



# Inch Cape Offshore Wind Farm

Offshore wind turbines, inter-array cabling & associated offshore infrastructure



**Non-Technical Summary**  
of the Environmental Impact  
Assessment Scoping Report  
August 2010

As a result of global warming, nations around the world are increasingly committed to an urgent requirement to reduce harmful greenhouse gas emissions by a significant amount.



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## About the Non-Technical Summary

This document is the Non-Technical Summary (NTS) of the Environment Impact Assessment (EIA) Scoping Report for the proposed Inch Cape offshore wind farm.

It provides an overview of the contents of the Scoping Report which presents details of the proposed project (wind turbines, inter-array cabling and associated offshore infrastructure) together with the environmental information associated with the development area. The Scoping Report provides detailed information to allow statutory and non-statutory consultees to give their opinion on the proposed scope of the EIA and to gather further information about siting offshore turbines in the marine environment.

Within the full Scoping Report, the potential impacts of the project have been identified, along with cumulative and in-combination impacts, following which the further assessments required for the EIA have been presented together with a proposed scope of works.

The NTS is intended to provide an easily accessible overview to encourage a broad range of stakeholders to examine our proposals. For more detailed information, please refer to the full Scoping Report, which is available at:

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## Inch Cape Offshore Wind Farm – Introduction

SeaEnergy Renewables Limited (SERL) proposes to develop the Inch Cape offshore wind farm in the outer Firth of Tay region in Scottish Territorial Waters.

The site is proposed to be located approximately 15-22 km to the east of the Angus coastline in Scotland (see Figure 1). It is anticipated to consist of approximately 180 wind turbines covering an area of about 150 km<sup>2</sup> with an estimated installed capacity of 1,000 MW and a potential yield of over 3,000 GWh per year.

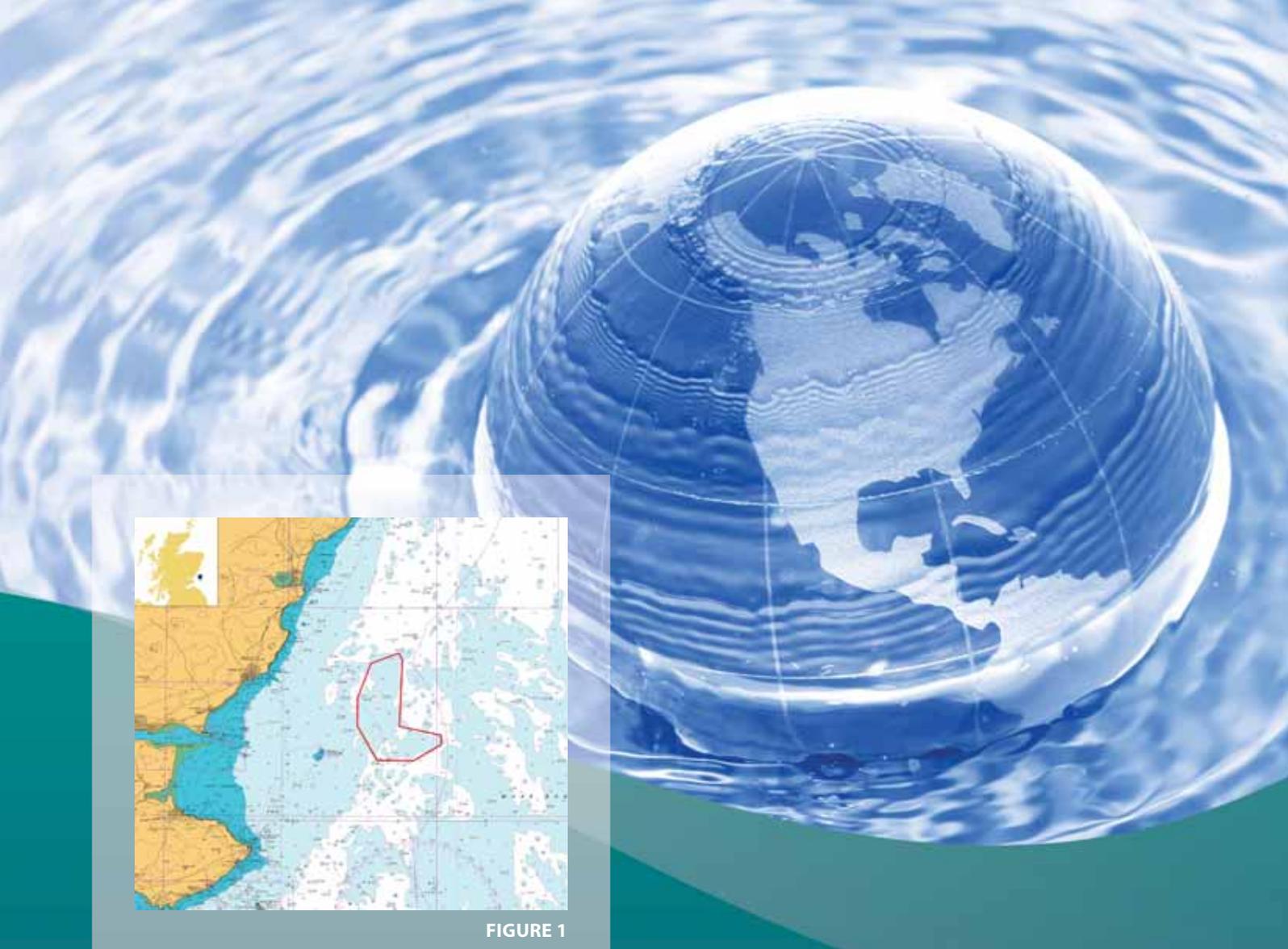


FIGURE 1

## SeaEnergy Renewables Limited

SERL will establish a special purpose vehicle (SPV) in the name of Inch Cape Offshore Wind Farm Limited (ICOWL), to develop, consent, finance, construct, operate and maintain the proposed wind farm over its lifetime.

SERL is an offshore wind developer based in Scotland and was established to take a leading position in the global market developing for offshore wind energy. The Company was formed around the key personnel involved in the Beatrice Demonstrator project, a pioneering development situated 25 km from shore, involving the first installation of 5 MW turbines offshore and the first use of a jacket substructure in the offshore wind industry, installed in water depths of 45 m. The Beatrice team brought together a unique combination of skills from the Oil and Gas and Utility Sectors.

The Inch Cape project team also includes marine industry professionals with a vast amount of experience in environmental consenting and specialist fields relevant to the offshore wind sector.

SERL's technical expertise has been recognised worldwide and the company has been involved in a number of research and development programmes. SERL is also partners in the Beatrice offshore wind farm, together with SSE Renewables and in Moray Offshore Renewables Limited (Zone 1 UK Round 3), together with EDP Renováveis.

## Offshore Wind Energy & Climate Change

As a result of global warming, nations around the world are increasingly committed to an urgent requirement to reduce harmful greenhouse gas emissions by a significant amount. The Scottish Government has established ambitious targets to achieve a 42% reduction in carbon dioxide emissions. The Government has also targeted that 50% of gross electricity consumed in Scotland is to come from renewable sources by 2020 (Scottish Government, 2010).

Historically, electricity generation has come from burning fossil fuels – coal, oil and gas. However, the combustion of these fuels creates carbon dioxide and other greenhouse gases. In order to limit our production of these harmful gases, we require alternative ways to generate electricity. In order to achieve these ambitious targets within this timescale, it is necessary to use proven renewable energy generating technologies which can reliably deliver large amounts of power.



### Why Offshore Wind Energy?

Wind energy electric power generation is a sustainable and proven technology. It can be reliably deployed and operated to generate power without the need to burn fuels and its effectiveness has been demonstrated onshore over several decades.

The seas around the Scottish coastline are noted for their strong, consistent, reliable winds and they offer the space necessary to develop large-scale wind energy electric power generation schemes.

Although there are technical challenges in working further from shore, in deeper waters of between 30 m and 60 m, here is where the best advantage can be taken of the available wind resource with minimal visual impact. The Inch Cape offshore wind farm in the outer Firth of Tay, situated some 15-22 km distance from the coastline, is a location which ideally meets these criteria within the context of its associated constraints.

The scale of the Inch Cape development is equivalent to the output of a conventional thermal power station and would therefore represent a major contribution to reducing the amount of fossil fuels required to meet our electricity demand, reducing harmful greenhouse gasses and helping to deliver national targets for renewable energy.

### Forth and Tay Offshore Wind Farm Developers Group

Three proposed offshore wind farm sites lie within the Firths of Forth and Tay region in Scottish Territorial Waters, in relatively close proximity to each other: Inch Cape, Neart na Gaoithe and Forth Array. In addition, zone 2 of the UK offshore wind Round 3 programme lies immediately to the east of these sites.

Developers of these four projects have formed the Forth and Tay Offshore Wind Developers Group (FTOWDG), in association with The Crown Estate. The developers are currently collaborating in order to identify potential cumulative effects and ensure a standardised approach to their future assessment as part of individual project EIAs.

It is estimated that the proposed offshore wind farm would produce enough power for over 680,000 homes<sup>1</sup>.



## Project Details

The offshore wind turbine generators are comprised of the following main components: rotor blades (three), hub, nacelle (containing gearbox and generator), tower and foundation.

The precise type and number of turbines that will ultimately be installed is currently unknown but the following will be assumed as a starting point for the purposes of the environmental assessment:

- Approximately 180 turbines, depending on the rotor diameter; (larger diameter rotors are likely to result in fewer turbines on the site);
- Wind turbines generating between 4 – 8 MW at capacity;
- Approximate hub height range 87 – 107 m above lowest astronomical tide (LAT);
- Approximate rotor diameter range 120 - 150 m;
- Expected installed capacity approximately 1,000 MW;
- Blade tip water clearance of 22 m (above MHWS); and
- Approximate blade tip height range 160-182 m (above LAT).

More detailed information on the turbine dimensions will be provided in the Environmental Statement (defined as a Rochdale Envelope).

It is estimated that the proposed offshore wind farm would produce enough power for over 680,000 homes<sup>1</sup>.

<sup>1</sup> Predicted annual generation from the wind farm of over 3,000 GWh per year divided by the average annual electricity consumption of a Scottish household of 4,410 kWh per year = over 680,000 homes. Annual electricity consumption of a Scottish household is derived from a total Scottish domestic electricity consumption of 12,001 terawatt-hours (TWh) divided by 2.72 million individual domestic customers in Scotland (The Digest of UK Energy Statistics, 2009).

## Getting Power Onshore

The project will require electrical infrastructure for transferring the energy generated by the wind turbines into the National Grid Transmission System, so that it can be transferred to where it is required. This will form the offshore transmission infrastructure; it will include offshore substations, export cable and onshore substation. Under current regulatory proposals, this infrastructure will be constructed and owned by a separate organisation; the Offshore Transmission Owner (OFTO). The offshore transmission infrastructure will be subject to a separate EIA. It is anticipated that the scoping process for this work will commence in 2011.

The proposed Inch Cape offshore wind farm site was selected following a study of wind resource and water depth data to identify a suitable region for offshore wind farm development in Scottish Territorial Waters.



### The Site

The proposed Inch Cape offshore wind farm site was selected following a study of wind resource and water depth data to identify a suitable region for offshore wind farm development in Scottish territorial waters. This study identified the east coast of Scotland as having the most suitable physical characteristics. Within the study area, analysis of other marine users and environmental parameters were then assessed to identify a suitable site. Increased distance from shore was considered particularly important as initial discussions with local stakeholders (e.g. fisheries, nature conservation) highlighted conflicts in inshore coastal locations and potential increased impacts on other human environmental receptors (e.g. visual/seascape issues, tourism and recreation).

A summary of the key factors influencing the location of the proposed site are listed below:

- An excellent wind resource. The mean wind speed is estimated at 8.70 m/s (about 19 miles/hour);
- At the closest point, the site is approximately 15 km from the shore which will help minimise its visual impact;
- Water depths and ground conditions suitable for jacket foundations;
- Potential electrical infrastructure near the coastline;
- Good access to suitable ports and local supply chain for construction and operations;
- No known Annex I habitats and outside any designated conservation area; and
- No known active oil, gas or aggregate interests in the site area.



## Wind Farm Construction

Offshore construction is likely to occur over a period of four to five years. Only limited information is available at present on the details of the construction process, since the major parameters of the proposed development have not yet been defined in detail. Prior to construction, a comprehensive Environmental Management Plan (EMP) will be implemented in consultation with statutory consultees and other relevant stakeholders. The EMP will contain a suite of complementary management plans corresponding to different aspects of the construction activity. Furthermore, the EMP will form an integral component of the contracts related to the construction of the proposed development, which will be tailored specifically to ensure compliance with the consent conditions for the project as well as current environmental best practice.

## Project Scoping Considerations

This section has been divided into three areas and outlines the potential for impacts of the proposed development on the physical, biological and human environment.

It is proposed that a holistic approach to the EIA process is taken, which will identify the linkages of environmental features and the potential for knock-on impacts.

## Physical Environment

The physical environment receptors included in this scoping report include bathymetry and geology, metocean, sedimentary regime, coastal processes and water quality. The wind climate controls the wave climate at the site and the sediment transport processes.

Water depths within the site boundary range from approximately 35 m to 55 m LAT, plus a tidal range up to about 5.5 m. Habitats to the east and west of the centre of the Inch Cape site form the Wee Bankie complex.

Geophysical surveys and models will be used to define any physical environmental variations across the area and to define the seabed environment, sediment types, features, obstructions and spatial variation of the near-surface sediments. Geotechnical surveys will also be used to establish baseline information regarding the seabed environment. Survey results will be integrated into a three-dimensional model of the seabed environment across the site. This model will be used to provide a high level qualitative construction risk assessment of the overall area, with a view to focusing in on any zones within the site where the seabed risks are relatively higher. This information will also be used to inform the EIA studies in relation to benthic ecology, fish and marine mammals.



The proposed Inch Cape site does not currently lie within a designated conservation area.

## Biological Environment

### Benthic Ecology

There is a lack of up-to-date benthic data for the offshore areas off the east coast of Scotland. Records indicate that the central North Sea has a benthic species diversity of approximately 48 species, which is similar to the northern North Sea and greater than the southern North Sea. However, local diversity is low and trawls within the SEA 5 area show an increase in species number further offshore and also to the south of the region. In comparison with the northern North Sea, the central North Sea has a higher biomass of benthic fauna, which is associated with production rates in shallower waters.

A survey methodology to characterise the benthic community within and surrounding the Inch Cape site boundary is to be agreed with statutory authorities and will also use the results of the geophysical surveys to determine appropriate sampling areas.

### Fish

Many species of fish spawn and have nursery areas within the North Sea, with a number of species using the proposed development site, at least in part. It should be noted that these spawning and nursery grounds represent only a small proportion of the overall area utilised in UK waters, although the relative importance of different sites is not clear from the data.

A survey methodology to characterise the fish community within the wider Inch Cape area is proposed and will be agreed with statutory authorities and relevant stakeholders.

### Marine Mammals

Harbour porpoise is the most commonly encountered marine mammal in the Firths of Forth and Tay and the other, more seasonal species include bottlenose dolphins, minke whales, white-beaked dolphins, harbour seals and grey seals.

A desktop study will be carried out to collect information and inform the impact assessment in relation to marine mammals. Further studies, including boat-based visual surveys and specialised acoustic surveys, will be completed to determine the distribution and density of the species present and any potential effects as a result of offshore wind farm development.



### **Ornithology (birds)**

Large numbers of seabirds are present along the Scottish coastlines. There are over 30 seabird colonies along the Scottish east coast and due to their size, some of these colonies are deemed to be of national and international importance and are therefore listed as designated. At present it is not known to what extent seabirds use the Inch Cape site. The proposed approach to the survey programme is to carry out boat-based visual surveys and analysis in order to characterise seabird use of the site and hence allow assessment of the impact of the development on these species. The visual studies will be complemented by data from aerial surveys and regional bird tagging studies.

### **Designated Site**

The proposed Inch Cape site does not currently lie within a designated conservation area. Given the distance offshore of the proposed wind farm site from coastal and inshore designated conservation areas, the key qualifying features that are scoped in for the assessment of changes to favourable conservation status are diadromous fish, marine mammal species and birds.

The relevant surveys to collect information on these receptors are discussed in preceding sections.

### **Noise**

There is currently no publicly available information on the background levels of noise within the marine environment in the outer Firth of Tay area. Background noise levels will be comprised of a mixture of natural noise (e.g. wind, waves, natural seismic action, echolocation from marine mammals, etc) and anthropogenic noise (e.g. vessels, military sonar, offshore and onshore construction, etc). In relation to offshore wind farms, vessel movements, construction and turbine operation are the key features associated with potential noise generation.

Data from subsea acoustic surveys will be modelled. Further data will be gathered from a robust literature review of underwater noise generation.



## Human Environment

### Commercial Fishing

There are both recreational and commercial fisheries along the east coast of Scotland.

There is currently no single data set or model which can accurately quantify the precise levels or values of commercial or recreational fishing within a small discrete sea area such as an offshore wind farm. As a result, data and information used to compile the commercial fisheries baseline will be acquired from a range of sources, including the International Council for the Exploration of the Sea (ICES), Marine Scotland Science, Seafish, Scottish Fishermen's Federation (SFF) and the National Federation of Fishermen's Organisation (NFFO).

Commercial fish species in the area include 'mud loving species' such as Nephrops, lobsters, scallops and crabs.

A survey methodology to characterise the commercial fish community within the wider Inch Cape area is proposed and will be agreed with statutory authorities and relevant stakeholders.

### Navigation

The North Sea is one of the busiest shipping regions in the world and is used by a variety of vessels, including cargo vessels, tankers, ferries and offshore service and supply vessels. Current AIS (automatic identification system) data has been obtained in order to understand the shipping densities and movements across the Firth of Forth and Tay and around the Inch Cape site.

Acquiring more detailed information on all shipping traffic will form part of a navigation risk assessment for the project. Both site-specific and regional navigation data will inform the EIA.

### Aviation

NATS En Route (NERL) prepared a preliminary assessment of the potential impacts of the proposed development on civil aviation radars. The assessment concluded that any potential impacts are expected to be insignificant.

Further studies and consultation with relevant stakeholders, such as the Civil Aviation Authority, NATS and local airport operators, will be undertaken as part of the EIA to ensure that future civil aviation radars are safeguarded.

### Ministry of Defence

The initial Ministry of Defence screening assessment concluded that the military installations and facilities that could potentially be impacted by the proposed development were the Primary Surveillance Radar (PSR) and Precision Approach Radar (PAR) at RAF Leuchars and the Line of Sight (LOS) of air defence radars at Air Surveillance and Control System (ASACS) Buchan and ASACS Brizlee Wood. Further investigations have ruled out any impact on the PAR radar at Leuchars, therefore this potential impact has been scoped out of the EIA.

Subsequent meetings between the Forth and Tay offshore wind farm developers and the Defence Estates are being held in order to establish a common understanding of the potential cumulative effects offshore wind farm developments may have on Defence Estate radars and to ensure a collaborative approach is taken to mitigate any potential impacts identified.

As part of the EIA, further assessments and consultations will be undertaken with relevant stakeholders.



### **Marine Disposal, Dumping, Dredging and UXO**

The offshore waters along the central east coast of Scotland contain two historic sewage sludge disposal grounds – Bell Rock and St Abb’s Head. The Bell Rock site lies across the southern boundary of the Inch Cape site but is now closed.

Due to historic practices of inaccurate ammunition dumping there is a risk of potentially hazardous unexploded ordnance (UXO) being present within the proposed Inch Cape area. Further consideration of these grounds will form part of the geophysical survey campaign and EIA.

### **Subsea Cables**

There are no known sub-sea cables, pipelines or activity within or in proximity to the boundary of the proposed Inch Cape site. The site specific potential for these impacts has been scoped out.

### **Seascape Landscape and Visuals**

The proposed project lies approximately 15-22 km to the east of the Angus coastline. As a result, it will be visible from shore during optimum weather conditions and as such a seascape analysis will be completed to assess the significance of the proposed development’s effects on the landscape, seascape and visual resources of the area, as well as effects on the settings of historic landscapes and monuments.

### **Archaeology and Cultural Heritage**

Archaeological remains that are protected include wrecks and wreckage of historical, archaeological or artistic importance. For the scoping assessment a search was undertaken which identified four wrecks in the vicinity of the proposed Inch Cape site. None of the wrecks identified are currently protected wrecks, known to be of archaeological significance or designated as War Graves.

The cultural heritage value of the site will be assessed through desk-studies and assessment of geophysical data and geotechnical data where available.

### **Socio-economics**

Analysis of the number of trips made by visitors shows that recreation and tourism is important to the Firth of Forth and Tay region. In the coastal waters of the Firths, boat trips running visitors to the Isle of May, Inchcolm Island, Bass Rock and other locations are popular. Further offshore, in the vicinity of the proposed Inch Cape site, recreation is minimal. Sailing routes pass to the west of the proposed site.

A socio-economic impact study, including consultation with relevant stakeholders, will be undertaken to establish potential effects arising from the proposed offshore wind farm development.

### **Cumulative Considerations**

The methodologies and potential survey requirements by which cumulative effects will be assessed in the outer Firths of Forth and Tay have been established by FTOWDG. These will be discussed and, where appropriate, agreed with relevant statutory consultees.

## Consultation

SERL is seeking comments from stakeholders on the proposed environmental impact assessment presented in the Scoping Report.

The full Scoping Report is available at [www.inchcapewind.com](http://www.inchcapewind.com)  
The consultation period runs from 31 August to 30 November 2010. Please direct all inquiries and feedback to the Inch Cape Project Team:

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