

Scotland's Offshore Wind Route Map

Developing Scotland's Offshore Wind Industry to 2020 and Beyond



Offshore Wind Industry Group (OWIG)

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Background

The aim of the Offshore Wind Industry Group (OWIG), which was established in early 2009, is to ensure Scotland fully capitalises on its offshore wind energy potential – estimated at around 25% of the whole European resource. Delivering this large scale development of offshore wind represents the biggest opportunity for sustainable economic growth in Scotland for a generation.

Co-chaired by the Scottish Government and industry¹, OWIG brings together all offshore wind developers active in Scotland, grid companies, manufacturing firms, academia, the key public sector bodies and other relevant parties to assess the actions required and to secure the large scale development of offshore wind in Scotland now and for decades to come.

Published in September 2010, the Offshore Wind Route Map was the culmination of the work undertaken by OWIG, setting out the opportunities, challenges and the priority recommendations for action for the sector to realise Scotland's full potential in offshore wind.

OWIG committed to undertake a fundamental review of progress of the Route Map's objectives. Through a series of workshops the membership discussed the current challenges facing the sector and whether the recommendations set in 2010 were still valid.

¹ Currently Dan Finch, Managing Director of EDPR

Introduction

Since its inception the role of the Offshore Wind Industry Group (OWIG) has been to:

“provide a forum for the public sector (Scottish Government, Scottish Enterprise, Highlands & Islands Enterprise Scottish Development International, Skills Development Scotland), offshore wind developers active in Scotland and other relevant parties to support the emergence of this new industry into Scotland. The role of the Group is to identify and take forward the actions necessary to support this industry in realising the fullest economic and environmental benefits for Scotland.”

This partnership working has been invaluable as we drive forward the offshore wind industry in Scotland. The development of the Route Map was the first time that such a document had been compiled for the sector. It brought together the Scottish Government, industry and economic development agencies who were able to take a united approach to the identification of opportunities, challenges and priority recommendations.

Through this partnership there has been significant progress in the development of the offshore wind sector since the Route Map’s publication two years ago, with advances in the majority of the key areas identified.

In 2010 Scottish Enterprise and Scottish Renewables together commissioned IPA Economics to quantify the scale of opportunity presented by offshore wind in Scotland. The resulting work illustrated four alternative futures for the Scottish offshore wind industry, with Scenario A, the top scenario, setting the basis for what the initial Route Map aspired to. Reaching full offshore wind capacity and securing one third of the UK offshore wind market would secure an estimated GVA in Scotland of £7.1bn and create 28,377 jobs.

Since then, Scotland’s offshore wind industry has successfully grown at the pace envisaged in the report. During 2012, the development of offshore wind projects in Scottish waters leapt forward with applications representing over 4GW of installed capacity. With further projects expected to submit next year, offshore wind looks set to play its full role in helping to deliver the Scottish Government’s 2020 renewable energy target.

International companies involved in turbine manufacture, including Samsung, Gamesa and Areva have shown their clear interest in the Scotland as a global hub for offshore wind by making investment announcements. This is a result of the continued focus by the Scottish Government, Scottish Enterprise, Highlands & Islands Enterprise, Scottish Development International and Scottish

Renewables providing expert support to leading global companies to encourage their investment and expansion into the Scottish supply chain.

Initiatives established include the Prototype Offshore Wind Energy Renewables Scotland fund (POWERS) which provides financial support for the capital and operational costs associated with the speculative production of full-scale prototypes of next generation offshore wind turbines. The offshore wind expert support programme has also been developed to help companies that have not traditionally been involved with offshore renewables to consider and design diversification strategies for winning business in the sector. The programme has already worked closely with 70 separate companies and aims to work with a further 600 during the next three years.

The support shown through these programmes has also helped to drive further investment in manufacturing and demonstration sites, prototype development, targeted R&D and programmes to support the development of the domestic supply chain and exporting opportunities. The development of the National Renewables Infrastructure Plan and its supporting National Renewables Infrastructure Fund, have led to significant infrastructure investment at Methil, Arnish, Macrihanish, Nigg and Westway in Renfrew to support the development of port manufacturing locations for offshore wind supply chain and related developments. Master plans are under development for the port facilities at Dundee and Leith, while the development of Scotland's first prototype testing centre at Hunterston, and the European Offshore Wind Deployment Centre in Aberdeen, continues apace.

Our vibrant company base, academic excellence in renewables and most ambitious renewables targets in Europe have led to the establishment of both the new UK Offshore Renewable Energy Catapult Centre in Glasgow and the UK's Green Investment Bank in Edinburgh, reinforcing Scotland's international reputation for research, development, design and engineering of offshore renewables and a range of enabling technologies. Further, Vattenfall, SSE and Iberdrola have established offshore offices in Scotland, while new global entrants to the UK market, EDPR and Repsol, have chosen Scotland as home to their new UK offices.

The achievements outlined above represent just a snapshot of the growth of Scotland's offshore wind industry. However, new challenges, such as Electricity Market Reform, continue to emerge, which may significantly impact on the development of the industry.

In light of these new challenges and as part of the fundamental review of the Route Map, OWIG undertook a series of workshops. OWIG members discussed the progress that had been made and whether the recommendations made in 2010 were still valid as we moved towards 2020 and beyond. As before OWIG undertook a backcasting session to establish a timeline of development and revisited the original areas deemed to require immediate action. Those areas were:

- Investment in Infrastructure
- Appropriate Supply Chain
- Ongoing Innovation of Technology and Practices
- Regulation of and Access to the Electricity Grid
- Managing the Marine Environment
- Skills
- Finance
- Securing Support of Local Communities and Existing Users of the Sea

This Route Map provides a synopsis of those conclusions, detailing progress to date while identifying the emerging challenges and actions required to secure a vibrant offshore wind industry in Scotland.

This update will feed into the overall renewables objectives published within the 2020 Renewable Route Map for Scotland. Furthermore, the work of OWIG will inform the UK's Offshore Wind Programme Board, tasked with taking forward the recommendations set out in the Cost Reductions Task Force Report, thereby ensuring that we achieve the goal of reducing the levelised costs of offshore wind to £100 per MW/h by 2020.

Progress on Key Recommendations and Next Steps

When published in 2010, the Route Map identified the following key areas which needed immediate action. OWIG members have each played their role tackling the issues and as a result have made significant progress in the past two years. The following section details that progress.

INVESTMENT IN INFRASTRUCTURE

The route map highlighted that existing infrastructure was insufficient to support significant offshore wind project deployment. Key infrastructure requirements for the sector include: sites for manufacturing, assembly, installation and operations and maintenance supply chain with access to appropriate load out quayside at ports, vessels, office facilities and housing for personnel.

Original Recommendations

- **Scottish Enterprise and Highlands and Islands Enterprise** to focus efforts on delivery of investment in the key clusters identified in the National Renewables Infrastructure Plan (N-RIP).
- **Scottish Enterprise and Highlands & Islands Enterprise** will build on the port cluster approach, support Scotland's supply chain and continue to market their locations domestically and internationally.
- **Scottish Enterprise and Highlands and Islands Enterprise** to identify appropriate onshore and offshore test facilities as part of the review of infrastructure requirements.

Progress

Since publication of the Route Map significant development has been made with regard to the opportunities initially identified within N-RIP:

- Launched in November 2010, the £70 million National Renewables Infrastructure Fund (N-RIF) aims to strengthen ports and manufacturing facilities for offshore wind turbines and related components and leverage private sector investment. Two funding awards have been made to date:

- Westway (Renfrew) - The 53 hectare Westway industrial site and adjoining dock in Renfrewshire has successfully secured £500,000 from the NRIF to support its £1.3 million project to bring dock facilities back into operational use to support and attract companies involved in the manufacture of heavy components for the renewables sector.
- Hunterston - Scottish Enterprise will invest up to £4.3 million from NRIF towards a joint venture with SSE to create an offshore wind turbine test centre, capable of hosting three full scale wind turbines designed for offshore deployment.
- In October 2011 Global Energy Group bought the Nigg Yard to develop a service yard for the energy industry (oil and gas and renewables). Expected to employ 2,000 people (of those 800 in renewables) on site by 2015. Nigg Skills Academy opened in March with 3000 training places to be created by 2015.
- Samsung Heavy Industries announced in January 2012 to base its first European offshore wind project at Fife Energy Park. With the creation of a manufacturing facility in Scotland, more than 500 jobs could be created in Fife through this £100m project to develop a new generation 7MW wind turbine.
- In March 2012 Gamesa announced its intention to site a new UK new wind turbine manufacturing plant at the Port of Leith. The Edinburgh plant would create around 800 new jobs and hundreds more in supply chain, with investment up to €150 million.
- In November 2012 Areva announced its UK manufacturing facility would be located on the East Coast of Scotland, with the potential to create 750 manufacturing and supply chain jobs.
- Highlands and Islands Enterprise has taken an equity stake in Wind Towers Scotland Ltd, enabling significant expansion and development of the facility at Machrihanish to support the development of the company and its growth towards the offshore wind market. Associated with this has been investment by the local authority in significant upgrade work at Campbeltown harbour and of the local road network to allow the transportation of increased-size tower sections.
- The enterprise agencies have worked with Scottish ports and harbours to assist them with understanding what an offshore wind service base will need to comprise, and have managed a number of learning journeys to visit ports in England that are already working as operations and maintenance facilities. This has helped with developing the thinking of Scottish operators and has also provided more market information to the enterprise agencies when considering approaches for investment at relevant sites.

Challenges and Next Steps

A key challenge for the sector remains the ability to unlock private investment for the development of port and manufacturing facilities. Without orders from developers, turbine manufacturers (and others in the supply chain) are less willing to commit to large scale investment in such infrastructure. However, not only do the developers require the security of a consent before placing such orders, they also need visibility of the supply chain's ability to deliver on those orders once placed. Such uncertainties have the potential to add significant delays to the development of port and manufacturing facilities, risking Scotland's ability to compete with

facilities on the continent. Therefore, in order to see the offshore wind industry in Scotland flourish, it is vital that public investment in infrastructure, namely around ports and harbours, continues. To this end, OWIG recommends:

- **Highlands and Islands Enterprise** continue to look at potential development sites in their area progress at least one site through the planning process during 2013
 - **The enterprise agencies and Scottish Development International (SDI)** to continue to work with inward investors to secure the most appropriate locations for manufacture, assembly, installation and ongoing operations and maintenance activity,
 - **The enterprise agencies and SDI to also work with The Crown Estate**, ports and harbours to ensure that the most complete and detailed propositions are offered to developers around the UK and further afield to showcase the range of facilities on offer in Scotland.
 - **The Scottish Government** to allocate funding to deliver a strategic port facility on the east coast of Scotland to facilitate offshore wind development on the east coast and attract inward investment from the supply chain.
 - **The enterprise agencies and SDI** should also focus on other inward investment opportunities associated with gravity base and floating substructures, plus cable manufacturers.
-
- **APPROPRIATE SUPPLY CHAIN**

The scale of the offshore wind opportunities both in Scotland and the rest of the UK means there will be great demand from developers for services, infrastructure and skills within the same timeframe. The Route Map identified a risk that Scotland's indigenous supply chain may not be adequately prepared in time to meet and take advantage of the opportunities that will exist both north and south of the border and further afield.

Original Recommendations

- **Scottish Development International (SDI)** to bring inward investors to Scotland to swiftly fill key gaps in the supply chain and develop new technologies.

Progress

There have been a number of key developments on the supply chain, which have been well received by the industry:

- The Offshore Renewables Supply Chain Directory was launched in September 2011 <http://www.scottish-enterprise.com/your-sector/energy/offshore-wind/CompanySearch.aspx>. The Directory helps identify Scotland's unique capabilities in the offshore environment and enables new Scottish entrants to showcase their offering for servicing this rapidly-emerging sector. Currently there are approximately 500 companies registered across 140 sub-sectors in the offshore renewables supply chain.
- The Offshore Wind Expert Support Programme has been operational since 2010 and has seen an extension to the programme. This specifically designed product has been established to help companies consider and build diversification strategies to enable them to win business in the offshore wind sector. Targeted at providing support to 600 companies over a three year period (2012 -2015) The product provides up to 2 days' worth (100% funded) of one-to-one support.
- Scottish Enterprise, Highlands & Islands Enterprise and Marine Scotland are working with developers to understand the procurement processes and to identify those companies not yet known to developers and their Tier One contractors to ensure that as much local content is used in Scottish projects as is realistic. Where companies are not yet able to meet the developer requirements, the enterprise agencies are working with them through the Offshore Wind Expert Support Programme.
- The enterprise agencies have run a series of supply chain events in collaboration with The Crown Estate, reaching out to hundreds of interested supply chain companies and using developers and top tier contractors to explain their positions and development plans for the future. Individual company 'meet-the-buyer' events have also proved successful, with a number of MoUs signed and some early work won by Scottish suppliers.
- Using intelligence garnered from account managed companies, market intelligence, and inward investors, Scottish Enterprise, Highlands and Islands Enterprise and Scottish Development International are actively engaging with suitable companies both foreign and domestic to encourage investment in necessary assets to address bottlenecks in the supply chain. Examples of this include Scottish Enterprise's investment in BiFab and Steel engineering to address shortfall in jacket structures, and an initiative to develop a foundry to produce necessary castings for offshore turbines.
- To support these activities enterprise agency support packages (both financial and non-financial) have been made available to address this. Recent events include meet the buyer events with OEMs such as Areva and Gamesa. These events enabled Scottish companies to engage with representatives, both technical and commercial, to establish relationships and tailor propositions for the industry.

Challenges and Next Steps

As stated above, a key challenge facing the development of a vibrant supply chain within Scotland is the uncertainty that exists while projects await their consents. This uncertainty delays investment and risks our ability to compete with established supply chains on the continent. In order to address these issues we recommend:

- **Scottish Enterprise (SE)** to continue to operate the Offshore Wind Expert Support Programme across Scotland over the next two years, delivering one-to-one support from industry experts to two hundred companies.
- **The Scottish Government (SG) and Scottish Enterprise** to continue to work with industry to improve understanding on the procurement strategies of the developers, ensuring that the supply chain is geared up to be ready for requests for proposals and information as they are issued, and the companies are well placed to provide a quality product at a competitive price.
- **Marine Scotland** will target all potential and current applicants for marine licences for commercial scale developments and seek to implement joint projects with the aim to facilitate engagement between developers, manufacturing and construction supply chain companies. This will ensure that indigenous Scottish companies are provided with the full range of support mechanisms to enhance their competitiveness and international companies are induced to become inward investors, if they are successful within the project bidding process.
- **Marine Scotland** to refine their consenting procedures to ensure timely consents are delivered within the nine month period as defined between themselves and the developer.
- **SE and SDI** to continue to work with the supply chain to secure export opportunities in advance of projects in Scottish waters securing consents, and to continue to attract new global players to use Scottish facilities and skills.
- **Industry to work with SG, SE and HIE** to build on existing project pipelines to give greater visibility to the supply chain on development timings and identify any potential bottlenecks.
- **SG** to monitor the requirements of the industry and support indigenous industry in successfully competing in those new markets. SG will also work with industry to monitor and report on local content levels of developments in Scottish waters.

ONGOING INNOVATION OF TECHNOLOGIES AND PRACTICES

There continues to be a challenge to drive down the levelised cost of energy of offshore wind developments, by up to 30%. Cost reduction will make offshore wind more attractive to developers and new sources of finance, which will in turn encourage the build-out of proposed developments across the UK by 2020.

Original Recommendations

- **Scottish Enterprise and Highlands and Islands Enterprise** to continue to review the overall support for innovation and the innovation system within offshore wind, compare with models of best practice and develop more detailed recommendations for improvements.
- **Scottish Enterprise and Highlands and Islands Enterprise** to continue to promote and support effective collaborations and knowledge flows within and between the company and research base including development of solutions to knowledge sharing and open transfer of knowledge.
- **Scottish Enterprise/ Highlands and Islands Enterprise/Scottish Funding Council** and other bodies to consider the development of additional specific targeted research and development funding support mechanisms, such as an offshore wind version of the Wave and Tidal Energy Support Scheme (WATERS).

Progress

A number of initiatives have been established to deliver the original recommendations and assist innovation within the sector. These include.

- The £35 million Prototype Offshore Wind Energy Renewables Scotland Fund (POWERS) has been established to recognise the production of prototypes is both speculative and high risk and will provide financial support for capital and operational costs associated with the production of full scale prototypes of next generation offshore wind turbines.
- Headquartered in Glasgow the Offshore Renewable Energy Catapult is a £50m centre designed to accelerate the development of solutions to offshore engineering problems. In addition, a second site in the North East of England (Blyth, Northumberland) would allow easy access to the first-rate facilities and assets at National Renewable Energy Centre.

- Prioritisation of a R&D and Innovation report and industry engagement has led to Scottish Enterprise identifying a number of areas that can deliver significant cost savings to the industry in the near-term. This research has led to a Scottish Enterprise innovation funding call to enable the acceleration of these solutions.
- Scottish Enterprise with partners such as Scottish Renewables has produced a number of knowledge and supplier events aimed at informing the industry of common issues, fostering best practice, and providing a conduit for innovative technologies to be introduced to developers and OEMs.
- Scottish Enterprise's foresighting team has produced a number of reports aimed at guiding innovation in key sectors – these include reports focussed on the constraints currently existing in the sub-structure market due to geographical conditions
- Through research and industry engagement Scottish Enterprise has developed actions actions that are based on learning from the oil and gas industry that can be transferred. These have focussed on areas such as health and safety and most recently Scottish Enterprise published a report on the cost savings that the oil and gas industry can bring to the renewables sector.
- The Scottish Government and industry were also heavily involved in the delivery of the UK Government's Cost Reduction Taskforce report which aims to bring the lifetime costs of offshore wind energy down to £100/MWh by 2020.

In addition to the activities carried out by the enterprise agencies to meet the original recommendations, the offshore wind industry has undertaken several projects to promote ongoing technological innovation. In addition to the Cost Reduction Taskforce work, Mitsubishi Power Systems Europe Ltd (MPSE) plans to invest up to £100 million in Centre for Advanced Technology to carry out R&D into offshore wind turbine technology. This project brings together Technip Offshore Wind, Wood Group Renewables, and SSE at an early stage of development to work together investigating engineering interfaces. The project is expected to create 30 engineering jobs.

Challenges and Next Steps

As stated above, the challenge laid down to industry is to reduce the lifetime cost of energy to £100/MWh. This is clearly ambitious and will require developers to work in collaboration and consider innovative technology and working practices. Test and demonstration facilities will also continue to be crucial to the development of the industry and in particular in pursuing the cost reduction agenda. Therefore, we recommend:

- **The enterprise agencies** to continue to progress work with developers and manufacturers to explore options for the onshore and offshore testing of the next generation of offshore wind technology.
- **Industry and Government** to work together to deliver turbines on test at both Hunterston and Methil.

- **The Scottish Government, Scottish Enterprise and Highlands & Islands Enterprise** to progress a suitable test and demonstration site in the Highlands and Islands for technology from 2016 onwards.
- **The Scottish Government and industry** to deliver the Cost Reduction Taskforce recommendations through ongoing work with the Offshore Wind Programme Board.

REGULATION OF AND ACCESS TO THE ELECTRICITY GRID

Despite the boost to renewable energy generation in Scotland from the positive decision on the Beaully-Denny transmission upgrade, the Route Map identified a concern that the UK's existing grid infrastructure is unable to support the considerable amount of new capacity coming from offshore renewable sources, especially offshore wind. Whilst the Electricity Networks Strategy Group (ENSG) report identifies necessary infrastructure works to be undertaken, there is a risk that these upgrades will not be ready alongside developers' timelines. A lack of grid infrastructure and uncertainty around the proposed Offshore Transmission (OFTO) regime could also delay developments.

Original Recommendation

- **OFGEM** to explore and propose alternative solutions to the existing Transmission Network Use of System charging regime, in order to find solutions which have the potential to encourage offshore wind developments.
- **OFGEM, National Grid and Department for Environment & Climate Change (DECC)** to provide offshore wind developers with assurances that works being undertaken by the **Offshore Transmission Owners** are aligned to the needs, requirements and timelines of the offshore developers.

Progress

Achieving the recommendations outlined above continues to prove challenging despite various representations being made by both the Scottish Government and industry. These representations include:

- OFTO consultation from DECC submitted. Scottish Renewables offshore grid working group are working on an offshore transmission paper which will be presented to Duncan Stone, head of offshore transmission at DECC, in early July. Scottish Renewables continues to engage in the Offshore Transmission Co-Ordination Group managed by DECC and Ofgem.

- Ofgem have launched the Integrated Transmission Planning and Regulation Project, seeking to facilitate improvements in transmission and interconnection planning for both onshore and offshore regimes. Ofgem are anticipating to introduce any measures from July 2013 onwards.
- Scottish Renewables have submitted a consultation response on draft framework guidelines for EU grid connection codes and will continue to track developments in Europe and with the development of European grid codes.

Challenges and Next Steps

As stated above, achievement of the original recommendations continues to prove challenging. Potential delays to planned infrastructure upgrades further increase the challenges facing the industry in relation to grid. Therefore, we recommend:

- Shunt compensation on existing circuits are completed during 2014 and raise existing border export capacity by 1GW.
- The construction of a west coast HVDC link to start in 2013. This link will have a 2.2GW export capacity, due for completion end of 2015.
- East coast HVDC link options development to be completed by end of 2014, with the project being completed in 2018.
- **Á The Scottish Government and industry** to continue work to overcome the impediments caused by geographical charging which add early security costs to projects.

ELECTRICITY MARKET REFORM

- Electricity Market Reform (EMR) represents the largest reform of the electricity market since privatisation. These reforms are fundamental to the energy sector, both for Scotland and for the rest of the UK. The Scottish Government is determined to ensure that EMR respects the devolved settlement, and recognises the benefits that Scotland's use of its devolved powers have delivered to the UK as a whole. EMR should work for those investing in Scotland, delivering our full energy potential and maintaining the significant and tangible industry, investor and developer confidence that we have worked hard to establish.
- We will therefore continue to be productive partners in the EMR process to ensure that investor confidence in Scotland's electricity sector is maintained, renewables and Carbon Capture and Storage in Scotland are developed and the proposed reforms support our renewable energy and climate change targets and priorities.
- As stated previously, the EMR proposals represent a significant change, with the Renewables Obligation (RO) being replaced by a new support mechanism – a Contract for Difference (CfD) – providing long term price certainty for low carbon generation. The uncertainty brought about by this change adds a high degree of risk to development; therefore, we urge the UK Á

Government to minimise these risks by avoiding any unnecessary delays in either the legislation or the Delivery Plan which will set the strike price.

- The Scottish Government has previously used our devolved powers over the RO to create a strong and effective framework of support, targeted to reflect Scottish priorities such as our considerable offshore wind, wave and tidal potential. We have secured, in primary legislation, a statutory consultation role for Scottish Ministers in the design and delivery of the CfD and underlying institutional framework to help ensure this can continue under the CfD.
- However, the Scottish Government's clear position is that changes to the support mechanism for renewables must be at least as effective as the current framework and the reforms must build on our strengths and successes.
- When we have sufficient assurance that the right levels of support will be available for technologies where Scotland has natural advantages, we will decide whether, and to what extent, we need to maintain the RO in Scotland beyond 2017.

MANAGING THE MARINE ENVIRONMENT

As the users of Scotland's seas continue to grow, managing the marine environment for a number of important uses is a challenging and complex task. Marine Scotland, is responsible for managing Scotland's seas in an economic and environmentally sustainable way. They are supporting the introduction of this new offshore renewables industry into Scotland's seas through the Marine (Scotland) Act 2010 which allows them to undertake marine spatial planning and offshore licensing responsibilities. The Route Map, however, recognised the challenges they face in doing so including resource issues, rapid transfer to a new regime, streamlining of processes and consistency with other planning regimes in UK waters.

Original Recommendation

- **The Scottish Government (Marine Scotland)** to implement the Review of Blue Seas Green Energy – A Sectoral Marine Plan for Offshore Wind Energy in Scottish Territorial Waters (0-12 nautical miles) in order to identify potential further locations where commercial scale offshore wind energy could develop. The Review will extend the scope of the Plan to Scottish Waters (0-200 nautical miles)
- **The Scottish Government (Marine Scotland and Energy Consents & Deployment Unit)** to retain strengths of current consents system, crucially implementing a 9 month determination objective where there is no PLI for offshore wind developments (subject to pre-application in advance of submission), resulting from good co-operation between industry and stakeholders particularly on conflicting issues.

Progress

- [Blue Seas Green Energy – A Sectoral Marine Plan for Offshore Wind Energy in Scottish Territorial Waters](#) was published in March 2011.

The biannual review of Blue Seas Green Energy identified as a requirement by the Habitats Regulation Appraisal, is currently underway, to date the review has produced:

- Scoping Study for Offshore Wind Farm Development in Scottish Waters. Marine Scotland Science Publication - November 2011
- Draft Regional Locational Guidance and Draft Initial Plan Framework were made available for comment – August 2012
- Marine Scotland Licensing Operations Team have enhanced their resources by using the Marine Scotland call-off consultancy framework for consultancy support to provide Environmental Assessment Audit and a level of technical expertise to provide advice on the more technically challenging aspects of offshore electricity generating station applications.
- Marine Scotland has updated the existing licensing and consents manual. It has been produced as licensing policy guidance for developers, regulators, statutory advisors, interested parties and the public. The manual is currently in draft format and out for consultation.
- Marine Scotland Science has developed an electric and magnetic field generating system to investigate the behavioural responses of migratory fishes to magnetic fields with alternating currents.
- Marine Scotland has established a fisheries tri-lateral group in order to discuss policy issues of relevance across both sectors

Challenges and Next Steps

Whilst OWIG welcomes the many measures the action to date, many of the challenges associated with the planning process remain, especially relating to the timelines. A huge volume of projects are simultaneously entering the planning system creating a significant challenge for Marine Scotland. However, the prize for delivering these project consents in a timely fashion, opportunity to establish a vibrant Scottish supply chain, local to where these first deeper water projects are consented.

Implementation of the nine month determination objective is dependent on Marine Scotland's Licensing Operations Team receiving quality, comprehensive applications from developers. Marine Scotland will continue working with the statutory consultees and industry to refine the application process to deliver an efficient and streamlined consenting process.

As part of that process the following activity will be undertaken.

- **Call Off Framework** - Marine Scotland Licensing Operations Team are using the Marine Scotland call off Framework to commission consultancy support to provide audit and advice on environmental statements. These consultancy services will complement Marine Scotland's existing expertise and help deliver efficient processing of applications and decision making.
- **Marine Licensing Manual** - Marine Scotland has updated the existing Licensing and Consents Manual to create a single, stand alone document covering marine renewables and offshore wind. It has been produced as Licensing Policy Guidance for developers, regulators, statutory advisers, interested parties and the public, covering Marine Licences and Electricity Act s36 consents.
- **Finalised Regional Locational Guidance for Offshore Wind Energy** will be produced which will provide further detail in relation to the Adopted Plan Options coming out of the Review of Blue Seas Green Energy **Socio-economic Impact Assessment**. Marine Scotland is also undertaking a series of the socio-economic studies to help inform the strategic planning and project licensing frameworks to include improved approaches to Fishing (Scotmap), Shipping and Visitor/Tourist Activity.
- **The Scottish Government (Marine Scotland)** to produce Draft Plan Review of Blue Seas Green Energy – A Sectoral Marine Plan for Offshore Wind Energy in Scottish Waters. The Draft Plan, along with the accompanying Sustainability Appraisal (encompassing the Strategic Environmental Assessment, Socio-economic Assessment and Habitats Regulations Appraisal) will be subject to a period of statutory consultation with stakeholders and the public in Spring / Summer 2013. The Finalised Plan Review is due for adoption by Scottish Ministers in 2013.
- **Finalised Regional Locational Guidance for Offshore Wind Energy** will be produced which will provide further detail in relation to the Adopted Plan Options coming out of the Review of Blue Seas Green Energy
- **Socio-economic Impact Assessment** - Marine Scotland are also undertaking a series of the socio-economic studies to help inform the strategic planning and project licensing frameworks.
- **The Scottish Government (Marine Scotland)** will play a key role in progressing **ORJIP: Offshore Renewables Joint Industry Programme**. The aim of the programme is for industry and government to fund strategic research to reduce consenting risk for offshore wind projects. The programme will initially concentrate on two priority consenting risks: uncertainty about impacts on marine mammals from underwater noise; and uncertainty about the avoidance and collision rates of birds with turbines. It is recognised that these environmental issues are of prime importance for industry and regulators alike and that a significant amount of resource will be required in order to research them in a meaningful way.
- **Marine Scotland** will continue to undertake a series of environmental research projects to facilitate the development of offshore renewable energy in Scottish Waters. These include:
 - **Strategic Monitoring Network** - An effective marine monitoring network is required to support the issues identified within our strategic Habitats Regulations Appraisal (sHRA) considerations for offshore wind, wave and tidal development effects

on our European designated sites and species. This project aims to review the current marine monitoring network in Scottish waters, to identify whether the current monitoring programmes and parameters are able to support plan-level SEA and sHRA monitoring for offshore renewable energy to also fit with emerging Marine Strategic Framework Directive requirements.

- **East Coast Network** - Strategic monitoring of cetaceans along the east coast of Scotland has been proposed through the deployment of a network of passive acoustic monitoring devices. Extending work already underway in the Moray Firth, this network of PAM devices will be deployed at strategic locations along the east coast and will provide baseline information on cetaceans, in particular bottlenose dolphins, that will enable detection of future changes in acoustic behaviour and distribution.
- **Robin Rigg Monitoring** - Marine Scotland intend to review and identify best practice for screening, scoping and assessment reporting using the Robin Rigg Offshore Wind Demonstrator.
- Marine Scotland to work with industry to develop guidance on the application of Rochdale Envelopes which enables industry to deal with unknowns and take advantage of potential technological advances which may reduce costs and environmental impact, while ensuring Marine Scotland have adequate information on which to make a sound determination.

NECESSARY AND AVAILABLE SKILLS

Companies across the UK involved in the renewable energy industry have reported difficulties in recruiting skilled personnel in, for instance, the fields of engineering (electrical, mechanical), design, project management and the marine environment. This is due in part to a general shortage of students in Scotland's colleges and universities specialising in such disciplines in the UK, combined with a difficulty in attracting experienced personnel from other sectors due to competition with other more established industries (in particular, the oil and gas industry). The 2010 Route Map suggested this could be exacerbated by competition for skills from the construction and other engineering sectors.

Original Recommendations

- Establish a demand-led approach to identify the skills articulated by employers with funding through **Skills Development Scotland (SDS)** and the **Scottish Funding Council (SFC)** targeting support for the college and university sectors.
- **Skills Development Scotland** to work with partners to create an Energy Skills Investment Fund to support the upskilling of the existing workforce and re-skilling of people entering the industry.

Progress

Skills should be focused on business need as articulated by employers funding through Skills Development Scotland and the Scottish Funding Council should target support for colleges and universities to support education and training provision that support offshore wind farm developments through the Energy Skills Partnership (ESP) and Energy Technology Partnership (ETP). Skills Development Scotland has worked with partners to establish an Energy Skills Challenge Fund to support up-skilling of the existing workforce and re-skilling of people entering the industry from other sectors as a matter of priority.

ESP and ETP have developed a joint project funded by Scottish Government focussed on:

- Identifying and delivering industry CPD for individuals already employed in the sector or aspiring to enter the sector.
- Developing progression routes from school to college to university.
- Developing the capability and capacity of lecturing staff in Scotland's colleges and universities to ensure update the skills and knowledge of existing lecturing staff and developing lecturers of the future.

Since the launch of the Energy Skills Investment Plan in March 2011, significant progress has been made in terms of strengthening the infrastructure and supply side for skills delivery and workforce development. Implementation of the Plan has already demonstrated extensive collaboration with industry, stakeholders, Scotland's colleges and universities, leading to a number of interventions which are impacting the sector and establishing strong foundations to support future development and inward investment.

This articulation of different types of employer need and wider industry demand, has provided a strategic framework within which suggested initiatives can be considered and prioritised by the public sector partners. These have included activities under the three broad themes highlighted in the plan:

Raise Awareness

- My World of Work was launched by SDS in 2011 and includes a specific energy section.
- 10,000 "Working in the Energy Sector" leaflets produced by Education Scotland were distributed to education establishments across Scotland
- The National Skills Academy for Power's careers website, ThinkPower, has been cascaded to schools, colleges and universities across Scotland
- More than 60 primary and secondary schools now participate in the Junior Saltire Prize, developed by SDS and SCDI

- SDS has supported the development of an Energy Skills Training Database to provide individuals and career advisers with details on job roles within the energy sector; the qualifications and skills required; and where these can be undertaken.

Developing Skills for the Sector

Considerable additional resources have been provided to respond to the needs of industry as articulated in the ESIP and there is evidence of a shift in the mix of skills supply coming to the market:

- Funding has been ring fenced for an additional 500 Modern Apprenticeship starts for energy each year until 2015
- Engineering and Energy Related Modern Apprenticeship Starts show a 13% increase over the past 2 years (2197 from 1947).
- Fabrication and Welding MAs have increased by 25% in the same period (256 from 204)
- The Low Carbon Skills Fund (LCSF) has provided an additional 1600 training places for SME businesses across Scotland since 2010.
- The number of students in HE institutions studying Engineering and Technology has risen 18% from 2007/08 to 2010/11 (18,250 from 15,510).
- £2m has been committed in 2012/13 through SDS to support an additional 1,000 flexible training places in energy and low carbon through a continuation of the Low Carbon Skills Fund and the new Energy Skills Challenge Fund. The ESCF is funding transformational training programmes for skilled workers wishing to enter the energy sector, including the offshore wind industry.
- The Scottish Funding Council will support an additional 300 funded university places in STEM, increasing this to 1,200 additional places by 2015/16.
- The Scottish Funding Council have established a college Skills for Growth Fund (£6m) to support priority sectors and are working with ESP to maximise the benefit for the energy sector.
- Plans to develop a Scottish Energy Skills Academy to work across Scotland's wide network of energy and skills centres is under development and is expected to be launched in 2013.

Resources and Infrastructure

- The development of Scotland's Colleges' Energy Skills Partnership (ESP), a new and unique step in collaboration between the colleges to offer energy skills training across regional and sub-sectoral hubs. Current activity includes:
 - Working with Scottish Power Renewables to develop a Wind Turbine Technician training programme.
 - Working with power companies and contractors to establish power network training capability and capacity.
 - Working with a major manufacturer to establish onshore and offshore health and safety training hubs.

- The Energy Technology Partnership (ETP) and the ESP are delivering an enhanced programme of continuous professional development (CPD) training to industry and FE/HE teaching staff.
- The ETP supports the Energy Industry Doctorate programme, as well as the UK's Wind Energy Doctoral Training Centre and Offshore Renewable Energy Doctoral Centre.
- Development and sustained delivery of the UK's first Wind Turbine Operation and Maintenance Modern Apprenticeship which is delivered through Carnegie College.
- Over £1m investment in the establishment of the college Energy Skills Partnership with a number of industry led initiatives already in development.

Challenges and Next Steps

Despite significant progress made in better aligning public sector services and products with industry demand, there remain clear challenges across the energy sector. The offshore wind sector in particular is coping with continuing uncertainty over technology, finance and planning which is affecting intelligence about specific skills demands and job opportunities. We therefore recommend:

- **The Energy Skills Action Group (ESAG)**, chaired by Frank Mitchell, SEO of Scottish Power Energy Networks, to manage greater communication and detail over these issues. This group, created to address cross-cutting skills issues across the energy sector, reports to the Scottish Energy Advisory Board and seeks stronger dialogue with the Industry Leadership Groups over skills challenges and potential solutions.
- **ESAG** to seek granular intelligence from industry groups and employers to inform the actions required from both the private and public sector to address the concerns about current and future talent as the offshore wind industry's potential is realised.
- **ESAG** to develop a skills matrix with the co-operation and intelligence from OWIG to support the development of appropriate and timely skills solutions for the sector.

FINANCE

Tackling the issues identified in this Route Map, in line with developers' timelines, will take investment of unprecedented sums of money, on levels way beyond Government's and utilities current expenditure limits. Therefore, innovative funding solutions must be sought to attract the significant levels of private sector investment needed if the offshore wind sector is to deliver as planned. This challenge is heightened given the current economic climate.

Recommendation

- **The Scottish and UK Governments** to provide access to sufficient levels of investment to incentivise port and harbour owners to overhaul their existing facilities to meet the needs of the offshore renewables sectors.
- The **UK Government** to agree that OFGEM immediately releases the Fossil Fuel Levy to the Scottish Government to allow for offshore infrastructure in Scotland to be supported and that this transfer will not lead to a corresponding reduction in Scotland's overall budget allocation.

Progress

Scotland successfully lobbied the Westminster government to release £103 million of the fossil fuel levy money to Scotland in late 2011. On 22 March 2012, the Minister for Energy, Enterprise and Tourism announced the intention to use this money to create the Renewable Energy Investment Fund. The Renewable Energy Investment Fund (REIF) was opened for business by the First Minister on 10 October 2012 at the Scottish Low Carbon Investment Conference in Edinburgh.

REIF's main objective is to accelerate renewable energy deployment by creating and leveraging private investment to ensure projects proceed. The fund is designed to create a delivery mechanism with the scope to attract other investors, offering longer term support to specific renewable sectors including those at an earlier stage.

Following independent market assessment and consultation with stakeholders, the initial priorities for REIF are marine (deployment and operation of arrays and enabling innovative technology); community renewables (energy generation with community benefit); renewable district heating; and other projects with a focus on innovative renewable technologies. The priorities will be reviewed regularly in light of demand and changing industry dynamics. The fund will be delivered by the Scottish Investment Bank on behalf of the Scottish Government and its enterprise agencies.

It was agreed that the remaining £103 million would be used as part of the capitalisation of the UK Green Investment Bank. Capitalised with £3bn over the current spending review and under the terms of its state aid approval, the Bank will be able to make investments on commercial terms in three priority areas, one of which will be offshore wind.

Key GIB development and operating principles

- Help accelerate the UK transition to a low carbon economy
- Provide enduring impact and minimise distortions
- Strategic alignment with – but operational independence from – government
- Mobilising private sector capital is the key to fulfilling the bank's mission
- Funding of £3bn is available over three years, as from April 2012
- GIB is looking for clients that meet the highest standards and portfolios of large scale projects that are investor ready
- GIB is not a provider of grants and regional assistance; venture capital and development equity. It is not the lender of last resort and is not a taker of high risk and low reward

Challenges and next steps

- **The Scottish Government** to ensure funding from REIF for innovative renewables is available to innovative offshore wind technology developers.
- **The Scottish Government** to develop an advisory group to help Scottish offshore wind projects wishing to access GIB funding.
- As stated previously, **the Scottish Government and industry** will continue to work with the UK Government to ensure revenue support through Renewable Obligation Certificate/Contract for Difference enables the delivery of the Scottish offshore wind industries ambitions.
- **The Scottish Government, in consultation with industry**, to deliver a separate, enhanced Renewable Obligation banding for innovative offshore wind developments.

SECURING SUPPORT OF LOCAL COMMUNITIES AND EXISTING USERS OF THE SEA

Whilst offshore wind development will bring unprecedented economic and environmental opportunities to Scotland, it is key that the sector engages directly and frequently with local communities, local authorities, interested parties and existing users of the sea to secure their support.

The offshore wind industry has recognised from the outset the need for a strong approach to engagement, not only with established statutory stakeholders, but with the communities near to whom development will be taking place, and indeed the national

'community' of Scotland as a whole. The Environmental Impact Assessment process puts in place a framework for working with stakeholders from a consenting perspective, and it is worth putting on record thanks to those organisations, with whom, developers have been able to develop positive relationships; ultimately contributing to good, sustainable project design.

The offshore nature of these projects, means there is often a broader range of communities with which a developer must engage in comparison to an onshore development. The introduction of new onshore infrastructure to support the offshore development also raises new and particular challenges.

Original Recommendation

- **Offshore Wind Developers** to engage as early as possible with local communities, local authorities and stakeholders on an ongoing basis with their project plans.

Progress

Across industry, the principle of local engagement has been deployed; no two areas of Scotland have been engaged in the same way, so no two project communications are the same. However, local exhibitions, in some cases local public meetings, advertised in the local media have formed a basic foundation for direct public engagement.

Given the huge public stakeholder profile of offshore wind projects, indirect public engagement has also been important over the past few years. The industry has taken a proactive role with the media, working both at local project level and at national level through Scottish Renewables. This has raised the profile of the industry, and significantly improved awareness of development around the country.

Strong communications and effective engagement do not only have the benefit of ensuring that projects can be consented and delivered with the support of stakeholder groups, but can provide the industry with a stronger and more competitive supply chain to deliver projects effectively, and can ultimately help to deliver the aspirations for national prosperity which are placed upon offshore wind.

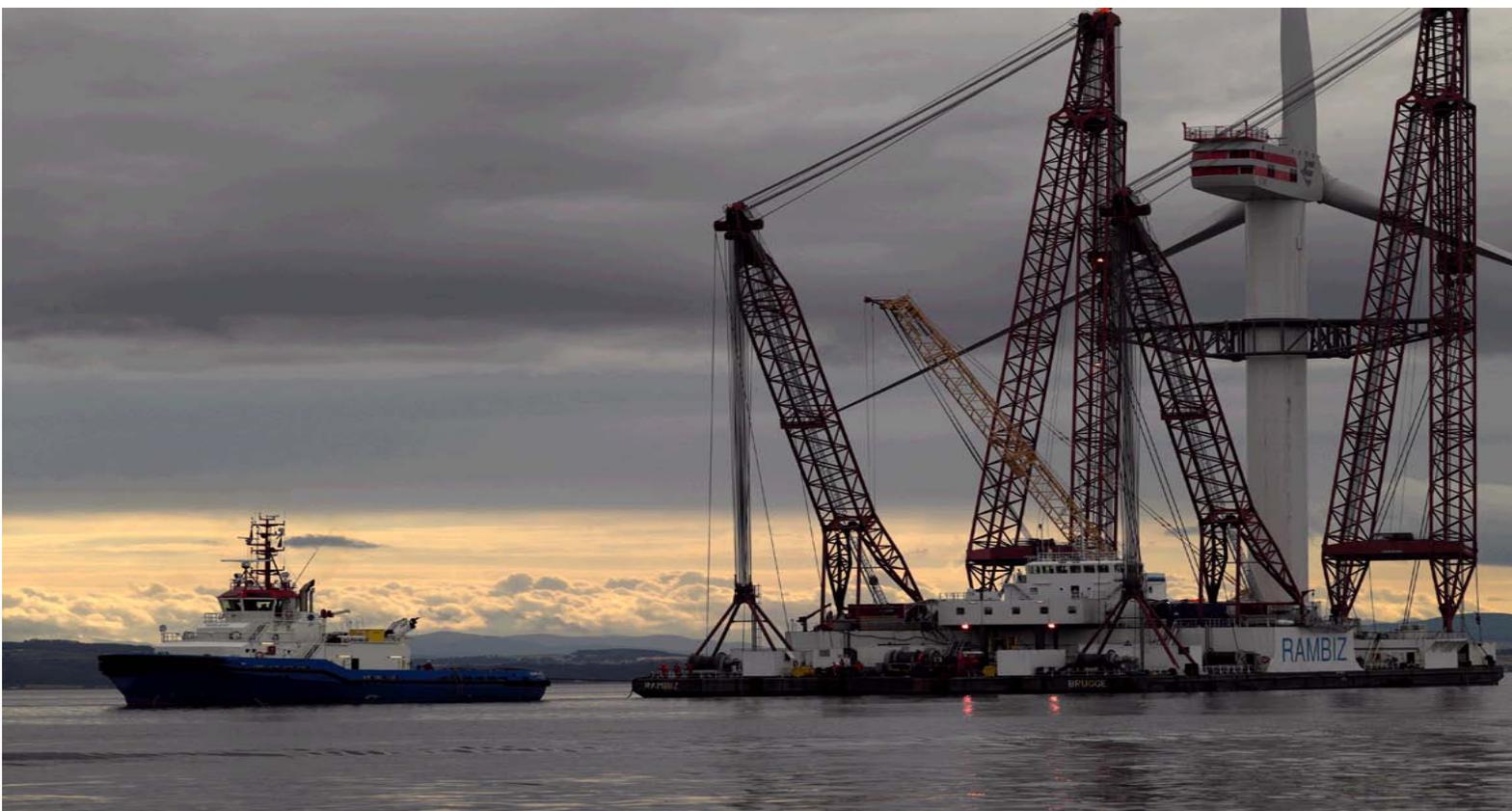
The Scottish Government and its agencies has also been proactive to ensure that individuals and business can be informed of our aspirations. Launched in May 2011, Scotland's offshore wind portal (www.offshorewindscotland.org.uk) is aimed at that audience

and has been developed in consultation with the wider industry and other key public sector partners. It includes a DVD, case studies, news stories and an interactive map showing the offshore wind sites, key infrastructure and current projects.

Challenges and next steps

Interest in offshore wind development will continue to grow as the projects develop. Therefore strong communication and effective engagement must remain at the forefront of any project to ensure a successful outcome for all involved. Both the public and private sectors will continue to act in a proactive manner to ensure from a local to national level those that need to be informed are informed.

- Through Scottish Renewables, **the industry** will continue to engage with marine stakeholders at a national level through forums such as Marine Strategy Forum and the Scottish Government's Fisheries Tri-lateral.



Milestone for Offshore Wind Development in Scotland

The 2010 Route Map contained a timeline of development up to 2015. Compiled in discussion with the industry and public partners it showed what needed to be achieved and by when for Scotland to attain its vision.

This timeline for offshore wind development has been revisited and updated to show the current opinions of the OWIG membership and can be seen in the following table.

1st Consents for Scottish Projects

National Grid Early Spend Profile Committed

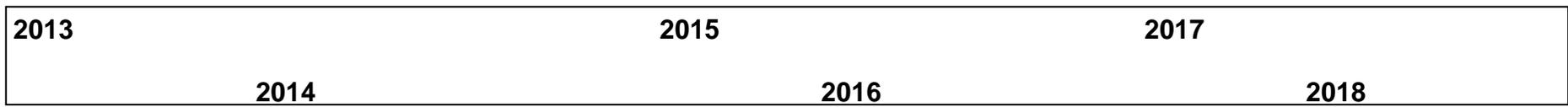
Non turbine supply chain committed

EMR Uncertainties constraining investment removed for developers

Hunterston build commences

- First site generating
- Key manufacturing facilities operational
- 2nd test & demo site operational
- Establish Scottish O&M site facilities
- FID on 2GW of further projects
- Private equity investment for tier 2 & 3 suppliers in place.
- Further investment in East Coast Integrated Grid confirmed

- Deep water test and demo site in construction commenced
- 2GW of capacity installed
- English R3 installation ramping up
- Cost of Energy reduction on track.



- Training and offshore skills initiatives commenced
- Port facilities construction commenced
- Further offshore leasing round
- First FID on project complete
- First construction activities commenced
- Further consent applications submitted bring total to 8GW
- Type certification of large (6-8MW) turbines.

- West Coast Interconnector operational
- Structures build capacity at 400/ year
- Second Major Installation Harbour operational
- 3rd wave of consent applications submitted
- Further offshore technology R&DCentre set up to support industry
- UK non utility equity investment available

- East Coast interconnector operational - Scottish export market developing
- Norwegian Interconnector construction commenced
- 3 GW operational
- Full Scottish STW and R3 sites through the consenting process
- construction commenced on further 2GW of sites

Conclusion

With the endorsement of this Route Map, as before, it is essential that all maintain the momentum that the offshore wind sector in Scotland has created to date. By focussing on the recommendations outlined in this document it creates a path to ensure that Scotland captures the biggest sustainable economic growth opportunity for a generation.

Whilst significant progress has been made, it is clear several difficult challenges remain. Due to the long lead nature of many aspects of the offshore wind industry, 2013/14 will be instrumental in determining the level of industrial deployment achieved and the degree to which Scottish Industry participates in that deployment by 2020.

Since the publication of the Scotland's Offshore Wind Route Map in 2010, Scotland has increased its target of electricity consumption from renewables sources by 2020 to 100%. As before this remains a challenging goal but one that is achievable, with offshore wind making a significant contribution.

OWIG is clear, the sites developed in Scottish Waters must not be seen as the totality of the market opportunity open to our supply chain ambitions but the catalyst. Further, that whilst these sites have made significant progress, and have met several key early milestones, as highlighted throughout this report, many challenges remain.

A combination of Scottish Territorial Waters and Round 3 offshore wind sites has created up to 10GW of potential development. During 2012 just over 4GW was submitted to Marine Scotland Licensing Operations Team seeking planning consent, with a further 1.5GW expected in 2013. The offshore wind industry is therefore currently on target to play its full role in meeting the target set out in the 2020 Routemap for Renewable Energy in Scotland and helping to decarbonise the UK power sector in line with the legally binding carbon budgets set out in the Climate Change Act.

Nevertheless the continuing uncertainty surrounding EMR and the mixed messages given by the UK Government has caused the industry concern. Therefore the UK Government's commitment to decarbonising the power sector and supporting offshore wind to maturity is crucial. Without this the future for the offshore wind sector beyond 2020 is in question.

Against this backdrop our ambitions for renewables and the delivery of clean electricity in Scotland go beyond our current 2020 targets. We therefore have set a 2030 decarbonisation target in our draft Electricity Generation Policy Statement and in our second Report on Policies and Proposals, in line with the recommendation of the Committee on Climate Change (CCC). This target is non-

statutory, but will be used to guide our overall policy approach and will set the context for planning decisions under Section 36 of the Electricity Act.

The decarbonisation target will be to achieve 50 gCO₂e/KWh of electricity generation in Scotland. We are confident that we will be able to achieve it, and our central scenario means that we will be able to meet the target well ahead of 2030. The CCC has provided advice to us on the downward path of emissions from the electricity industry from 2010 through to 2030. It is likely that we will be able to meet the downward path in the longer term, but we may exceed it in the early years, especially before the closure of coal generation stations due in the years ahead and the further build-up of renewable supply.

Our decarbonisation target is based upon estimates of the development of renewable energy as well as changes in the patterns of use of thermal energy. In the context of renewable energy, we see offshore renewables, especially the full deployment of Round 3 and the Scottish Territorial Waters Round, playing a key role in helping us deliver our 100% consumption target by 2020 and in paving the way for further deployment of offshore wind energy in the 2020s as grid and interconnection upgrades and storage are further developed.. In this context Marine Scotland have been developing plans to identify further options for offshore wind leases beyond existing leases, as set out in Sectoral Marine Plans and the broader development framework provided by the National Marine Plan which will be consulted on later this year. As the wave and tidal energy industry develops apace, we expect offshore renewable energy will provide the bulk of Scotland's renewable energy production by 2030.

The lack of a 2030 decarbonisation target in the Energy Bill has been criticised. It leaves a high degree of uncertainty for investors and could adversely impact on supply chain investment and development of projects to come on line after 2020. The Scottish Government have urged the UK Government to enshrine a decarbonisation target in primary legislation and will work with the UK Government to ensure that the planned amendment in the UK Energy Bill provides as much security as is possible about future deployment beyond 2020.

The absence of a commitment means the Scottish Government and its enterprise agencies will work ever harder to secure the right electricity policy and development of the supply chain. We will also urge the Department of Business, Innovation and Skills to ensure that its Industrial strategy for Offshore Wind gives the right level of support to the supply chain about further deployment plans as costs reduce and offshore wind becomes increasingly competitive as a source of low carbon electricity.

Next Steps

As before following publication of the Route Map, OWIG will continue with its programme of work, as outlined in the document. Again OWIG will undertake a fundamental review of the progress against the Route Map's objectives at the end of 2014.

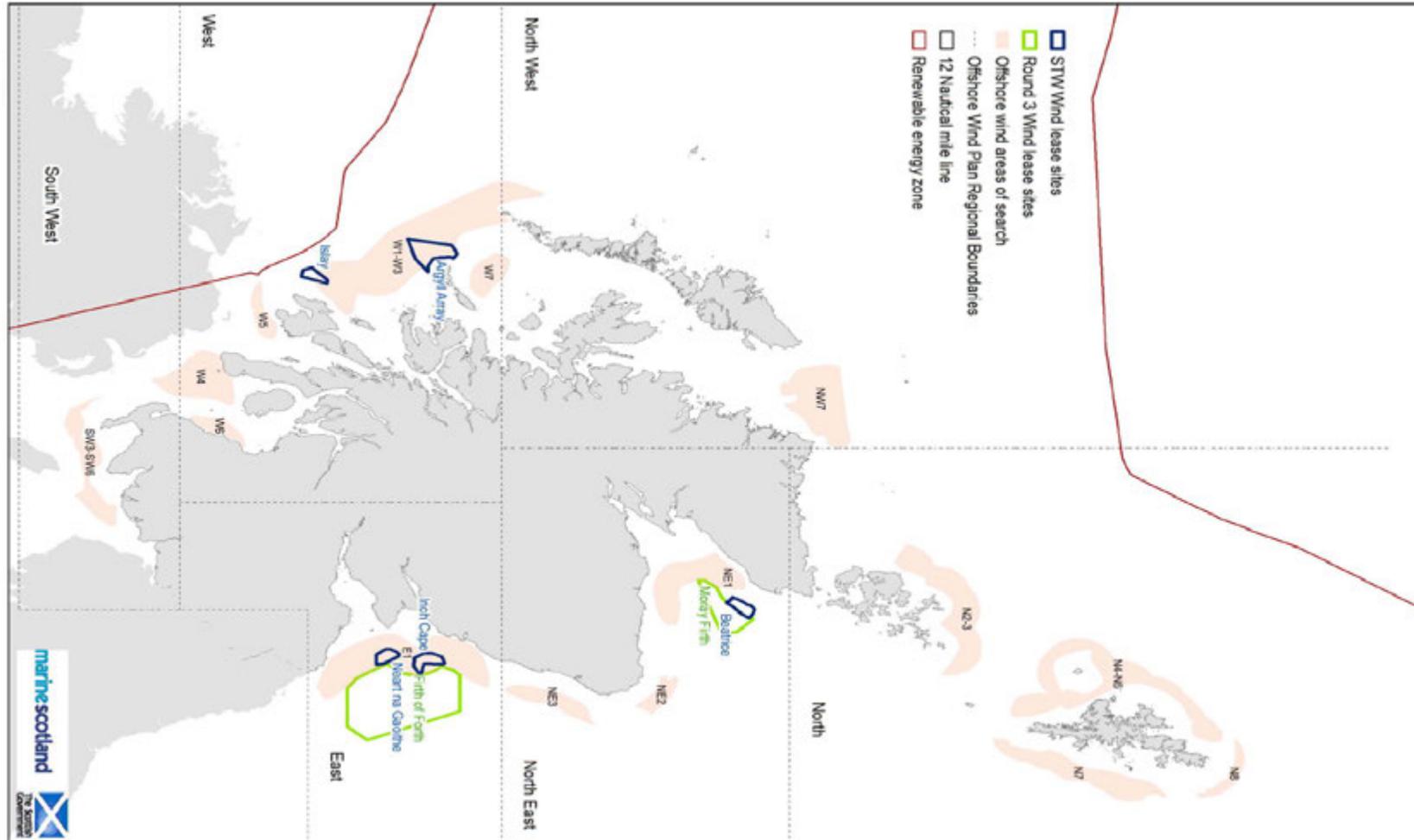


Offshore Wind Industry Group (OWIG) - Membership

Scottish Government
EDPR
SSE
Scottish Power Renewables
Mainstream Renewable Power
Repsol Nuevas Energías UK
Fluor
Gamesa
Areva
REpower
Mitsubishi Power Systems Europe
Petrofac
BiFab
The Crown Estate
Marine Scotland
Scottish Renewables
Technip
Renewable UK
Scotland's Colleges
Mitsui Global
Skills Development Scotland
Scottish Enterprise
Highlands & Islands Enterprise
Scottish Development International
Tymor Marine Ltd
National Grid
Seaenergy

ABB
Fife Council
Scottish Natural Heritage
RSPB
Energy Technology Partnership
Offshore Renewable Energy Catapult
Vattenfall
The Carbon Trust

Map of STW, Round 3 Sites and Offshore Wind Areas of Search



Note: The offshore wind areas of search are current subject to review in 2013.



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ISBN: 978-1-78256-362-4 (web only)

The Scottish Government
St Andrew's House
Edinburgh
EH1 3DG

Produced for the Scottish Government by APS Group Scotland
DPPAS13811 (01/13)

Published by the Scottish Government, January 2013