European Offshore Wind Deployment Centre
Environmental Statement

Appendix 23.2: Socioeconomics, Recreation and Tourism EIA Technical Report

A project part-funded by the European Union under the European Economic Plan for Recovery in the field of Energy

DTZ

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Socioeconomic, Tourism & Recreation Assessment of the European Offshore Wind Deployment Centre:

EIA Technical Report

Aberdeen Offshore Wind Farm Limited

May 2011

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1.0 Information for the Non-Technical Summary

1.1 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). DTZ has been commissioned by AOWFL to undertake a socioeconomic, recreation and tourism impact assessment of the proposed EOWDC. The scope of the assessment is the Inner Study Area (Aberdeen and Aberdeenshire), Wider Study Area (Scotland), and the UK.

1.2 The project has been successful in gaining EU funding of up to €40m from the European Economic Recovery Plan. This award is in recognition of the project's potential role in supporting development of the European offshore wind industry by proving technologies and techniques. It also has an excellent strategic fit with local and national policy, as described in the Baseline Report. The Scottish Government is committed to achieving a headline target of 20% of total Scottish energy use from renewable sources by 2020, and Scotland has a quarter of Europe's offshore wind potential. At a local level, Aberdeen City and Aberdeenshire recognise the importance of the energy sector to the local economy. The 'Energetica' project has been developed which sets out a vision as to how the Inner Study Area can see energy, tourism, other industries and quality of life factors combine to raise the profile and economic performance of the region.

1.3 The impacts considered in this assessment are the direct and supply chain impacts of construction, operation and decommissioning activities; impacts on tourism; impacts on recreational activities; and impacts on the offshore wind energy sector. A range of assumptions have been developed in consultation with AOWFL in order to assess the socioeconomic impact of the development, and are set out in the report. For the purposes of this assessment, it has been assumed that the capacity of the EOWDC will be 84 MW across 11 turbines.

1.4 Total capital expenditure during the two-year **Construction Phase** has been estimated at £260.4 million. As shown in the summary table, it has been estimated that this will support 738 job-years worth of employment, and £40m of Gross Value Added (GVA) in Scotland; of which 296 job-years and £16 million of GVA will be in the Inner Study Area (Aberdeen and Aberdeenshire). The impact related to the Inner Study Area will relate mainly to the construction and assembly of turbines and foundations, whilst the additional impact in the rest of Scotland will relate to the manufacture of project components such as foundations and potentially also wind turbines.

Table 1.1: Summary of Impact: Construction Phase (2 years)

Total Employment (job-years)	Direct & Indirect	Induced	Total
Inner Study Area	248	48	296
Wider Study Area (Scotland)	531	207	738
UK	955	n/a	n/a
Gross Value Added (£ million, discounted)	**Direct & Indirect**	**Induced**	**Total**
Inner Study Area	£13.8	£2.3	£16.1
Wider Study Area (Scotland)	£29.5	£10.0	£39.6
UK	£53.1	n/a	n/a

The Crown Estate lease has a limit of 22 years within which construction and decommissioning must also take place. In terms of the Operational Phase of the project – this is anticipated to be up to 22 years in duration, and therefore a 'Long-term' effect. Once fully deployed, it is anticipated that the EOWDC will require a local team of around 25 jobs for operational and maintenance activities. Over the up to 22 year operational life of the development, this will support 768 job-years worth of employment and £23m of GVA at the Scotland level as summarised below.

Table 1.2: Summary of Operational Impacts over lifetime of project (22 years)

Total Employment (job-years)	Direct & Indirect	Induced	Total
Inner Study Area	553	108	661
Wider Study Area (Scotland)	553	216	768
UK	693	n/a	n/a
Gross Value Added (£ million, discounted)	Direct & Indirect	Induced	Total
Inner Study Area	£17.4	£3.0	£20.4
Wider Study Area (Scotland)	£17.4	£5.9	£23.4
UK	£21.9	n/a	n/a

1.5 The **Decommissioning Phase** is expected to be temporary, lasting for up to 5 months. It has been estimated that the total expenditure on decommissioning will be £33.3m, and this will support 248 job-years of employment and £7.7m of GVA at the Scotland level.

Table 1.3: Summary of Impacts from Decommissioning Phase (up to 5 months)

Total Employment (job-years)	Direct & Indirect	Induced	Total
Inner Study Area	178	35	213
Wider Study Area (Scotland)	178	69	248
UK	178	n/a	n/a
NPV of GVA	**Direct & Indirect**	**Induced**	**Total**
Inner Study Area	£5.8	£1.0	£6.8
Wider Study Area (Scotland)	£5.8	£2.0	£7.7
UK	£5.8	n/a	n/a

1.6 The impact of other offshore wind farm projects in the vicinity of the proposed development is likely to be very significant. Around 7.5GW of offshore wind capacity is planned for the East coast of Scotland, which will require capital investment in the order of £23 billion[1] up to 2020 supporting 28,000 jobs and having a major impact on ports such as Leith, Dundee, Nigg, Aberdeen, Peterhead, and Fife Energy Park. Consultees felt that this project would have a significant role in supporting the development of the industry as there is an identified need for more proving sites for turbines (RenewableUK).

1.7 The impact of the proposed development on **Tourism** is considered to be of **negligible significance.**

1.8 The impact of the proposed development on **Recreational** activities is considered to be of **negligible significance.**

1.9 The impact of the proposed development on **Research and Development and the Offshore Wind industry** has also been considered at both a local and national level. The view of consultations was that the proposed deployment centre would have a **positive impact** on the offshore wind sector. The following quotations highlight the significance of that impact:

- *'The development of offshore wind still faces many challenges to commercial deployment. The operation of the EOWDC will make a strong contribution to knowledge sharing for new components, designs and access methodologies for construction, operations and maintenance to be executed in the marine environment.'* **Chris Bronsdon, Chief Executive, Scottish European Green Energy Centre (SEGEC)**
- *'The European Offshore Wind Deployment Centre will provide invaluable opportunities for R&D, helping the industry to grow with real confidence. Innovative projects such as this will*

[1] i.e. 7,460MW of capacity multiplied by a CAPEX figure of £3.1 million per MW

help the UK to maintain its position as the world leader in offshore wind. This will in turn encourage more investors to come forward, creating thousands of jobs in the rapidly-expanding offshore wind sector.' **Maria McCaffery, Chief Executive of RenewableUK**

- *'This is potentially a great opportunity for Scotland's research community to actively engage in the development of an important means to generate low carbon electricity. Particularly important will be the deployment of the Ocean Laboratory, a wide range of turbines and support structures as possible and access to these for independent evaluation in order to aid future developments.'* **Professor Paul Mitchell of the University of Aberdeen's School of Engineering**

- *'The EOWDC is a major component of ACSEF's flagship project, Energetica. As a pioneering offshore wind project, it will be at the cutting edge of the development of new technologies and presents significant opportunities for Aberdeen City and Shire to build a viable, robust supply chain around offshore wind, particularly in the areas of development, operation and maintenance'* **Sara Budge, project manager for Energetica, Aberdeen City and Shire Economic Future (ACSEF)**

- *'This is a real opportunity for Aberdeen and the North-east [of Scotland] to place itself at the forefront of this aspect of the renewables industry. There is fierce completion not just in Scotland but across the rest of Europe to gain recognition as a leader in the field and this project will provide an extremely valuable testing site for manufacturers to demonstrate their products and to gather vital data on performance.'* **Bob Collier, Chief Executive of Aberdeen & Grampian Chamber of Commerce**

1.10 Overall, the assessment demonstrates that the project will have a significant positive impact on the economy of the Inner Study Area and the remainder of Scotland. **Including construction, operation and decommissioning, it is estimated that the project will support over 1,750 job-years worth of employment in Scotland, and over £70 million of Gross Value Added**. It will also provide benefits to the wider offshore wind energy sector by providing opportunities for testing, research and development, and training. This will accelerate the deployment of offshore wind projects progressing through The Crown Estate's 'Round 3' and Scottish Territorial Waters licensing processes by providing the opportunity to demonstrate new equipment in the marine environment.

2.0 Introduction

2.1 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).

2.2 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.

2.3 The project has been successful in gaining EU funding of up to €40m from the European Economic Recovery Plan. This award is in recognition of the project's potential role in supporting development of the offshore European wind industry by proving technologies and techniques.

2.4 DTZ has been commissioned by AOWFL to undertake a socio-economic, recreation and tourism impact assessment of the proposed EOWDC. The structure of the assessment can be summarised as follows:

- **Baseline Technical Report** – this provides a summary of the policy context with regard to offshore renewables in Scotland; and a baseline of indicators related to socio-economics, recreation and tourism within Aberdeen City and Aberdeenshire.

- **EIA Technical Report (this document)** – an assessment of the impact that the proposed EOWDC will have upon socio-economics, recreation and tourism in the study areas, as described below.

2.5 The scope of this assessment is to consider the impacts of the development across the areas listed below. The scope of the assessment has been informed through a benchmarking exercise (see Section 6) which identified the key socio-economic impacts which have been considered in previous Environmental Impact Assessments of comparable offshore wind schemes.

- **Socioeconomic** – employment and economic impacts associated with the construction, operation and decommissioning of the project, including supply chain and income effects
- **Tourism** – considering the impact on tourism in the local area
- **Recreation** – considering the impact on coastal recreational activities
- **Research and Development** – considering the possible impact of the deployment centre on the UK offshore wind industry as a whole, due to the opportunity for research, development and testing of equipment.

2.6 For the purposes of this assessment, the study area has been defined as follows:

- **Inner study area**: the two local authority areas of Aberdeen City and Aberdeenshire, the development will pose direct impacts to this area
- **Wider study area:** Scotland as a whole
- **UK**: potential national impacts, such as the impact on the offshore wind industry as a whole

Consultation

2.7 DTZ consulted with the following individuals in April 2011 (all by phone) to inform the Baseline Assessment and Impact Assessment:

- Colin Parker, Chief Executive, Aberdeen Harbour
- Matt North, Port Manager for the Port of Dundee, Forth Ports
- Steven Paterson, Chief Financial Officer, Peterhead Port Authority
- Eric May, Marine Renewable Section Leader, Marine Scotland
- Robert Forbes, Aberdeen City Council
- Eric Wells, Aberdeenshire Council
- Roddy Mathieson, Aberdeenshire Council
- Alistair Reid, Aberdeenshire Council
- Paul Reynolds, Offshore Wind Development Manager, RenewableUK
- Sara Budge, Project Director, Energetica
- Dr Graham Russell, RYA Scotland

Key Guidance Documents

2.8 This assessment has been undertaken based on the following guidance on economic assessment:

- HM Treasury (2003) Green Book
- BIS (2010) Impact Assessment Guidance
- English Partnerships (2008) Additionality Guide: Third Edition
- BIS (2009) Guidance for Using Additionality Benchmarks in Appraisal

- Surfers Against Sewage (2009) Guidance on Environmental Impact Assessment of Offshore Renewable Energy Development on Surfing Resources and Recreation

Data Information and Sources

2.9 The main sources of information for this assessment (aside from consultations) are the following:

- BWEA (2009) UK Offshore Wind: Charting the Right Course
- Ernst & Young (2009) Cost of and financial support for offshore wind
- Marine Scotland (2011) Economic Assessment of Short Term Options for Offshore Wind Energy in Scottish Territorial Waters: Costs and Benefits to Other Marine Users and Interests
- Scottish Enterprise (2010) National Renewables Infrastructure Plan
- Scottish Renewables (2010) Scottish Offshore Wind: Creating an Industry
- Technip (2011) Rochdale Envelope Requirements for the European Offshore Wind Development Centre
- The Crown Estate / BVG Associates (2010) Guide to an Offshore Wind Farm

Impact Methodology

2.10 The overall impact methodology is primarily based on a quantitative assessment of the economic impacts in terms of job and Gross Value Added (GVA), in line with HM Treasury (2003) Green Book guidance.

2.11 The level of significance is assessed as follows:

Table 2.1: Impact Methodology

Magnitude of the Effect (based on spatial extent, duration, and scale)		
Spatial Extent of Effect, assessed at the level of • Inner Study Area (Aberdeen & Aberdeenshire) • Wider Study Area (Scotland) • UK	**Duration of Effect** • Long-term/ permanent (more than 10 years) • Medium-term (existing for 5 to 10 years) • Short-term (existing for 1 to 5 years) • Temporary effect (existing for less than a year)	**Scale of Effect:** As there are no specific standards or guidelines, the impacts have been assessed relative to baseline conditions, or a 'No Development' scenario
Sensitivity of the Receptor		
The sensitivity of the receptor is typically assessed in terms of the recoverability of the receptor and importance of the receptor. However this method of assessment does not perform well in terms of socio-economic impacts (particularly beneficial impacts), where the receptor is assumed to be the economy, population, businesses and workforce in the study area. In the case of job creation (or job losses), the sensitivity has been judged in terms of the level of unemployment in the area.		

2.12 Impacts are assigned a rating of major, moderate, minor or negligible, based on the magnitude of the effect and sensitivity of the receptor, as follows:

Table 2.2: Matrix for Significance of Impact

Magnitude of Effect based on spatial, duration and scale of effect	Sensitivity of Receptor Very High	High	Medium	Low
Very High	Major	Major	Major	Moderate
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor
Low	Moderate	Minor	Minor	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

Cumulative and In-combination Impact Assessment Methodology

2.13 The core development under consideration within this assessment is the offshore works associated with the European Offshore Wind Deployment Centre (EOWDC). Other cumulative developments which need to be considered are: the onshore works associated with the project, the Ocean Laboratory element of the project, and any other potential offshore wind energy projects in the area.

2.14 The onshore works will be subject to a separate Environmental Impact Assessment, however they have been considered briefly within this assessment as a cumulative development.

2.15 The cumulative impact assessment has also considered the interaction with other offshore wind developments on the East coast of Scotland. There are two clusters of offshore wind farm developments planned for the East coast of Scotland totalling around 7.5GW of capacity, as follows:

- **Moray Firth** – Beatrice project (920MW) and Moray Firth Round 3 project (1,300 MW)
- **Firth of Forth** – Inch Cape (905MW), Neart na Gaoithe (420MW), Forth Array (415MW), and Firth of Forth Round 3 project (3,500MW)

Worst Realistic Case

2.16 In conducting this assessment, consideration has been given to the possible range of impact scenarios, based around the following key aspects of the project:

- **Scale** (capacity deployed) and timing of the project - the larger scale the project and the sooner it takes place, the greater the beneficial economic impacts
- **Sourcing of components** – higher levels of local sourcing will increase beneficial impacts in the Inner and Wider study areas.
- **Usage of local ports for construction and operational activities** – using a local port such as Peterhead or Aberdeen will increase beneficial impacts in the inner study area.

2.17 For the purposes of this assessment, a central scenario has been developed reflecting the most likely outcome; although it is recognised that there is some uncertainty around the key project parameters above, and that the actual impact may be higher or lower.

Scale and timing of the project

2.18 The level of capacity deployed within the EOWDC is one of the key variables for the socioeconomic assessment; as this determines the scale of capital and operational expenditure and the resulting socioeconomic impact. The development will comprise 11 turbines of between 4MW and 10MW each (although The Crown Estate Lease limits the overall capacity to 100 MW). However, following further consultation with the developer, it appears that the most likely outcome is towards the midpoint of this range rather than the extremes, as the development is likely to involve a mix of different turbine designs and sizes. For the purposes of this assessment, DTZ has used an indicative total capacity figure of **84MW**, based on the following assumptions:

- 4 x 6 MW turbines installed in 2013
- 4 x 7.5 MW turbines plus 3 x 10 MW turbines installed in 2014

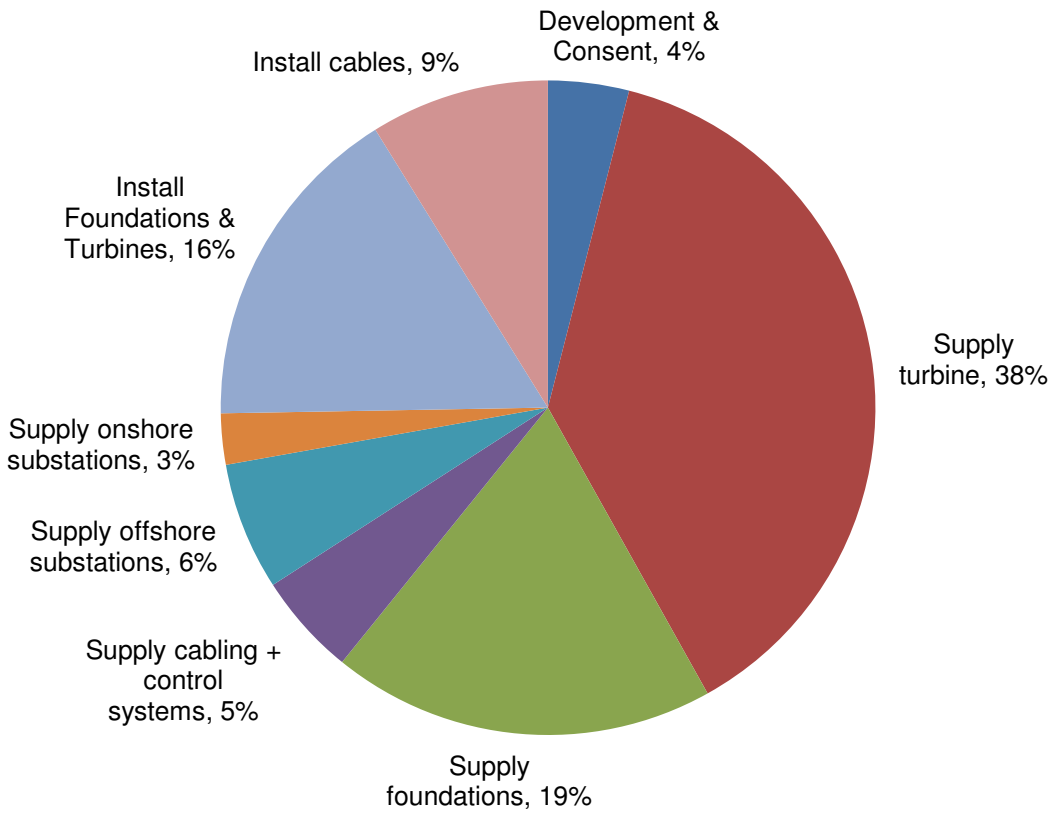
2.19 It is anticipated that the project will be constructed over a two year period, and will be operational for up to 22 years.

Sourcing of Project Components

2.20 Another key aspect in determining the socioeconomic impact during the construction phase is the extent to which project-related capital expenditure is captured by businesses within the study area. This can be assessed by breaking the total CAPEX into its constituent elements; and then making assumptions as to the likelihood of each element of expenditure remaining within the study area.

2.21 A report produced by BVG Associates for The Crown Estate (2010) provides a breakdown of the CAPEX for a typical offshore wind farm, based on industry benchmarks, which DTZ has analysed as shown in Figure 2.3. As can be seen, the largest single element is the cost associated with the supply of the wind turbine generator (38%), followed by the supply of foundations (19%), and the installation of foundations and turbines (16%). Installation activities account for 25% of the total CAPEX, whilst supply of project components comprises 71% of the total CAPEX (the remaining 4% relates to Development and Consenting).

Figure 2.3: Breakdown of Capital Cost for a Typical Offshore Wind Farm (Source: Crown Estate / BVG Associates, 2010)



2.22 DTZ has considered where the main project elements are likely to be sourced from, in consultation with AOWFL and wider consultees, and bearing in mind the actual locations of potential suppliers for each element. The assumptions are shown in Table 2.4:

Table 2.4: Assumptions on Sourcing of Components

Project Element (% of CAPEX)	Assumption	Comments
Turbines (38% of CAPEX)	Assume: 25% Wider Study Area 25% Rest of UK 50% Non-UK	The key manufacturers of offshore wind turbines are currently located in Continental Europe and Asia. A number of manufacturers (e.g. Siemens, GE, Clipper Windpower, Mitsubishi, Vestas, Gamesa, Doosan) are considering the development of manufacturing bases for offshore turbines in the UK. Of these, Doosan and Gamesa are considering investing in Scotland, but not in the Inner Study Area.[2] Given that the project proposes to use a mix of turbines, it is likely that they will be sourced from a number of distinct companies and locations.
Foundations (19% of CAPEX)	Assume: 50% Wider Study Area 50% Rest of UK	There are a number of suppliers of foundations for offshore wind projects in the UK, including some within the Wider Study Area (but not Inner Study Area) such as BiFab. Given the physical size of foundations it is preferable to source locally if possible. Given that there will be a mix of foundations used within the development, it is possible that they will be sourced from a range of different locations
Cabling & control systems (11%)	Assume: 50% Rest of UK 50% Non-UK	The probable source for this element is the UK or Scandinavia. No offshore substation is proposed so this element is included within cabling.
Development & Consenting (4%)	Assume: 33% Inner Study Area 33% Wider Study Area 33% Rest of UK	Includes project development work, which in this case will be split between Technip, AOWFL and any associated contractors/advisors. Also includes survey work which is likely to be carried out locally.
Onshore Substation (3%)	Note: this element falls outside the scope of this assessment, as the assessment only covers offshore works. The impact of this element is considered in the section on Cumulative Impacts below.	

Usage of Local Ports

2.23 Another main factor which will influence the scale of socioeconomic impacts is the choice of port used during the construction and operational phases – and whether this is within the Inner Study Area, Wider Study Area, or further afield – as this is a key factor in the location of impact.

2.24 The final decision on which port(s) are to be used has not yet been made, although current intentions are as follows:

- Potential utilisation of Aberdeen Port for small vessels during the construction phase, and for operational activities
- Potential utilisation of Peterhead Port as a construction port

2.25 DTZ has conducted an independent high-level review of a number of major ports in close proximity to the proposed development site (see Section 6), including Aberdeen and Peterhead, in order to assess their suitability for construction and operational activities. This review found that Aberdeen and Peterhead ports are likely to be sufficient for construction activities in relation to the EOWDC, although noting that these ports may not be suitable for the construction of larger offshore wind projects in their current state, due to space constraints.

[2] Doosan in Renfrew, near Glasgow, and Gamesa in Dundee

2.26 The review also found that Aberdeen and Peterhead have sufficient infrastructure in order to be used during the operational phase, and offer good facilities and may be chosen due to the requirement for an operational port in close proximity to the development site.

2.27 Overall, the conclusions of DTZ's review of ports are consistent with the preferences of the project, as indicated above. For the purposes of this assessment, it has therefore been assumed that the both the construction port and operational port will be located within the Inner Study Area (i.e. Peterhead and Aberdeen).

3.0 Impact Assessment

Direct and Supply Chain Impacts

Construction Phase

Potential Impacts

3.1 The construction of an offshore wind farm can potentially generate socioeconomic benefits related to the direct employment of staff in manufacturing and construction activities, and indirect knock-on impacts on the supply chain for the construction project.

3.2 As identified in Section 2 above, the **duration** of the construction phase will be for two years (2013-2014), and is therefore viewed to be a **short-term effect**.

3.3 In assessing the **scale** of the impact it is important to first consider the level of capital expenditure (CAPEX) related to the project. As detailed costings have not yet been finalised for the project, DTZ has estimated the total capital cost based on the likely capacity and industry benchmarks for the level of CAPEX per Mega Watt (MW).

3.4 BWEA (2009) identifies that the capital cost offshore wind projects currently stands at £3.1 million per MW. This ratio has increased markedly in recent years, due to changes in commodity prices, foreign exchange rates, and supply constraints. BWEA (2009) provides a range of forecasts for CAPEX, concluding that there is some uncertainty as to whether CAPEX will increase or decrease in the short to medium term. On this basis, DTZ has used the current figure of £3.1 million per MW in order to model the likely CAPEX associated with the EOWDC.

3.5 Based on a total capacity of 84 MW, this results in an estimated capital cost of **£260.4 million**, as shown in Table 3.1.

Table 3.1: Capital Cost estimates for the EOWDC

	2013	2014	Total
Capacity Deployed in year	24	60	84
CAPEX per MW (£m)	3.1	3.1	
Total CAPEX	74.4	186.0	260.4

3.6 Based on the assumptions on sourcing of project components (as set out in Figure 2.4) and excluding the onshore elements, the proportion of CAPEX retained within the study area is estimated to be as follows:

Table 3.2: Assumptions of CAPEX retained in study area

Project component	% of CAPEX	Inner Study Area	Wider Study Area (inc Inner Study Area)	UK (Inc Wider Study Area)
Development & Consent	4.0%	1.3%	2.7%	4.0%
Supply turbine	38.0%		9.5%	19.0%
Supply foundations	19.0%		9.5%	19.0%
Supply cabling & control systems	11.4%			5.7%
Install Foundations & Turbines	16.5%	16.5%	16.5%	16.5%
Install cables	8.9%			4.4%
Total CAPEX retained (% of total)		17.8%	38.1%	68.56%
Total CAPEX retained (£m)		£46.3	£99.2	£178.5

3.7 As shown in Table 3.2, it has been assumed that 38% of CAPEX will be retained in the Wider Study Area (Scotland), of which 18% will be retained in the Inner Study Area. This translates into £99m of expenditure captured in the Wider Study Area, of which £46m will be captured in the Inner Study Area.

3.8 The next steps in calculating the impact are described as follows, and summarised in Table 3.3:

- The number of job-years supported directly or indirectly by project expenditure can be calculated by dividing the total expenditure by the average turnover per worker in a relevant industrial sector – which in this case would be the 'Construction of Civil Engineering Projects'[3] sector, with a turnover per head of £187,000 (Source: Annual Business Inquiry 2008, Office for National Statistics). As shown in Table 3.3, the project is estimated to support 531 job-years worth of employment in the Wider Study Area, of which 248 job-years worth of employment will be in the Inner Study Area.

- The Gross Value Added (GVA) supported by the expenditure can be estimated by multiplying the number of job-years by the average GVA per worker in the sector - £59,000 (Source: Annual Business Inquiry 2008, Office for National Statistics; Construction of Civil Engineering Projects sector). HM Treasury (2003) Green Book guidance recommends that where possible, economic impacts which occur over differing timescales are expressed in Net Present Values (NPV) terms using an appropriate discount rate (the guidance suggests 3.5%). As shown in Table 3.5, the GVA supported (directly or indirectly) by the proposed development in the Wider Study Area is estimated to be £29.5m, of which £13.8m will be in the Inner Study Area.

- The direct and indirect employment supported will increase household incomes and expenditure in the local area, which will support additional jobs. This is known as an induced or income multiplier effect. At a Scotland level, estimates have been made for the scale of the income multiplier effect in the Scottish Input-Output tables (the latest set of data relates to 2007). For the construction sector the induced multiplier is 0.39 for employment, or 0.34 for GVA. In the absence of any corresponding estimates of multiplier effects for the Inner Study Area, we have assumed that the multiplier effects on the local economy will be half as great as for Scotland as a whole (i.e. 0.195 for employment, and 0.17 for GVA).

[3] As defined in the Office for National Statistics Standard Industrial Classification (SIC) system

Table 3.3: Summary of Impact: Construction Phase

Total Employment (job-years)	Direct & Indirect	Induced	Total	Magnitude of Impact
Inner Study Area	248	48	296	Medium
Wider Study Area (Scotland)	531	207	738	High
UK	955	n/a	n/a	Very High
NPV of GVA (£m)	**Direct & Indirect**	**Induced**	**Total**	
Inner Study Area	£13.8	£2.3	£16.1	Medium
Wider Study Area (Scotland)	£29.5	£10.0	£39.6	High
UK	£53.1	n/a	n/a	Very High

3.9 The receptors of the above economic impacts have been assumed to be the economy, population, businesses, and workforce of the Inner Study Area and Wider Study Area. One way of assessing the sensitivity of the receptors is in terms of the relative level of unemployment – as the creation of jobs associated with the proposed project will be of benefit in reducing unemployment in the area, and partially offsetting the anticipated contraction in employment in other sectors such as oil and gas and manufacturing (see Baseline Report, Figure 4.5). As described in the baseline report, the current level of unemployment is 2.8% in the Inner Study Area, and 7.1% in the Wider Study Area (compared to a UK benchmark of 7.8%).

3.10 Another factor in assessing the sensitivity of the receptors is in terms of the wider catalytic impact the development could have in supporting the development of renewable energy sector. This is particularly true of the Inner Study Area, where the project will have a strong linkage with other local initiatives such as the Energetica project described in the Baseline Report. **Overall, the sensitivity of the receptors has been assessed as 'Medium' in both the Inner Study Area and the Wider Study Area.**

3.11 The impact on the Inner Study Area has been assessed of Medium (positive) magnitude, Medium sensitivity and therefore of **Moderate (positive) significance**. In the Wider Study Area, the potential impact has been assessed of High (positive) significance, Medium sensitivity, and therefore of **Moderate (positive) significance.**

Mitigation

3.12 The impacts of the development in terms of direct employment and supply chain impacts have been assessed to be of Moderate positive significance. Therefore no mitigation of negative impacts is required.

3.13 The consultations with stakeholders including Aberdeen City and Shire Councils and Scottish Enterprise, including the Energetica Project, highlighted the anticipated positive impacts of the project on the economy in both the Inner Study Area and Wider Study Area.

3.14 However, it is acknowledged that there is some uncertainty as to the scale of impact, as set out in Section 2. Actions which should be taken in order to maximise the beneficial impacts of the development include the following:

- Work with the major ports within the Inner Study Area to ensure that they can be utilised during the construction, operational, and decommissioning phases; identifying any necessary infrastructure upgrades at the earliest possible opportunity.
- Identify suitable local businesses which could provide components of the project. Engage with these companies and make them aware of the opportunities available where possible. Actively encourage these businesses to bid for contracts related to the project. Scottish Enterprise has been engaged in activities of this kind.

Residual Impacts

3.15 Not applicable – no mitigation measures

Cumulative Impacts

3.16 This assessment covers the offshore works for the proposed project only: onshore works will be considered separately in the assessment as part of the application for the onshore works. In terms of socioeconomic impact, the onshore works such as a substation are viewed to be of negligible significance on their own. The rationale for this is that the total capital expenditure on this element will be relatively modest (3% of total CAPEX), and that components are likely to be sourced from outside the Inner Study Area or Wider Study Area. However, consultees have highlighted the benefits of locating onshore works at the Science and Energy Park in order to support a cluster of offshore wind related businesses. If this can be achieved, the cumulative beneficial impacts will be greater.

3.17 The impact of other offshore wind farm projects in the vicinity of the proposed development is likely to be very significant. As described in Section 2, there is around 7.5GW of offshore wind capacity planned for the East coast of Scotland, which will require capital investment in the order of £23 billion[4] and will be constructed on a phased basis between now and around 2020. A study by Scottish Renewables (2010) showed that the offshore wind sector in Scotland could directly support 28,000 full time equivalent jobs by 2020. Offshore wind projects on the East coast of Scotland will have a major impact on ports in the area - a report by Scottish Enterprise & HIE (2010a) concluded that the most likely ports/locations to be used for offshore wind manufacturing and construction in the area are Leith, Dundee, Nigg, Aberdeen, Peterhead, and Fife Energy Park. Consultees felt that this project would have a significant role in supporting the development of the industry as there is an identified need for more proving sites for turbines (RenewableUK).

Operational Phase

3.18 The operation of an offshore wind farm can potentially generate socioeconomic benefits related to the direct and indirect employment of staff in operations and maintenance (O&M) activities.

3.19 The **duration** of the operational phase is 22 years, and is therefore judged to have a **long-term** effect.

3.20 In order to assess the **scale** of the effect, it is necessary to consider the total level of Operational Expenditure (OPEX); the proportion of this which will be retained locally; and the employment which this will support. The following assumptions have been used, with the results shown below:

- Total OPEX can be estimated based on the total installed capacity (i.e. 84MW by end of 2014) multiplied by a ratio of £79,000 per MW per annum (Source: Ernst & Young, 2009). This means that once all capacity has been installed in 2014, the total OPEX will be around £6.6 million per annum.
- The proportion of total OPEX which will be retained locally has been estimated in a number of studies. A report by Scottish Renewables (2010) estimated that of total OPEX related to offshore wind projects in Scottish Territorial Waters, 45% would be retained in Scotland, and 56% in the UK. The local impact will relate to the operations and maintenance team, which will typically be located in a port proximate to the wind farm site to minimise transfer times. DTZ's review of port infrastructure (see Section 6) concluded that there are two ports in the Inner Study Area (Aberdeen and Peterhead) which would be suitable for use as an Operations and Maintenance base. The project has confirmed the utilisation of Aberdeen Port during this phase of development. On this basis, it can be assumed that the 45% of OPEX which falls within the Wider Study Area would relate to the Inner Study Area and not the remainder of Scotland.

[4] i.e. 7,460MW of capacity multiplied by a CAPEX figure of £3.1 million per MW

- Direct and Indirect GVA impacts can be estimated using a ratio of OPEX to GVA of 2.27 to 1 (Source: Scottish Renewables, 2010).
- The level of direct and indirect employment can be estimated from GVA using a suitable ratio for the total cost per operations and maintenance job, which Scottish Renewables (2010) estimated at £52,000.
- As with the construction phase above, the induced multiplier effect has been calculated through reference to the Scottish Input Output tables. At Scotland level, the induced multiplier for the construction sector is 0.39 for employment, or 0.34 for GVA. It has been assumed that the corresponding multiplier effects for the Inner Study Area are 0.195 for employment, and 0.17 for GVA.

Table 3.4: Operational Impacts (per annum, once all capacity deployed)

	OPEX (£m p.a.)	Jobs supported directly & indirectly	GVA (£m p.a.)
Inner Study Area	3.0	25	1.3
Wider Study Area (Scotland)	3.0	25	1.3
UK	3.7	31	1.6

Table 3.5: Total Operational Impacts over lifetime of project (22 years)

Total Employment (job-years)	Direct & Indirect	Induced	Total	Magnitude of Impact
Inner Study Area	553	108	661	High
Wider Study Area (Scotland)	553	216	768	High
UK	693	n/a	n/a	High
NPV of GVA	**Direct & Indirect**	**Induced**	**Total**	**Magnitude of Impact**
Inner Study Area	£17.4	£3.0	£20.4	High
Wider Study Area (Scotland)	£17.4	£5.9	£23.4	High
UK	£21.9	n/a	n/a	High

3.21 As shown in Table 3.4, O&M activities will (directly and indirectly) support 25 jobs and £1.3 million of GVA per annum in the Inner Study Area. Over the 22 year operational phase of the project, the project will directly or indirectly support £17.4 million of GVA in the Inner Study Area, or £20.4 million once induced effects have been taken into account. The impact is viewed to be of High significance at both the level of the Inner Study Area and Wider Study Area.

3.22 The sensitivity of receptors is as described above in relation to the Construction phase– i.e. 'Medium' in both the Inner Study Area and Wider Study Area.

3.23 In the Inner Study Area, the potential impact has been assessed of High (positive) magnitude, Medium sensitivity and therefore of **Moderate (positive) significance**. In the Wider Study Area, the potential impact has been assessed of High (positive) significance, Medium sensitivity, and therefore of **Moderate (positive) significance**.

Mitigation

3.24 The above section demonstrates that the impact of the development during the operational phase is of Moderate positive significance. Therefore no mitigation of negative impacts is required.

Residual Impacts

3.25 No change from pre-mitigation position.

Cumulative Impacts

3.26 This assessment covers the offshore works for the proposed project only: onshore works will be considered separately. In terms of socio-economic impact, the onshore works such as substations are viewed to be of negligible significance, as OPEX related to these elements will be minimal. However, as already identified, the siting of these elements on the Energy Park north of Aberdeen could, in the opinion of consultees, support a cluster of offshore wind related companies and be used as part of the demonstration and training aspects of the project. This would have knock-on beneficial impacts for the local economy.

3.27 The impact of other offshore wind farm projects in the vicinity of the proposed development during the operational phase is likely to be very significant. As described in Section 2, there is around 7.5GW of offshore wind capacity planned for the East coast of Scotland, which will require operational expenditure of nearly £600 million per annum[5] for the lifetime of these projects. This will support a large number of permanent jobs in operations and maintenance, which are likely to be located in operations and maintenance ports on the East Coast of Scotland.

Decommissioning Phase

3.28 The decommissioning of an offshore wind farm can potentially generate socioeconomic benefits related to the removal, disassembly, and disposal of wind farm components. It is anticipated that foundations and turbines will be cut/lifted and removed by a self-elevating crane vessel. Cables will be left in situ where possible, with exposed ends cut and/or buried.

3.29 The **duration** of the decommissioning phase is estimated to be up to 5 months, and is therefore judged to be a **temporary** effect.

3.30 In order to assess the **scale** of the effect, it is necessary to consider the total level of expenditure on decommissioning; the location of this expenditure; and the employment which this will support. The following assumptions have been used:

- Ernst and Young (2009) recommend that the costings for offshore wind projects build in a contingency equivalent to £18,000 per MW per annum for decommissioning; which for a project with a lifetime of 22 years equates to a total figure of £396,000 per MW of capacity.
- This figure has been multiplied by the total capacity (84 MW) to give a total decommissioning cost of **£33.3 million**.
- It has been assumed that the decommissioning phase takes place in 2036/7, assuming a 22 year lifetime of the project.
- It has been assumed that the construction port would be used for decommissioning activity – which as described above, has been assumed to be in the Inner Study Area. The economic activity associated with decommissioning activity will be associated with the decommissioning port.
- The number of job-years directly or indirectly supported by expenditure on decommissioning can be calculated by dividing the total expenditure by the average turnover per worker in a relevant industrial sector – which in this case would be the 'Construction of Civil Engineering Projects'[6] sector, with a turnover per head of £187,000 (Source: Annual Business Inquiry 2008, Office for National Statistics).
- The Gross Value Added (GVA) supported by the expenditure on decommissioning activity can be estimated by multiplying the number of job-years by the average GVA per worker in the sector of £59,000 (Source: Annual Business Inquiry 2008, Office for National Statistics;

[5] i.e. 7,460 MW multiplied by £79,000 per MW per annum
[6] As defined in the Office for National Statistics Standard Industrial Classification (SIC) system

Construction of Civil Engineering Projects sector).

- HM Treasury (2003) Green Book guidance recommends that where possible, economic impacts which occur over differing timescales are expressed in Net Present Values (NPV) terms using an appropriate discount rate (the guidance suggests 3.5%).
- As with the construction phase above, the induced multiplier effect has been calculated through reference to the Scottish Input Output tables. At Scotland level, the induced multiplier for the construction sector is 0.39 for employment, or 0.34 for GVA. It has been assumed that the corresponding multiplier effects for the Inner Study Area are 0.195 for employment, and 0.17 for GVA.

3.31 Overall, the analysis shows that the total expenditure on decommissioning will be £33.3 million. This will directly or indirectly support 178 job-years of employment within the Inner Study Area, generating £5.8 million of GVA. Once induced effects have been taken into consideration, this will support £6.8 million worth of GVA in the Inner Study Area.

Table 3.6: Summary of Impacts from Decommissioning Phase

Total Employment (job-years)	Direct & Indirect	Induced	Total	Magnitude of Impact
Inner Study Area	178	35	213	Medium
Wider Study Area (Scotland)	178	69	248	Medium
UK	178	n/a	n/a	Medium
NPV of GVA	**Direct & Indirect**	**Induced**	**Total**	**Magnitude of Impact**
Inner Study Area	£5.8	£1.0	£6.8	Medium
Wider Study Area (Scotland)	£5.8	£2.0	£7.7	Medium
UK	£5.8	n/a	n/a	Medium

3.32 As with the impacts associated with construction and operation, the **sensitivity of the receptors** has been assessed as 'Medium' in the Inner Study Area and Wider Study Area.

3.33 In the Inner Study Area, the impact has been assessed to be of Medium magnitude, Medium sensitivity, and therefore of **Moderate (positive) significance.** In the Wider Study Area, the impact has been assessed of Medium magnitude, Medium sensitivity and therefore of **Moderate (positive) significance**.

Mitigation

3.34 The above section demonstrates that the impact of the development during the decommissioning phase is of Moderate positive significance. Therefore no mitigation of negative impacts is required.

Residual Impacts

3.35 No change from pre-mitigation position.

Cumulative Impacts

3.36 This assessment covers the offshore works for the proposed project only: onshore works will be considered separately.

3.37 The impact of other offshore wind farm projects in the vicinity of the proposed development during the decommissioning phase is likely to be very significant. As described in Section 2, there is around 7.5GW of offshore wind capacity planned for the East coast of Scotland. The expenditure on decommissioning on these projects could total nearly £3 billion[7], and is likely to take place around 25 years from commissioning (which on the East coast projects is likely to occur between now and

[7] i.e. 7,460 MW of capacity multiplied by around £400,000 per MW (assuming a 22 year project lifetime)

2020). This will create a large number of temporary jobs for the duration of the decommissioning phase. The £7m of GVA associated with this project will be a very small part of the wider cumulative impacts.

Impact on Tourism

3.38 Marine Scotland (2011) highlight that offshore wind projects can have a range of potential impacts on tourism, including positive and negative impacts:

- Visual effects on the landscape and seascape deterring visitors to an area or deterring tourism investment;
- Disturbance or injury to coastal or marine wildlife interests (e.g. for wildlife watching) during construction or operation of the wind farm;
- Disruption to site access for tourism operations; and
- Visual effects on landscape and seascape during operation creating tourism opportunities, providing add-on benefits to existing wildlife excursions and attracting visitors to an area.

3.39 The Marine Scotland assessment cites a survey by Riddington et al (2008), which estimates the impacts of *onshore* wind farm development on tourism expenditure in Scotland (Note: there is no corresponding survey looking at the impact of offshore wind projects on tourism, but this is taken to be a reasonable proxy). The survey found that the vast majority of visitors (93-99%) who had seen a wind farm suggested that the experience would not have any effect on their decision to return to the area; in fact there were some tourists for whom the experience increased the likelihood of a return visit rather than decreasing it.

3.40 The assessment by Marine Scotland suggests that the seascapes in the East and North East of Scotland (i.e. the area around the proposed development site) are less sensitive than the West coast of Scotland (citing Scott et al, 2005); and that the effects of offshore wind development on general tourism in these regions has therefore been considered to be negligible.

3.41 Commercial wildlife boat trips such as whale watching trips have the potential to be impacted directly by the physical presence of the wind farms by making access difficult to routes often used by the boats or by interrupting lines of sight while scanning for wildlife with scopes or binoculars. However the report by Marine Scotland (2011) found these effects to be negligible.

3.42 Overall, the assessment by Marine Scotland (2011) suggests that the impact of offshore wind farms on tourism is of negligible significance. This view is supported in a study by Glasgow Caledonian University for the Scottish Government (2008), which concluded that 'even using a worst case scenario, the impact of current [wind farm] applications [on tourism] would be very small.'

3.43 The views of consultees supported this view, though the close proximity of the Trump Development at Menie Estate has been noted. Construction of new golf courses is well underway at Menie and the EOWDC lies to the south east of the estate. Consultees also highlighted the high levels of business tourism. The baseline report highlighted Visit Scotland and Scottish Enterprise statistics showing that nearly three quarters of tourist trips to Aberdeen are for business. The EOWDC will clearly support and potentially grow this important market segment, which is estimated by Scottish Enterprise to be worth £137 million per annum.

3.44 The assessment by Marine Scotland (2011) suggests that offshore wind farms can have positive impacts on tourism – particularly where the wind farm has an associated visitor centre. For example, a report by BWEA (2006) reviewed numerous studies and surveys assessing the impacts of wind farms on tourism in the UK, including two operational offshore wind farms in England and Wales. The report stated that E.ON UK's Scroby Sands Information Centre welcomed 30,000 people in the first six months (from May 2004), and in 2009, 42,000 people visited the centre (Marine Scotland, 2011). .

3.45 Furthermore, there may be positive effects on the local tourism economy associated with temporary workers during the construction phase. It is often the case on offshore wind construction projects, that workers are employed on a shift pattern system – for example one week of work on an offshore vessel, followed by one week of shore leave. Workers on shore leave are likely to have a (modest) impact on the local tourist economy, through expenditure on accommodation and subsistence. The extent of this impact varies from development to development, and has not been quantified in this case.

3.46 Overall, the potential impact on tourism has been assessed to be of **negligible significance**. The EOWDC may have a minor beneficial effect on business tourism.

Impact on Recreation

3.47 The assessment of Offshore Wind projects in Scotland by Marine Scotland (2011) highlights that in general, offshore wind projects may have impacts on recreational boating; and surfing, windsurfing and kayaking.

3.48 The EOWDC is seen by consultees to be too far offshore to prevent surfing or bathing. In terms of the potential impact on recreational boating, a number of potential impacts have been considered such as: safety, changes to recreational boating behaviour or activity levels, and increased steaming distances to avoid offshore wind farms. There are known to be jet skiers in the area.

3.49 However, the assessment by Marine Scotland concludes that the presence of an offshore wind farm will not have any significant negative impacts in terms of changes to recreational boating behaviour or activity levels, or collision risk/navigation. A position statement by the European Boating Association (EBA) states that "there is no danger to a vessel under 24 metres in length navigating through the farm taking reasonable care" – a position which is supported by the RYA Scotland (Marine Scotland, 2011, pg 73). The report also suggests that (with the exception of one offshore wind development in the West of Scotland) there would not be any impacts in relation to the loss of essential routes to anchorage points. Consultation with RYA further reveals that normal sailing routes for large craft are several miles offshore at that point in order to avoid Aberdeen Harbour traffic. Any small craft (e.g. dingy sailing) would, on the other hand, sail around and in between the turbines quite safely.

3.50 The only impact quantified in the assessment by Marine Scotland relates to the negative impact (increased cost) associated with increased steaming distances to avoid wind farms, for which a number of scenarios are identified (High, Medium, and Low Impact). However even in the High Impact scenario, the overall impact associated with increased steaming is £33,000 per annum for the 10 offshore wind farms in Scottish Territorial Waters combined. Given the relatively small area affected by the proposed development (26 sq km) compared to the projects considered in the Marine Scotland report (1,233 sq km combined), the impact associated with the proposed development is likely to be of **negligible significance**.

3.51 In terms of the potential impact on surfing, windsurfing and kayaking, the assessment by Marine Scotland (2011) identifies that the main impact of offshore wind developments is related to the deterioration of surf wave quality due to the presence of foundations. However, the assessment concludes, based on evidence from existing wind farm developments, that there have been no significant changes in wave quality at the shoreline as a result of other offshore wind projects. On this basis, it has been assumed that the proposed development will not have a significant impact on surfing, windsurfing or kayaking activity.

3.52 Overall, the potential impact on recreation has been assessed of **negligible significance**.

Impact on the Offshore Wind sector / R&D impacts

3.53 The EOWDC has the potential to create benefits for the offshore wind energy sector at a local and national level, through its role as a deployment and research and development centre. Key features of the EOWDC in this regard are that it will involve the deployment of different foundation and turbine designs; and the inclusion of the Ocean Laboratory within the overall development, which will provide both training and environmental monitoring opportunities.

3.54 Deployment centres are needed to allow manufacturers to test turbines, foundation designs and other components in the offshore environment. Given the large number of manufacturers expressing an interest in UK manufacture of offshore turbines, a large number of turbine test locations will be required.

3.55 The EOWDC will be the second largest of four current deployment centres in the UK. The others are at Blyth (National Renewable Energy Centre) with up to 99 MW of capacity (20 turbines) in development; and two smaller deployment centres each comprising two turbines (Gunfleet sands, Kent and 2B Energy at Methil, Fife). The four current centres will collectively provide the opportunity to test 35 turbines, of which 11 (or 30%) would be at the EOWDC. RenewableUK identifies a further two sites as being required to support industry development in the current round of licensing plus more sites in future rounds.

3.56 The deployment centres will allow manufacturers to improve reliability and reduce costs through testing. Extensive data will be generated that will be of benefit to all of the industry. RenewableUK has identified a need for 10 new UK factories to produce the 23 GW required by 2020. Sites such as the EOWDC will be critical in the UK securing this new manufacturing base and the associated jobs. Its location off Aberdeen will allow the lessons of the oil and gas industry to be transferred to offshore wind reinforcing the region's position in energy. Turbine manufacturers from China, France, Korea, USA and Japan have already shown keen interest in the EOWDC as a possible route into supplying Round 3 projects.

3.57 Stakeholders have expressed their strong support for the scheme, and the significant impact it will have in supporting the development of the offshore wind energy sector at a national level through the R&D opportunities it provides:

- 'The development of offshore wind still faces many challenges to commercial deployment. The operation of the EOWDC will make a strong contribution to knowledge sharing for new components, designs and access methodologies for construction, operations and maintenance to be executed in the marine environment.' **Chris Bronsdon, Chief Executive, Scottish European Green Energy Centre (SEGEC)**

- 'The European Offshore Wind Deployment Centre will provide invaluable opportunities for R&D, helping the industry to grow with real confidence. Innovative projects such as this will help the UK to maintain its position as the world leader in offshore wind. This will in turn encourage more investors to come forward, creating thousands of jobs in the rapidly-expanding offshore wind sector.' **Maria McCaffery, Chief Executive of RenewableUK**

- 'This is potentially a great opportunity for Scotland's research community to actively engage in the development of an important means to generate low carbon electricity. Particularly important will be the deployment of the Ocean Laboratory, a wide range of turbines and support structures as possible and access to these for independent evaluation in order to aid future developments.' **Professor Paul Mitchell of the University of Aberdeen's School of Engineering**

3.58 Consultees in the Inner Study Area saw the EOWDC as a key part of the Energetica project (discussed in the Baseline Report), underlining the capability of the area in energy and renewables and helping to attract inward investment. For example, if the onshore elements could be co-located with the Energy Park (Bridge of Don) it would help to create a cluster of energy and engineering companies in one location. Sara Budge, project manager for Energetica, Aberdeen City and Shire Economic Future (ACSEF), commented:

> *"The EOWDC is a major component of ACSEF's flagship project, Energetica. As a pioneering offshore wind project, it will be at the cutting edge of the development of new technologies and presents significant opportunities for Aberdeen City and Shire to build a viable, robust supply chain around offshore wind, particularly in the areas of development, operation and maintenance*
>
> *"Energetica is a highly ambitious, dynamic proposal at the heart of our efforts to promote Aberdeen City and Shire as a global energy hub. In addition to the EOWDC, the hydrogen corridor, airport development zone and Peterhead's decommissioning and emerging marine renewable sector along with links to the region's two universities and research base are also key to Energetica's success.*
>
> *"Energetica may have the potential for a Smart Grid system to transport and deliver electricity, a pump storage facility to store any excess electricity produced through wind generation, test and research facilities for other forms of renewable energy and high quality, low carbon commercial and industrial accommodation."*

3.59 Bob Collier, Chief Executive of Aberdeen & Grampian Chamber of Commerce commented:

> *"This is a real opportunity for Aberdeen and the North-east [of Scotland] to place itself at the forefront of this aspect of the renewables industry. There is fierce completion not just in Scotland but across the rest of Europe to gain recognition as a leader in the field and this project will provide an extremely valuable testing site for manufacturers to demonstrate their products and to gather vital data on performance."*

3.60 Overall, the consultees and stakeholders have expressed a high level of support for the project. They identified that the proposed project will be an important contributor to the offshore wind industry as a whole, in particular benefitting the rollout of Round 3 projects, and benefitting the local area / Inner Study Area.

3.61 Whilst it is not possible to precisely quantify the scale, magnitude or duration of this effect, **DTZ's view is that this effect is of Moderate/Major (positive) significance to the Inner Study Area, and of Moderate (positive) significance to the Wider Study Area and the UK.**

4.0 Summary of Impact Assessment

4.1 The following tables provide a summary of the Impact Assessment at the level of the Inner Study Area and Wider Study Area.

Table 4.1: Impact Assessment: Inner Study Area

Potential Impact / Activity	Sensitivity of Receptor	Scale	Duration	Spatial Extent	Magnitude of Effect	Significance	Significance after Mitigation
Direct & Supply Chain impacts							
Construction	Medium	Medium (positive)	Short-term	Local	Medium (positive)	Moderate (positive)	Moderate (positive)
Operation	Medium	High (positive)	Long-term	Local	High (positive)	Moderate (positive)	Moderate (positive)
Decommissioning	Medium	Medium	Temporary	Local	Medium (positive)	Moderate (positive)	Moderate (positive)
Tourism	Medium	Low (positive)	Long-term	Local	Negligible	Negligible	Negligible
Recreation	Low	Low (positive)	Long-term	Local	Negligible	Negligible	Negligible
R&D	High	Medium (positive)	Long-term	Local / National / International	High (positive)	Moderate / Major (positive)	Moderate / Major (positive)

Table 4.2: Impact Assessment: Wider Study Area

Potential Impact / Activity	Sensitivity of Receptor	Scale	Duration	Spatial Extent	Magnitude of Effect	Significance	Significance after Mitigation
Direct & Supply Chain impacts							
Construction	Medium	High (positive)	Short-term	Regional	High (positive)	Moderate (positive)	Moderate (positive)
Operation	Medium	High (positive)	Long-term	Regional	High (positive)	Moderate (positive)	Moderate (positive)
Decommissioning	Medium	Medium (positive)	Temporary	Regional	Medium (positive)	Moderate (positive)	Moderate (positive)
Tourism	Low	Negligible	Long term	Regional	Negligible	Negligible	Negligible
Recreation	Low	Negligible	Long term	Regional	Negligible	Negligible	Negligible
R&D	High	Medium (positive)	Long term	Local / National / International	Medium (positive)	Moderate (positive)	Moderate (positive)

5.0 Appendix 1: Port Assessment

5.1 The construction, operation and decommissioning of the European Offshore Wind Deployment Centre will require the use of port facilities. The extent to which ports will be required will vary depending on various factors such as the technical specification of the wind farm, the location of the development site and the level of ongoing maintenance required. This appendix briefly explores the port specifications needed to deliver each phase of the proposed wind farm development, and seeks to identify at high level which ports in the local area could be suitable.

5.2 The following ports have been assessed. These ports were chosen on the basis that they are the nearest major ports to the development site and are of sufficient size to support at least part of the construction and / or operational phases.

- Aberdeen
- Peterhead
- Cromarty Firth (including Nigg and Invergordon)
- Dundee

5.3 Aberdeen and Peterhead are located within the Inner Study Area, whilst Cromarty Firth and Dundee are outside of the Inner study area but within the Wider Study Area.

Port Requirements

Construction and Decommissioning Activity

5.4 The National Renewable Infrastructure Plan (NRIP) produced by Scottish Enterprise and Highlands and Islands Enterprise (2010a) sets out the priorities for investment in infrastructure to ensure that the Scottish economy benefits from the growth potential of the renewable energy sector. The report identifies sites suitable for offshore wind construction, ranking them according to their potential.

5.5 The NRIP draws upon research carried out by BVG Associates for DECC (2009), which identified that the typical requirements for a construction port with the capacity to deploy 100 turbines a year is:

- At least 80,000 sq m (8 hectares) suitable for laydown and pre-assembly
- 200-300 m of quayside length with high load baring capacity and adjacent access
- Water access to accommodate vessels up to 140 m in length, 45 m beam and 6 m draft with no tidal or other access restrictions
- Overhead clearance of 100 m minimum to allow for the vertical transportation of towers
- Sites with weather restrictions could require additional lay down space, up to 300,000 sq m (30 hectares)

5.6 Whilst the DECC (2009) report identifies the infrastructure required to deploy 100 turbines per year, the proposed project is much smaller at only 11 turbines. On this basis, it is possible that some of the infrastructure requirements such as the extent of lay-down space could be scaled back given the need to handle fewer turbines at any one point in time (depending on the exact method of construction). The Project has indicated that approximately 20,000 sq m (2 hectares) of laydown space will be required at the construction port.

5.7 However, the requirements for harbour access, draft, quayside length and vessel dimensions are likely to be as per the DECC (2009) assessment, since it is anticipated that the proposed project will utilise standard jackup crane vessels (as per the DECC, 2009 assessment).

Operational Phase

5.8 The DECC (2009) report describes the need for ports to act as bases for operations and maintenance activities. The main factors in choosing an operations and maintenance port are proximity to the offshore wind farm (in order to minimise transfer times), uninterrupted access, and adequate berthing for maintenance vessels.

5.9 As a result of the oil and gas industry there is already a wide range of locations which are able to service the operations and maintenance of wind farm operations, particularly along the east coast of Scotland.

Port specifications

Aberdeen

5.10 The Port of Aberdeen is the closest major port to the proposed development site. It is the principal commercial port in Northern Scotland dealing with general cargo, roll-on/roll-off and container traffic. There a total of six deep water berthing areas in Aberdeen Harbour. Consultations with Aberdeen Harbour have identified Telford Dock as being the most suitable for construction and / or assembly of wind farm components. Telford dock has 520 m of berthing space available, a heavy lifting area and two transit sheds. The two sheds have a total space of 4,700 sq m (0.47 ha). This could make them suitable for storing parts such as turbine blades. It is possible that the construction phase could take place at Aberdeen, although there are some constraints in terms of the amount of space available.

5.11 Aberdeen has expressed an interest in becoming the operations port for the EOWDC development. The port has over 40 years experience in delivering similar support services for the oil and gas industry. It also benefits from being the closest location to the wind farm site, reducing the time taken to transfer between the wind farm and the port. The port has confirmed that it would be possible for operations activities to take place alongside existing port activities.

5.12 The NRIP Stage 2 document (Scottish Enterprise, 2010b) states that Aberdeen has the 'potential [to be used] for distributed manufacturing and service and maintenance [of offshore wind farms], and expertise in offshore industries which could be diversified.'

5.13 Aberdeen Harbour recently made the following statement in support of the proposed development:

> *"We welcome today's announcement and subsequent planning application; both crucial steps in driving forward the European Offshore Wind Deployment Centre (EOWDC).*
>
> *"Renewable energy, and in particular the offshore wind industry, has the potential to generate significant levels of traffic for Aberdeen Harbour in the future, while offering considerable economic opportunities that will benefit the whole region. Vessels involved in surveying and drilling bore holes for offshore wind farms are, for example, already utilising the port's facilities.*
>
> *"The EOWDC is a facility that has the potential to substantially develop the north east's burgeoning renewables sector. The harbour's future role as an operations and maintenance base for the Scottish renewables industry is something we will embrace as we build on the excellent reputation we have already established within the existing oil and gas industry."*

Peterhead

5.14 Peterhead port is located to the north of the proposed wind farm site. Based upon consultations with representatives of the Peterhead Port Authority, Smith Embankment is the facility which is most likely to be able to service any wind farm related construction activity. This newly developed facility has a 200 m berthing area, with 10 m draft, heavy lifting equipment and no tidal restrictions. Attached to the Smith Embankment is 16,000 sq m (1.6 ha) of working area which is specified as being suitable for offshore and onshore renewable developments. There is the potential to reclaim a

further 50,000 sq m (5 ha) from the harbour if the phase 2 development goes ahead.

5.15 Peterhead has experience in delivering ongoing support to the oil and gas industry and would be a suitable base for the operations base for the proposed wind farm. It is possible that part of the ASCO facility to the south of the port area could be redeployed to support the offshore renewable industry.

Cromarty Firth

5.16 Cromarty Firth is a trust port. The Cromarty Firth Port Authority (CFPA) has authority over the shipping and navigation across the whole of the Firth up to a limit of two miles offshore. The CFPA own several facilities within the Firth such as the Invergordon Service Base, whilst some other assets such as those at Nigg are owned by other parties.

5.17 Nigg is a 96 hectare facility majority owned by KBR Ltd. Its facilities include a dry dock, large fabrication / warehouse buildings, 725 m of quayside with load-out areas up to 1,000 tonnes. It is accessible in all states of wind and tide, with extensive deep water and sheltered anchorage. Existing buildings on site include fabrication units of 17,000 sq m, assembly of 17,000 sq m and warehousing of 22,000 sq m. The NRIP Stage 2 report (Scottish Enterprise, 2010b) identifies that the site is suitable for large scale integrated manufacturing of offshore wind components, construction, and operations activities, particularly in conjunction with the site at Invergordon. The turbines used for the Beatrice offshore wind demonstrator project were assembled at Nigg. Nigg has the potential to be used for construction activities relating to the Aberdeen Offshore Project.

5.18 The Invergordon Service Base (ISB) has around 450 m of quayside space with water depth varying between 5.5 and 12 m. The ISB has many years experience supporting the oil and gas sector and has developed a strong supply chain. Therefore, ISB would have many of the necessary skills and expertise to be involved as an operations facility for the Aberdeen Offshore Wind project, once in place. The main downside is that the distance between Cromarty Firth and the proposed development site is significant, meaning that there may be other closer ports to the development site which are more suitable overall.

Dundee

5.19 The port of Dundee currently offers around 27 hectares of development land available for the renewable sector, all of which is in the ownership of Forth Ports. Other sites have been identified within the City of Dundee for renewable energy activities which do not require waterside access. The port itself offers about 1,800m of quayside in a sheltered location with access to the North Sea unrestricted by either air draft or vessel width. The water depth along the quay is up to 9.5m. Facilities include heavy lift equipment and required space to accept jack-up rigs. Potential exists for a rail freight terminal within the port estate.

5.20 The NRIP Stage 2 report (Scottish Enterprise, 2010b) identifies that there ‘is potential for a major turbine manufacturing facility and a tower manufacturing facility to co-locate on the site.’ Further capacity could exist for supply chain operations within the existing site.

5.21 In theory Dundee would have the required facilities and experience to act as either a construction or operations port for the Aberdeen Wind Farm development. However, as with Cromarty Firth, the distance between the port and the development site may prove to be a significant drawback in terms of operations activities.

Summary of Port Suitability

5.22 Table 5,1 below summarises the capability of the four chosen ports for construction activity, based upon the high-level assessment we have conducted.

Table 5.1: Summary of Port Suitability – Construction Activities

	Suitability as a construction port	Suitability as an operational port	Comments
Aberdeen	✔	✔	Some constraints in space available, but potentially sufficient for the EOWDC project. Proximate to the development site.
Peterhead	✔	✔	Some constraints in space available, but plans to expand capacity in the future. Proximate to the development site.
Cromarty Firth (Nigg)	✔	x	Highly ranked by the NRIP as a site to support the development of offshore wind in Scotland. Distance from site means it is less likely to be chosen for operational activity.
Dundee	✔	x	Large amounts of development space available. Highly ranked by the NRIP as a site to support the development of offshore wind in Scotland. Distance from site means it is less likely to be chosen for operational activity.

5.23 On the basis of this assessment, it appears that both of the ports in the Inner Study Area (Aberdeen and Peterhead) could be utilised in the construction phase of the proposed project; particularly given the relatively small scale of the EOWDC development relative to other commercial wind farm projects.

5.24 In terms of operations and maintenance activities, the most likely scenario is that one of the major ports in the Inner Study Area (Aberdeen or Peterhead) would be utilised. The rationale for this is that whilst other ports meet the requirements in terms of port infrastructure, the ports in the Inner Study Area benefit from proximity to the development site (which is a particular advantage for operational activities).

6.0 Appendix 2: Benchmarking of Offshore Wind Projects

6.1 The purpose of this section is to highlight the range of socio-economic impacts which have been considered in previous Environmental Impact Assessment studies for other comparable offshore wind projects around the UK, to inform the scope of the Impact Assessment. This assessment has been made through reference to completed Environment Impact Assessments of the following offshore wind projects, as summarised in Table 6.1:

- North Hoyle
- Beatrice
- Gwynt Y Mor
- Kentish Flats

6.2 In summary, the main socio-economic impacts identified across all of the case studies are:

- Direct employment during the Construction, and Operations and Maintenance phases
- Value of the construction project
- Supply chain effects

- Impact on tourism and recreation
- Impact on other marine activities such as fishing and shipping

Table 6.1: Summary of Socio-Economic Impacts of Benchmark Offshore Wind Projects

Details of the development:	North Hoyle	Gwynt Y Mor	Kentish Flats	Beatrice Demonstrator
Location	North Wales	North Wales	Thames Estuary	Moray Firth
Capacity / number of turbines	60 MW 30 turbines	576MW 160 turbines	129MW 30 turbines	10MW 2 turbines
Timescale	Constructed in 2002	Installation 2011-2014	Constructed 2004	Constructed 2006
Scope of assessment:				
Direct employment during the Construction, and Operations and Maintenance phases	✔	✔	✔	✔ #
Value of construction project	✔	✔	✔	✔ #
Supply chain effects	✔	✔	✔	✔ #
Impact on tourism and recreation	✔	✔	✔	✔
Impact on other marine activities such as fishing and shipping	✔	✔	✔	✔
Impact on offshore wind industry	✔		✔	
Community benefits		✔		
Sources of Information:	8	9	10	11, 12
# - not considered in the EIA report itself, but within a separate report by Highlands and Islands Enterprise / Snedden Economics (2005)				

7.0 References

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8.0 Glossary

- GVA / Gross Value Added – a measure of the economic value of a job or economic activity
- GW – Gigawatt, a measure of electrical generation capacity, equivalent to 1 billion Watts

- Ha – hectare (10,000 square metres)
- MW – Megawatt, a measure of electrical generation capacity, equivalent to 1 million Watts
- STW – abbreviation for Scottish Territorial Waters