

CHAPTER 2: NEED FOR THE PROJECT

INTRODUCTION

- 2.1. This chapter of the ES presents a summary of the need for renewable energy development such as the Seagreen Project, and the main energy, climate change and sustainability policy objectives and targets, which are currently shaping the offshore wind energy industry both in Scotland and internationally. The chapter then goes on to put the Seagreen Project, as described briefly in Chapter 1: Introduction and in detail in Chapter 5: Project Description of this ES, into this policy context, to demonstrate how it can play an important role in meeting these policy objectives.
- 2.2. Global climate change is widely recognised as one of the greatest environmental challenges facing the world today. A key contributor to climate change has been the rising levels of greenhouse gases (GHGs), in particularly CO₂, present within the atmosphere. There are several major contributors to CO₂ levels, and the burning of fossil fuels to generate electricity is a major source.
- 2.3. The increased generation of electricity from a clean and renewable source such as wind will play an important role in the reduction of GHGs. The need to increase generation from renewable sources is being promoted and encouraged through the implementation of various international and intergovernmental objectives and targets, as described later in this chapter.
- 2.4. Energy policy has been defined on an international level through international conventions and European Union (EU) policy, which are then ratified into national law or policies. Overall energy policy is reserved to the UK Government, whilst the Scottish Government is responsible for the promotion of renewable energy and determining applications for renewable energy developments in Scotland.
- 2.5. The UK and Scottish Governments have identified a need for offshore wind energy generation to meet international climate change obligations and domestic targets for renewable energy.
- 2.6. This chapter covers the following four topic areas which summarise the need for offshore wind:
 - climate change;
 - new energy infrastructure;
 - energy security of supply; and
 - economic benefit.
- 2.7. Plate 2.1 shows the key legislation, policies and guidance that fall under the aforementioned topics.

CLIMATE CHANGE

- 2.8. The 1997 Kyoto Protocol was ratified by the UK in 2002. This is a framework which sets mandatory targets aimed at reducing GHG emissions, such as CO₂, by an average of 5% against 1990 levels over the five year period 2008 – 2012. Under this framework, participating countries were assigned targets stipulating the maximum amount that they can emit per year over the period of commitment (2008 – 2012).

- 2.9. The EU produces around 22% of global GHG emissions and agreed, under the Kyoto Protocol, to a cut of 8% from 1990 levels by 2012 for the EU-15¹ countries. The EU-15¹ is on track to reach these targets based on the latest available inventory data (2009) (EC, 2011a). At the Durban Climate Change Conference in November / December 2011 over 120 governments agreed to adopt a legally binding commitment to limit emissions of gases that contribute to climate change as soon as possible, and by 2015 at the latest.
- 2.10. A second commitment period has been agreed under the Kyoto Protocol by a number of governments including 35 industrialised countries (including countries within the EU), from 1 January 2013 and will end either on 31 December 2017 or 31 December 2020 (UNFCCC, 2011a). The parties to this second period will turn their economy-wide targets into quantified emission limitation or reduction objectives and submit them for review by 1 May 2012. It was decided at the Conference that the UN's approach to climate change "*will be led by the climate science in the IPCC's [Intergovernmental Panel on Climate Change] Fifth Assessment Report and the Global Review from 2013-2015*" (UNFCCC, 2011b).
- 2.11. The EU Renewable Energy Directive 2009/ 28/ EC takes into account different national potentials for renewable energies and requires each member state to adopt a national target ensured to meet the Commission's targets for energy from renewable sources. The UK has been set a target of 15% of the energy consumed in the UK to come from renewable sources by 2020 (EurActiv, 2009).
- 2.12. 'A Roadmap for moving to a competitive low carbon economy in 2050' sets out that the EU "*is looking beyond these 2020 objectives and setting out a plan to meet the long-term target of reducing domestic emissions by 80 to 95%. It shows how the sectors responsible for Europe's emissions - power generation, industry, transport, buildings and construction, as well as agriculture - can make the transition to a low-carbon economy over the coming decades*" (EC, 2011b).
- 2.13. In July 2010, the UK Government submitted the UK's 'National Renewable Energy Action Plan' (NREAP) to the EC under Article 4 of the European Renewable Energy Directive 2009/ 28/ EC. The NREAP is based on the target set by the EC, 15% of energy consumption in 2020 to be from renewable sources. The 'lead scenario' set out in the UK NREAP demonstrates that it is possible to achieve the 15% target and provides one view of the technology mix in 2020 - in which some 30% of electricity demand is derived from renewables. The NREAP makes it clear, that this scenario does not represent a target for any particular sector or technology and it should not be seen as an upper limit to the UK's ambition for renewables deployment.
- 2.14. The UK Government is committed to addressing the causes and consequences of climate change and consequently has introduced the world's first long term legally binding framework to tackle climate change. The Climate Change Act 2008 sets a legally binding commitment to cut the UK's carbon emissions by 80% by 2050 and requires that limits be set on the total amount of emissions in successive five year periods (carbon budgets) against a 1990 baseline. This makes the UK the first country in the world to set such a long-term and significant carbon reduction target into law.
- 2.15. Within the White Paper 'The UK Low Carbon Transition Plan', actions required to cut carbon (equivalent) emissions by 34% by 2020, based on 1990 levels, are set out. Latest estimates show that in 2010 net UK CO₂ emissions were 17.3% (491.7 metric tonne CO₂ equivalent (Mt CO₂e) per year) below 1990 levels (DECC, 2011d).



¹ The EU-15 were the member countries in the EU prior to the accession of ten candidate countries on 1 May 2004.

Table 2.1 Key policies, legislation and guidance influencing the need for Seagreen Project

SEAGREEN PROJECT		
Climate Change	Economic Benefit	Energy Infrastructure and Security of Supply
<ul style="list-style-type: none"> United Nations (UN) (1998). Kyoto Protocol to the United Nations Framework Convention on Climate Change UN Framework Convention on Climate Change (UNFCCC) (2011a). Draft decision -/CMP.7 UNFCCC (2011b). Durban conference delivers breakthrough in international community's response to climate change Intergovernmental Panel on Climate Change (IPPC) (2010). The IPCC's Fifth Assessment Report (AR5) EurActiv (2009). EU Renewable Energy Policy European Commission (EC) (2009). Directive 2009/28/EC. Amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC EC (2011 a). Progress Towards Achieving the Kyoto Objectives EC (2011b). A Roadmap for moving to a competitive low carbon economy in 2050 Her Majesty's (HM) Government (2008). Climate Change Act 2008. Department for Energy and Climate Change (DECC) (2009a). The UK low Carbon Transition Plan DECC (2010). National Renewable Energy Action Plan for the UK Committee on Climate Change (2010). The Fourth Carbon Budget – Reducing emissions through the 2020s Committee on Climate Change (2011). Renewable Energy Review AEA Technology plc. (2011). Pathways to 2050 –DECC's 4th Carbon Budget Evidence Base ; Final Report Scottish Executive (2009a). Climate Change (Scotland) Act 2009 Scottish Executive (2009b). National Planning Framework for Scotland 2 Scottish Executive (2011 a). 2020 Routemap for Renewable Energy in Scotland 	<ul style="list-style-type: none"> DECC (2011a). UK Renewable Energy Roadmap Boston Consulting Group (2010). Valuing the UK Offshore Renewable Energy Resource Scottish Executive (2010a). A Low Carbon Economic Strategy Scottish Executive (2010b). Conserve and Save: Energy Efficiency Action Plan Scottish Executive (2011a). 2020 Routemap for Renewable Energy in Scotland Scottish Executive (2012). Draft Electricity Generation Policy Statement Offshore Wind Industry Group (OWIG) (2010). Scotland's Offshore Wind Route Map 	<ul style="list-style-type: none"> HM Government (2010). The Coalition: our programme for government HM Government (2011a). Carbon Plan HM Government (2011b). UK Marine Policy Statement DECC (2011a). UK Renewable Energy Roadmap DECC (2011 b&c). National Planning Statements EN-1 & EN-3 DECC & Office of Gas and Electricity Markets (Of gem) (2011). Statutory Security of Supply Report Department for Trade and Industry (DTI) (2007). Energy White Paper Committee on Climate Change (2011). Renewable Energy Review Scottish Executive (2009c). Renewables Action Plan Scottish Executive (2011 a). 2020 Routemap for Renewable Energy in Scotland Scottish Executive (2011 b&c). Low Carbon Scotland Scottish Executive (2012). Draft Electricity Generation Policy Statement

- 2.16. In addition, the UK Government set out the Fourth Carbon Budget in a policy statement which was presented to Parliament and published in the Parliamentary library on 17 May 2011. A 'carbon budget' is a cap on the total quantity of greenhouse gas emissions emitted in the UK over a specified time. Under a system of carbon budgets, every tonne of greenhouse gas emitted between now and 2050 will count. Where emissions rise in one sector, the UK will have to achieve corresponding falls in another. The Government's statement on the Fourth Carbon Budget highlighted its high level ambitions for reducing greenhouse gas emissions in line with its commitments under the Climate Change Act 2008, which will also serve to enhance energy security and stimulate low carbon investment. The level of the Fourth Carbon Budget was set in law, following approval by Parliament at the end of June 2011, as required under the Climate Change Act. The level is set at 1,950 Mt CO₂e, in line with the Committee on Climate Change's² recommendation (Committee on Climate Change, 2010). The evidence base on which the Carbon Budget was set was provided by the Pathways to 2050 project. The key results from the 'Review and Scenarios for DECC's 4th Carbon Budget Evidence Base' demonstrated the importance of renewables, especially large scale wind and marine in driving decarbonisation in the energy sector within and following the Fourth Carbon Budget is noted.
- 2.17. The Scottish Government renewables target is the most ambitious in the EU and is committed to generating an equivalent of 100% of electricity demand from renewable sources by 2020 (Scottish Government, 2011a). Furthermore, the Scottish Government has made legally binding commitments through the Climate Change (Scotland) Act 2009, which sets a GHG emissions target, for a reduction of 80% from 1990 levels by the year 2050, in line with the UK Climate Change Act 2008.
- 2.18. The document 'Low Carbon Scotland: Meeting the Emissions Reduction Targets 2010 - 2022', published on March 14, 2011, outlines the measures identified to meet the emissions reduction targets established by the Climate Change (Scotland) Act 2009, over the period 2010 - 2022. By 2020 renewable electricity generation must account for at least 80% of gross electricity consumption.

NEW ENERGY INFRASTRUCTURE

- 2.19. The UK requires new energy infrastructure (generating capacity and transmission capacity) for the following four principal reasons, which are expanded on below:
- to reduce the carbon footprint of electricity generation capacity in order to achieve the 2050 climate change targets;
 - to enable the transition from heat and transport being powered by fossil fuels to being powered by electricity;
 - to ensure adequate supplies due to changes in the demands on transmission infrastructure and changes in the nature of generating capacity; and
 - to ensure security of supply by replacing existing power stations and meeting predicted increase demand.
- 2.20. The Overarching National Policy Statement (EN -1) (DECC, 2011b) sets out the need for new energy infrastructure in the UK over the next 40 years, focusing particularly on the next 13 years, up to 2025. It considers that 59 Gigawatt (GW) of new build electricity generation



² The independent body established under the Climate Change Act 2008 to advise the UK Government on setting and meeting carbon budgets and on preparing for the impacts of climate change.

capacity is required in that period, of which 33GW should be from renewables. This requirement is *"in order to secure energy supplies that enable us to meet our obligations for 2050"* (DECC, 2011b).

- 2.21. The Renewables Action Plan (RAP) was published by the Scottish Government's Renewable Energy Division in June 2009. The overall aim of the RAP is to support and accelerate the implementation of renewable energy in line with EU targets. The RAP sets out the requirements and timescales to meet the Scottish Government's Renewable Energy targets, with a focus on the period to 2011 - 2012 and affirms that Scotland is committed to achieve a headline target of 20% of total Scottish energy use (including for heat and transport) coming from renewable sources by 2020. With respect to electricity generation specifically, the plan expects 50% of gross electricity consumption from renewable sources by 2020.
- 2.22. The RAP outlines the Scottish Government's support for the development of offshore wind projects as outlined in their vision for the industry which states: *"To make a significant contribution to 2020 renewables targets and beyond. To maximise economic benefits to the Scottish economy, and enable a young industry to establish, whilst working in harmony with the marine environment."* (Scottish Government, 2009b).
- 2.23. In 2011, the 2020 Routemap for Renewable Energy in Scotland was launched by the Scottish Government to *"drive forward the renewables revolution, and to meet the Scottish Government's world-leading green energy targets"* (Scottish Government, 2011a). The Routemap is an update and extension to the RAP. The 2009 RAP set out short term actions towards the delivery of 2020 targets for renewable energy. The updated and expanded Routemap reflects the challenge of the new target to meet an equivalent of 100% demand for electricity to be generated from renewable energy by 2020 and states the need for new energy infrastructure.
- 2.24. In March 2012 the Scottish Government published their Draft Electricity Generation Policy Statement (EGPS) for consultation. The EGPS sets out the Scottish Government's plans for renewable energy and fossil fuel thermal generation in Scotland's future energy mix and shows that the target to generate the equivalent of 100% of Scotland's electricity needs from renewables, as well as more from other sources, is achievable. This followed the Renewable Energy Review which forecast a major role for renewables (alongside nuclear and Carbon Capture and Storage (CCS)) in decarbonising power, heat and transport.
- 2.25. According to DECC and Ofgem, generation capacity in the UK currently stands at 90.2GW (DECC & Ofgem, 2011). The Large Combustion Plant Directive³ will lead to closure of around 12GW of coal and oil-fired generation, which is considered too polluting by modern standards, by the end of 2015 at the latest. With regards to nuclear, DECC and Ofgem state that up to 7.1GW of existing nuclear generating capacity is reaching the end of its operational life and will have closed by 2020. This gives a potential reduction in generating capacity of 19.1GW.
- 2.26. The 2010 Updated Energy and Emissions Projections (DECC) indicates that by 2025 the UK might need around 113GW of total electricity capacity; of which, 59GW would come from new sources. This will require around 33GW from renewable sources, if renewable energy commitments are to be met. Currently, 2GW of renewables and 8GW of non-renewable technologies are already under construction (DECC, 2011a).



³ Directive 2001/ 80/ EC of the European Parliament and of the Council of 23 October 2001 on the limitation of emissions of certain pollutants into the air from large combustion plants.

ENERGY SECURITY

- 2.27. Without action the UK will become ever more reliant on imported energy sources and have greater exposure to global energy price fluctuations (DECC, 2009). In 2009, the UK Government released the Low Carbon Transition Plan White Paper which plots how the UK will meet the 34% cut in emissions on 1990 levels by 2020. Within this White Paper it was identified that by decarbonising electricity supplies the UK can greatly reduce its reliance on fossil fuels (which increasingly have to be imported). Developing a low carbon energy sector for the longer term can deliver both increased energy security for the UK and Scotland and ensure international targets for the reduction of greenhouse gas emissions are met (UK Government Renewable Energy Strategy, 2009).
- 2.28. Indigenous sources of energy, such as the Seagreen Project, can play a significant role in addressing issues surrounding energy security.

ECONOMIC BENEFIT

- 2.29. The UK Government's Renewable Energy Roadmap sets out a comprehensive action plan to accelerate the UK's deployment and use of renewable energy, to put the UK on a path to achieve the 2020 target, while driving down the cost of renewable energy over time. It also identifies that the required growth in the renewables industry to achieve targets, could more than double the number of jobs, to over half a million working in the UK renewable sector by 2020.
- 2.30. 'A Low Carbon Economic Strategy for Scotland' published in November 2010, sets the policy direction for low carbon economic opportunities in Scotland, and aims to strengthen business confidence in exploiting those opportunities. In respect of offshore wind, the Strategy states: *"The large scale development of offshore wind represents the biggest opportunity for sustainable economic growth in Scotland for a generation. It is critical that Scotland exploits the opportunities being made available by the offshore wind industry. Harnessing just one third of our offshore renewable energy potential could meet Scotland's electricity needs seven times over by 2050"* (Scottish Government, 2010a).
- 2.31. The Routemap identifies the objectives in respect of energy consents and planning and records the actions required to meet them. In the Sectoral Routemaps, at Annex A, the ambition for the offshore wind industry is outlined *"With 25% of Europe's offshore wind potential, the manufacturing, supply chain, job creation and training opportunities present Scotland with huge scope for sustainable economic growth"* (Scottish Government, 2011a). Scotland's Offshore Wind Route Map outlines and examines these opportunities in detail and makes recommendations in areas which can support the growth of the offshore wind industry such as infrastructure, managing the marine environment and developing innovation and relevant skills.

OFFSHORE WIND IN SCOTLAND

- 2.32. The UK Government is committed to ensuring that an increased proportion of electricity is generated from wind power and other renewable energy sources. Improvements in technology and rising fossil fuel costs have also resulted in the cost of wind power converging towards the costs of conventional sources of electricity. As this trend continues a significant growth in energy generated from wind power can be expected within Scotland. In March 2011, at the Scottish Renewables conference in Glasgow, the Energy and Climate Change Secretary for the UK stated *"If we are to meet our climate change targets, Scotland will be 'mission critical'. Success here will define our low carbon legacy"*. (DECC, 2011e).

- 2.33. Scotland boasts the largest offshore renewable energy resources in the EU (25% of EU offshore wind; 25% of EU tidal; and 10% of EU wave power); meaning Scotland has a pivotal role to play in the EU's ability to achieve its overall renewable energy and climate change targets.
- 2.34. In the 2004 Scottish Natural Heritage (SNH) publication, 'Marine Renewable Energy and the Natural Heritage: an Overview and Policy Statement' (SNH, 2004), SNH strongly encouraged exploration of marine renewable energy resources. They concluded that areas most likely to be suitable for the development of offshore wind energy were the near-shore and shallow sea areas such as the Moray coast, Solway Firth and the east coast off the Firth of Tay and the Firth of Forth.
- 2.35. Following that, in 2006, the Scottish Government (then the Scottish Executive) commissioned the University of Edinburgh (Institute for Energy Systems) to investigate Scotland's renewable energy resource. The final report, 'Matching Renewable Electricity Generation and Demand' predicted that annual demand for electrical energy in Scotland could be around 41 TWh, with a peak power demand of around 7.3GW. Supplying 40% (16.4TWh) of the electricity required over the year from renewable resources suggests the need for around 6GW of renewable capacity (Scottish Executive, 2006).
- 2.36. Existing and planned hydro capacity in Scotland will contribute 1.5GW to the 2020 energy mix. Onshore wind projects built, or consented to date, should contribute at least a further 1.5GW. The balance of around 3GW could be met by a range of technologies. Wave and tidal power, between them, have the potential to deliver over 1GW. However, offshore wind in Scotland is anticipated to make the greatest contribution with 10GW of potential offshore wind projects currently planned for Scottish waters.
- 2.37. The Offshore Valuation Group⁴ estimated that Scotland has 206GW of practical offshore wind, wave and tidal resource - almost 40% of the total UK resource. In terms of offshore wind it is estimated that Scotland has a resource of 169GW. The Scottish Government estimates that by harnessing just a third of this potential resource, the countries' electricity needs could be met seven times over by 2050. The net value of this amount of energy, in terms of electricity sales, would be £14 billion by 2050. Hence, the large scale development of offshore wind represents the biggest opportunity for sustainable economic growth in Scotland for a generation, potentially supporting up to 28,000 directly related jobs and a further 20,000 indirect jobs and generating up to £7 billion for the Scottish economy by 2020 (Scottish Government, 2011a).

NEED FOR AND BENEFITS OF ROUND 3, THE ZONE AND THE SEAGREEN PROJECT

- 2.38. In June 2008, The Crown Estate announced the Round 3 (R3) offshore wind leasing round, in anticipation of the successful conclusion of DECC's first Offshore Energy Strategic Environmental Assessment (OESEA) for the UK's Renewable Energy Zone (REZ) (DECC, 2009b) and the adoption of the offshore wind plan. Subsequently, The Crown Estate selected and tendered nine 'R3' development zones, including two zones in Scotland, the Moray Firth Zone and the Firth of Forth Zone. Further details of the R3 process are provided in Chapter 3: Site Selection and Alternatives of this ES.



⁴ The Offshore Valuation Group is an informal collaboration of government and industry organisations consisting of The Department of Energy & Climate Change, The Scottish Government, The Welsh Assembly Government, The Crown Estate, Energy Technologies Institute, SSE, RWE Innogy, E.ON, DONG Energy, Statoil, Mainstream Renewable Power, Renewable Energy Systems (RES), Vestas and the Public Interest Research Centre.

- 2.39. A Draft Plan for Offshore Wind Energy in Scottish Territorial Waters was released in May 2010 by Marine Scotland (Marine Scotland, 2010) which identified a number of locations with potential for offshore wind farm development, including waters off the Firths of Forth and Tay. This was followed by the Scottish Government's publication in March 2011 of 'Blue Seas Green Energy' (Marine Scotland, 2011a), which reiterated the support for offshore wind farm development off the Firths of Forth and Tay.
- 2.40. The Marine Scotland report 'Scoping Consultation Study for Offshore Wind Farm Development in Scottish Waters' (Marine Scotland, 2011b) describes the process employed by Marine Scotland in collaboration with The Crown Estate to develop a series of new offshore wind plan options within Scottish Territorial Waters (STW), and presents the first discussion of development potential outside STW out to 200NM. The report recognises that the areas off the Firth of Forth and Tay are located in generally moderate to low levels of constraint to development.
- 2.41. The siting of the R3 offshore wind farm zones was based on the experience gained from analysis of earlier Round 1 and Round 2 offshore wind projects, which indicated that a piecemeal 'project-by-project' approach was unlikely to deliver the required capacity of offshore wind in the UK within the 2020 emission targets set by the Climate Change Act 2008 amongst other renewable energy development legislation. This is partly because the delivery of such a large capacity requires the industry to scale up considerably - not only in terms of the size of individual projects and the pace at which they are developed, but also in terms of the supporting facilities and supply chain.
- 2.42. The R3 offshore wind development programme consists of the development of nine large zones around the UK. The overall target capacities for the R3 zones are 32.2GW, with a target of 25GW offshore wind capacity operating or in construction by 2020. If these targets are met they will contribute significantly to the achievement of the UK's NREAP; to reach a target of 15% of energy consumption in 2020 to be from renewable sources.
- 2.43. There are multiple benefits associated with the R3 which apply to the Zone and the Seagreen Project, including:
- very low lifetime CO₂ emissions per unit of electricity generated;
 - increased levels of sustainability in energy resource market;
 - increased diversity and security of electricity supply;
 - elimination of the cost uncertainties associated with fuel supply price fluctuations;
 - energy production costs approaching those for existing thermal plant;
 - larger available development areas than previous offshore wind farms;
 - higher capacity factor⁵ than previous offshore wind farms;
 - reduced visual impact than many previous offshore wind farms;
 - rapid 'energy payback', such that wind turbines take between three to ten months to produce the electricity consumed during their lifecycle; and
 - opportunities for economic development and job creation e.g. supply and assembly, turbine provision and installation, and infrastructure development.



⁵ Capacity factor of a wind farm is the ratio of the actual output over a period of time and its potential output if it had operated at full, rated capacity the entire time.

- 2.44. Currently, wind energy is the only renewable energy technology ready to deliver on a significant scale and R3 offshore wind energy generation is well placed to play a significant role in response to pressing climate change and energy targets.
- 2.45. The need for R3 Zone 2 is a direct result of the need to meet Government renewable energy and climate change policy objectives, of which the R3 offshore wind development programme will play a vital role in contributing towards. Other key benefits of the Zone include:
- the entire Zone covers a large development area of approximately 2,852 square kilometres (km²), providing space and flexibility for the provision of renewable energy capacity whilst minimising environmental impacts;
 - the wind regime across the Zone is undisturbed by topographic effects, thus improving the efficiency of wind turbines and increasing the capacity factor, thereby reducing the environmental impact per megawatt hour (MWh) of electricity exported; and
 - the Zone is 25km from the nearest landfall and as such will have significantly less potential impact on seascape, landscape and visual amenity compared to onshore renewable energy development of a similar level.
- 2.46. The Seagreen Project is the first phase of the development of the Zone and the Applicants' contribution to meeting Government policy on renewable energy (100% of electricity from renewables by 2020) and climate change policy.
- 2.47. There are multiple benefits associated with the Seagreen Project, discussed in more detail below, including:
- the production of up to 1GW of clean energy - the equivalent to nearly one third of Scotland's existing renewable capacity;
 - very low lifetime CO₂ emissions per unit of electricity generated;
 - address climate change through a move to a low-carbon generation mix for a secure energy future;
 - provide an indigenous source of clean energy;
 - contribution to new energy infrastructure; and
 - contribution to sustainable economic growth.
- 2.48. The Seagreen Project provides the opportunity for a significant contribution to be made towards the ambitious Scottish, UK and EU renewable energy targets. The Seagreen Project would deliver up to 1GW of low carbon and domestically sourced electricity for the UK and unlike burning fossil fuels, which releases polluting GHGs into the atmosphere, the Seagreen Project harnesses offshore wind energy in a non-consumptive and non-polluting (i.e. produces no gases or other by-products) manner.

- 2.49. The proposed installed capacity of the Seagreen Project will provide approximately 3.2TWh per annum⁶. This is equivalent to the approximate annual electricity needs of more than 670,000 homes, based on an average consumption of 4,700 kWh of electricity per annum (DECC: Annual Digest of United Kingdom Energy Statistics (DUKES), 2011f).
- 2.50. The Seagreen Project may prevent CO₂ emissions ranging from 1,300,000 to 2,900,000 tonnes of CO₂ per year⁷, depending on whether gas or coal is displaced and assuming an existing mix based on conventional fuels.
- 2.51. The Seagreen Project will contribute significantly to the new energy infrastructure that needs to be developed to replace existing generating capacity that is reaching the end of its lifespan, to ensure security of supply and to assist in meeting targets for renewable energy generation capacity, as set out in the 'New Energy Infrastructure' sub-section, above.
- 2.52. The Zone has a target capacity of circa 3.5GW, with the Seagreen Project delivering the first 1GW of this target. The Zone target capacity would contribute significantly to the requirement for new plant and, given the significant closures in the middle of this decade, it is important that the Seagreen Project comes on as scheduled (commissioning 2017 onwards) to avoid risks to security of supply and to minimise reliance on foreign sources of energy.
- 2.53. The Seagreen Project will contribute to the growth of the decarbonised energy sector in Scotland. As stated previously, the Government have set out clear policy drivers that seek to maximise future economic opportunities presented by offshore wind development. The Zone is Scotland's largest R3 project and is therefore integral to Governments strategy for sustainable economic growth.
- 2.54. Chapter 19: Socio-economics, Tourism and Recreation of this ES provides an appraisal of the potential benefit of the Seagreen Project to the Scottish economy, as well as the wider UK economy.
- 2.55. The need for the Seagreen Project is clearly driven by key climate change, energy infrastructure, energy security and economic development from energy, at International, European and National levels. The key environmental benefit of the Seagreen Project is the generation of electricity from a renewable energy source that will reduce or avoid the use of fossil fuels in combustion power plants.

⁶ This figure is calculated based on a load / capacity factor of 40% and 150 turbines each with a rated capacity of 6 Megawatt (MW). The energy capture predicted and hence derived homes equivalent may change once on-site data are gathered.

⁷ Calculations assume emissions of 398g CO₂ / kWh for gas generated electricity and 909g CO₂ / kWh for coal generated electricity as stated in DUKES 2011. Changes in the power generating mix and fuel costs in the UK may result in changes to these figures over time.

REFERENCES

- AEA Technology plc (2011). *Pathways to 2050 – Key Results: MARKAL Model Review and Scenarios for DECC's 4th Carbon Budget Evidence Base; Final Report*. Available at: <http://www.decc.gov.uk/assets/decc/11/cutting-emissions/carbon-budgets/2290-pathways-to-2050-key-results.pdf> [Accessed on 19/ 01/ 2012]
- Boston Consulting Group (2010). *Valuing the UK Offshore Renewable Energy Resource*. Available at: <http://offshorevaluation.org/> [Accessed on 02/ 03/ 2012]
- Committee on Climate Change (2010). *The Fourth Carbon Budget – Reducing emissions through the 2020s*. Available at: http://downloads.theccc.org.uk.s3.amazonaws.com/4th%20Budget/CCC-4th-Budget-Book_with-hypers.pdf [Accessed on 19/ 01/ 2012]
- Committee on Climate Change (2011). *Renewable Energy Review*. Available at: <http://www.theccc.org.uk/reports/renewable-energy-review> [Accessed on 19/ 01/ 2012]
- DECC (2009a). *The UK Low Carbon Transition Plan*. Available at: http://www.decc.gov.uk/en/content/cms/tackling/carbon_plan/lctp/lctp.aspx [Accessed on 19/ 01/ 2012]
- DECC (2009b). *UK Offshore Energy Strategic Environmental Assessment - Future Leasing for Offshore Wind Farms and Licensing for Offshore Oil & Gas and Gas Storage, Environmental Report*. Available at: http://www.offshore-sea.org.uk/consultations/Offshore_Energy_SEA/index.php [Accessed: 14/ 03/ 2012]
- DECC (2010). *National Renewable Energy Action Plan for the United Kingdom*. Available at: <http://www.decc.gov.uk/assets/decc/what%20we%20do/uk%20energy%20supply/energy%20mix/renewable%20energy/ored/25-nat-ren-energy-action-plan.pdf> [Accessed on 19/ 01/ 2012]
- DECC (2011a). *UK Renewable Energy Roadmap*. Available at: <http://www.decc.gov.uk/assets/decc/11/meeting-energy-demand/renewable-energy/2167-uk-renewable-energy-roadmap.pdf> [Accessed on 19/ 01/ 2012]
- DECC (2011b). *Overarching National Policy Statement for Energy (EN-1)*. Available at: <http://www.decc.gov.uk/assets/decc/11/meeting-energy-demand/consents-planning/nps2011/1938-overarching-nps-for-energy-en1.pdf> [Accessed 10/ 07/ 2012]
- DECC (2011c). *National Policy Statement for Renewable Energy Infrastructure (EN-3)*. The Stationery Office (TSO), UK.
- DECC (2011d). *Statistical Release*. Available at http://www.decc.gov.uk/assets/decc/Statistics/climate_change/1515-statrelease-ghg-emissions-31032011.pdf [Accessed on 19/ 01/ 2012]
- DECC (2011e). *Press release from the Renewables Conference, Glasgow, 22nd March 2011*. Available at: http://www.decc.gov.uk/en/content/cms/news/pn11_028/pn11_028.aspx [Accessed 19/ 01/ 2012]
- DECC (2011f). *Annual Digest of United Kingdom Energy Statistics (DUKES)*. Available at: <http://www.decc.gov.uk/en/content/cms/statistics/publications/dukes/dukes.aspx> [Accessed 19/ 01/ 2012]
- DECC and the Ofgem (2011). *Statutory Security of Supply Report*. Available at: <http://www.decc.gov.uk/assets/decc/What%20we%20do/UK%20energy%20supply/resilience/803-security-of-supply-report.pdf> [Accessed 19/ 01/ 2012]
- DTI (2007). *Energy White Paper: Meeting the Energy Challenge*. Available at: http://www.decc.gov.uk/assets/decc/publications/white_paper_07/file39387.pdf [Accessed 11/ 07/2012]

- EurActiv (2009). *EU Renewable Energy Policy* [Online]. Updated September 2011. Available at: <http://www.euractiv.com/en/energy/eu-renewable-energy-policy/article-117536> [Accessed on 19/ 01/ 2012]
- EC (2011a). *Progress Towards Achieving the Kyoto Objectives*. Available at: http://ec.europa.eu/clima/policies/g-gas/docs/com_2011_624_en.pdf [Accessed 19/ 01/ 2012]
- EC (2011b). *A Roadmap for moving to a competitive low carbon economy in 2050*. Available at: http://ec.europa.eu/clima/policies/roadmap/index_en.htm [Accessed on 19/ 01/ 2012]
- UK Government (2010). *The Coalition: our programme for government*. Available at: http://www.direct.gov.uk/prod_consum_dg/groups/dg_digitalassets/@dg/@en/documents/digitalasset/dg_187876.pdf [Accessed 19/ 01/ 12]
- UK Government (2011a). *Carbon Plan*. Available at: <http://www.decc.gov.uk/assets/decc/What%20we%20do/A%20low%20carbon%20UK/1358-the-carbon-plan.pdf> [Accessed on 19/ 01/ 2012]
- UK Government (2011b). *UK Marine Policy Statement*. TSO, UK
- IPPC (2010). *The IPCC's Fifth Assessment Report (AR5). Leaflet*. Available at: <http://www.ipcc.ch/pdf/ar5/ar5-leaflet.pdf> [Accessed on 19/ 01/ 2012]
- Marine Scotland (2010). *Draft Plan for Offshore Wind Energy in Scottish Waters*. Available at: <http://www.scotland.gov.uk/Publications/2010/05/14155221/8> [Accessed 20/ 01/ 2012]
- Marine Scotland (2011a). *Blue Seas – Green Energy, A Sectoral Marine Plan for Offshore Wind Energy in Scottish Territorial Waters*. Available at: <http://www.scotland.gov.uk/Publications/2011/03/18141232/8> [Accessed 20/ 01/ 2012].
- Marine Scotland (2011b). *Scottish Marine and Freshwater Science Report Volume 2 Number 13: Scoping Study for Offshore Wind Farm Development in Scottish Waters*. Available at: <http://www.scotland.gov.uk/Publications/2011/11/28104658/9> [Accessed 20/ 01/ 12].
- OWIG (2010). *Scotland's Offshore Wind Route Map*. Available at: <http://www.scotland.gov.uk/Resource/Doc/326105/0105071.pdf> [Accessed 20/ 01/ 2012]
- Scottish Executive (2006). *Matching Renewable Electricity Generation and Demand..* Available at: <http://www.scotland.gov.uk/Publications/2006/04/24110728/0> [Accessed 20/ 01/ 2012]
- Scottish Government (2009a). *National Planning Framework for Scotland 2*. Available at: <http://www.scotland.gov.uk/Resource/Doc/278232/0083591.pdf>
- Scottish Government (2009b). *Renewables Action Plan*. Available at: <http://scotland.gov.uk/Resource/Doc/278424/0083663.pdf> [Accessed on 19/ 01/ 2012]
- Scottish Government (2010a). *A Low Carbon Economic Strategy..* Available at: <http://www.scotland.gov.uk/Topics/Environment/climatechange/scotlands-action/lowcarbon/lces> [Accessed on 19/ 01/ 2012]
- Scottish Government (2010b). *Conserve and Save: Energy Efficiency Action Plan..* Available at: <http://www.scotland.gov.uk/Publications/2010/10/07142301/0> [Accessed on 18/ 11/ 2011]
- Scottish Government (2011a). *2020 Routemap for Renewable Energy in Scotland*. Available at: <http://www.scotland.gov.uk/Publications/2009/07/06095830/2020Routemap> [Accessed on 19/ 01/ 2012]
- Scottish Government (2011b). *Low Carbon Scotland: Meeting the Emissions Reduction Targets 2010-2022*. Available at: <http://scotland.gov.uk/Resource/Doc/346760/0115345.pdf> [Accessed on 19/ 01/ 2012]

Scottish Government (2011c). *Low Carbon Scotland: Meeting the Emissions Reduction Targets 2010-2022 Technical Appendix - The Report on Proposals and Policies*. Available at:

<http://www.scotland.gov.uk/Publications/2011/03/10163857/0> [Accessed on 19/01/2012]

Scottish Government (2012). *Draft Electricity Generation Policy Statement*. [Online] Available at:

<http://www.scotland.gov.uk/Topics/Business-Industry/Energy/EGPS2012> [Accessed on 08/03/2012]

SNH (2004). *Marine Renewable Energy and the Natural Heritage: an Overview and Policy Statement. Policy Statement No. 04/01*. Available at: <http://www.snh.org.uk/pdfs/polstat/mrp.pdf> [Accessed 20/01/2012]

UN (1998). *Kyoto Protocol to the United Nations Framework Convention on Climate Change* Available at:

http://unfccc.int/kyoto_protocol/items/2830.php [Accessed 19/01/2012]

UNFCCC (2011a). *Draft decision -/CMP.7- Outcome of the work of the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol at its sixteenth session*. Available at:

http://unfccc.int/files/meetings/durban_nov_2011/decisions/application/pdf/awgkp_outcome.pdf [Accessed 19/01/2012]

UNFCCC (2011b). *Durban conference delivers breakthrough in international community's response to climate change*. Available at:

http://unfccc.int/files/press/press_releases_advisories/application/pdf/pr20111112cop17final.pdf [Accessed on 19/01/2012]