

# OFFSHORE WIND CAPABILITIES IN ABERDEEN CITY AND SHIRE



Aberdeen Renewable Energy Group (AREG) is committed to developing a sustainable renewable energy industry in Scotland and the UK. One of the ways this is being achieved is through the transfer of energy expertise from offshore oil and gas operations to offshore renewables, especially wind.

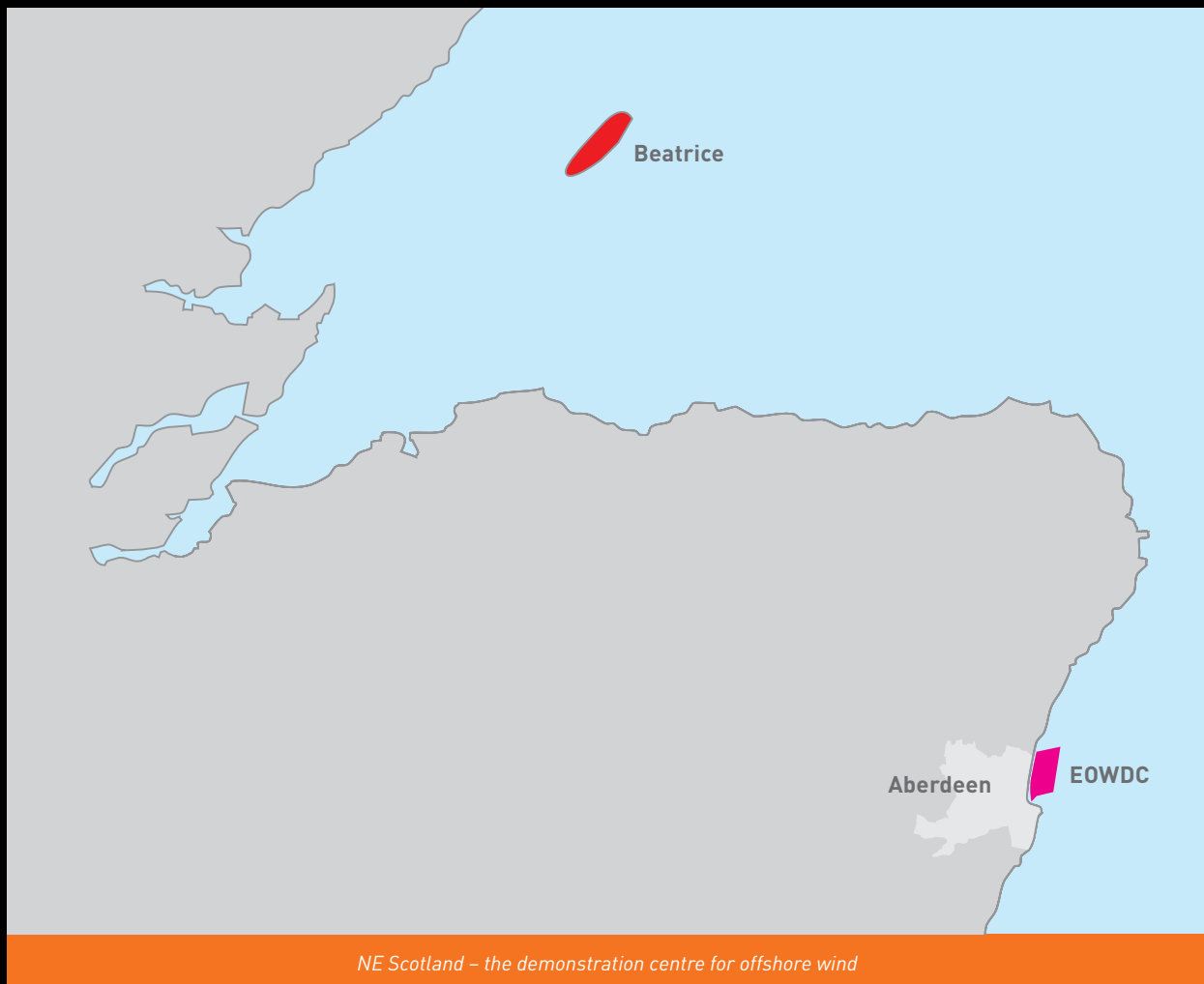
With over forty decades of such experience rooted in Aberdeen City and Shire, this rapid growth sector is of huge importance to the region and represents a multi-billion pound opportunity. Businesses here are already applying existing technology, skills and knowledge to capitalise on offshore wind supply chain opportunities around the world.

AREG believes that the active utilisation of this experience will be essential if the UK is to meet its challenging EU targets for renewable energy power generation.

# Why Aberdeen?

There are a number of reasons why Aberdeen is the ideal location to seek supply chain expertise for offshore renewables:

- (a) The extensive experience of the largest concentration of energy supply chain companies in Europe, and the second largest in the world after Houston
- (b) The progressive can-do attitude of that supply chain, local politicians and public sector organisations
- (c) The availability of local academic support through Aberdeen's two Universities, and regional colleges and technical institutes
- (d) The planned location in Aberdeen of the European Offshore Wind Deployment Centre (EOWDC), which is a key strategic asset of European significance. For this reason, the EU is investing 40 million Euros in its construction
- (e) The experience gained in the development and successful testing of the Beatrice offshore wind project – a crucial step in the global evolution of offshore wind as a technology
- (f) All-Energy - the UK's largest renewable energy conference and exhibition takes place in Aberdeen annually, providing key renewables industry networking and business development opportunities. The show is located in Aberdeen because it acknowledges the city's status as the Energy Capital of Europe with over 900 energy businesses and a vast concentration of renewables interests
- (g) Local assistance through AREG, whose membership has experience in all aspect of renewable energy markets but with a significant depth of expertise in the offshore sector.



# The Market Opportunity

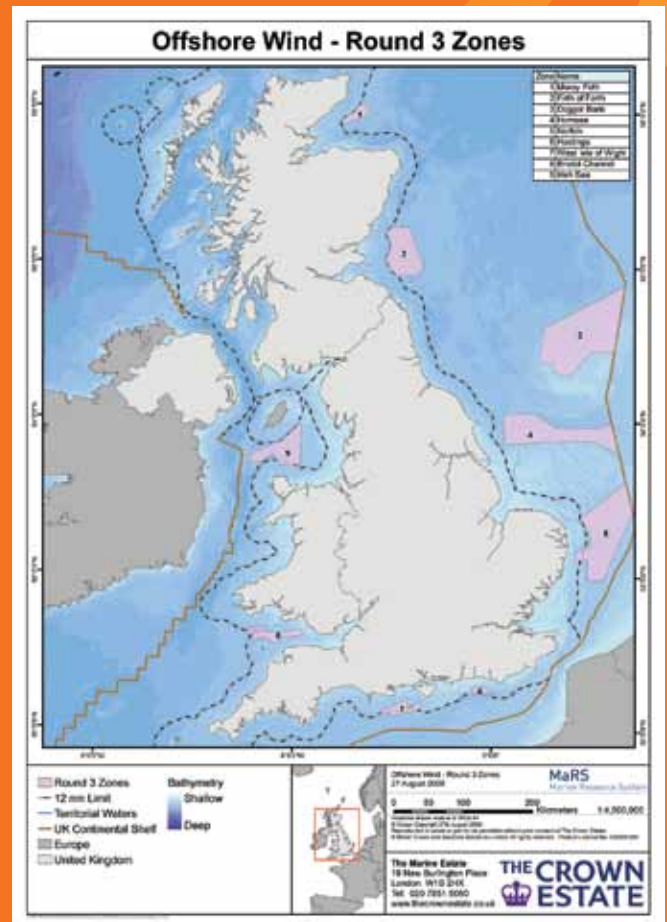
The UK is widely acknowledged as the most attractive offshore wind market in the world. The government is committed to delivering a significant proportion of Britain's energy needs from renewables and has published plans to become a world leader in the development of offshore wind technology. In order to deliver this objective the UK government has developed an effective regulatory framework and attractive incentive regime allowing projects to progress quickly from consent to operation and deliver attractive returns.

The planned Round 3 zones will involve the construction of 7,000 turbines in fields that each may be as large as 1000MW. Taken together, the Round 3 sites will produce around a quarter of UK electricity supply.

Our European neighbours also have plans for offshore wind developments but these are more limited in scope. However, taken all together, the total European capacity planned could be double that envisaged for the UK sector meaning the size of the market potential could be in the region of £75-100 billion.

The world is watching what is happening in the North Sea. There is no doubt that those companies which secure work and valuable experience in Round 3 will go on to sell that expertise around the world – potentially to every country with a suitable coastline and wind resource.

In a very similar way to offshore oil and gas, the North Sea will once again act as a proving ground for technologies of global significance.



## A Partnership Approach

**Aberdeen has enjoyed a long and successful history of applying oil and gas expertise in national and international markets. Through the World Energy Cities Partnership and Aberdeen City Council's International Trade function, the region has excellent links with countries such as China, the United States and Brazil, which are becoming very significant markets for renewable energy services. A number of AREG members are already winning work overseas and experience gained in the North Sea is accelerating that process.**

AREG is eager to work with partners across the board to ensure that the potential of the offshore renewables opportunity is realised. In the public sector, we have strong links to Government agencies such as Scottish Enterprise, Scottish Development International (SDI), and the Scottish

European Green Energy Centre (SEGEC), the Department of Energy and Climate Change (DECC) and UK Trade and Investment (UKTI).

AREG also works closely with colleagues in other trade associations such as Scottish Renewables and RenewableUK and are working with local authorities on the Scottish east coast - under the banner of East Coast Renewables - to ensure that we collectively approach these opportunities in a co-ordinated manner.

In terms of industry, the rapidly expanding AREG membership is testament to the engagement we have with the Aberdeen supply chain which is backed up by support from the Aberdeen and Grampian Chamber of Commerce, the Offshore Contractors Association, the Energy Industries Council, The Energy Institute and the Scottish Council for Development and Industry (SCDI).

# Case Studies

The following case studies demonstrate just a small selection of Aberdeen's vast offshore wind industry capability.

## Scottish European Green Energy Centre (SEGEC)

Launched by the First Minister, Alex Salmond, in August 2009, SEGEC's principal remit is to facilitate innovative, collaborative, low-carbon, infrastructure projects which deliver real benefits for Scotland, the UK and Europe.

SEGEC achieves this by developing projects which meet key success criteria including the right partners, technology focus, market readiness and structure in order that they can be financed.

From its base in Aberdeen, SEGEC provides a focal point for organisations in Europe developing low-carbon energy projects and activities. Engaging with institutions, networks and technology platforms, SEGEC works to influence the future policy agenda and identify niche opportunities for collaboration across different industry sectors.

Due to the collaborative nature of the projects that it supports, SEGEC works to secure investments from a range of public grants and private sector funds, including EU funding streams that have been allocated to support market and technology development.

Working with partners in Scotland, the UK and Europe, SEGEC maximises the potential to contribute to the European Energy and Emissions targets for 2020 and beyond.

Since its establishment, SEGEC has delivered over €110M of EU funding for low-carbon energy projects and facilitated several others including:

- **€40M** secured for the **European Offshore Wind Deployment Centre**, to be located off Aberdeen. This project will have a total investment of around €200M. SEGEC facilitated the EU funding application and collaboration between the project partners of Aberdeen Renewable Energy Group, Vattenfall and Technip
- **€74.1M** secured towards a new **Moray Firth Offshore HVDC hub**, facilitating a more optimal transmission solution for the connection of offshore and onshore renewables in far North East Scotland. This €150M project is being developed by SSE's transmission business, whose case to the regulator Ofgem for the balance of costs is significantly de-risked by the EU grant allocation
- **CCS Regulatory Toolkit** – SEGEC provided facilitation between the Global Carbon Capture and Storage Institute (GCCSI) and the Scottish Centre for CCS to design a toolkit to help nations and regions to test their

legislative, regulatory and public engagement processes in advance of receiving applications for CCS projects

- **Maldives Renewables Potential** – Project support and dissemination of results
- **NorthConnect Interconnector project** – SEGEC is a project partner providing support to the routing study for an interconnector between Norway and GB. With a landfall option in North East Scotland, such a link has the potential to form part of a future offshore grid
- Co-ordinating/ facilitating two separate collaborative marine energy bids for **NER300** funding
- Working with the Scottish and UK Government, and the energy industry to influence Scottish, UK and European energy policy.

All of these projects will create many local jobs, require the establishment of local supply chains, provide opportunities for dissemination of valuable knowledge gained from project delivery and contribute significantly towards Europe's green energy ambitions.

An independent, not-for-profit organisation, SEGEC is supported by the Scottish Government, the European Regional Development Fund, Scottish Enterprise, Highlands and Islands Enterprise, ScottishPower and SSE. SEGEC's energy priorities include, but are not limited to: Marine, CCS, Renewable Heat, Grids, Offshore Wind and Energy Efficiency.

For more information please visit [www.segrec.org.uk](http://www.segrec.org.uk)



# Vattenfall

**Vattenfall is one of Europe's largest generators of electricity and the largest producer of heat. Vattenfall's main products are electricity, heat and gas. In electricity and heat, Vattenfall works in all parts of the value chain: generation, distribution and sales. The Parent Company, Vattenfall AB, is 100%-owned by the Swedish state.**

Vattenfall will develop a sustainable diversified European energy portfolio and be among the leaders in developing environmentally sustainable energy production. Wind power is an important cornerstone.

Vattenfall has strong ambitions for offshore and onshore wind power in the UK. They currently operate three wind farms in the UK, supporting more than 1,000 jobs. These comprise Kentish Flats, off the north Kent coast and Thanet, off the north east Kent coast and the onshore windfarm Edinbane, on the Isle of Skye, which started generating power in the summer of 2010.

Vattenfall is also moving forward with the planned European Offshore Wind Deployment Centre (EOWDC) off the coast of Aberdeen – a joint venture involving Technip and Aberdeen Renewable Energy Group (AREG). With the EOWDC, the Clashindarroch onshore scheme, consented December 2010, and the planned Aultmore onshore scheme, the North East of Scotland is an important area for the company.

In addition, Vattenfall is currently constructing Ormonde Offshore Wind Farm, off Barrow-in-Furness, which will be completed during 2011. The Round 3, East Anglia Offshore Wind Farm is being developed in partnership with ScottishPower Renewables and is a project which could deliver up to 7,200 MW in installed capacity, providing clean

electricity for the equivalent annual demand of around 4 million UK homes.

Aside from offshore wind, Vattenfall is involved in other renewable projects. They have teamed up with Edinburgh based Pelamis Wave Power to explore development opportunities off the west coast of the Shetland Islands and the joint-venture, called Aegir, hopes initially to develop a project of 10MW.

The company has also agreed to sponsor the development of the Doosan Babcock OxyCoal UK project out of Renfrew and it is part of a group which was awarded UK Government money to investigate carbon capture and storage solutions at Scottish & Southern Energy's Ferrybridge Power Station in West Yorkshire.

For more information please visit [www.vattenfall.com](http://www.vattenfall.com)



*Construction at the Ormonde Project*



# SeaEnergy Renewables

SeaEnergy Renewables is Scotland's only independent offshore wind development company and was established in June 2008 by the Beatrice Windfarm team from Talisman and Scottish and Southern Energy. The company was formed to fill the technology gap between proven practices in offshore oil and gas and the emerging offshore renewables industry.

The Beatrice Demonstration Project showed the potential for offshore oil and gas skills to transform the offshore wind industry and saw the installation of two 5 MW turbines in 45m of water, 25km from shore and achieved a number of major firsts:

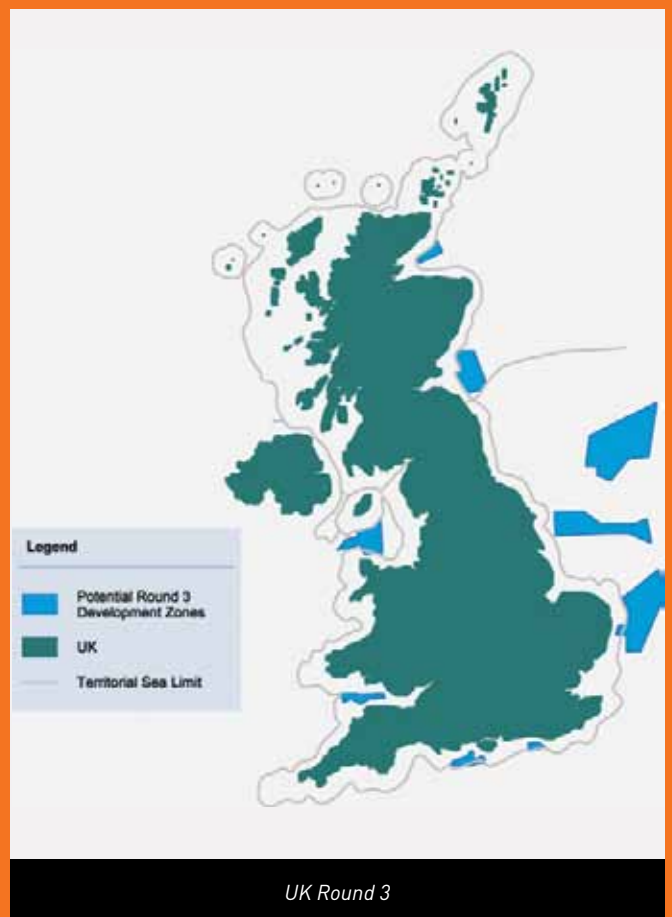
- First 5 MW turbines deployed offshore
- First deployment of turbines distant from shore in deep water
- First application of a jacket substructure in offshore wind
- First onshore assembly of tower, turbine and blades for offshore installation
- First offshore installation from a floating vessel
- First successful development of a ladder-less safe access system

With years of successful experience in large scale offshore project developments and operations in the oil and gas sector SeaEnergy applies their proven multi-contracting and risk mitigation strategies to their offshore wind developments and has enjoyed remarkable success since its launch.

The company has been awarded three projects in the UK - two in the Scottish Territorial Waters leasing round and one in UK Round 3. The locations are shown in the maps opposite.

- **Beatrice:** The Beatrice Offshore Windfarm site was awarded to SeaEnergy and SSE Renewables, one of the UK's largest utilities, in the Scottish Territorial Waters leasing Round in February 2009. The site has a capacity of 920 MW and is located north of the Beatrice Demonstrator Project.
- **Inch Cape:** SeaEnergy was also awarded the Inch Cape site in the same leasing round with a capacity of 905 MW.
- **Moray Firth:** In partnership with EDP Renewables, the third largest wind energy developer in the world with a global portfolio of 5,000 MW in Europe, USA and Latin America, SeaEnergy was awarded the Moray Firth Zone in the UK round 3 leasing programme with a capacity of 1,500 MW, enough to power 730,000 homes.

Looking internationally, SeaEnergy has signed Cooperation Agreements with two companies in the Far East - Taiwan Generations Corporation (TGC) and Nantong COSCO Ship Construction Co. Ltd. (NCSC) - one of China's large state companies and the second largest shipping company in the world with a fleet of more than 800 ships.



The agreement with TGC is to develop offshore wind farms in Taiwan and will combine SeaEnergy's offshore development expertise with TGC's pipeline of projects, local knowledge and experience. The project will use SeaEnergy's development model adapted for the local environment and is an ideal opportunity to take unique Aberdeen expertise overseas to explore a new and exciting market at relatively low risk.

The companies will jointly plan, construct and operate offshore windfarms, commencing with the Changhua Offshore Windfarm planned to have an installed capacity of up to 600 MW. This will be located in the Taiwan Strait off Changhua County on the West Coast of Taiwan, about 2.5 to 10 km from shore in water depth up to 30m. SeaEnergy will have the right to retain a 25% interest in the wind farm development.

SeaEnergy's Agreement with NCSC requires the two companies to develop a business plan for a Joint Venture company to supply jackets and access systems to the offshore wind industry. The equipment will be targeted at the emerging offshore wind market in China and internationally.

SeaEnergy has used its knowledge, experience and commercial acumen to establish first mover advantage

and develop the world's first pure play offshore wind development company. It has established a brand, accessed finance, developed a substantial portfolio of projects and provided significant opportunity for Scottish service companies in this emerging market.

With 1,510 MW of net capacity owned, SeaEnergy has made a significant achievement in less than three years. In addition to their current operations in the North Sea, SeaEnergy has identified project opportunities in a number of geographic regions with viable offshore wind resources close to population and industrial centres. These include offshore Europe, North America and the Far East.

SeaEnergy expects to remain at the forefront of offshore wind farm development globally because of our industry-leading experience and current slate of projects in development. The company is intent on developing, owning and operating large-scale offshore power generation assets safely, responsibly and in an environmentally sustainable manner. SeaEnergy aims to work with partners, investors and stakeholders to build a successful, high growth business delivering value to shareholders and clean energy to society.

For more information please visit [www.seaenergyrenewables.com](http://www.seaenergyrenewables.com)



*Beatrice Demonstration Project*

# Technip

Technip is a leader in the fields of project management, engineering and construction offering innovative solutions to the global energy industry. With 23,000 employees, integrated capabilities and proven energy expertise both onshore and offshore, Technip is a key contributor to the development of sustainable energy solutions for the 21st century.

Through its Aberdeen based operating centre, Technip provides best-in-class subsea products and services to companies working offshore UK, Denmark, the Netherlands and the west coast of Ireland and is rapidly developing capability to support the growing offshore wind sector.

The company, which intends to become a major player in this sector, will capitalise upon its expertise in offshore operations, fleet management and project execution to tackle the challenges of offshore wind. It will also build upon experience gained through recent projects including installation of the world's first full-scale offshore floating wind turbine "Hywind" and supporting tidal power generation trial operations at the European Marine Energy Centre in Orkney.

Technip was recently awarded a conceptual engineering study for the Havsul Wind Farm situated offshore Norway and, in a move to strengthen its offering, acquired the assets of a prominent marine cable installation company – a clear demonstration of its ambitions and commitment to the sector.

Technip is also a partner in the European Offshore Wind Deployment Centre (EOWDC), alongside Vattenfall and AREG. The project proposes the installation of up to eleven

wind turbines offshore Aberdeen Bay and a full planning application in support of it will be submitted to Marine Scotland later this year.

For more information please visit [www.technip.com](http://www.technip.com)



*Technip installed the world's first full scale offshore floating wind turbine "Hywind"*

# Petrofac

Petrofac has a broad engineering, operational and project management skills base developed through serving oil and gas markets across the globe, which it is now delivering to renewable energy markets.

The company is offering their core competencies in engineering, procurement, construction, operations, maintenance and training to help their customers meet the challenges of delivering safe, environmentally responsible and reliable energy supplies and aims to become a valued, long-term player in the offshore wind sector.

For more information please visit: [www.petrofac.com/newenergy](http://www.petrofac.com/newenergy)

# Subsea 7



*Subsea 7's Skandi Neptune construction and pipelay vessel*

**Subsea 7 has transferred its proven seabed-to-surface expertise, capabilities and strong safety and risk management processes to specifically develop and execute work in the emerging renewable energy market; particularly wind, wave and tidal energy. The Aberdeen based division's key focus is to provide project management, engineering and construction services to support offshore developments in the global renewables industry. The company believes that as projects become larger and move into more complex environments, the skills and experience that Subsea 7 can bring will be vital to its clients.**

Employing around 12,000 people globally, Subsea 7 enables clients to access a significant capability in project management, engineering and technical expertise. Clients can utilise a high-end, well diversified fleet comprising forty two vessels, including heavy lifting capability through its part ownership of Seaway Heavy Lifting; already operating successfully in the sector having undertaken the successful installation of monopiles on the Greater Gabbard project for Scottish and Southern Energy plc (SSE) and the recent award of installation of monopiles and transition pieces for the Sheringham Shoal wind project on behalf of Statoil.

Subsea 7 has already demonstrated its capability of working in this sector by project managing, engineering and executing a workscope, on a fast track basis, for a tidal device manufacturer at the European Marine Energy Centre in Orkney, in 2009. The scope of work included surveying the

location, completing grouting operations, installing a new power cable and completing a cable splice operation. This was the first use of dynamically positioned (DP) vessels in these harsh environmental conditions, with tides of up to 7.5 knots.

Earlier in 2011, the division announced the signing of a Memorandum of Understanding with Scottish and Southern Energy plc (SSE), under which Subsea 7 has formed an alliance with SSE, Siemens plc, Siemens Transmission and Distribution Limited, Burntisland Fabrications Ltd and Atkins. The purpose of this alliance is to work together in a collaborative arrangement in order to secure substantial reduction in the cost of delivered power from offshore wind farms. Subsea 7 is responsible for marine operations and offshore construction within the alliance.

Being chosen as part of this alliance and working with recognised leaders in the offshore wind industry is further advancing the capabilities of Subsea 7's renewables division. Working in collaborative arrangements with clients and the supply chain is one of Subsea 7's company values and it strongly believes this approach will lead to improvements in the economics of future developments. Subsea 7 has worked in a number of alliance arrangements in the past and experience has proven that working in this type of collaborative arrangement will lead to efficiency and optimisation in design and construction and will provide the forum for all the alliance partners to challenge their conventional thinking on how things should be done.

For more information please visit: [www.subsea7.com](http://www.subsea7.com)

# Wood Group

Wood Group is an international energy services company with \$5 billion annual sales, employing more than 29,000 people worldwide and operating in over 50 countries. The Group has three divisions - Engineering, Production Facilities and GTS providing a range of engineering, production support, maintenance management and industrial turbine overhaul and repair services to the oil and gas, renewables and power generation industries worldwide. With over thirty years of offshore operations experience, Wood Group has built up an enviable health safety and environmental system which is at the forefront of all our operations.



*Beatrice Demonstrator Project*

Wood Group's renewable energy solution is supported principally by our Engineering and Project Management specialists: Wood Group Renewable Energy Services, J P Kenny Renewables, Mustang Engineering and SgurrEnergy. The entities work closely together to provide a seamless "blade tip to grid" solution for offshore and onshore renewable energy.

Wood Group's expertise in offshore wind is demonstrated through their involvement in the **Sheringham Shoal offshore wind farm**, currently being developed by Statoil and Statkraft 23 km off the Norfolk coast in a site area covering 35 km<sup>2</sup> in water depths ranging from 16 to 22 m.

At a cost of approximately £1 billion, the wind farm will comprise 88 x 3.6 MW Siemens turbines, two offshore substations, two 132 kV submarine export cables and a new inland substation. When fully operational, its annual electricity production is expected to be around 1.1 TWh, enough energy to power approximately 220,000 UK homes.

Wood Group was appointed by Areva to engineer and project manage the delivery of two 850 tonne offshore substations for the 315 MW wind farm development. This included management of subcontractors, structural and fatigue assessments, corrosion protection, lifting arrangements, transportation and sea fastening, delivery and handover protocols and access and logistics.

Another significant project Wood Group are involved in is the **Beatrice Offshore Wind Farm**. This was initially a joint venture development between Talisman Energy (UK) and Scottish and Southern Energy (SSE) 25 km off the north east coast of Scotland. At a cost of £41 million, the deepwater demonstrator project saw two 5 MW wind turbines installed adjacent to the Beatrice oil field with the aim of testing the technical and economic feasibility of offshore wind farms in water depths of up to 45 m.

The project illustrated the successful efforts to transfer technologies, methods and practices from the offshore oil and gas industry and apply them to wind farm applications to result in several breakthroughs and offshore wind industry "firsts".

Wood Group has provided operational services to Talisman for 5 years and has subsequently assumed Duty Holder responsibilities for the Beatrice field.

Wood Group is responsible for all operations as the Duty Holder of the facility including: technical and operational support during the fabrication and installation of the structures; provision of support during the installation of cables; provision of an HSE safety case to comply with statutory regulations; organisation of scheduled and unscheduled interventions; routine personnel and equipment transfers.

This project has been a clear demonstration of the suitability of oil and gas techniques and methodologies for application to offshore wind farm developments.

For more information please visit: [www.woodgroup.com](http://www.woodgroup.com)

# J P Kenny Renewables

A Wood Group Company



Image courtesy of Greater Gabbard Offshore Wind Ltd

J P Kenny Renewables provides market leading engineering and project management services to the offshore wind, wave and tidal energy sectors throughout the world. The company offers leading capabilities in all aspects of a marine renewables project life-cycle, from early feasibility studies through to detailed design, commissioning and into operation to ensure delivery of a fully integrated project. Their independence from developers, operators, manufacturers and suppliers ensures that optimal “Through Life” engineering solutions are prepared and specified to maximise the technical and commercial returns to clients.

The **Greater Gabbard Offshore Wind Farm** is currently the world’s largest offshore windfarm and a joint venture development between Scottish and Southern Energy (SSE) and RWE npower renewables. The scheme is located approximately 23 km off the Suffolk coast around two sand banks known as Inner Gabbard and The Galloper. The wind farm has been designed to provide a capacity of up to 500 MW, with construction works commencing during early 2010.

J P Kenny Renewables was appointed by Greater Gabbard Offshore Wind Farm Ltd to provide independent technical advice and undertake reviews of prepared designs by the EPC Contractor and Subcontractors. This was to provide confidence that the design was prepared in accordance with recognised standards and industry best practice.

...optimal “Through Life” engineering solutions are prepared and specified to maximise the technical and commercial returns to clients.

The work included: a review of wind turbine and offshore substation platform cable entry systems and J-tube design including aspects of design; installation and construction; a review of the wind turbine monopile cathodic protection (CP) system including aspects of installation and maintenance; a review of offshore substation topsides including design calculations, specifications, fabrication drawings and method statements; and on-site supervision and inspection, including painting works, FAT and witnessing of qualification tests.

J P Kenny Renewables involvement in the project resulted in the identification of key issues relating to the potential long-term integrity and performance of the wind farm structures. J P Kenny Renewables suggested refinements in the analysis and design methodology of the J-tube based on their extensive offshore experience and recommended an improved J-tube/cable entry system and internal system to be developed.

market leading capabilities in all aspects of a marine renewables project life-cycle...

In addition: a modified approach was suggested for fatigue modelling and analysis of the monopile structure due to the potential for microbial induced corrosion. Amendments to bracing layouts and joint modelling to substation jackets in line with offshore design and best practice were recommended and amendments to the fatigue methodology in the jacket splash zone were also identified.

Another example of J P Kenny Renewables experience in offshore wind was their involvement in **The Carbon Trust - Offshore Wind Accelerator (OWA) project**. This is a UK Government backed initiative to fund large scale research, development and demonstration projects to unlock technology barriers and advance the offshore wind industry towards Round 3. The initiative is a funded collaboration between The Carbon Trust and five international energy companies including: DONG Energy; RWE Innogy; Scottish Power Renewables; SSE Renewables; and Statoil.

The project aimed to deliver a two step change in offshore wind performance and cost effectiveness by (i) demonstrating cheaper, safer and easier access, logistics and transportation systems that are applicable to large scale offshore wind farms and (ii) using improved systems as a basis for re-thinking and improving other aspects of offshore wind farm operations.

As Technical Delivery Consultant (TDC), J P Kenny Renewables provided a leading role in the identification and development of technologies combined with Operation and Maintenance (O&M) modelling to demonstrate strategies and systems that would lead to an improvement in turbine availability.

For more information please visit: [www.jpkenney.com](http://www.jpkenney.com)

# Senergy

**Senergy is an international energy services business, delivering an integrated service that adds value and minimises risk for clients through the application of commercial and technical innovation.**

Established in 2005, Senergy provides project and field development services to clients in the oil and gas and alternative energy markets, and employs over 500 people worldwide. The formation of our alternative energy business in 2008 was a key step in extending our integrated project and asset development services into the alternative and renewable energy sectors. 2008 also saw the acquisition of Econnect, a leading consultancy and technology development company focused on supporting the development of renewable electricity projects across the world, with involvement in over 50% of all wind projects constructed in the UK by 2008.

Senergy delivers world-class consulting and advisory services to clients in the wind power, grid connection, carbon capture and storage, geothermal and coal bed methane markets. Our goal is to bring innovative solutions to the most challenging of problems and harness the best capabilities and talent available.

In 2008, The Crown Estate commissioned Senergy to conduct a feasibility study for a **UK East Coast Transmission Network**. The findings confirm the technological and economical feasibility of an offshore east coast transmission line, to take electricity from as far north as Shetland to the south east of the UK, with the potential to connect to the rest of Europe.

The report states that any such interconnector could transmit power from on and offshore generation, and should use Voltage Source Converter (VSC) High Voltage Direct Current (HVDC) technology because of its easier installation, flexibility and maintenance benefits.

Senergy was also commissioned by The Crown Estate to work alongside the National Grid in determining the likely cost of connecting the 25GW of Round III offshore wind farms to the national grid. This work investigated the feasibility of different technologies such as HVDC connections, gas insulated lines and superconducting cables for each Round III lease area.

“Senergy, in collaboration with National Grid, has brought Round 3 one step closer to reality by delivering achievable conceptual connection designs for offshore wind farms of unprecedented scale as envisaged by the Round 3 leasing programme. Their feasibility study on the East Coast Offshore Transmission Network may also prove to be one of the building blocks for a European Supergrid” said Danielle Lane of The Crown Estate.

Senergy were also engaged to produce the technical appendices to the **‘Offshore Development Information Statement’ (ODIS)** published by National Grid Electricity Transmission plc (NGET). This included information on specifications, sizes, weights, installation requirements and costs for the technology elements required to form an offshore transmission network. The main purpose of the

ODIS is to provide a vision of how offshore transmission systems are likely to develop in the future and how these developments should be co-ordinated with transmission reinforcement onshore.

In 2007 Senergy was contracted by DONG Energy to act as engineer and project manager for the onshore 132kV cable installation works which connects the 172MW **Gunfleet Sands wind farm** to the onshore grid. Gunfleet Sands offshore windfarm comprises fifty two 3.6MW turbines and is located off Clacton-on-Sea in England. Senergy’s role is to manage the technical, commercial, environmental, permitting and stakeholder aspects of the project, which involves overseeing the cable installation works, ensuring the contractors compliance with the project requirements, liaising with relevant stakeholders such as the Highways Agency, Network Rail and local landowners and management of the horizontal directional drilling (HDD) works.

Another, equally impressive undertaking by the company is to act as the only UK representative in an **offshore grid consortium** in collaboration with EWEA, 3E, DENA, SINTEF, NTUA and ECBREC. This consortium has developed a scientifically-based position on an offshore grid in the North and Baltic Seas, considering technical, economic, policy and regulatory aspects. The project is targeted towards European policy makers, industry, transmission system operators and regulators.

Senergy’s role is to design and cost the potential Offshore Grid topologies for the North and Baltic Seas which has required extensive stakeholder engagement both with the other consortium members, and particularly the HV equipment suppliers and installation contractors, as well as the key client individuals within the European Commission.

For more information please visit [www.senergyworld.com](http://www.senergyworld.com)



# Rotech

Rotech is a technology driven group of companies providing innovative products to the energy industry. The company's headquarters are based in Aberdeen with additional operating bases in Singapore and Houston.

Rotech was formed in Aberdeen in 1994 out of the fabrication business of Volker Stevin Offshore (UK) Limited, with the goal of establishing a group of companies focused on developing new technologies for the offshore energy industry.

Rotech's main focus is the provision of subsea excavation services to the oil and gas, renewable energy, salvage and decommissioning markets claiming to be specialists in mass flow excavation and market leaders since 1998.

In 2000, Rotech Subsea was formed and in 2003 the company commenced development of the Rotech Tidal Turbine under the DTI Sustainable Energy Programmes.

Two recent examples of Rotech Subsea's capabilities include projects undertaken in the Alpha Ventus Field and in the Greater Gabbard Field.

Rotech Subsea were contracted by Visser Smitt Marine Contractors to carry out post excavation work over wind farm power cables and cable loops in the Alpha Ventus field, German North Sea. Rotech post trenched sections of power cable to a depth of 1.5 mtrs and in addition to these works there were various cable loops on natural seabed that were

required to be excavated for protection. While in the field Rotech were asked to lower existing cables a further 0.5 mtrs.

The Rotech Twin SLD R 2000 carried out this work safely and successfully from Seim Ruby, a purpose built DP vessel chartered by VSMC. The Rotech Twin SLD R 2000, (a safe non contact method of excavation) proved its versatility and power in achieving the client's requirements. Real time images from our multi beam system ensured full control and images were recorded and fed back to the client during and after completion of the various work scopes.

Rotech Subsea were originally using the T8000 tool on the Greater Gabbard wind farm to excavate for J Tube entry around the base of the installed monopoles. The Twin R 2000 is currently still operating in the field to excavate cable sections and cable loops to complete post lay rectification work.

The soils in some areas are in excess of 100 kpa shear strength requiring an ancillary jetting ring which allows excavation of materials in excess of 200 kpa shear strength. The ring is only active when heavy clay is encountered, to assist with breaking through the surface.

Other wind farms Rotech have worked on are Thornton, Walney and Thanet encompassing similar work scopes as above.

For more information please visit: [www.rotech.co.uk](http://www.rotech.co.uk)



*The T8000 being deployed from the Bourbon Enterprise to excavate cable transitions into monopile J tubes*

# Fugro Renewables

Companies within the global Fugro Group have been involved in more than 100 marine renewable energy projects, primarily in UK and German waters, ranging from offshore wind farms to deployment of current and tidal devices. Two recent geotechnical contracts, won in the space of two months at the end of 2010 from EDPR and SSE Renewables, and both mobilised from Aberdeen, have led to greater knowledge of the Moray Firth – the location of two important deep water wind farms.

Fugro has been a leader in offshore geotechnical surveys for over forty years, and their experience from the offshore oil and gas industry is now being transferred, with great success, to the offshore wind industry.

The first contract - from EDPR, partner in the **Moray Offshore Wind Farm** - saw Fugro GeoConsulting Ltd (FGCL) undertake a six-week contract providing preliminary geotechnical data to assist the development of a ground model and for met mast foundation design.

“Using services from our Aberdeen base, and mobilised from Aberdeen Harbour, FGCL performed a number of boreholes from the Gargano dynamically positioned drilling vessel. Using offshore drilling methods, soil samples and down-hole CPTs were performed on site,” explains Tony Hodgson, Global Business Development Manager, Fugro Renewables - the organisation that pulls together all Fugro Group activities within the marine renewables industry.

The Round 3 Moray Offshore Wind Farm is being jointly developed by Portugal’s EDPR, and Aberdeen’s SeaEnergy. Fugro’s contract with them enables data to be used to provide the start of a ground model to improve the interpretation of geophysical data and to allow preliminary foundation scoping studies to start. This was the first geotechnical programme to be undertaken on the site.

The **Beatrice** contract, with SSE Renewables, was a similar, but smaller contract – Fugro has worked previously with SSE on the Butendiek wind farm in German waters. Once again this was to provide preliminary geotechnical data to assist the development of a ground model and for met mast foundation design on the Beatrice Offshore Wind Farm in the Moray Firth, which is being developed jointly by SSE and SeaEnergy. During the ten day contract FGCL performed five boreholes with maximum depth of around 50m from the drilling vessel Gargano. The resulting data will also be used in a similar way to that obtained on the EDPR project.

In both instances, Fugro were using tried and tested technology in the form of standard offshore drilling and testing techniques, with a core barrel available as back up in case any hard soils or rock was encountered.

From our Aberdeen base we are now offering construction support services to many of the foundation and cable installation contractors involved with current offshore wind developments. These services include, positioning, ROV support, weather forecasting, power cable post lay and depth of burial surveys.

For more information please visit: [www.fugro.com](http://www.fugro.com)



*Skandi Olympia ROV Deployment – One of Fugro’s operation and support vessels deploying an ROV*

# Balmoral Offshore Engineering

Balmoral has extensive experience of the polymer and composite industry including design, material selection, stress analysis, manufacturing, testing, installation and commissioning as well as offering in-house R&D and laboratory facilities.

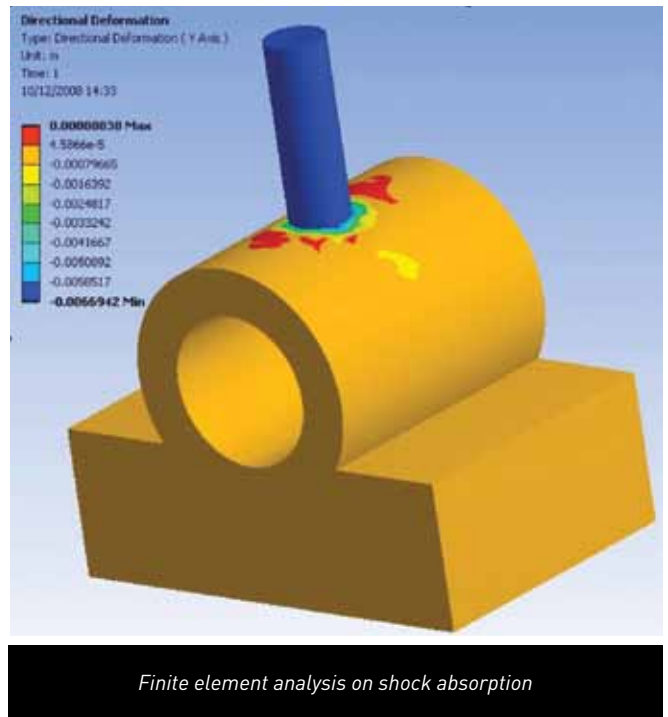
The company has worked with the renewable energy sector for many years designing and manufacturing products including composite wind tower turbine covers and blades as well as subsea components for wind and tidal generators, elastomer cable protection, bend stiffeners and restrictors.



One of the ways in which Balmoral meets the needs of the offshore wind sector is to provide cable protection systems. Hundreds if not thousands of kilometres of cable are used by the offshore wind sector carrying power and communication signals to and from the turbines. Cables lying on the seabed require protection from many things including dropped objects and the energy generated by such an impact must be deflected, reflected, absorbed or spread over a larger area.

Balmoral Offshore Engineering's technical team undertook a review into the various methods of cable protection available to provide the offshore wind industry an insight into suitable solutions and demonstrated the benefits of their Balmoral Duraguard™ elastomer mat, which provides protection by acting like a spring on top of the cable, reducing the transferred force and potential damage. Their Duraguard can also be specified to protect corrosion coatings and external sheaths.

For more information please visit:  
[www.balmoraloffshore.com](http://www.balmoraloffshore.com)



# The Met Office

As the UK's national meteorological service, the Met Office has over 150 years' forecasting know-how and decades of specific experience working with the offshore industry. To meet the requests from its customers, the Met Office has a range of services for the offshore wind sector. These services help the industry assess the feasibility and design of wind-farms, through to their construction, the management of operational and maintenance schedules, power outputs and future decommissioning of wind farm sites.



Figure 1: Wind energy business lifecycle

Increased certainty in wind resource assessments is critical early on in the wind farm life cycle to optimise investments. The Met Office developed the Virtual Met Mast™ wind resource analysis method, which provides a reliable site-specific estimate of the wind climatology at hub height. The outputs from the initial data record can be correlated with real met mast data when available to provide an advanced wind resource analysis of the site.

For the early stages of site selection, we can help recognise weather trends by:

- analysing site-specific historic data to determine suitability;
- deploying buoys, capturing real-time wind and wave measurements;
- estimating wind resource determining economic viability;
- providing metocean information enhancing engineering design.

To optimise safety and efficiency during offshore construction, operations and maintenance activities, the Met Office offers a wide range of forecast packages. The Safesee™ web system which acts as a 'one-stop shop' for all short-term weather forecasts, allowing customers to make crucial 'go' / 'no-go' decisions. The Met Office is also able to deploy forecasters offshore to assist with weather sensitive operations.

Once up and running, for improved power forecast accuracy the Met Office can provide real-time and forecast weather information on an ongoing basis for energy analysts and traders to make informed strategic decisions on the trading markets.

In the near future the offshore renewables industry will be presented with new challenges for structure and design and mitigating downtime as it seeks to exploit resources further offshore. Less of the quality assured observation data traditionally used by the industry as a bankable knowledge base for developments will be available. Offshore areas can be 'observation sparse' so filling this gap requires exploitation of

model and satellite remote sensed data products. They have the advantage of presenting a long-term and geographically coherent picture of the environment, in conjunction with high quality in-situ observations such as the Met Office's Virtual Met Mast product and operational wind and wave model archive data.

As part of The Crown Estate's enabling actions programme for Round 3 wind farms, the Met Office was commissioned during 2010 to undertake an initial study to determine how far beyond qualitative mapping tools such data sources can be applied within the offshore renewables sector, by:

- proposing industry appropriate 'standard tests' for comparing the quality of datasets available;
- analysing the present Met Office offering, indicating how appropriate the current generation of model data products may be for supplementing in-situ observations;
- proposing next steps for development of model data products to ensure optimal application by the industry.

The results of the study were presented and discussed among offshore wind developers and associated experts within the Metocean Analysis Group, and have led to The Crown Estate proposing a second phase of work in which independent tests of a wider range of metocean supplier data can be compared for the benefit of the industry.

For more information please visit [www.metoffice.gov.uk/marine](http://www.metoffice.gov.uk/marine)



Met Office is supporting renewable energy projects throughout each stage of their lifecycle

# NCS Survey

NCS Survey is a leading independent UK based survey company providing survey services to the offshore construction and positioning markets in the oil and gas and offshore wind sectors on a worldwide basis. The company was formed in 2005 and has grown from eight employees to over sixty in less than five years. The company comprises a group of highly experienced onshore and offshore staff, and works closely with its clients to provide cost effective and technically advanced solutions, which are tailored to meet project requirements.

NCS Survey has been performing restricted access data acquisition for Shell Upstream International Europe with one of their fleet of Gavia Offshore Surveyor Autonomous Underwater Vehicles (AUVs). The use of AUVs meant that NCS Survey could provide high quality data while significantly reducing operational costs for the client. The success of the project has prompted Shell to award NCS Survey a number of follow on projects.

The primary reason for the surveys was to observe possible scouring around the spud cans of a jack-up drilling rig located alongside a platform. The AUV is able to fly several lines between the legs of the jack-up drilling rig, and between the stern legs and the fixed platform. The accompanying images demonstrate that the Multi-beam Echo Sounder (MBES) and Side Scan Sonar (SSS) images are both very high resolution. The MBES is a 500kHz Geoswath interferometric system, with the SSS being a 900kHz Marine Sonics system, although an 1800kHz SSS is

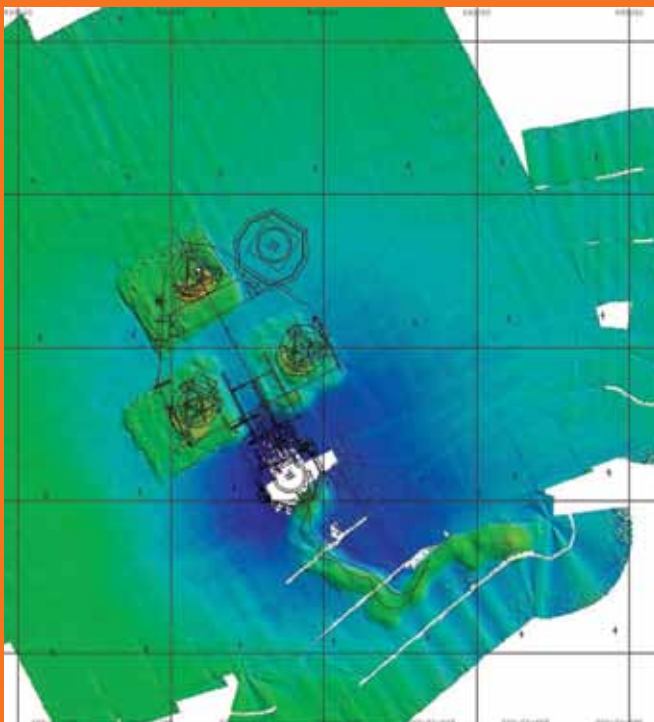
also available on the same vehicle. The data presented was acquired in water depths of less than 10m.

Previously, undertaking such a survey required the deployment of a small vessel and the suspension of drilling operations. By using the AUV, NCS Survey could work from a standby vessel outside the 500m zone and eliminate the need to stall operations. By completing the project from a standby vessel – already on location as a support vessel – NCS Survey ensured that no extra vessel costs were incurred by the client.

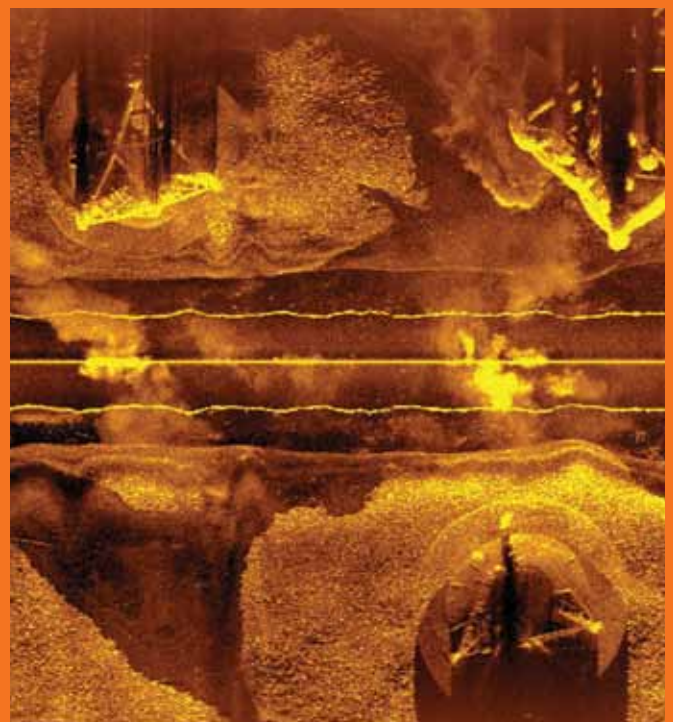
The benefits of the AUVs represent an ideal solution for scour monitoring for Renewable Energy projects. Scouring around the base of wind turbine piles is an issue facing most wind farms located in relatively shallow waters. The ability of an AUV to work away from its support vessel would allow the support vessel to perform other tasks. This would enable NCS Survey to undertake simultaneous operations and maximise efficiency for the wind farm operator. Similarly, by launching and operating multiple AUVs from the vessel NCS Survey could again increase the efficiency of numerous projects.

The support vessel requirement for such low logistics AUVs is minimal. A typical Windcat vessel used for wind farm support operations would meet all requirements. To date, the AUVs have been used to complete a number of projects including pipeline inspection, harbour surveys and decommissioning, and NCS Survey is keen to use the advantages of the AUVs for the benefit of the Renewable Energy sector.

For more information please visit: [www.ncs-survey.com](http://www.ncs-survey.com)



*MBES showing bathymetry around and under rig/platform*



*SSS showing feet/legs of drilling rig & platform*

# DHI

DHI is an independent, international consulting and research organisation. Our objectives are to advance technological development and competence within the fields of water, environment and health. We offer a wide range of consulting services and leading edge technologies, software tools, chemical / biological laboratories and physical model test facilities as well as field surveys and monitoring programmes. We are more than 1,000 employees worldwide.

DHI contributes to the development of offshore wind farms and marine renewable energy installations worldwide. We have more than fifteen years of experience as a provider of integrated services within this field. This experience knowledge is turned into solutions for our clients.

DHI was awarded a contract by **London Array Limited** to provide operational metocean and environmental support to their 245sqkm wind farm development in the outer Thames Estuary.

DHI carried out habitat modeling, by combining bird survey data and integrated hydrodynamic model data in high resolution. By coupling statistical species distribution to temporally resolved predictions of distribution changes, the spatial variability of key animals (Red-throated Diver in this project) can be linked to the periodicity, strength and depth of the modelled distributions of water masses and

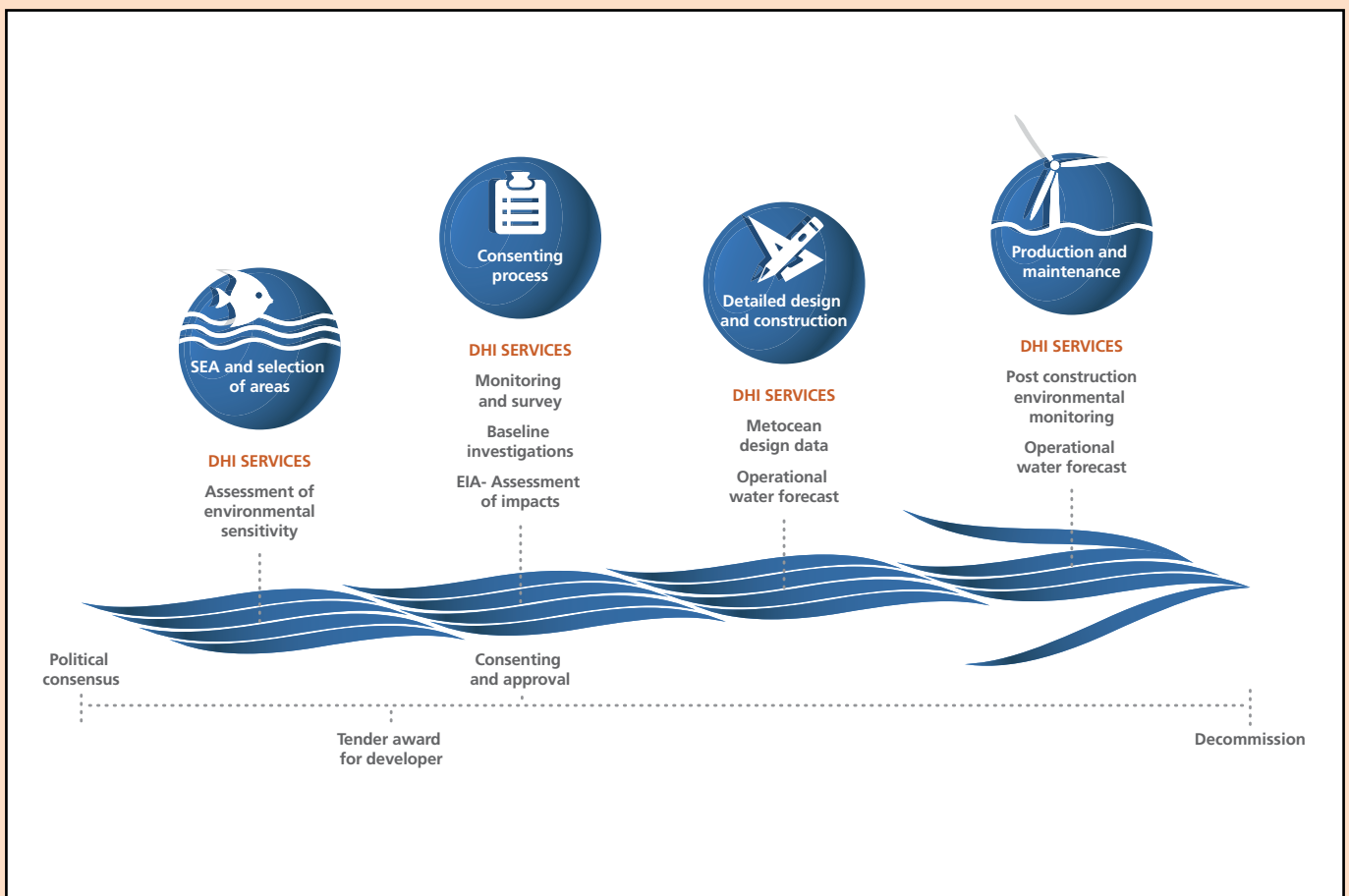
hydrographic fronts. This approach improves the estimation of distribution dynamics of marine animals around localized offshore sites; and for monitoring increases the power of sampled data hence reducing the need of prolonged biological surveys which are costly and may carry the risk of undetected changes.

On the metocean front, DHI designed, procured, installed and maintains a monitoring system to provide hydrodynamic and wave data for an operational metocean forecast system which is used for operational purposes in the 3 year construction phase. Based on DHI's own modeling software MIKE by DHI and real-time measurements, the forecast covers wind, air temperature, sea temperature, visibility, lightning risk, cloud height, water levels, waves (sea and swell) and currents.

DHI contributes not only to the development of offshore wind farms, but also to marine renewable energy installations worldwide. DHI aims to provide local support to its clients and local representation in Aberdeen together with a large expert team at our Danish headquarters allows quick response customised to clients' needs.

DHI recognises the importance of the UK in the offshore wind industry. With an office in Aberdeen, DHI will strive to grow its business from here with close links to other players in the renewable industry.

For more information please visit: [www.dhigroup.com](http://www.dhigroup.com)



# OEG Offshore



*Siemens units which OEG were contracted to manufacture for the London Array wind farm.*

**Aberdeen-based OEG Offshore first expanded into the renewables sector by securing a £2.2million deal with a major UK offshore wind farm project.**

The company – which specialises in the design, build and rental of cabins and cargo carrying units for the offshore oil and gas market – delivered specialised equipment room modules for use on the first phase of London Array, which will be located in the outer Thames estuary.

The first phase of London Array will consist of up to 175 turbines generating 630MW – enough power to supply over 472,000 homes. Upon reaching its 1000MW capacity, it will become the world’s largest offshore wind farm, making a substantial contribution to the UK Government’s climate change targets.

The significant contract was awarded by Siemens Transmission and Distribution Limited, which is one of six European suppliers involved in the London Array project. The contract involved the design and construction of 18 custom-built Local Equipment Room (LER) modules to be installed on two in-field transformer platforms situated within the offshore wind farm development.

The units – which were designed and built by OEG at their Kirkton and Pitmedden facilities in Aberdeen – were used to house electrical switchgear, workshops and emergency accommodation on the offshore sub-station platforms.

Once completed, the modules were shipped to Belgium for installation on-deck before they were transported offshore.

Craig Russell, Director at OEG, said: “The London Array project was OEG’s largest contract win in the renewables sector and marks a successful start for us in an area of the energy industry that we hope will present us with a high level of new business opportunities going forward.

“The 18 modules that were designed and delivered to Siemens were similar to units that OEG has previously supplied for other offshore projects, so we were able to bring a significant amount of tried and tested expertise to the contract.

“A crucial factor in securing the contract was the ability to supply the required units within a tight timescale, and Siemens awarded the deal on the basis of OEG’s excellent reputation for on-time delivery.

“The offshore renewable sector is an area of strategic growth for OEG and one in which our expertise and experience in the offshore oil and gas industry can be easily transferred, as demonstrated by the success of the London Array contract. We intend to expand our share of this rapidly-growing market and will be looking to gain further contracts within the UK and internationally.”

For more information please visit: [www.oegoffshore.com](http://www.oegoffshore.com)

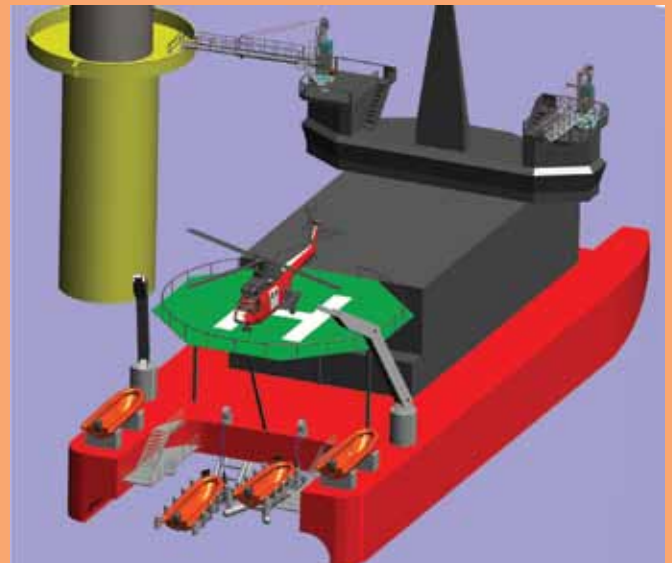
# Divex Ltd

Divex is embracing the offshore renewables opportunity by applying its existing wealth of engineering experience in the offshore environment. The progressive expansion from near shore to offshore, with the associated greater water depths and more severe environment, is requiring energy providers to manage the problems the offshore oil and gas industry has encountered and successfully solved over the past four decades.

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Divex, as the leading provider of diving technology and sophisticated life support and launch and recovery systems, offers many solutions to address such issues as:

- Wind turbine foundation design and installation methods
- Purpose designed vessels for year round maintenance to maximize the availability of the turbine generators



*Wind farm maintenance vessel with active personnel access bridge and daughter craft launch and recovery*

- Personnel access from vessel to turbine tower in higher sea states
- Daughter craft launch and recovery systems

For more information please visit [www.divexglobal.com](http://www.divexglobal.com)



*Abeking and Rasmussen SWATH vessel*

# Blue Water Shipping

Blue Water Shipping A/S was founded in 1972 and today have 53 offices in 26 countries with local representation in Aberdeen. Blue Water Shipping employ more than 860 employees across the globe.

Blue Water Shipping has been involved in offshore wind since 1994 and some of our best known projects include King Mountain, Smøla, Black Law, White Lee, West Wind, Wolfe Island, Horns Rev I, Horns Rev II, Greater Gabbard, Thanet, Q7, Quesnoye, Robbin Rig, Walney I, HP Wind, Sherringham Shoal and London Array.

They offer a one-stop-shop concept including port agency, stevedoring, terminal setup, road-air-sea transport, consultancy, special designed IT systems and in-house naval architects.

On a yearly basis their port operations handle more than 300 port calls and 260 stevedoring operations related to the wind industry and they transported more than 2600 turbines units in 2010.

Blue Water are one of the key players in relation to port setup, transports and development of IT systems and equipment, and with a dedicated staff of more than 100 within offshore renewables they can offer a tailored service to the industry.

For more information please visit: [www.bws.dk](http://www.bws.dk)



# Bond Pearce LLP

Bond Pearce LLP describe themselves as the pre-eminent firm for legal advice on renewable energy in the UK with a dedicated all-energy team of more than 50 lawyers. Several of these experts work out of the company's Aberdeen office and since 1989 they have advised on almost 250 renewable projects.

Projects have included legal advice for the largest offshore wind farm project in the world, Greater Gabbard in the North Sea, plus two projects which are set to surpass it - Gwynt-y-Mor off North Wales and the London Array project.

Bond Pearce has advised several companies on successful bids for Round 3 projects, including Centrica, and on the implications of the new offshore transmission regime and how project developers can minimise the risks to their project of a new offshore transmission owner being put in place.

Bond Pearce has experts in every area of renewables from wind to carbon capture and storage and their knowledge is backed by strength and breadth in specialist areas such as health and safety, dispute resolution and environmental law.

For more information please visit [www.bondpearce.com](http://www.bondpearce.com)

# Maclay Murray & Spens LLP

**Maclay Murray & Spens LLP (MMS) is one of Scotland's leading commercial law firms. The firm's 15 strong renewables team has developed an extensive track record in the sector, working with clients on issues ranging from funding, regulation, leases, property and land issues, to the protection of intellectual property, commercialisation and joint ventures.**

The firm has a strong international reach, through Lex Mundi, the world's leading association of independent law firms, and is backed by its offices in Aberdeen, Glasgow, Edinburgh and London.

The firm's energy regulatory team is widely regarded as one of Scotland's leading practices and has been closely involved in advising government and regulators on key policy initiatives in the renewable energy sector. Specific areas include transmission access, offshore transmission, feed-in tariffs and smart meters.

In 2009 MMS was instructed by Ofgem to assist in the development of the regulatory regime to support government policy on offshore transmission. This involved advising on amendments to relevant industry codes and licences necessary to implement the desired policy, including the tender process for the selection of new OFTOs. Following the completion of this work, the team advised the Department of Energy and Climate Change (DECC) and the Secretary of State on the implementation of statutory powers in directing those changes to industry documents. MMS' energy regulatory team subsequently advised on the exercise of statutory powers to implement required changes to industry documents, which would achieve the new policy 'generator build' as a method for the delivery of offshore transmission infrastructure.

The MMS renewables team comprises specialists from the firm's Banking and Finance, Capital Projects, Corporate, Tax, Environmental, Property/Planning, IP & Technology and Regulatory practices, and has recently been boosted with the arrival of Aberdeen-based partner Richard Cockburn.

Richard has advised a number of offshore wind developers, including Moray Offshore Renewables Limited, Aberdeen Renewable Energy Group, Mainstream, Neart na Gaoithe, SmartWind and Scottish Power Renewables. He has also worked on a range of other renewables projects, including onshore wind, biomass and marine sectors.

MMS' renewable energy team, headed up by former Barclay Capital director, David Cruickshank, continue to advise a number of landowners and estates on the real estate aspects of onshore wind developments. The team has also assisted clients in the negotiation and finalisation of various commercial deals with some of the leading utilities and developers in this sector. In particular, this has involved advising on planning and environmental issues, as well as options and generation agreements.

A long-standing corporate adviser to Aquamarine Power Limited, MMS supported the company during its milestone £11m fundraising and the negotiations with Crown Estate over its lease to develop the Brough Head Orkney wave/tidal array site. The lease is the first of its kind in the world.

MMS has also developed extensive expertise in the intellectual property (IP) field and has advised a wide range of renewable energy companies on the protection of IP rights, including a global manufacturer of small wind turbines on ownership of IP.

For more information, please visit [www.mms.co.uk](http://www.mms.co.uk)

# The Energy Institute (EI)

The EI is a leading chartered professional membership body for the international energy industry. With over 14,000 individuals and 300 companies in membership, it develops and disseminates knowledge and good practice to support working towards a safe, secure and sustainable energy system.

Many of the challenges facing the offshore renewables sector are similar to those already tackled by the offshore petroleum industry. The EI's technical work in this area includes good practice guidance on subjects such as safety, integrity, human and organisational factors and corrosion management, all of which have direct relevance to the development of offshore renewables.

Of particular note is guidance produced for the operation of facilities that are not normally attended, featuring risk management programmes for manning these facilities for maintenance purposes. It is this type of industry knowledge and experience that companies investing in offshore renewables should be seeking to exploit.

The EI also facilitates development of good practice guidance for the subsea sector. The **Guidelines for the management of integrity of subsea facilities** was written and compiled under the direction of a steering group comprising a cross-section of offshore operators, independent verification bodies and industry specialists. The work provides recommendations on how to manage the integrity and reliability of subsea facilities 'from cradle to grave' and outlines key principles for an effective integrity management process. Key principles highlighted here could transfer to the offshore renewables sector especially as the intervention needed for inspection, repair and maintenance purposes could prove similarly costly.

Management of asset integrity features widely in the oil and gas sector and many of the EI's technical projects focus on this important safety aspect. This is especially the case for the management of corrosion both within pipelines and vessels and external atmospheric corrosion of structures and equipment due to the harsh marine environment. Therefore, it is important to understand the corrosion threats that exist and the need to have in place effective strategies and systems for managing corrosion.

The guidance produced by the EI's **Corrosion Management Working Group** aims to assist operators with setting up an effective corrosion management system and relates to the general principles and requirements for improving the management of corrosion in oil and gas production and processing. It is regarded as one of the most important documents for describing good practice in corrosion management, highlighting many crossover principles for maintaining asset integrity and compliance with corporate health, safety and environmental requirements for all offshore installations.

Another project within the corrosion management theme and relevant to the offshore renewables sector is the current work to develop guidance for **Cathodic protection of**

**offshore installations** which extends the work in corrosion management. The steering group has agreed that this work should be extended not only to include floating production and storage offloading facilities but also offshore wind farms and therefore provides direct benefit to this sector.

Over the next 10-15 years, the energy industry will continue to change and along with it large numbers of energy professionals are expected to retire and take their knowledge and expertise with them. Businesses have to develop strategies to manage the retention of experience – even beyond retirement – and this transfer of knowledge.

There is the potential for renewables operators to learn from the experiences of oil and gas operators, sharing knowledge across industry to maintain the highest levels of professionalism. Through its technical work programme, the EI works as an 'honest broker' between the government regulator and the operator thereby bolstering the commitment for self-regulation and, assisting with the dissemination of accepted good practice gleaned from key industry experts.

For more information please visit: [www.energyinst.org](http://www.energyinst.org)





The information within these case studies has been provided by our members and AREG holds no responsibility for any errors or omissions therein.

## Contact with AREG

If you wish to learn more about opportunities in offshore wind energy or if you are an Aberdeen City and Shire business interested in joining AREG as a member please get in touch with us at:

Tel: 01224 523630

Email: [info@aberdeenrenewables.com](mailto:info@aberdeenrenewables.com)

[www.aberdeenrenewables.com](http://www.aberdeenrenewables.com)



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