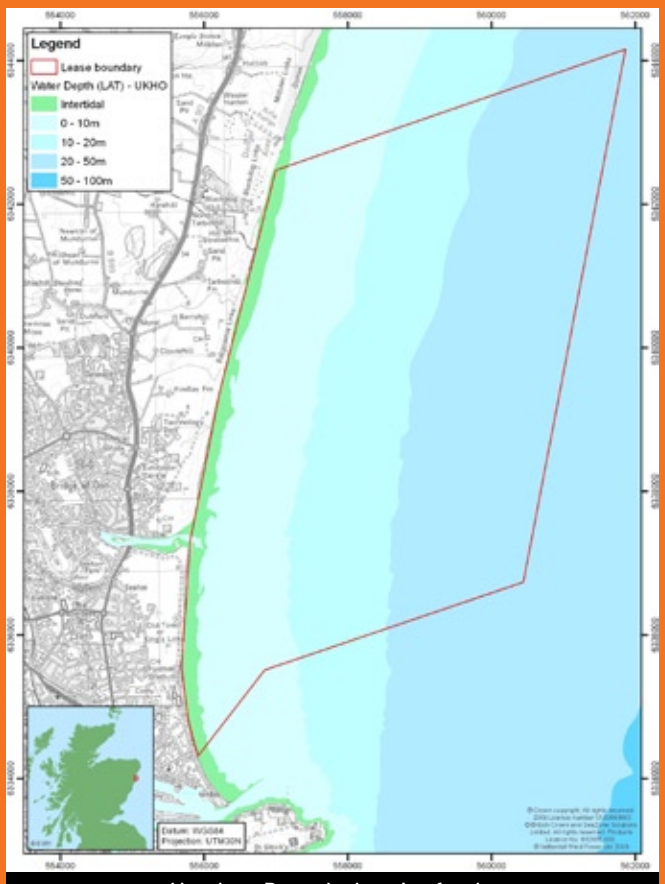
This is a European centre of excellence for offshore activities, with over 900 active energy companies with over thirty years of North Sea oil and gas experience and innovation behind them. The offshore industry here is keen to transfer their skills into the developing wind market to provide innovative and future proof solutions.

Aberdeen provides a highly attractive site for the Deployment Centre for the following additional reasons:

- **Combination of shallow and deep water**
- **Potential access to excellent offshore logistic bases**
- **Good wind regime**
- **A relatively benign marine environment**
- **Strong support from existing industrial suppliers**
- **Proximity to globally recognised research and academic centres**

A further advantage enjoyed by Aberdeen is that each year it plays host to the All-Energy Conference and Exhibition – the largest renewable energy event in the UK - approaching its tenth year of continuous expansion. This provides an excellent venue for the dissemination of knowledge and the introduction of technical visits to the Centre.

Locating in Aberdeen also facilitates strong links with the Scottish academic community, as represented by the Energy Technology Partnership (ETP). Its Wind Energy Alliance foresees a strong role for the Aberdeen project, linking particularly with the wind engineering strengths of Strathclyde University in Glasgow.



Aberdeen Bay - the location for the European Offshore Wind Deployment Centre

Creation of Employment

The UK confidently expects that around 160,000 new jobs will be created as a result of the renewable energy industry expansion (UK Prime Minister, 26th June 2008). The UK Department for Energy and Climate Change estimates that 70,000 new jobs will be generated in the UK from offshore wind alone.

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 greater impact recognised at 572,000 by 2010 and 2.2 million by 2020 (Global Wind Energy Congress).

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 population or land and sea area might imply.

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.

It also clear therefore that the European offshore wind programme will result in a very significant level of job creation and the European Offshore Wind Deployment Centre will assist in enabling the creation of that employment.

Knowledge Sharing

The project plans to adopt an approach to knowledge dissemination which is comprehensive, inclusive, international and innovative.

The scope of knowledge sharing will cover all areas of research addressed at the facility and disseminated using a variety of mechanisms likely to include:

- **Publication of findings through academic and trade routes**
- **Relevant seminars, conferences and moderated discussion boards**
- **Linking to a network of similar deployment centres in the UK, Europe and beyond**

The Centre will fulfill a role in informing the general public about the importance of renewable energy to our society and have an important role to play in learning generic lessons of environmental impact, of relevance to the wider Scottish offshore agenda and beyond.

Activities and Attributes

The Centre will allow "first of run" production wind turbine systems to be operated in a marine environment so that manufacturers, developers, owners and financiers can gain confidence in new designs. Deployment of pre-production innovative foundations will also be carried out as well as ongoing research into manufacture, installation, operation and maintenance.

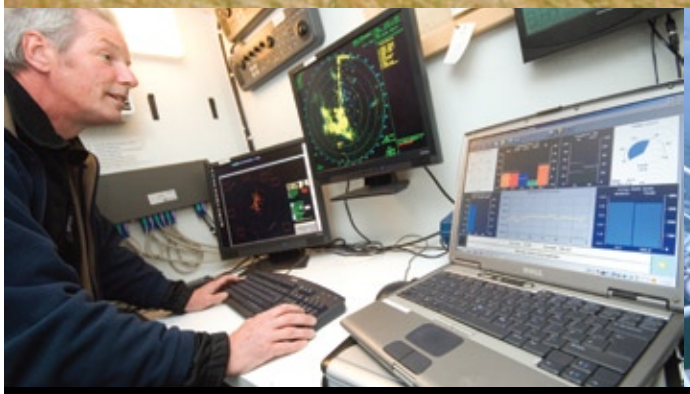
It is anticipated that the Centre's activities will significantly increase competition by enabling new entrant technologies to be developed and shared in a near-shore environment with suitable support.

The Deployment Centre facility will include turbines ranging in size from 3 MW to 10 MW on a mix of conventional and novel foundations, from a number of different manufacturers, with extensive monitoring and instrumentation for technical and environmental purposes. It is expected that each design would be operated for at least five years to gain a full operations and maintenance track record for each design.

By providing this infrastructure relatively close to shore, the project can also include a training, logistics and accreditation centre to enable the efficient and timely deployment for European offshore wind farms.

The Centre plans to provide the following business and commercial opportunities:

- Wind turbines: ranging in size from 3 MW to 10 MW. Total indicative capacity of 75 MW at first powering with infrastructure up to 150 MW.
- Foundations: water depths of 12-32 m allowing all current and planned designs to be tested; including drill-drive mono-pile, jacket constructions with pin-piles, tripods, gravity bases and emerging hybrid designs. The feasibility for an additional deep water site for floating/tension legged foundations will be investigated.
- Met Mast: permanently installed LIDAR/SODAR wind resource measurement with facility to co-locate prototypes for evaluation. Marine CCTV/ Webcam for logging of site events.
- Wave and Tidal Sensors: permanently installed wave and tide gauges to support foundation structural analysis/performance.
- Cabling: infield and export.
- Energy storage/ substation or switch-yard with potential research, development, deployment and training aspects.
- Control centre which could be expanded as a control centre for other wind farms, an emergency response centre for offshore assets and a logistics and O&M base for a group of offshore developments with a training remit.
- Onshore research base lay down area, storage area, assembly area for turbines, educational/ promotional/visitor facility – if commercially viable.
- Commercial and academic offshore 'lab space' for testing new offshore instruments and other renewable technologies offshore, a platform for experiments, R&D, shaping best practice and communicating lessons learned.



Environmental Considerations

Extensive environmental studies have already been carried out in support of this project. These have addressed all relevant areas, including birds, marine mammals and the benthic environment.

Bird studies have included a combination of conventional land-based surveys over a number of years, boat-based surveys, and high-tech radar studies of bird behaviour at critical periods, on a 24-hour basis. A number of European designated bird sites exist along the North East coast.

Marine mammal occurrence and behaviour has been studied from the same boat-based surveys and using passive acoustic monitoring techniques. There are populations of both bottlenose dolphins and harbour porpoise in the area, as well as seals and the seasonal occurrence of other cetaceans, such as white-beaked dolphins and minke whales. A photo-id catalogue of the local bottlenose dolphins in the area has been established to assist these studies. Further work is planned involving acoustic monitoring around the site, as well as ongoing boat surveys, as part of the full Environmental Statement and permitting process.

In relation to benthic ecology, no unusual or threatened species have been found to date. An artificial reef effect created by the foundation structures may promote future diversity.

Moving Forward

The European Offshore Wind Deployment Centre started life in 2004/5, when a joint venture between AREG and AMEC (now Vattenfall) began developing plans to build and operate an offshore wind farm.

Over time, the project's scope developed to combine a commercial wind farm with a deployment centre and technology enabler.

This broadening of project scope has been accompanied by the creation of a consortium based concept whose collective interests and expertise enhances the potential benefits for European organisations.

The consortium model for the Deployment Centre aims to combine publicly supported assets with commercially operated entities to ensure both the long term viability of the centre and the market focus of activities. In order to achieve this, the development and ongoing operation of the Centre will be undertaken by a core operating company which owns the site lease, the infrastructure, foundations and non-generating assets. This company is likely to be supported by the following commercial entities:

- **A power company to develop and manage the power provided by the development plus appropriate contracts and lease(s) for the site(s)**
- **An operations, maintenance and logistics provider**
- **A research, training and accreditation provider**

The existing project partners combine the full set of complementary skills required including permit and stakeholder involvement; project planning, management and implementation; technology enabling; test centre establishment, operation and research; wind farm development; offshore deployment; financing and operations capability.

The project's environmental and other studies are well-advanced, having already:

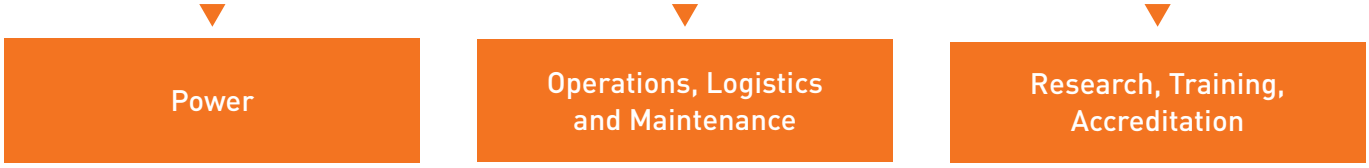
- Developed the concept and undertaken feasibility studies
- Engaged with industry and marine, aviation and environmental stakeholders
- Completed extensive bird and other environmental monitoring
- Undertaken connection route feasibility
- Carried out public consultations
- Completed preliminary scoping and discussions on permits

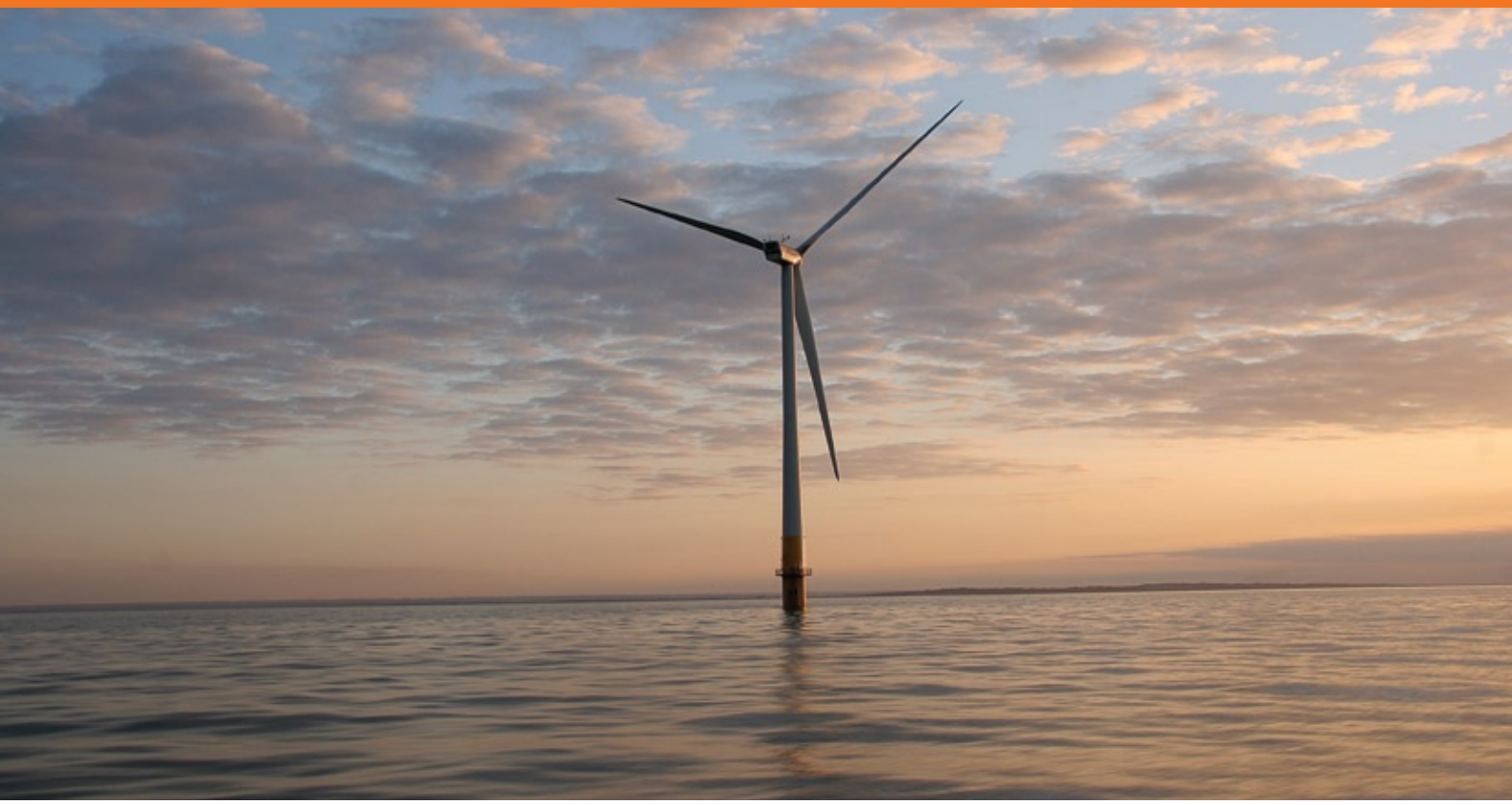
Many letters of support for the project have already been received from organisations around Europe.

It is anticipated that a Consent Application will be made to the Scottish Government in 2010 which puts the project in an ideal timeframe to secure several years of experience before the major construction work on the UK Round 3 projects begins in the middle of the decade 2010-2020.

Aberdeen Offshore Wind Limited

Project development, Foundation infrastructure ownership, Dissemintion, PR and communication





We aim to work closely with all our stakeholders on the development of the project, in order that it best reflects the needs of all those with an interest in this area. We therefore encourage comments, views and inputs from all stakeholders.

Please contact Aberdeen Renewable Energy Group on 01224 814620 to discuss your ideas and questions relating to this project in more detail.

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