

SCOTLAND'S OFFSHORE WIND ROUTE MAP

DEVELOPING SCOTLAND'S OFFSHORE WIND INDUSTRY TO 2020



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OFFSHORE WIND INDUSTRY GROUP (OWIG)

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EXECUTIVE SUMMARY

Scotland has an estimated 25% of Europe's offshore wind potential. Therefore, the large scale development of offshore wind represents the biggest opportunity for sustainable economic growth in Scotland for a generation. To ensure that Scotland exploits this opportunity, the Offshore Wind Group (OWIG) was established in early 2009.

Co-chaired by the Scottish Government and industry (ScottishPower Renewables), OWIG brings together all offshore wind developers active in Scotland, grid companies, manufacturing firms, academia, other relevant parties and the key public sector bodies to assess what needs to happen now, to secure the large scale development of offshore wind in Scotland for decades to come.

This Offshore Wind Route Map is 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.

Publication of this Route Map is timely given the increased pressures for the development of renewable energy flowing from the Climate Change (Scotland) Act 2009¹ and the new European Directive on Renewable Energy². Offshore wind will make a significant contribution to Scotland's renewable energy target of 80% of Scotland's electricity consumption coming from renewable sources by 2020. The Route Map also complements the Scottish Government's vision for renewable energy as set out in its Renewables Action Plan³.

¹ Climate Change (Scotland) Act 2009, <http://scotland.gov.uk/Topics/Environment/climatechange/scotlands-action/climatechangeact>

² Directive 2009/28/EC 'On the Promotion of the Use of Energy from Renewable Sources and Amending and Subsequently Repealing Directives 2001/77/EC and 2003/30/EC' <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0016:0062:EN:PDF>

³ Renewables Action Plan, Scottish Government, 2009, <http://www.scotland.gov.uk/Publications/2009/07/06095830/0>

This Route Map assesses the current position of the offshore wind sector in Scotland and highlights the opportunities for further development of the sector in the form of scenarios for growth. Scottish Renewables and Scottish Enterprise commissioned IPA Economics to compile scenarios illustrating four alternative futures for the Scottish offshore wind industry. Scenario A, the top scenario, is the one to which this Route Map aspires. Reaching full offshore wind capacity and securing one third of the UK offshore wind market will secure an estimated GVA in Scotland of £7.1bn and create 28,377 jobs (indirect and induced employment would increase this figure)⁴. The box below illustrates the offshore wind market that Scotland wishes to host by 2020 and beyond.

2020+ – a Bright Future for Scotland

Full capacity of offshore wind installed in Scotland

Embedded marine spatial planning practices embedded managing activity in Scotland's seas

Grid is available and cost is reasonable

Grid interconnection with Europe allowing Scotland to export renewable electricity

Project development process has reduced in cost by 30%

Successful globally competitive supply chain in Scotland, active in Scottish, UK and international markets

Sufficiently trained and skilled workers to service the offshore wind industry

Further offshore wind projects planned for construction in 2020s and 2030s

Offshore wind developments considered attractive investment propositions

⁴ [Scotland Offshore Wind: Creating an Industry:](http://www.scottish-enterprise.com/your-sector/energy/news-se-energy/News%20Details.aspx?itemId={3F931A2D-C9A3-4E8C-9E2E-6C76F433C539})

[www.scottish-enterprise.com/your-sector/energy/news-se-](http://www.scottish-enterprise.com/your-sector/energy/news-se-energy/News%20Details.aspx?itemId={3F931A2D-C9A3-4E8C-9E2E-6C76F433C539})

Scenario A can be compared with three additional scenarios (B, C and D) where capacity and supply chain are secured to more limited extents. Scenario A will not be easy to achieve, the barriers to development are considerable and the timelines are challenging. However, this Route Map provides the solutions to achieving Scenario A and with concerted effort from industry and Government to implement these solutions, confidence in Scotland as a leading offshore wind market will grow. With this sectoral confidence, the proposed offshore wind developments will deliver in establishing a long term, sustainable offshore wind market in Scotland bringing both economic and environmental benefits for decades to come.

The Route Map identifies the following key areas which need immediate action given the scale of the challenges to be addressed.

Investment in Infrastructure

Existing infrastructure is currently considered insufficient to support significant offshore wind project deployment. Key infrastructure requirements for the sector include: sites for manufacturing, installation and operations and maintenance supply chain with access to appropriate load out quayside at ports, vessels, office facilities and housing for personnel.

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. There is 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.

Ongoing Innovation of technologies and practices

There is a real need to drive down the costs of offshore wind development, developers estimate by approximately 30%, reducing the risk to developers and guaranteeing the delivery of the proposed developments across the UK by 2020. The ongoing innovation and development of new and existing technologies and operations will be a factor in driving down current costs, stimulating greater confidence in the technologies and attracting private investment.

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, there is 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.

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, the lead marine management arm of the Scottish Government, 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. There is, however, recognition of 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.

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 graduates 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). This will be exacerbated by competition for skills from the construction and other engineering sector.

Finance

Tackling the issues above, 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.

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 offshore wind sector engages directly and frequently with local communities, local authorities, interested parties and existing users of the sea to secure their support for the developments being taken forward.

The consistent theme, across all of the above issues, is timing and accessing unprecedented levels of resource and finance, particularly in the first half of the decade, to make Scotland's offshore wind ambitions a reality.

The following table outlines OWIG's priority recommendations which, if implemented in the near future, will give Scotland the best chance of securing this Route Map's most ambitious growth scenario.

- **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 Development International** to bring inward investors to Scotland to swiftly fill key gaps in the supply chain and develop new technologies.
- **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** 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.
- **The Scottish Government (Marine Scotland)** to finalise the Strategic Environmental Assessment and take forward the Appropriate Assessment for offshore wind in Scottish Territorial Waters quickly and accurately.
- **The Scottish Government (Marine Scotland and Energy Consents & Deployment Unit)** to retain strengths of current consents system, crucially ensuring a 9 month determination where there is no PLI for offshore wind developments (subject to pre-application in advance of submission), resulting from good cooperation between industry and stakeholders particularly on conflicting issues.

- Establish a demand-led approach to identify the skills articulated by employers with funding through **Skills Development Scotland** and the **Scottish Funding Council** 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 up-skilling of the existing workforce and re-skilling of people entering the industry.
- **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.

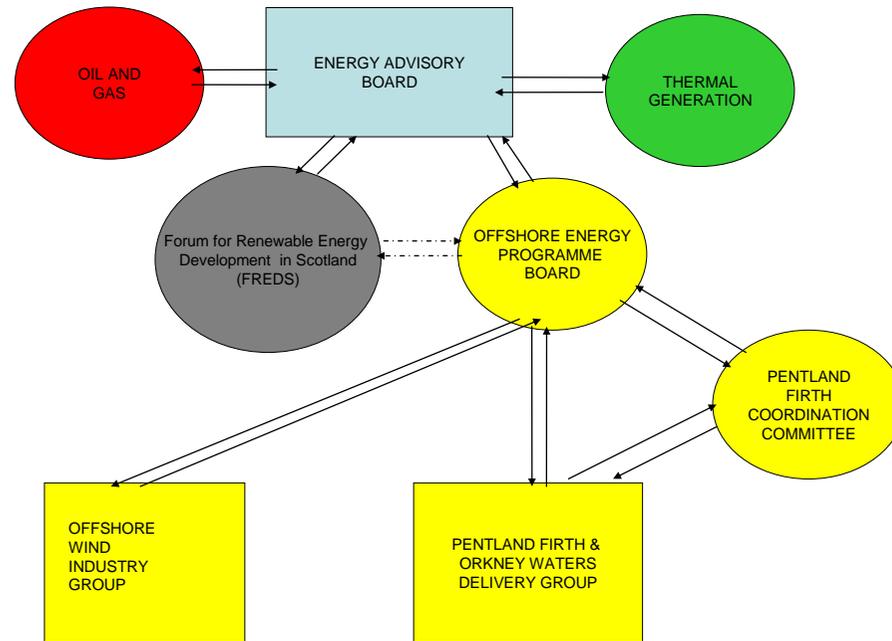
Following publication, OWIG will continue with its programme of work, driven by the recommendations within this Route Map. This programme of work will continue to evolve at a fast pace and significant changes to the programme of work are anticipated over the coming months. The Offshore Energy Programme Board, at strategic level, will oversee the work of the OWIG group as it pursues this Route Map's recommendations. In addition, OWIG will undertake a fundamental review of progress against these recommendations at the end of 2012.

INTRODUCTION

This document has been produced by the Offshore Wind Industry Group (OWIG) in partnership with Scotland's Offshore Energy Programme Board⁵. The role of the Offshore Wind Industry Group is to:

“provide a forum for the public sector (SG, SE, HIE and SDI), 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.”

⁵ The membership and remit of these groups are outlined in Annexes 1 and 2.



This is the first time in Scotland that an industry route map has been compiled for the offshore wind sector, however, it hopes to replicate the successful momentum that has resulted from the recent publication and subsequent actions coming from the FREDS Marine Energy Group's (MEG) Marine Energy Road Map of August 2009⁶. It also complements the Scottish Government's Renewables Action Plan⁷, revised in January 2010 and developed with substantial industry input.

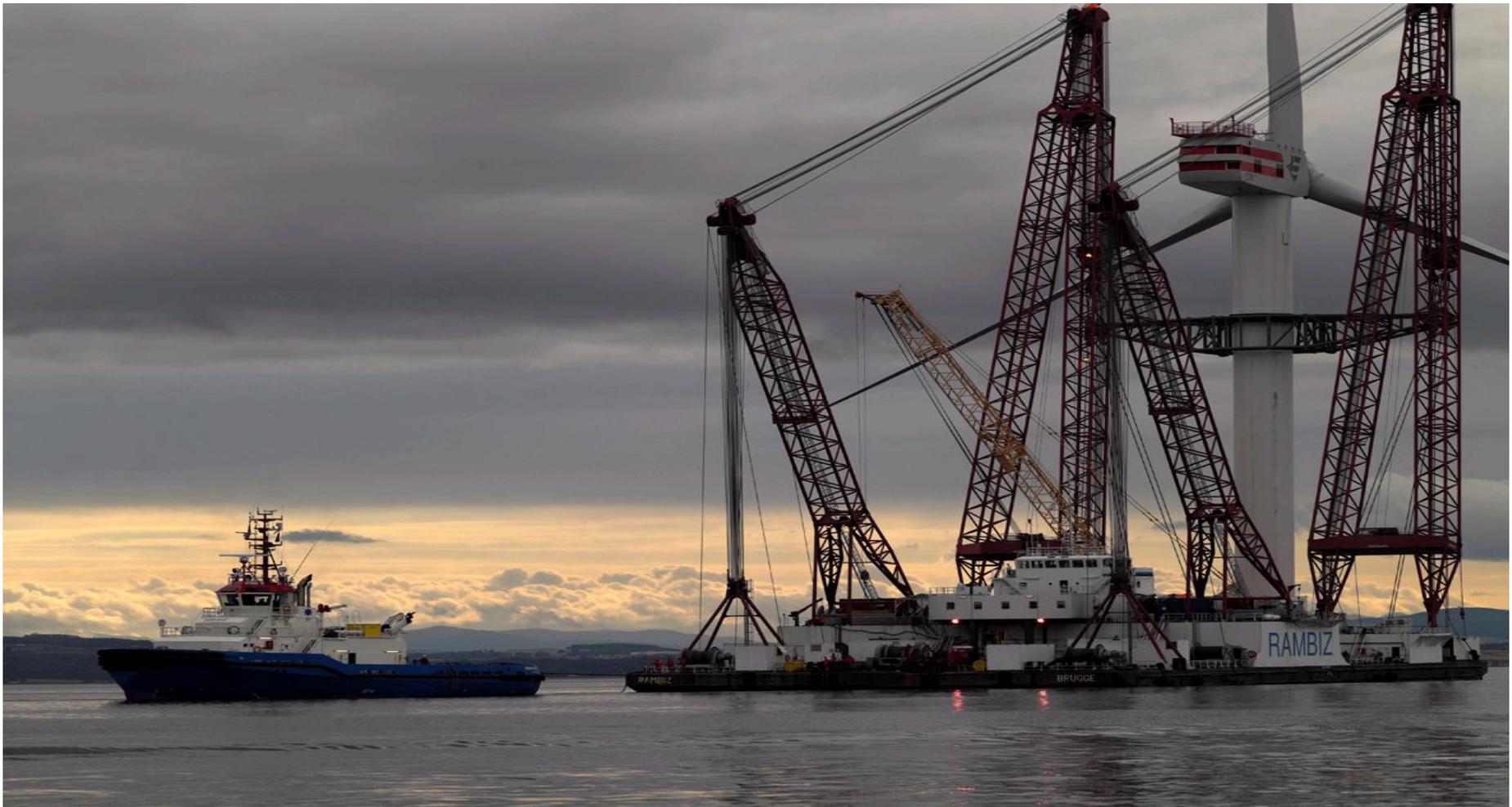
⁶ Marine Energy Group, Marine Energy Road Map, 2009, <http://www.scotland.gov.uk/Resource/Doc/281865/0085187.pdf>

⁷ Scottish Government's Renewables Action Plan, 2009, <http://www.scotland.gov.uk/Publications/2009/07/06095830/0>

The purpose of this Route Map is to illustrate the significant opportunities for Scotland that will emerge from the development of offshore wind in Scotland's waters. With a view to securing as many of these opportunities as possible, this Route Map sets out the challenges and hurdles that will have to be addressed in order to secure the maximum benefit for Scotland in this growing industry. In addressing these challenges, this Route Map contains the recommendations of OWIG on the key actions that need to be addressed to build a strong and sustainable offshore wind industry in Scotland, whilst securing the maximum economic benefits available. The recommendations contained within are made to key players and stakeholders including:

- Scottish and UK Ministers
- Local authorities
- Public bodies, including regulatory, advisory and enterprise agencies
- The private sector itself.

Following publication, OWIG will continue with its programme of work, driven by the recommendations within this Route Map. This programme of work will continue to evolve at a fast pace and significant changes to the programme of work are anticipated as the nature and scale of the challenges and opportunities become clearer. The Offshore Energy Programme Board, at the strategic level, will oversee the work of the OWIG group as it pursues this Route Map's recommendations. As a sub-group of the Energy Advisory Board, the Offshore Energy Programme Board will ensure the key issues surrounding the offshore renewables sector are brought to the attention of the EAB. In addition, OWIG will undertake a fundamental review of progress against these recommendations at the end of 2012.



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THE STORY SO FAR

Context

Scotland is already a player in the offshore wind market as home to the Beatrice wind demonstrator project in the Moray Firth, the world's first deep water offshore wind turbine deployment and Robin Rigg, E.ON's fully commissioned 180MW windfarm in the Solway Firth. With an estimated 25% of Europe's offshore wind resource⁸ and long-standing expertise in offshore practices, such as oil and gas, Scotland has a competitive advantage and is uniquely placed to take an early lead in the development of offshore wind and make a strong contribution to the EU's renewable energy targets.

In the EU Renewables Directive⁹ of 2009, the UK committed to delivering 15% of energy from renewable sources by 2020. This challenging target is a clear policy driver for significantly increasing the scale of renewable generation within our energy mix. In the UK, 5% of consumption was produced by renewable sources in 2008. In Scotland, a large proportion of electricity demand is produced by renewable generators, with 22% of gross consumption met by such sources in 2008. Scotland, with a Scottish Government target of 80% of gross electricity consumption to be met by renewable sources by 2020, is well-placed – and is willing and able – to make a significant contribution to the overall UK target of 15% energy from renewable sources by 2020. The Directive also requires Member States to develop National Renewable Energy Action Plans setting out how they will meet the 2020 targets.

⁸ Garrard Hassan, 2001

⁹ <http://eur-lex.europa.eu/JOHtml.do?uri=OJ:2009:140:SOM:EN:HTML>

The energy sector is a cornerstone of the Scottish economy, supporting economic growth, businesses, communities and jobs. The sector also plays a key role in tackling climate change and in delivering the transition to the low carbon economy¹⁰ in Scotland which is part of the Scottish Government's Economic Strategy¹¹ to deliver Sustainable Economic Growth.

Offshore renewables, and offshore wind in the immediate term, represents the biggest opportunity for sustainable economic growth for a generation in terms of manufacturing, supply chain, job creation and training opportunities. Investment in key infrastructure with projected maximum investment in offshore wind is expected to be approximately £30bn over the next decade and the creation of upwards of 28,000 jobs by 2020. New investment on this scale offers great opportunities for Scottish based firms to support the development of this growing sector. The Scottish Government is committed to the development of offshore wind in Scotland and capturing the anticipated economic benefits.

To best capture the benefits the offshore wind sector can offer Scotland, the Scottish Government will work in active partnership and collaboration with local authorities, the UK Government, the other Devolved Administrations and the European Union. Together all these players are working hard to meet the EU's challenging renewable energy and climate change targets and given the scale of the global climate change challenge, success will be realised through greater co-operative working.

¹⁰ Towards a Low Carbon Economy for Scotland, Discussion Paper, 2010, <http://www.scotland.gov.uk/Publications/2010/03/22110408/0>

¹¹ Scottish Government's Economic Strategy, 2007, <http://www.scotland.gov.uk/Publications/2007/11/12115041/0>

SCALE OF THE CURRENT DEVELOPMENT OPPORTUNITIES

Scottish Territorial Waters sites

Ten offshore sites within Scottish Territorial Waters have been granted “exclusivity agreements” by The Crown Estate to develop offshore wind projects. A map of these sites is available at **Annex C**. Unfortunately, due to irresolvable radar issues, the partners involved in the Bell Rock project in the Firth of Forth have had to halt the development of this particular site, reducing the number of Scottish Territorial Water sites to nine. The granting of agreements for lease by The Crown Estate will be subject to the conclusions contained within the Offshore Wind Strategic Environmental Assessment (SEA)¹² in Scottish Territorial Waters taken forward by Marine Scotland and their appointed consultants, Halcrow. The plan assessed by SEA will require an appropriate assessment as part of a Habitats Regulations Assessment (HRA), which will provide a starting point for HRA of the projects arising from agreements for lease. A fuller discussion of the SEA is available in the chapter on Offshore Planning and Consents. All projects will be subject to Environmental Impact Assessment (EIA) and a HRA to determine if there are potential significant effects of a project or plan on designated European species and habitats.

¹² Marine Scotland’s Offshore Wind in STW Strategic Environmental Assessment, 2010, <http://www.scotland.gov.uk/Topics/Business-Industry/Energy/Energy-sources/19185/Resources/offshorewindsea>

Projects are as follows:

| Site Name | Company/Consortia | Capacity Size (MW) |
|------------------|--|---------------------------|
| Solway Firth | E.ON Climate & Renewables | 300 |
| Wigtown Bay | Dong Wind (UK) Ltd | 280 |
| Kintyre | Airtricity Holdings (UK) Ltd | 378 |
| Islay | Airtricity Holdings (UK) Ltd | 680 |
| Argyll Array | Scottish Power Renewables | 1,500 |
| Beatrice | Airtricity Holdings UK Ltd SeaEnergy Renewables Ltd | 920 |
| Inch Cape | SeaEnergy Renewables Ltd | 905 |
| Nearr na Gaoithe | Mainstream Renewable Power Ltd | 420 |
| Forth Array | Fred Olsen Renewables Ltd | 415 |

Total potential capacity of 5.8GW

Round 3 zones

Round 3 is the largest offshore wind development project being taken forward in the world, positioning the UK market as the current leader in offshore wind. The potential scale of this round is 32GW. Two zones are based in Scotland's Renewable Energy Zone,

with the zones of search bordering on two of the Scottish Territorial Water sites. Scottish companies are also consortia members in two of the other major Round 3 zones adjacent to English waters. A map of these sites is available at **Annex C**.

| Zone Name | Company/Consortia | Estimated Capacity Size (MW) |
|------------------|---|-------------------------------------|
| Moray Firth | EDP Renovaveis S.A. (75%) SeaEnergy Renewables Ltd (25%) | 1,300 |
| Firth of Forth | Fluor Corporation (50%) Scottish and Southern Energy PLC (50%) | 3,465 |

Total potential capacity of 4.8GW

SCALE OF RESOURCE

The Offshore Valuation Study¹³ published in May 2010 is the first comprehensive valuation of the UK's offshore renewable energy resources to 2050. It is estimated that Scotland has 206 GW of offshore wind, wave and tidal resources – almost 40% of the total UK resource and greater than previously assessed. Harnessing just a third of this practical resource off Scotland's coast by 2050 would mean offshore installed capacity of up to 68 GW – enough to power Scotland 7 times over.

OPPORTUNITIES

The large scale development of offshore wind represents the biggest opportunity for sustainable economic growth in Scotland for a generation. Development and investment on this scale is similar to the emergence of Scotland's oil and gas industry in the 1970s.

¹³ Offshore Valuation Study, 2010, <http://www.offshorevaluation.org/>

With the natural comparative advantage we have, it is anticipated that offshore wind development will provide a similar economic success story, with projected maximum investment in offshore wind of approximately £30bn in Scotland over the next decade, and the creation of upwards of 28,000 jobs by 2020.

Combining all of The Crown Estate’s offshore wind leasing rounds (Rounds 1-3 and STW) brings a staggering 48GW of renewable energy by 2020, making the UK the largest offshore wind market in the world. It is estimated that a supply chain of £100bn could arise to support this scale of development. Scotland is well placed to capture one third of this market, securing £30bn of investment for Scotland’s supply chain. For instance, the National Renewables Infrastructure Plan (N-RIP) estimates that between 2009 and 2020 approximately 3,800 turbines will need to be installed in North East England and Scotland.

Number of turbines anticipated to be installed per annum – Table taken from National Renewables Infrastructure Plan

Table 1 – Offshore Wind Installations Estimated Turbine Numbers

| | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---------------------|------------|-----------|-----------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|
| Round 3 | | | | | | | | | | | | |
| Scotland East Coast | 0 | 0 | 0 | 0 | 10 | 20 | 30 | 70 | 100 | 130 | 150 | 160 |
| Irish Sea | 110 | 10 | 20 | 20 | 90 | 100 | 40 | 50 | 80 | 110 | 130 | 130 |
| North East England | 0 | 0 | 20 | 0 | 0 | 0 | 20 | 80 | 140 | 190 | 220 | 220 |
| STW | | | | | | | | | | | | |
| Scotland East Coast | | | | | | 50 | 80 | 150 | 160 | 140 | 48 | |
| Scotland West Coast | | | | | | | 50 | 80 | 150 | 160 | 140 | 80 |
| Total | 110 | 10 | 40 | 20 | 100 | 170 | 220 | 430 | 630 | 730 | 688 | 590 |

STW West Coast = 3,138MW = 628WTG / East Coast = 3,300MW = 660WTG (Assumes STW Av. WTG = 5MW) R3 WTG sizes increase over time to 5.9MW average

ANTICIPATED OFFSHORE WIND DEVELOPMENT TIMELINE

Whilst development timelines will vary per project, the timeline below gives a generic overview of the key phases of development and anticipated milestones.

| Project Stage | Associated Timeline |
|---|---|
| Pre-application | 2010 onwards |
| Application | 2010 onwards |
| Environmental Impact Assessment | 2010 – 2012 |
| Decision Making to Determination | Decision Making to Determination |
| Planning | 2012 – 2013 |
| Procurement | 2013 – 2017 |
| Construction | 2014 – 2017 (Installation rate peaking in 2016-17) |
| Commissioning | 2015 - 2018 |

ISSUES TO BE ADDRESSED

This Route Map identifies the key issues that OWIG believes could potentially hamper (and delay) offshore wind development in Scotland, unless the necessary priority actions are taken now. The key issues to be addressed are:

Fit for purpose infrastructure

Existing infrastructure is thought to be insufficient to support significant offshore wind project deployment. Key infrastructure requirements for the sector include: sites for manufacturing, installation and operations and maintenance supply chain with access to appropriate load out quayside at ports, vessels, buildings to house fabrication facilities, control centres, office facilities and housing for personnel.



© Scottish Renewables

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. There is 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.

Ongoing Innovation of technologies and practices

There is a real need to drive down the costs of offshore wind development, developers estimate by approximately 30%, reducing the risk to developers and guaranteeing the delivery of the proposed developments across the UK by 2020. The ongoing innovation and development of new and existing technologies and operations will be a factor in driving down current costs, stimulating greater confidence in the technologies and attracting private investment.

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, there is 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.

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, the lead marine management arm of the Scottish Government, 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 a Plan for Offshore Wind Energy with a supporting Strategic Environmental Assessment, the Marine (Scotland) Act also allows Marine Scotland to develop marine spatial planning and introduce new licensing procedures. There is, however, recognition of the challenges they face in doing so including resource issues, rapid transferring to a new regime, streamlining of processes and consistency with other planning regimes in UK waters.

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 graduates 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). This will be exacerbated by competition for skills from the construction and other engineering sectors.

Finance

Tackling the issues above, 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.

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 offshore wind sector engages directly and frequently with local communities, interested parties and existing users of the sea to secure their support for the developments being taken forward.

Competition

A substantial amount of experience has been gained by continental EU companies in the environmental, design, construction and operation of UK and EU offshore wind farms. It is clear that Scottish companies will face experienced competition from EU

companies for work in construction and supply chain. In addition, there will be competing demands for the offshore & subsea expertise from continued oil & gas exploration and production, decommissioning, carbon capture & storage and offshore wind.

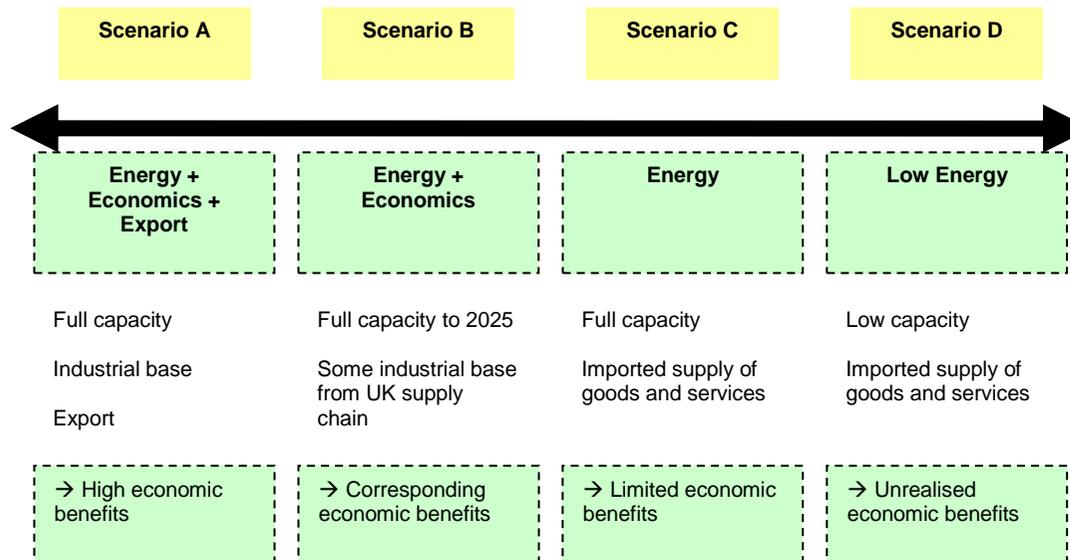
Timing

Further to the challenges above, timing will be the crucial factor for Scotland in securing the greatest benefit from this offshore wind opportunity. The challenges above, particularly in relation to adopting the Plan and SEA for offshore wind energy, must be addressed in line with developers' timelines. If progress lags in any of the above mentioned areas, there is a real risk of failure to deliver the proposed projects by 2020 and securing the economic and environmental benefits which flow from these projects. There are also a range of current policies in development that will directly affect the progression of the offshore wind sector. Their impacts will need to be managed in harmony with the development timelines set out previously. These include the publication of a national Marine Plan by spring 2012 and the Inshore Marine Regions to be drawn up by Marine Scotland. The Marine Scotland Act 2010 also commits Scotland to the establishment of a network of Marine Protected Areas to protect biodiversity and geodiversity. It is intended this network will be substantially in place by the end of 2012.

WHERE WE COULD BE – 4 Scenarios of Offshore Wind Development

Scottish Renewables and Scottish Enterprise commissioned work from IPA Economics ¹⁴ to consider the potential scale of development in Scotland and assess the associated impacts of each. OWIG and Scottish Ministers are committed to maximising the returns to Scotland from offshore wind.

The following 4 scenarios were explored:



¹⁴ [Scotland Offshore Wind: Creating an Industry:](http://www.scottish-enterprise.com/your-sector/energy/news-se-energy/News%20Details.aspx?itemId={3F931A2D-C9A3-4E8C-9E2E-6C76F433C539})

Analysis

IPA Economics calculated Gross Value Added (GVA) and employment (FTE) effects for the 4 scenarios. The calculation used forecasts for offshore wind development to 2025, and it took into account learning rates of 9%.

Scenario A **delivering Energy + Economic benefits + Export (energy and knowledge) capability**

Scotland develops the proposed Scottish offshore wind sites, grows an industrial and knowledge base capable of installing much of its own offshore wind capacity and builds global companies of scale to capture a significant proportion of the investment in Scottish, UK and international waters. Under Scenario A, **the industry is worth a cumulative £7.1bn by 2020 and an additional 28,377 jobs are created.**

Scenario B **delivering Energy + Economic benefits**

Despite slower delivery of Scottish offshore wind projects, Scenario B still generates significant benefits for the economy. In 2020, **more than 19,000 people can be employed** directly in the offshore wind sector in Scotland. The industry is worth a **cumulative value of £4.5bn** over the coming decade.

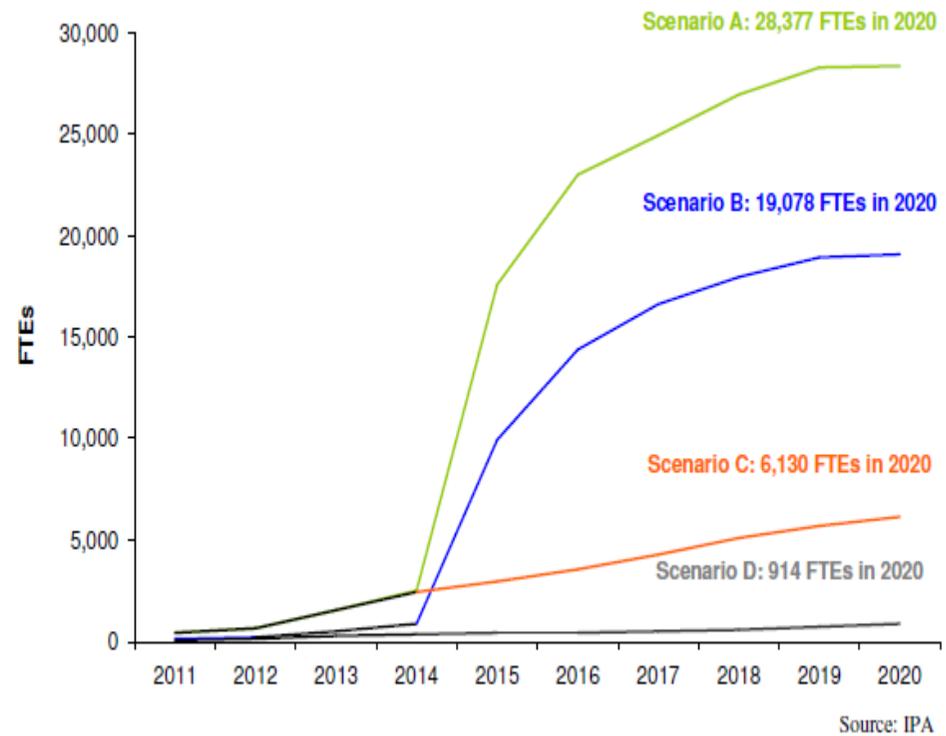
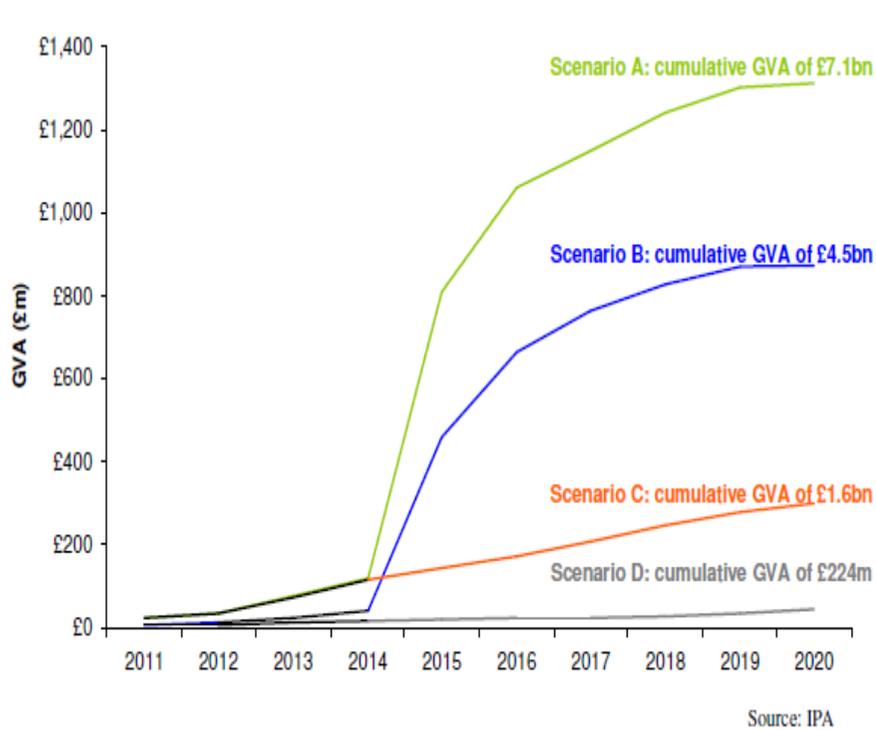
Scenario C - *low delivery of Energy + Economic benefits*

Scotland does not see much of the economic benefits. Just **over 6,000 full-time equivalent jobs** exist in the offshore wind sector in 2020. A total **cumulative value added of £1.6bn** between 2011 and 2020 is the result.

Scenario D - *low delivery of Energy only*

With so much activity across the UK and Europe, supply chain resources are drawn to near-shore sites first, leaving the bulk of Scottish generation undeveloped or lagging to post-2020. Much of the equipment and installation resource is brought in from outside of Scotland and economic benefits are largely unrealised. The industry only grows to **£224m in value** by 2020 and **additional jobs created fail to reach 1,000**.

The tables below show the GVA and the full-time equivalent (FTE) jobs that will be created directly by the Scottish Offshore Wind Industry under each of the four scenarios.



Achieving the higher of the illustrative scenarios will depend on tackling a number of variables which are addressed in greater detail within this document. It is notable, however, that the conclusions of the Strategic Environmental Assessment (SEA) for Offshore Wind in Scottish Territorial Waters concluded that not only were the short term plans realisable for the sites identified in Scottish Territorial Waters, twenty five further zones have been identified where future development may be possible in the medium term (i.e. 2020-2030). Whilst this is not an indication that all of these zones will be developed, it is clear there is ongoing potential in Scotland for continued sector expansion over the coming decades that positively impacts on such scenario consideration and provides stable economic potential for Scotland's economy.

Scenario A would deliver the greatest benefits in terms of renewable energy generation and economic benefit. It would realise Scotland's vision of positioning Scotland as a European hub of expertise for offshore wind development, enjoying the export benefits which stem from this. **It is this top scenario which this Route Map aspires to reach.**

The **Top Scenario A** – the following gives a theoretical ideal case for what the Scottish offshore wind industry could look like by 2020:

Scotland's high wind regimes encourage developers to complete the full 10.6GW of capacity currently available for commissioning by 2020, with Scottish Territorial Water sites developed first (earliest sites commissioned in 2014), and the larger Round 3 sites following.

This requires significant grid reinforcement and results in over 2,000 additional 5MW offshore wind turbines installed by 2020. Beyond 2020, the capacity development will continue at a rate of 2 to 3GW/year. Simultaneously, Scotland develops a full supply chain for all three phases of the project lifecycle, including consenting & development, construction &

commissioning, and operations. This exploits all opportunities that Scotland offers: a turbine manufacturer sets up a manufacturing base in Scotland; significant skills and expertise are developed; port infrastructure is developed, upgraded and adapted to the needs of the offshore wind industry; Scottish-based companies with relevant manufacturing and service skills move into the offshore wind sector and existing suppliers scale up significantly to meet domestic (and growing UK, European and international) demand for equipment and services. The overall sector activity develops over the decade to its full potential, resembling the automotive industry in its level of coordination and density. By 2020, an industry of the scale of the oil & gas sector has developed.

*This adds significant value to the Scottish economy: IPA calculated that the value retained in Scotland directly from the offshore wind industry is **£1.3bn in 2020 and £7.1bn over the decade. In 2020, this creates more than 28,000 full-time equivalent jobs directly in the offshore wind sector.** This compares to the current Scottish energy sector with a total value of £5.5bn in 2007¹⁵ and 41,900 direct jobs¹⁶ in 2008.*

¹⁵ Government figure which includes mining of coal; manufacture of coke, refined petroleum and nuclear fuel; electricity, gas, steam, and hot water supply; collection and purification and distribution of water; service activities incidental to oil and gas extraction
<http://www.scotland.gov.uk/Publications/2010/03/22115357/2>

¹⁶ Figure includes all of the above (see footnote 15) plus extraction of crude petroleum and natural gas
<http://www.scotland.gov.uk/Publications/2010/03/22115357/2>

2020 – A Bright Future for Scotland

Full capacity of offshore wind installed in Scotland

Embedded marine spatial planning practices managing activity in Scotland's seas

Grid is available and cost is reasonable

Grid interconnection with Europe allowing Scotland to export renewable electricity

Project development process has reduced in cost by 30%

Successful globally competitive supply chain in Scotland, active in Scottish, UK and international markets

Sufficiently trained and skilled workers to service the offshore wind industry

Further offshore wind projects planned for construction in 2020s and 2030s

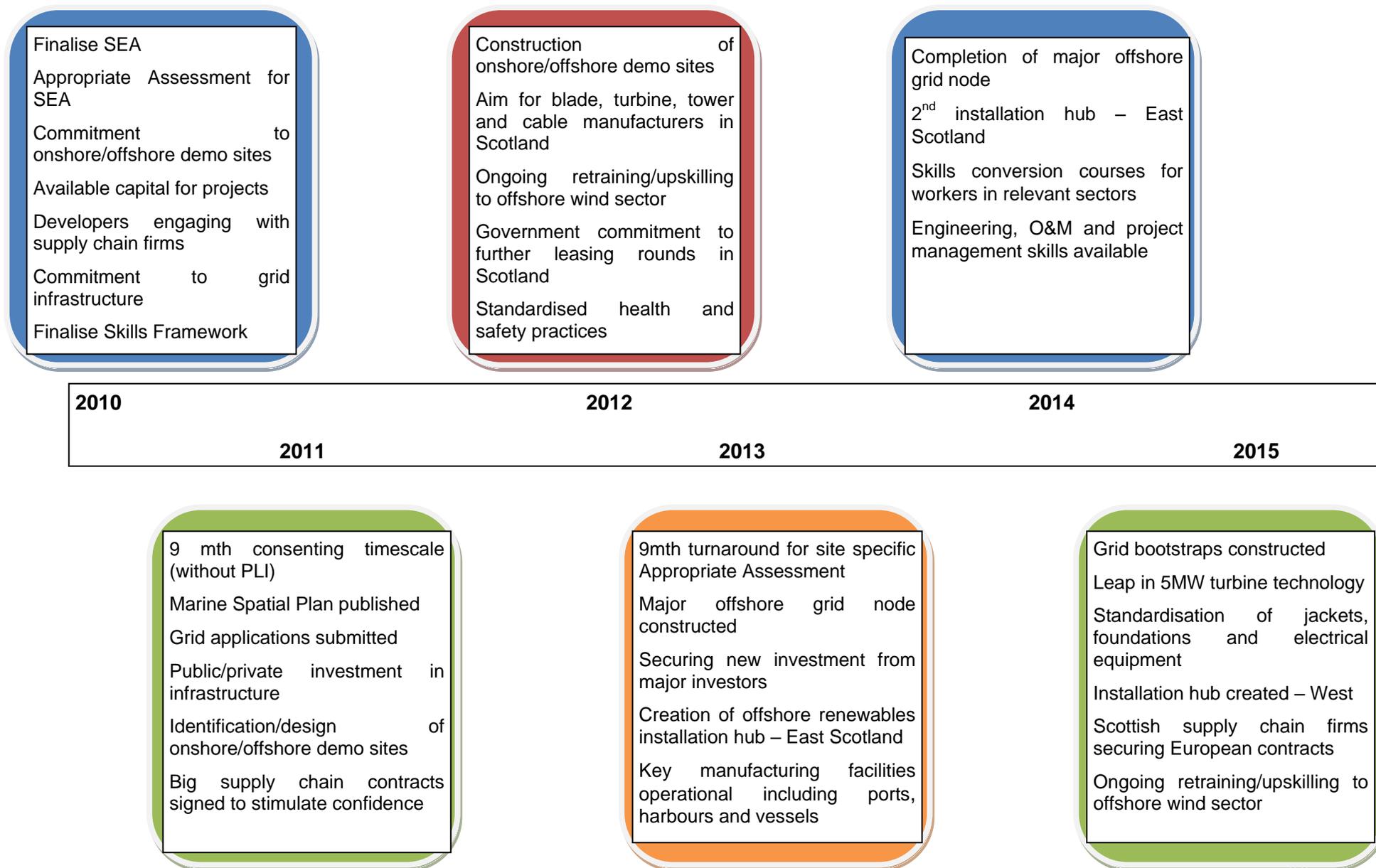
Offshore wind developments considered attractive investment propositions – relatively low risk, attractive to pension/infrastructure investments

Public acceptance and awareness of offshore renewables as an important source of renewable energy and economic powerhouse for Scotland

Offshore wind sector accepted as a powerful, influential player within Scottish, UK and European economies.

To do what is necessary to secure this top scenario, it is important to consider the key elements that need to be in place (and by when) to make this top scenario a reality rather than an aspiration. Discussions across the industry and with public partners have projected the following timeline of development that is needed for Scotland to secure this top scenario.

Milestones for Offshore Wind Development in Scotland



To achieve this top scenario, this document sets out each of the issues which could create a barrier to development and the actions that need to be taken to overcome these issues. These actions are set out in a series of recommendations to be taken forward in the short-term from 2010-2012. The future work plan of OWIG will be influenced by doing what it can to realise these short-term recommendations. The Offshore Energy Programme Board will oversee the work of OWIG and provide support where necessary. In addition, OWIG will undertake a fundamental review of progress against these recommendations at the end of 2012. At this stage the Route Map's recommendations will be revised with a view to developing new recommendations for actions based on the subsequent two year period, 2013-2015.

HOW TO GET THERE - RECOMMENDATIONS

INFRASTRUCTURE, SUPPLY CHAIN AND INNOVATION

CONTEXT

In order to achieve the ambition articulated in the introductory sections of this Route Map, Scotland needs to ensure that we have the physical infrastructure and supply chain in place to support the growth of the offshore wind industry. Appropriate sites at key ports and harbours are key to enabling the manufacturing supply chain for offshore wind to choose Scotland and associated with this, it is important that Scottish locations can support efficient and large scale installation processes. Effective installation locations which are preferred by offshore developers will be a key magnet for supply chain companies' location decision-making. Many supply chain elements, because of their size, need easy access to a quayside for load-out. Longer term operations and maintenance (O&M), both local and in specialized hubs, need access to quayside to efficiently service the arrays. Investment in research and development (R&D) and the provision of test, demonstration and deployment facilities will also support the growth of a strong supply chain which needs, in particular, to build upon Scotland's world class expertise in offshore construction and O&M from our successful oil & gas sector, but also our expertise in sectors such as engineering, aerospace, decommissioning and marine.

Infrastructure

The Offshore Wind opportunity for Scotland requires there to be adequate, fit for purpose port and harbour infrastructure to enable construction installation processes to take place from Scotland. Many supply chain companies - particularly in sub-structures, nacelles and gear boxes, towers, various types of platforms and cable manufacturing - also need locations that are adjacent to deepwater ports. This is required not just because of the location of final installation but also because the manufactured components are of a scale that make regular movement by road or rail in finished form impractical.

Scotland faces strong competition from other parts of the UK and Europe who are geared up and preparing sites to service this opportunity. Proximity to offshore leased sites is favoured by developers and manufacturers and is a driver of competitive advantage in this opportunity. However, efficient port operations and strong supply chain linkages can offset some of the physical remoteness challenges that Scottish ports face when viewed in relation to lease sites out with Scottish Waters.

Many ports in Scotland may play a role in supporting the development of the industry. There should continue to be a strategic approach to maximising Scotland's role. This is the approach being taken through the **National Renewables Infrastructure Plan (N-RIP)**¹⁷ led by SE and HIE. Private investment in a cluster of locations to attract a group of supply chain companies where there is market interest is the approach identified in the N_RIP Stage 2 report. Public funding support will be considered where this is required to win key early investments.

Stage 1 of N-RIP reported in February 2010. It set out a group of best fit port locations based on industry requirements. It also set out a short process to develop investment cases for ports that can support the development of the industry. Through this process, SE and HIE are striving to ensure that the supply chain has strong location options in Scotland and that our port owners are at the forefront of understanding the industry's needs and how they can be supported.

Stage 2 of N-RIP published in July 2010 set out investment required for the best fit locations identified in stage 1. It sets out the public sector pump-priming investment approach for these sites and the key planning and consenting steps that have to be taken to deliver these sites in a timeframe that makes the attraction of private investment achievable. The Stage 2 report fully takes on

¹⁷ National Renewables Infrastructure Plan, 2010, <http://www.hie.co.uk/National-Renewables-Infrastructure-Plan>

board industry views on what makes a location attractive. A continuing dialogue through the N-RIP process will ensure that as the industry develops their needs are reflected in the development of sites. Stage 2 was supported by a Delivery Group consisting of port interests and key industry stakeholders that reached four key conclusions.

- As this industry develops there is a stock of sites in Scotland that could potentially meet industry needs for a broad range of uses. Decisions to invest will be led by the port owners.
- Based on market interest, catalytic public sector support through part funding initial investment with the private sector may be needed to make ready some sites in the right timescale for them to be used by the industry.
- Based on offshore project developer feedback and Scottish Development International's enquiry stream most interest is being shown in sites in the Forth/Tay cluster and Moray Firth cluster at present. The sites where the interest is strongest should be the focus for initial investment.
- The strategic importance of the development of the sites for economic growth should be recognised in the next review of the National Planning Framework.

The report indicates that total investment for all sites of £223m would create a set of clustered port sites which could support an offshore wind sector manufacturing 750 complete offshore wind units a year. For Scotland's economy, the **direct economic impact of this manufacturing site potential** alone would support up to 5180 jobs and create an annual economic impact of up to £294.5m year on year.

Different wind arrays will follow different installation approaches dependent on closeness to shore, water depth and scale. Scottish Enterprise (SE) and Highlands and Islands Enterprise (HIE) will work with developers to identify systematic approaches that might speed installation and reduce cost and risks. Key elements being considered are installation vessel type and availability, just in

time delivery processes, the extent to which turbines are pre-commissioned on shore prior to load out and the benefits to barging to field with assembly offshore. Different lease sites may find different solutions work best.

Developers will engage further with Scottish ports on their future O&M needs so that our active ports can ensure that they are able to offer what is needed for this long term opportunity. This is an opportunity particularly for more remote locations that can serve as local O&M bases for close by wind arrays.

Public sector pump-priming investment will be a key part of the approach in many of the locations and through the Delivery Group the amount and source of this funding has been identified. Lack of fit-for-purpose infrastructure at ports could prevent Scotland playing to its full potential in this globalising industry. Investment must be made at the right time and in the places the industry favours to ensure we make the most of the economic growth opportunity.

Through N-RIP (full report available at <http://www.scottish-enterprise.com/energy>) clear next steps are clearly set out to ensure Scotland maximises its opportunity to be the manufacturing home for Offshore Wind. The report highlights that this aspect of the industry alone could support over 5000 direct jobs based on the potential of the sites that have been identified. Securing the first wave of these jobs is the next key step for SE and HIE with the asset owners.

Stage 3 of N-RIP is underway led by SE and HIE. Stage 3 is the development and delivery of investment packages driven by the asset owner with appropriate public investment where required. Key planning and consenting issues will be progressed to ensure that users' timescales can be met and sites are developed sustainably. This investment will be based on an assessment of market interest. The regional port cluster approach detailed in the stage 2 report will be further developed and used to draw more supply chain interest to Scotland.

Potential Wider Benefits

Operations and Maintenance can offer a route to long term sustainable jobs for some remote communities as can the supply chain role played by places such as Machrihanish. An early decision on investment in a particular location (such as ports or other infrastructure) can be a clear indication and sign of commitment to the supply chain and may help allay fears that suppliers may have in making investments of their own in the region. However, the social and environmental issues of employment growth in these locations are a key consideration. If a remote area is to support up to 100 new jobs in O&M, it will be important to ensure that existing local infrastructure such as housing and schools can support this. An integrated view on these needs is being developed.

INTERNATIONAL DIMENSION

Offshore Wind Developers

Many of the companies that will be involved in developing the offshore wind farms in Scotland in the Scottish Territorial Waters and Round 3 projects are themselves inward investors or are owned by overseas companies:

- Scottish Power Renewables (Iberdrola, Spain)
- E.ON Climate & Renewables (Germany)
- Dong Energy (Denmark)
- EDPR (Portugal)
- Fluor (USA)

- Fred Olsen Renewables (Norway)
- RWE nPower (Germany)
- Mainstream Renewable Power (Ireland)
- Vattenfall (Sweden)

Tier 1 & 2 Companies

The opportunity for Scottish companies to enter the offshore wind energy supply chain, particularly with diversification from the offshore oil and gas and maritime sectors, will lie in opportunities with our indigenous developers, the companies listed above and the Tier 1 & 2 companies appointed by these developers.

Many of the Tier 1 & 2 companies of scale already active in the European offshore wind supply chain are not based in Scotland or the UK. The early engagement of Scottish companies with these international players will be critical to Scotland's success in growing a sustainable offshore wind supply chain.

However, in order to ensure that this successfully happens more clarity is needed from the offshore wind developers as to what they consider to be Tier 1 & 2 companies. It is vital that the contractual and procurement strategies used by developers are developed collaboratively with suppliers.

Supply Chain and R & D

The task will be for Scotland to attract major international companies to:

- Fill the gaps in the Scottish and UK supply chain.

- Develop the new technologies required to lower the cost and increase the reliability of offshore wind.

This will involve targeting:

- Established European companies (turbine, blades, towers, substructures and components) who are gearing up for the vast increase in the offshore wind market.
- New entrants from Europe to the offshore wind market.
- New entrants and established manufacturers from the offshore wind sector from outside of Europe who currently have no European presence.
- Overseas joint venture partners for Scottish companies.
- New technologies capable of lowering the cost of offshore wind.
- Research activity into Scottish universities and companies from global industry players.
- International consultants/ designers responsible for placing work.

Particular attention will have to be paid to bottleneck areas in the global supply chain, for instance in:

- Substructures;
- HVDC subsea cable manufacture and technology;
- Offshore grade steel plate;
- Vessels;
- Environmental consultants;
- Steel Fabrication;

- Installation Vessels (Foundation, Turbines and Cable Lay); and
- Transformers (where lead times can be particularly challenging).

The importance of the international dimension to Scotland achieving its ambitions for offshore wind cannot be overstated. It will require the Scottish Government, the public sector and the offshore wind industry along with other stakeholders working in partnership to rapidly create such a global supply chain solution and to bring it to bear on the delivery of these challenging projects by 2020.

SUPPLY CHAIN DEVELOPMENT

Scotland has the opportunity to build a world-leading supply chain to service the UK offshore wind market and export to the rapidly increasing European and global markets. Establishing a strong Scottish supply chain is key to the development of a sustainable industry of scale and the following issues require to be addressed in order to achieve this.

Quantifying and qualifying the nature and scale of the opportunity.

Current investment predictions vary widely. However, even at conservative estimates, the opportunity for the supply chain is huge. There is a need to understand the timetable for development of individual sites and the procurement strategies that developers are intending to adopt. OWIG developers remain committed to regular dialogue as parameters will change over the near term as individual project elements are defined

Defining the Supply chain

The supply chain can usefully be broken into six main stages:

- Research, Design and Development (R,D&D)
- Pre-engineering (consents/surveys)
- Manufacturing
- Construction
- Operations & Maintenance (O&M)
- Decommissioning



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In 2006, Scottish Enterprise has mapped the offshore wind supply requirements over a typical windfarm development lifecycle. This work will be updated in conjunction with Highlands & Islands Enterprise through the discussions with developers regarding procurement strategies, as they become available.

Scottish Supply Chain Opportunities

Supply chain shortages in a number of areas including turbines, foundations and cables are well known. A report by AEA (Wind Market 2009-2014)¹⁸ published in March 2010 on the market for on and offshore wind for Scottish Enterprise focuses on the period to 2014 and suggests that the highest value opportunities for Scottish companies lie in the following areas.

¹⁸ Is the AEA report publically available, if so add link?

Project Developers and Services:

Environmental Studies
Met Mast Installation
Outline Design
Feasibility Studies
Site Surveys

Turbine Manufacture:

Blades
Gearboxes
Generators
Yaw Assembly
Nacelle covers

Construction:

Turbine Manufacture
Mains connection
MEI- installation - electrical
MEI installation – transformers
Tower Erection

O&M:

Management & consultancy
Service and maintenance

In addition, the recently published (June 2010) report by Renewables UK, “UK Offshore Wind, Building an Industry”¹⁹ explores the UK supply chain requirements to build an offshore industry. Further analysis is now required to identify and quantify specific supply chain opportunities and once concluded this information should be made accessible to potential Scottish supply chain companies.

¹⁹ Renewables UK, UK Offshore Wind, Building an Industry, 2010, http://www.bwea.com/pdf/offshore/offshore-wind_building-an-industry.pdf

Existing and potential Scottish Supply Chain

Initial analysis by SE & HIE has identified over 750 companies in Scotland who are both already supplying products and services to the market or have shown aspirations to diversify into this market. This information is currently being verified to confirm active supply chain company numbers and assess diversification requirements. There are, however, additional companies, particularly in the oil & gas sector, but also in sectors such as engineering, marine, construction, property development and aerospace who have transferable skills and expertise applicable to the offshore wind market. Further work is ongoing to identify those companies that could diversify into the offshore wind sector. This work should also consider the likely oil and gas market developments and the impact this may have on such supply chain company business strategies. This information is intended to be used to:

- identify the scale and capabilities of Scottish companies and resolve identified supply chain gaps; and
- target supply chain opportunity awareness raising campaigns and diversification support activities with the aim of increasing the number of Scottish companies active in the sector.

This information requires to be updated and maintained on a regular basis in order to track supply chain activity and capability.

Provide support to existing and potential supply chain companies to extend their capability and capacity

There is a need to develop a programme of activities which aims to take the knowledge of the market opportunity to the Scottish supply chain and support those that are interested to develop and secure business from this sector. The following key activities will be included in this programme:

Lessons learned from Rounds 1 & 2

With one gigawatt of offshore wind now commissioned in UK waters and more under construction, there is a wealth of experience already being applied that should be captured and shared for the benefit of the sector. There are also projects in other European waters.

Lessons learned from other sectors/countries

Analysis of approaches used by other countries and in other sectors to successfully support supply chain development/diversification. This could include countries such as Spain and Portugal and diversification support for onshore wind and nuclear decommissioning. In addition, significant learning can be transferred from the oil & gas offshore expertise i.e. health & safety standards.

Awareness Raising Events

SE, HIE and The Crown Estate ran a series of Share Fair events in Inverness, Aberdeen and Glasgow in January and February 2010. These events were aimed at raising awareness of the opportunity around The Crown Estate Round 3 leases and the investment in the Scottish Territorial Waters. These events were a good opportunity to identify the companies who are interested in the sector and with whom SE & HIE might work on future supply chain development programmes. In total over 400 companies attended the events.

The analysis of the survey responses received from business representatives who attended the UK Regional Offshore Wind Supply Chain Events suggests that Scotland is well placed to maximise the opportunities from the offshore wind industry. Respondents from Scotland considered there to be adequate tower and/or foundation facilities compared to other regions, as well as good port and harbour access.

Further awareness raising events and workshops are required on a regional basis and feedback has suggested that these should focus on specific opportunities further down the supply chain and in the near term.

Company Support

A pilot supplier development programme funded by SE and DECC worked with over 20 companies to provide market knowledge and assistance to companies interested in exploring the offshore wind opportunity. A similar pilot is planned in the north of Scotland. The pilot is now being expanded into an offshore wind diversification support project which is proposed to include: an offshore wind enquiry service; offshore wind expert support for companies; and meet the buyer/supplier events. The new interregional offshore wind group chaired by DECC and TCE will assist with the co-ordination of Scottish and UK-wide supply chain events.

Oil & Gas

The Oil & Gas sector provides Scotland with significant competitive advantage for offshore wind given its world class expertise in offshore installation and operation. There are, therefore, significant opportunities for companies from the oil & gas supply chain to move into offshore wind but there are also lessons which can be learned from oil & gas for the development of an industry of scale in offshore wind e.g. focus on health & safety, offshore installation expertise, development of appropriate “soft” infrastructure e.g. OPITO, LOGIC, and ITF. A supply chain seminar hosted by Scottish Renewables, Scottish Enterprise, Aberdeen Renewable Energy Group and the Carbon Trust in Aberdeen in February 2011 will explore the lessons learned from oil and gas and the opportunities for oil and gas companies to get more involved in offshore renewables. Scottish Enterprise is also engaging directly with Oil & Gas UK and key oil and gas players to promote the relevant opportunities the new offshore renewables sector will offer for decades to come.

INNOVATION

Importance of innovation

To meet and exploit the challenges of developing an offshore wind industry for Scotland and achieve a globally competitive position, a reduction in lifecycle cost and a significant increase in the pace of industrialisation for offshore wind are needed. This requires a co-ordinated, integrated and sustained effort from both public and private sectors.

The opportunity presented by offshore wind generation will only be realised if innovation is embedded at the heart of the industry and the appropriate policy measures and support infrastructure are implemented to encourage innovative development. The key industry objective to minimise costs and risks in order to overcome significant technical obstacles and maximise the returns from investment and development requires innovation to have a central position in the development of support solutions for the industry. This encompasses not only technical innovation and the development of products but also innovation in functions, logistics, business models and processes.

SE has undertaken initial analysis of the effectiveness of the current offshore wind innovation system in Scotland and the key areas for innovation. This has highlighted the overall need to ensure innovation activities are market focused and has identified a number of specific actions and opportunities.



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R&D priorities

There is a need to prioritise and focus on research and funding activities across the sector. This will include the development of a detailed set of R&D challenges that need to be overcome. Initial analysis suggests the challenges presented by offshore wind specific turbine design, key components for targeted reliability improvements, improving energy yield, increasing availability and the development of support structures for deep water, should be afforded priority. The identification of research and development challenges should be informed by continual examination of the research and technology landscape for the emergence of new and/or potentially disruptive technologies.

Funding alignment

Current funding mechanisms will be reviewed to assess their alignment against these priorities and discussions held with key funders such as Carbon Trust, Energy Technology Partnership and the Technology Strategy Board to encourage greater alignment of funding priorities. Initial analysis has highlighted gaps in the funding mechanisms available and consideration is being given to specific targeted funding mechanisms to fill these gaps.

Improved research/industry links

Further activity is required to make the connections between research and industry stronger. Interventions to complement and enhance activities underway such as RENEWNET, the Carbon Trust's Offshore Wind Accelerator collaborative RD&D programme (see also below) and Scottish Energy Research Academy are being considered, as well as a more focused and effective mechanism for connecting Scotland's offshore knowledge assets with Scottish-based entrepreneurial activity such as the Scottish Virtual Energy Laboratory. This could be complemented by the development of a single open source of comprehensive market, economic, technology and financial information and intelligence and support for companies to increase their focus on innovation.

Building on existing Scottish strengths, the opportunities to transfer knowledge from oil and gas, to develop strategic solutions for offshore installation, fabrication, O&M, and lead the agenda on standards development and application, also requires to be promoted and supported. The risks associated with investing in R&D and innovation are considerable. Companies will only invest if technology promises to decrease risk, cost and increase performance and availability.

The risks associated with investing in R&D and innovation are considerable. Companies will only take this step if they can recruit adequate people with the right skills and competencies to exploit the opportunities. Technologies and funding resources can be

considered to be globally mobile; however, competitive countries which invest in upskilling and focussing investment can win high value markets and sectors. A strong skills base will give Scotland relative competitive advantage and anchor industry investment for the long term.

Example:

The Offshore Wind Accelerator (OWA) is a collaborative R&D programme between Carbon Trust, DONG Energy, Mainstream Renewable Power, RWE Innogy, ScottishPower Renewables, SSE Renewables, Statkraft, E.ON and Statoil that aims to reduce the cost of offshore wind by 10%. The focus is on improving the economics of offshore wind farms in UK waters over the decade – technologies that can be deployed in Round 2 extensions, Round 3 and Scottish Territorial Waters projects. The Offshore Wind Accelerator currently covers four research areas:

- Offshore Foundations;
- Wake Effects;
- Access, Logistics and Transportation; and
- Electrical Systems.

The total funding for Stage II of the OWA is £9.2m over the next 4 years for common R&D projects backed by all developers. In addition, developers can opt-in to larger demonstration projects (e.g., a new foundation concept) that are most relevant to their sites. There is sufficient funding to support ~£30m of these discretionary projects. Over two thirds of the financial investment is from the private sector, with each of the partners committing an equal financial share as well as a significant contribution ‘in kind’

from their engineer teams' active involvement. In addition to securing financial commitment to fund research out to 2014, the OWA also benefits from active participation from over 60 specialists from across the partnership feeding into research areas.

Test & Demonstration Facilities

Fit for purpose test & demonstration facilities - onshore and offshore - are critical to de-risk technology for the offshore market. Furthermore, it will attract a major turbine manufacturer to the region and will serve a number of Scottish companies looking to further R&D in offshore wind technology. Initial analysis has highlighted gaps in Scotland's test and demonstration infrastructure which require to be filled.

Recommendations

2010

- **Scottish Enterprise/Highlands and Islands Enterprise/Scottish Government** to identify additional funding mechanisms to support investment by private sector in key port locations
- **Scottish Enterprise and Highlands and Islands Enterprise** to focus efforts on the delivery of investment in the key clusters identified in National Renewables Infrastructure Plan (N-RIP)
- **Scottish Enterprise and Highlands and Islands Enterprise** will build on the port cluster approach and continue to market their locations domestically and internationally.
- **Local Authorities** to work with **Scottish Enterprise and Highlands and Islands Enterprise** to agree upon planning mechanisms for sites identified within the N-RIP report.
- **Scottish Enterprise and Highlands and Islands Enterprise** to identify appropriate onshore and offshore test facilities as

part of the review of infrastructure requirements.

- **Scottish Enterprise and Highlands and Islands Enterprise** to develop a national offshore wind supply chain database.
- **OWIG** informed by Scottish Enterprise's Foresighting research priorities, to agree R&D priorities, promote an increase in support for offshore wind R&D and seek to influence key funders to align their resources to agreed priority areas.

2010/2011

- **Scottish Development International** to continue to focus on attracting inward investment to swiftly fill key gaps in offshore wind supply chain and develop new technologies.
- Ongoing engagement with developers by **Scottish Enterprise and Highlands and Islands Enterprise** to understand their overall timescales, procurement strategies, supply chain and infrastructure needs, and create feedback loop to enable ongoing effective collaborative working.
- **Scottish Enterprise and Highlands and Islands Enterprise** to undertake work defining nature/role of Tier one companies and their respective procurement strategies.
- **Scottish Enterprise and Highlands and Islands Enterprise** to develop and implement an offshore wind supplier development programme.
- **Scottish Enterprise/Highlands and Islands Enterprise/Local Authorities** to collaborate to ensure the potential local content of the offshore wind industry is maximised and fully taken advantage of across local communities in Scotland.
- **Scottish Enterprise/Highlands and Islands Enterprise/Scottish Funding Council** and other funding bodies to consider the development of additional specific targeted R&D funding support mechanisms, such as an offshore wind version of the Wave and Tidal Energy Support Scheme (WATERS).
- **Scottish Enterprise** to engage directly with the oil and gas sector to encourage exchange of best practice with the offshore

wind industry for working in the offshore environment and to promote and support skills and technology transfer

- **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.

2011

- **Scottish Enterprise and Highlands and Islands Enterprise** to work with port/harbour owners of sites identified in N-RIP to finalise investment plans and planned upgrades.

2012

- **Scottish Enterprise/Highlands and Islands Enterprise/Scottish Development International** to work with **Developers** and **Manufacturers** to construct onshore/offshore demonstration sites in Scotland which will be crucial to the attractiveness of Scotland as a leading offshore wind market.

ACCESSING THE GRID

Context

The availability of grid infrastructure is an issue which must be addressed to ensure that the large volumes of offshore renewable electricity to be generated by offshore wind farms can be accommodated over the next decade. With many offshore developments located in the remoter areas of Scotland, there is a need for grid infrastructure to be available in these areas in line with the development timelines of the proposed offshore wind projects.

OWIG welcomes the Scottish Government's recent announcement to approve the proposed Beaully-Denny upgrade which will install a 400kV electricity transmission line replacing the existing 132kV line. The group hopes that this positive development is just the first of many major grid upgrades in Scotland, greatly needed to support the plethora of offshore wind projects (and wave and tidal projects) with plans to generate significant amounts of renewable electricity by 2020 and beyond.

Considerable work has already been taken forward in this area, in a UK context, via the Electricity Networks Strategic Group (ENSG). ENSG's 2009 report "Our Electricity Network: a vision for 2020"²⁰ was a welcome exercise in identifying a range of transmission network reinforcements.

Transmission Network Use of System (TNUoS) Charging in Scotland

An ongoing concern of Scottish Ministers and some key players in the Scottish renewables industry is that the charges levied for access to the Transmission System in Scotland and the Scottish Islands are unfair and may become a barrier for the development of offshore wind farms located in Scotland. Given Scotland's natural resource potential for offshore renewables (offshore wind,

²⁰ ENSG, Our Electricity Network: a vision for 2020, (2009), www.ensg.gov.uk/assets/1696-01-ensg_vision2020.pdf

wave and tidal) there is a strong risk that the current regime could hamper Scotland reaping the full benefit from its impressive resources, hampering the strong contribution Scotland could make to the EU's renewable energy targets and climate change agenda.

Scottish Ministers welcome the UK Government's recent announcement to initiate a review of the charging regime which will consider other alternatives to the current TNUoS charging regime. The Scottish Government will work closely with the UK Government, OFGEM and National Grid during this review exercise.

There are many options for amending the current TNUoS charging system. One example is of a wind load factor where a reduced TNUoS for wind (both onshore and offshore) could be applied where alternative sources of generation could access the Transmission System, in calm days when wind farms weren't operating at full capacity. Another alternative could be a 'Postage Stamp' TNUoS Charging regime which would involve a GB wide single tariff for transmission.

Underwriting of Transmission Reinforcing Works

Given this new era of offshore renewables, OWIG appreciates that the pressure on existing grid infrastructure is strong and that extensive reinforcements are needed to develop and update the transmission system, capable of supporting electricity generated from offshore sources, often from remote locations. It is currently estimated that up to £15 billion of offshore transmission investment will be needed. The group also accepts in principle the need for financial underwriting given the scale of the transmission reinforcement works being undertaken. However, the developers on OWIG do see the underwriting of these final sums as being a further financial barrier to projects being brought to fruition. The recent modification to the Final Sums Methodology by National Grid which removes the requirement for Users to underwrite works defined as being 'wider' is welcomed

by the OWIG but it remains to be seen if these changes have a significant effect. OWIG also calls for further work on financial under writing to allow offshore projects to underwrite project using the Interim Generic User Commitment Methodology.

New Offshore Transmission Regime (OFTO)

Since the OFTO regime was initiated in 2005, there has been a significant and continuing policy shift at both UK and EU level towards greater interconnection and integration of energy systems and energy markets. These developments since the inception and development of the OFTO regime suggests the regulatory approach of the OFTO has become out of step with the current UK and EU policy landscape. There are therefore strong arguments that the regulatory regime planned will need to be adapted to reflect these changes.

The proposed Offshore Transmission System is to be competitively tendered by OFGEM. The original plan meant that developers of projects to generate energy (generators) could not also be the Offshore Transmission Owner (OFTO) who operate the subsea connections to the grid. OWIG had some concerns over OFGEM's proposed tendering exercise particularly around the timing of the tendering process which has the potential to delay the development timelines of offshore wind projects and significantly affect whether Scottish and UK Government targets can be met. Queries also existed around the final costs of the works, the delivery date, and the point of connection, the risk associated with not including a grid connection within offshore wind applications (EIA) and ultimately whether the proposed system can facilitate development of a wider interconnected offshore grid. However, OFGEM has recently announced that it is to hold a further consultation exercise on the OFTO regime and that the introduction of an enduring regime is to be considered. OWIG welcomes this latest development from OFGEM and will participate in the consultation accordingly. The group does however stress the importance of carrying out this consultation in a speedy manner given the impact the OFTO regime will have on development plans.

To ensure offshore wind developers are comfortable with any modification to the OFTO regime and aware of the costs and timelines involved, it is important that, post consultation, further reassurance on the OFTO regime is provided to offshore wind developers. Questions remain about the ability of the approach to enable offshore energy projects to develop and deploy quickly enough to meet Government targets and policies, and in particular, whether it can facilitate development of a wider interconnected offshore grid.

Offshore Grid

The Scottish Government vision is for Scotland to play its part in developing onshore and offshore grid connections to the rest of the UK and to European partners – to put in place the key building blocks to export energy from Scotland to national electricity grids in the UK and Europe. We want Scotland to play its part in building a Europe wide supergrid to help meet Scottish, UK and EU renewable energy targets to address the challenges of climate change and ensure security of future energy supply through greater interconnection.

The Offshore Valuation Report suggests the scale of the offshore resource is even greater than previously assessed – as are the economic and employment benefits from developing the offshore renewables sector. From a total practical resource of 531GW in the UK, Scotland has 206 GW of wind, wave and tidal resources (almost 40% of the total UK resource). Scotland's existing renewable energy capacity - installed and under construction – is 3.959GW²¹. The report's central scenario shows that by harnessing just a third of the practical resource by 2050, installed offshore capacity could reach 68 GW in Scotland, 40% of the UK total potential of 169 GW for the UK as a whole. This level of capacity could generate around 7 times annual Scottish demand.

²¹ As at 10th September 2010

The net value of Scotland's 68 GW of offshore resources in terms of UK and EU electricity sales is estimated at £14 billion by 2050, with more than 90% of the value coming from fixed and floating wind. The potential for employment creation is estimated at 145,000 direct jobs UK wide by 2050 under the central scenario. The discounted net present value of electricity sales (to UK and EU) from offshore renewables in Scottish waters over the period 2010-2050 is estimated at £14 billion. The equivalent UK figure is £36 billion. By 2050 this could mean an annual value of 68GW of renewable electricity sales from Scotland of £24.8 billion. The equivalent UK figure is £62 billion.

The findings strengthen the economic, policy and security of supply arguments for developing Scotland's offshore renewable potential, for regulatory change to deliver, for greater interconnection to the rest of the UK and Europe and for the development of an offshore grid for the export of renewable electricity from Scotland direct to continental Europe.

The study also recommends that developing offshore resources will require an offshore interconnected grid between parts of the UK and to Europe. A North Seas Supergrid would make Scotland a leader in generation and export of green energy to the rest of the UK and to markets in Europe.

Existing and planned connections

There are a number of existing grid connections across Europe – for example links between the UK and France, between Scotland and Northern Ireland and between Norway and the Netherlands. There are also a number of other grid connections planned – including between the UK and the Netherlands and between Norway and Germany. To date, these have evolved in a relatively piecemeal way – without regional coordination.

Making the European Grid concept work will require a collaborative approach to developing interconnections between countries, regions and member states into a strategic, co-ordinated and interconnected grid network. It will also need significant and sustained effort to work with other countries and regions to standardise electricity transmission and energy regulation. To achieve this, the Scottish Government is working closely with UK and EU partners.

In practical terms, Scotland already has offshore sub sea connections to Ireland and some of the Scottish Islands. But the period 2010-2018 will see significant activity to reinforce and develop this connection for both our onshore and offshore renewable generators. Publication of the 2009 report “Our Electricity Network: a vision for 2020”²² was a major step forward in identifying key reinforcements required for the electricity transmission network. Scotland played a key role in this work.

In terms of the ongoing work of ENSG, Scottish generators have worked closely with Scottish and UK Government and Ofgem to:

- confirm the case for – and importance of upgrades to fulfil the full potential for export of Scottish renewables (both offshore wind and wave and tidal projects) from the North and Scottish Islands;
- confirm the value of sub sea grid developments;
- provide a springboard for developing the Irish Sea and North Sea Grids;
- build squarely on the National Planning Framework 2 (which clearly identifies onshore and offshore grid development as national infrastructure priorities) and;
- minimise further major onshore reinforcements.

²² ENSG, Our Electricity Network: a vision for 2020, (2009), www.ensg.gov.uk/assets/1696-01-ensg_vision2020.pdf

For sub-sea grid ENSG identifies a need for two subsea cables linking Scotland to centres of energy demand in the Southern part of the UK. It will see two subsea cables off the east and west coasts of Scotland connected to centres of demand in England.

- a West Coast 1.8GW HVDC link between Hunterston and Deeside – attracting investment of around £760M:
- an East Coast 1.8GW HVDC link between Peterhead and Hawthorne Pit in Humber side – attracting investment in the region of £700M.

It also includes sub-sea High Voltage Direct Current (HVDC) links between the Scottish mainland and the Shetland Islands, Orkney and the Western Isles and also in Argyll and Bute region.

The Scottish Government has already funded pre-scoping studies on the technical, economic, social and financial feasibility of the development of an offshore transmission network or grid to encourage electricity generation from renewable resources in both the North Sea and the Irish Seas. The Scottish Government is now working in partnership with the Governments of Ireland and Northern Ireland, to accelerate the development of abundant renewables off our western coasts. This project, ISLES (Irish-Scottish Links in Energy Study), is a major step towards the creation of a grid in the Irish Sea.

Funded by the EU's INTERREG IVA Programme, ISLES is undertaking an extensive feasibility study into the creation of an offshore integrated transmission network and subsea electricity grid linking potential renewable energy sites off western Scotland and in the Irish Sea area. The project consultants will deliver a robust business case to the partner governments in early 2011. Much as technology and supply-chain issues will help determine the prospects for ISLES being implemented, how to transcend the potential minefield of regulating a tri-jurisdictional network is to the fore and occupies a substantial slice of consultancy work.

ISLES is an exemplar of what Georg Adamowitsch, EU coordinator for Baltic and North Sea off-shore wind connections, terms the “solidarity” between member states in pursuit of a greener future.

North Sea Grid

In the context of developing a North Sea Grid, Scotland’s potential is irresistible – and is a potential that neither we in Scotland, nor our partners across Europe – can ignore. As highlighted above, the scale of the offshore wind potential around the UK, and around Scotland in particular, strengthens the already strong economic, policy and security of supply arguments for maximising this offshore renewable potential, for regulatory change to help deliver it, and for greater interconnection to the rest of the UK and Europe through development of an offshore grid to connect and export renewable energy from Scotland.

The UK Government policy framework has put new emphasis both on renewable energy development and subsea grid. The UK Government Partnership Agreement includes commitments to *“increase the existing target UK level for energy from renewable sources”*, *“to reform energy markets to deliver security of supply and investment in low carbon energy”* and *“to deliver an offshore electricity grid to support development of a new generation of offshore wind power”*²³.

At EU level, the 2008 Second Strategic Energy Review²⁴ from the European Commission identified a number of strategic infrastructure development projects at EU level. These include the development of a blueprint for a North Sea offshore grid, interconnecting national electricity grids and plugging in planned offshore wind projects. In addition, on 7th December 2009, 10 countries around the Northern European Seas agreed to deliver a memorandum of understanding on delivering an interconnected

²³ www.cabinetoffice.gov.uk/media/409088/pfg_coalition.pdf

²⁴ <http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/08/703&format=HTML&aged=0&language=en&guiLanguage=en>

North Seas grid by the end of 2010. This joint declaration will increase co-operation between Member States in the development of offshore grid connections. The Scottish Government is working with DECC to take this forward.

European Coordinators have been appointed to facilitate the implementation of these priority infrastructure projects. Mr. Adamowitsch has recognised the scale of the renewable energy potential around Scotland's coasts. The Scottish Government is therefore engaged at UK and EU level on developing an interconnected North Sea grid and Scotland is part of the Adamowitsch Working Group on North Sea grid connections.

The work of the Group to date has been very valuable. It is a unique forum for sharing information and learning about projects, developments and studies across Member States, helping deepen collective knowledge of offshore development and to promote Scotland's role in the wider North Sea wide perspective. Scotland intends to continue to prioritise this important work.

But there are also significant issues to be addressed - around interconnection, standardisation of regulatory and legal frameworks, financing development and political will.

THE NORTH SEAS COUNTRIES SUB SEA GRID INITIATIVE

To drive this political will, the declaration signed on 7 December 2009 by Ministers of the North Seas Countries, has agreed to develop a memorandum of understanding to deliver an integrated offshore grid in the North Seas. This is a joint declaration to increase political and policy co-operation in the development of offshore grid connections. The Scottish Government is working with DECC and the other North Seas Countries to take forward this work. The Scottish Government is also working with British Isles

colleagues through the British Irish Council framework and an agreement was signed in June 2010 on areas of further joint working on grid development.

Recommendations

2010

- **OFGEM, National Grid and DECC** to provide offshore wind **developers** with assurances that the works being undertaken by the **Offshore Transmission Owners** are aligned to the needs, requirements and timelines of the offshore developers.

2010/2011

- **Offshore Wind Developers** to submit their grid applications to National Grid, SHETL and SPT at the earliest opportunity.
- **OFGEM** to explore and propose alternative solutions to the existing TNUoS charging regime, in order to find solutions which have the potential to encourage offshore wind developments.
- **Offshore Wind Developers** to work with **National Grid** and **OFGEM** to explore potential new ideas for amending the current policy for the underwriting of Transmission Reinforcement Works.
- **Scottish and UK Ministers** and the **Offshore Wind Industry** to continue to support the EU's plans for development of the European Supergrid.

MANAGING THE MARINE ENVIRONMENT

Context

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, the lead marine management arm of the Scottish Government, is responsible for managing Scotland's seas in an economic and sustainable way. Given the importance of the emergence of the offshore renewables sector to Scotland, Marine Scotland has been taking forward a significant number of developments in this area since its establishment in April 2009. These measures are aimed at introducing offshore renewables to Scotland's seas whilst protecting the marine environment and working closely with existing users of the sea, such as the fisheries and shipping sector. These important measures are as follows.



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Strategic Environmental Assessment (SEA)

The Scottish Government announced it would undertake an SEA into offshore wind potential in Scottish Territorial Waters in October 2008. Marine Scotland leads on this process designed to provide a plan for progressing the development of offshore wind energy projects in Scottish waters. The SEA draft environmental report and draft plan were published in May 2010. Initial findings are that the STW sites identified by The Crown Estate for short-term development could be progressed between 2010 and 2020 if appropriate mitigation is implemented to avoid, minimise and offset impacts identified within the SEA. The draft Plan sets out such proposed mitigation and monitoring for the short term sites and also identifies 25 additional areas as the medium term options (beyond 2020) for developing offshore wind.

Marine Scotland has taken a systematic approach to undertaking the SEA. Pre-consultation workshops have already been taken forward with the environmental regulators as well as offshore wind, fishing, shipping, ports, environmental and recreational sectors. It is now taking forward an extended consultation that will end on 27th September 2010 and will hold a series of workshops with the environment NGOs, offshore wind, fishing, shipping, tourism, fresh water fishing and other interested sectors and stakeholders.

The findings are also subject to the outcomes from an assessment of the effects of the options on European protected nature conservation sites. To recognise the fast pace of change within the offshore wind sector and the marine environment, Marine Scotland will also review the draft plan associated with the SEA every two years. The Scottish Government (Marine Scotland and the Energy Directorate) will also work closely with DECC as it takes forward its own offshore energy SEA for UK waters.

OWIG welcomes these positive steps and notes the pressing need for the appropriate assessment for offshore wind in Scottish Territorial Waters to be taken forward quickly and accurately to allow planned development timelines to be maintained.

Marine Planning

On 10 March 2010, Scotland's Marine Bill received Royal Assent, making it the Marine Scotland Act. The Marine (Scotland) Act 2010 provides a framework which will help balance competing demands on Scotland's seas. It introduces a new statutory marine planning system to sustainably manage the increasing, and often conflicting, demands on our seas.

A strategic framework – a National Marine Plan - will give greater clarity to decision making in the marine environment. The intention is that this will take two years and a finalised plan will be published by Q2 2012. It will state Scottish Ministers' policies for the sustainable development of Scotland's seas including the setting of economic, social and marine ecosystem objectives. The national plan must also state Scottish Ministers' policies on the contribution of designated conservation sites to the protection and enhancement of the sea. OWIG is pleased that the Act also states the National Plan must address objectives relating to the mitigation of, and adaptation to, climate change.

The Marine (Scotland) Act 2010 has introduced a system of regional marine planning to be developed for Scottish waters. The Act gives Scottish Ministers the power to designate the boundaries of Scottish marine regions in secondary legislation. A consultation on the boundaries of these regions will be conducted by Marine Scotland.

OWIG welcomes this strategic focus to marine planning and notes that, guided by the conclusions of the SEA, offshore wind developments will be a key element of Scotland's national and regional plans. Forging strong relationships between developers and other marine users will be important in reaching a greater understanding of all the users activities and favoured locations with a view to using marine planning tools to secure a shared vision for the future development of Scotland's seas. Ensuring environmental sensitivities are managed effectively will be another important goal of marine planning. An approach based on pragmatism and consensus will be necessary. There are already examples of good practice reflecting these values. These

include the stakeholder sessions managed through collaborative groups set up by The Crown Estate for STW offshore wind developers such as the Forth & Tay Offshore Wind Developer Group, the West Coast windfarm initiative, the Scottish Sustainable Marine Environment Initiative (SSMEI) pilots and the consultation initiated by Marine Scotland on the Strategic Environmental Assessment.

However, there is a clear and pressing need for the marine planning process underway to reflect the continuing development of the offshore wind sector. The timescales involved are not complimentary to the clarity of direction required for precise project planning and risk minimisation. By Q2 of 2012, when the National Marine Plan is expected to be published, many developers will be at an advanced stage of planning and will have committed considerable expense to research associated with their projects. OWIG recognises there is a danger that the National Marine Plan, and the associated requirement for a network of Marine Protected Areas (MPAs) as set out in the Act, could significantly impact on project plans, although OWIG also recognises the efforts being made by Marine Scotland and regulators to account for these issues as the plan is progressed.

Streamlined Licensing and Consents

The Energy Consents and Deployment Unit have the objective of determining new applications within 9 months where there is no public inquiry. OWIG acknowledges the significant efforts made to improve performance in this regard. Also welcome is the Unit's experience, plus that of Marine Scotland's Licensing Operations Team, in the continuing involvement through the Robin Rigg Monitoring Group - the offshore wind development in the Solway Firth - which will be crucial across Government in dealing effectively with the forthcoming raft of offshore wind applications.

On the 1st of April 2010, Marine Scotland assumed administrative responsibility for a range of statutory controls in waters adjacent to Scotland for which responsibility lies with the Scottish Ministers. A single point of access for offshore consenting/licensing operations has been created, bringing together some of the Scottish Government's delivery functions.

This single point of access will be administered by the Licensing Operations Team (LOT), which is located at:

Marine Scotland, Marine Laboratory, Aberdeen AB11 9DB.

Enquiries to env_prot@scotland.gsi.gov.uk or env_prot@marlab.ac.uk or ☎: 01224 295579)

Using new powers in the Marine (Scotland) Act 2010, Marine Scotland have committed to ensuring that Licensing and Consenting arrangements:

- Support the delivery of strategic priorities;
- Are efficient and streamlined and offer appropriate environmental and other safeguards;
- Are better integrated with other bodies also with marine regulatory responsibilities, such as the Scottish Environment Protection Agency (SEPA);
- Are taken account of in the new marine plans; and
- Are involved in pre application discussions and meetings where key methodologies / issues are to be discussed. There is a plan to provide additional support in achieving this by extending the role of the Marine Renewable Licensing Facilitators Group to include offshore wind developments.

More details on how these objectives will be achieved will be developed in the coming year.

New streamlined procedures are expected by the autumn of 2010, with further streamlining subsequently resulting in the new marine licence which is expected to be in place in the spring of 2011. The Marine (Scotland) Act 2010 provides the framework for the new marine licensing regime. Projects which have applied for consents/licences through the current procedure should be dealt with wherever possible under these procedures.

OWIG welcomes the fact that Marine Scotland are also committed to further streamlining, such as combining application, assessment and monitoring requirements and processes, to help contain the management costs of licences and consents for both regulators and developers. OWIG believes Marine Scotland should ensure that the current strengths and speed of the consents and licensing procedure are not lost in developing new streamlined procedures. OWIG also recognises that there are likely to be difficulties during the transition to a new consenting and licensing regime, for example, the use of different regulators in inshore and offshore waters and in ensuring consistency of approach between the consenting regime in Scotland and in other parts of the UK.

Another key area for consideration is the alignment with local and national terrestrial planning procedures. Alignment is important as whilst developers will pursue offshore consents for the offshore windfarm itself, terrestrial consent is necessary for the on-land power station. Additionally future infrastructural development that will follow on from the work on the National Renewables Infrastructure Plan will also be subject to terrestrial planning processes. OWIG welcomes Marine Scotland's commitment to match the Scottish Government Energy Consents and Deployment Unit's objective of a 9 month determination where there is no public inquiry and are confident local authorities' terrestrial planning procedures will complement these timescales.

OWIG believes Marine Scotland and the statutory consultees must ensure there is appropriate resource to determine s.36 applications and related licences quickly and accurately. Developers would be prepared to consider a pragmatic revision of the

related fees provided there was a tangible and demonstrable link to improved standards of service that allowed for greater accuracy in predicting project timetables, thus minimising risk.

Marine Scotland will make generally available a marine renewable energy (wave and tidal) licensing manual in the summer/autumn of 2010 which will explain to developers how their applications will be assessed, what information is required in support and how the public sector, consultees and stakeholders involved in the assessment will engage. OWIG welcomes this development but feels every effort should be made to ensure the offshore wind sector is addressed in the manual or in a new offshore wind version. Any attempts to align processes for all sectors are welcome.

Marine Scotland will be working on a number of areas where they will add more legislative detail to provide a clear and transparent system for users. This will be done using secondary legislation-making powers allowing them to set out the licensing process in more detail. Some of the areas that will be covered by secondary legislation are:

- Fee structure;
- Statutory Consultees;
- Applications process; and
- Appeals against licensing decisions.

The commitment of Marine Scotland to process development and improvement is both not in doubt and welcome. However the scale of the administrative burden planned offshore developments will place on them and regulatory authorities should not be underestimated. OWIG asks that further work be undertaken to determine that marine regulators and statutory consultees have the necessary resources to deal with the expected growth in offshore wind casework.

Marine Environment Research

The need for marine research data to reduce uncertainty in the assessment of environmental risk and answer consenting requirements will be a major challenge given the ambitious targets for development. Currently, there is a lack of consistent guidance and although much can be learned from projects developed through Rounds 1 and 2, the scale and locations of development identified in Scotland necessitates new approaches. Substantial research into the environmental effects of development is needed to refine techniques. The work of the Marine Energy Spatial Planning Group (MESPG) Environment sub-group to co-ordinate and fund a programme of research of benefit to the renewables industry in Scotland is welcome. DECC²⁵ (through their SEA process) and The Crown Estate (through their Enabling Actions programme)²⁶ are also taking forward research workstreams. OWIG recommends the co-ordination of all the research that is being undertaken across the UK, giving greater clarity and with the ongoing ability to update and modify our deployment strategies and assessments of environmental risk rapidly in the light of any future findings. This should help avoid duplication of effort, identify any further research gaps and ensure that the best evidence is used. With an eye on possible future developments, OWIG also recommends that best practice guidelines be drafted, setting out how to capture important data during various stages of projects i.e. deployment.

Due to the potentially wide-ranging effects from large scale windfarm development, and also the cumulative nature of these effects across many projects, strategic research requiring the co-operation of developers is recommended. Regional scale studies will improve the contextual information base and enable more rapid consenting of projects. Both Marine Scotland and The Crown

²⁵ Details available at http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/renewable/policy/offshore/orrsq/orrsq.aspx

²⁶ Details available at <http://www.thecrownestate.co.uk/enabling-actions>

Estate have a key role in this, as has been shown in the Forth and Tay Developers Group, and OWIG recommends further studies of this kind.

Environmental research can also be an expensive hurdle for developers to overcome. The ongoing SEA consultation will help enormously with determining the priority areas for funding by the public purse and by developers. OWIG asks that it be consulted regularly on the issue once the full implications of the SEA are better understood.

To understand the risks to projects, developers need early notification of potential designations and how this affects consenting and development. Where developments are already identified, Scottish Natural Heritage and Joint Nature Conservation Committee, in conjunction with Marine Scotland, should clearly communicate where data is / has been collated for potential / future offshore designations. Where sites are identified in the future, developers should communicate closely with SNH and JNCC to ensure that they are up to date with the information being collected for offshore Marine Protected Area (MPA) designation and to ensure that their investigations are also considered.

Marine Scotland will mediate the potential conflicts of conservation designation and offshore development by driving the development of marine planning, promoting engagement and clarifying how the consenting process will handle new designations. OWIG asks that, with regard to the designation of MPAs, information should be shared with the group as early as possible about the extent of possible designations, timelines, and potential future constraints (or not) on development. Similarly, there should also be OWIG involvement in the development of indicators of Good Environmental Status (GES).

Recommendations

2010

- **Scottish Government (Marine Scotland)** to take forward the appropriate assessment for offshore wind in Scottish Territorial Waters quickly and accurately.
- **Scottish Government (Marine Scotland)** to set out a clear timeline and process for future SEA updates that developers can plan their activities around to create stability that assists investment decisions.
- **Scottish Government (Marine Scotland) and Energy Consents & Deployment Unit** to retain strengths of current consents system, crucially ensuring a 9 month determination where there is no PLI for offshore wind developments (subject to pre-application in advance of submission).
- **Scottish Government (Marine Scotland) and Regulatory Agencies** to ensure there is appropriate resource to determine s.36 applications and related licences quickly and accurately. Consideration should be given to whether a fee increase is necessary to achieve this.
- **Offshore Wind Developers** to engage with **Scottish Government (Marine Scotland) and Local Authorities** at earliest possible opportunity on proposed offshore wind developments and other onshore infrastructure works.
- **Scottish Government (Marine Scotland)** to share information on MPA designation and timelines with OWIG as early as possible.

2010/11

- **Scottish Government (Marine Scotland)** to ensure that the Marine Planning process continues to reflect the particular needs and timescales of the offshore wind industry, particularly through clarification of the spatial planning tools that will be used and early discussion on regional Marine Planning Partnerships.
- **Scottish Government (Marine Scotland) and Local Authorities** to introduce alignment between the offshore and terrestrial planning regimes for offshore renewables developments.
- **Scottish Government (Marine Scotland's)** licensing manual should be reviewed during the consultation period and specific measures to address the offshore wind sector included.
- **Scottish Government (Marine Scotland,) The Crown Estate and DECC** to co-ordinate the various research that is going on, giving greater clarity on what research has been done and to consult OWIG on future direction of research in light of SEA findings.
- **Scottish Government (Marine Scotland), SNH AND JNCC** to draft best practice guidelines setting out how to capture information during various stages of project i.e. deployment.

DEVELOPING THE RELEVANT SKILLS

Context

The development of the offshore wind industry represents a massive business opportunity for Scotland with around £34 billion invested in Scottish waters over the next 10 years. With an active and buoyant manufacturing and supply chain, the offshore wind industry could account for up to 28,000 Scottish jobs. This presents a real challenge to ensure that the industry has the necessary skills it needs now and in the future to realise this opportunity.

The offshore wind industry is operating in a challenging environment with regard to skills. With the expansion of offshore wind installations planned globally there will be a huge increase in demand for the skills required across the supply chain and across all levels. However, within the UK there is a significant demand/supply imbalance in the wind energy labour market.



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The pool of people with the skills and experience to undertake the range of specialist roles is already limited. As the growth and maturity of the offshore wind industry accelerates the pressure to fill these roles will only increase and become more challenging. The largest demand comes from the need for technical skills but the need for higher level skills is also critical to ensuring delivery of the offshore developments.

Skills Challenges

There are a number of skills challenges facing the sector and it will be critical to address these in a timely manner to minimise their impact on offshore wind developments. Key challenges include the following:

- Significant vacancy levels are driven by a lack of experience, a lack of qualifications, and a shortage of applicants. For example there is an acute shortage of people with both an electrical background and power industry knowledge.
- There are already identified skills gaps in engineering disciplines across the UK which will be exacerbated by the rapid expansion of offshore wind.
- The traditional power sector is suffering severe skills shortages, with projections showing that 85% of their existing engineering workforce is expected to leave the industry by 2024 across generation, transmission and distribution.
- Within operational roles, there is a shortage of service and maintenance technicians. This is encouraging an intake of people into the industry who are multi skilled in mechanical and/or electrical roles who require reskilling.
- There is a lack of applicants with offshore and wind analysis experience.
- There is a significant shortage of people with the right skill sets in programme/project management, particularly in wind farm installation.
- Installation managers are in extremely short supply.

- Prior to the housing market downturn, construction individuals were difficult to source – as the construction recovers, this situation may return.
- It is difficult to find engineers with a broad range of skill sets (modelling, landscapes, stakeholder management, planning). Hence businesses often have to recruit from commercial backgrounds as they don't have the luxury of pinpointing individuals with all these skill sets.
- Some employers are beginning to increase their intake of graduate trainees, but, there is often considerable competition and turnover and reward practices are unsustainable.
- There is a general shortage of skilled offshore workers particularly: mariner skills, masters, chief officers, crane drivers, navigators, electrical engineers and riggers.
- There is great potential job creation in the supply chain. However, with this opportunity comes significant issues - emerging issues include welders and divers as particular areas of concern.
- Geographic access to skills and jobs can be difficult in the onshore wind sector and there is potential for this to be a greater issue offshore.
- Current market estimates suggest that the number of graduate engineers will remain generally static over the next 12 years. This could result in insufficient numbers of new engineering graduates entering the offshore wind market, therefore not being able to support the growth demands of the industry.
- Operating in an international market will increase global demand for the necessary skills.
- Recognition that no 'new' skill sets are required as such but it is the demand and numbers required which is set to change in the future. This will require new education and training programmes and provision be developed.

- The education and training infrastructure have a significant role to play in ensuring the right people are available in the right place and at the right time. Funding issues are already causing problems for colleges and universities and there is a real potential that this will cause a bottleneck.

There is a need to prioritise support for the energy sector in general with a particular emphasis to be placed on offshore wind if we are to maximise the economic benefits to be gained from these developments. Additionally, many of the skills issues are only emerging and can be a particular problem for employers requiring a rapid response. This has a particular impact where inward investment opportunities are realised or indigenous companies need to expand rapidly. Funders and providers must be able to respond to these in a prompt and flexible manner which is difficult to deal with in the current funding regime.

Promoting the Industry

Sector recruitment and attractiveness is a key issue and it will be important to develop interventions that will provide the information that will allow those in school to make the right choices. There will be a need to tap into ongoing work to promote STEM (Science, Technology, Engineering & Mathematics) subjects in schools. This work is already underway with the Forum for Renewable Energy Development in Scotland (FREDS) Skills subgroup taking forward a number of actions which will promote the industry as a viable alternative to other sectors such as oil and gas. This is taking the form of a co-ordinated approach drawing on existing interventions, working with Learning and Teaching Scotland and Curriculum for Excellence, resurrecting the Path is Green initiative and establishing a Junior Green Energy Awards.

Promoting the offshore wind industry should highlight:

- skills frameworks and career pathways;

- environmental benefits of offshore wind;
- economic benefit and opportunity to be gained from wind power generation;
- job creation opportunities and job security within the sector;
- vast range of innovative technologies used in the sector; and
- the rewards to be gained from the Offshore Wind industry.

There is likely to be a need to attract workers from the international market in the short-term but we should look to grow our own skills base in the long term e.g. there are existing expansion plans and potential inward investment opportunities that will require a significant number of welders at relatively short notice (potential expansion of BiFab).

Skills Interventions

There are already existing skills shortages in most engineering disciplines both for highly qualified engineers and experienced technicians. There is an increasing reliance on STEM skills which will exacerbate current shortages as competition increases from other sectors of the economy.

Many occupations within the renewables sector do not require new skills according to research conducted by Energy Technologies Institute (ETI). For example, many of the skills required in the offshore wind and marine sectors already exist in the offshore oil and gas industry. The difference is in the combination of skills that are needed. Turbine technicians working in the traditional generation industry will have skills that can equally be used in the offshore wind industry. Up-skilling and re-skilling will be critical to delivery and can be delivered quickly, but the experience to carry out these roles effectively and unsupervised takes significantly longer.

It is therefore important to recognise these issues when considering skills interventions to support the sector. Identified priorities in support of the sector are outlined below.

- Apprenticeships – there are a number of existing apprenticeship programmes which can be applied to the offshore wind sector such as welding, construction and manufacture. However, there is demand for bespoke skills sets and this is being addressed by RenewableUK and their Renewable Energy Apprenticeship Programme with the first cohort of Wind Turbine Technicians in the UK scheduled to be start in September 2010 at Carnegie College in Fife.
- Apprenticeships alone cannot meet the need for increased numbers in the sector and it will be important to re-skill employees from other related sectors. This is already used by industry but as demand increases for staff so will the demand for increased numbers and increased financial support from employers.
- Employers are faced with the challenge of up-skilling their existing workforce. Firms will therefore have to make significant investments in training and HR processes. As technology advances and roles change, from onshore to offshore, up-skilling will become a more significant issue.
- There is a need for a range of higher level skills and graduate recruitment will have a significant role to play in supporting the development of the offshore wind sector. The capping of degree programmes that will support the development of the sector may restrict development – there is a need to target funding towards degree programmes required to support the development of the industry and potentially incentivise them to make them more attractive.
- Safety/safe working practices are continually evolving and will be key to the safe delivery of offshore wind farms that Health and Safety and safe working practices are embedded across the industry.

Provision

The education and training infrastructure have a significant role to play in ensuring the right people are available in the right place and at the right time. Funding issues are already causing problems for colleges and universities and there is a real potential that this will cause a bottleneck.

- There is a need to ensure that high quality education and training provision is available to support the sector.
- The capacity of provision needs to increase significantly and it will be critical to ensure that public investment is directed to support skills for the sector.
- The recently established National Skills Academy Power is being charged by industry to ensure sufficient high quality provision is available. There is a clear need to ensure that the needs of the offshore wind industry in Scotland are addressed.

The Skills Landscape

The Skills landscape is complex and difficult to understand but Scottish Government is determined to simplify processes for industry and looks to the FREDS Skills subgroup to facilitate support for employers. Consideration is currently being given as to how FREDS industry groups can work with the skills group to identify key issues and respond to industry needs. An outline of the key organisations and how the FREDS Skills Group aligns with key stakeholders is outlined below (figure 1).

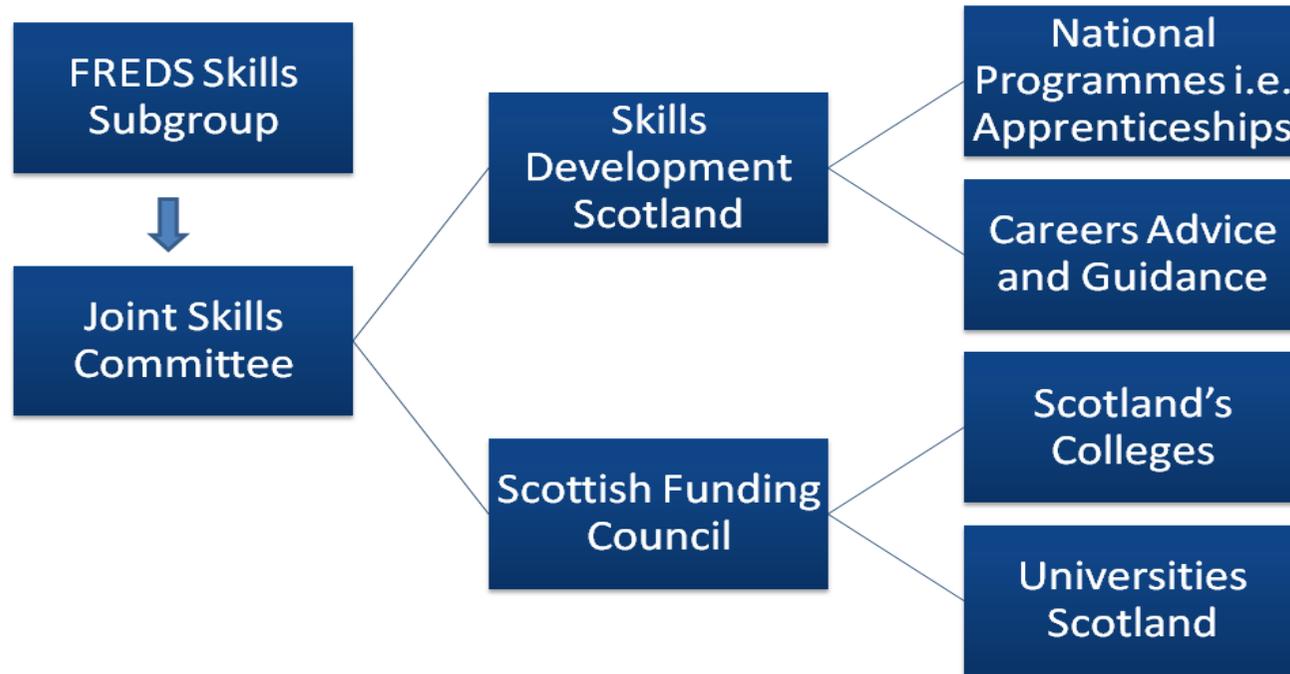


Figure 1

There are two key funding agencies in Scotland:

- The **Scottish Funding Council (SFC)** provide funding for colleges and universities across Scotland. Although visibility of the funding is not obvious it is critical to maximising support for the sector in reducing course costs.
- **Skills Development Scotland (SDS)** is the Single Skills Agency and has responsibility for funding National Programmes such as Modern Apprenticeships. SDS is also considering a more flexible approach via an Energy Skills Action Plan that will support re-skilling those entering from other sectors and up-skilling the existing workforce.

The Role of Forum for Renewable Energy Development in Scotland (FREDS) Skills Sub-Group

In recognition of the importance the Scottish Government is placing on the skills agenda, the Renewable Energy Skills Group (RESG) has been transferred to the Scottish Government, to become a FREDS Sub-Group (Figure 2). The group is charged with responding to skills issues communicated by industry to minimise bureaucracy and enable a rapid response. It also has a direct link into the Joint Skills Committee of the SFC and SDS to highlight significant issues and influence support for the sector.

The overarching purpose of the group will continue to be in line with RESG i.e. ensuring that the skills can be delivered to support the predicted growth of the renewables sector. However, the group will focus on the delivery of identified and emerging priorities for action. The Skills subgroup will also place a greater emphasis on specific areas for set time periods, with offshore wind identified as a particular focus.

FREDS Skills Group

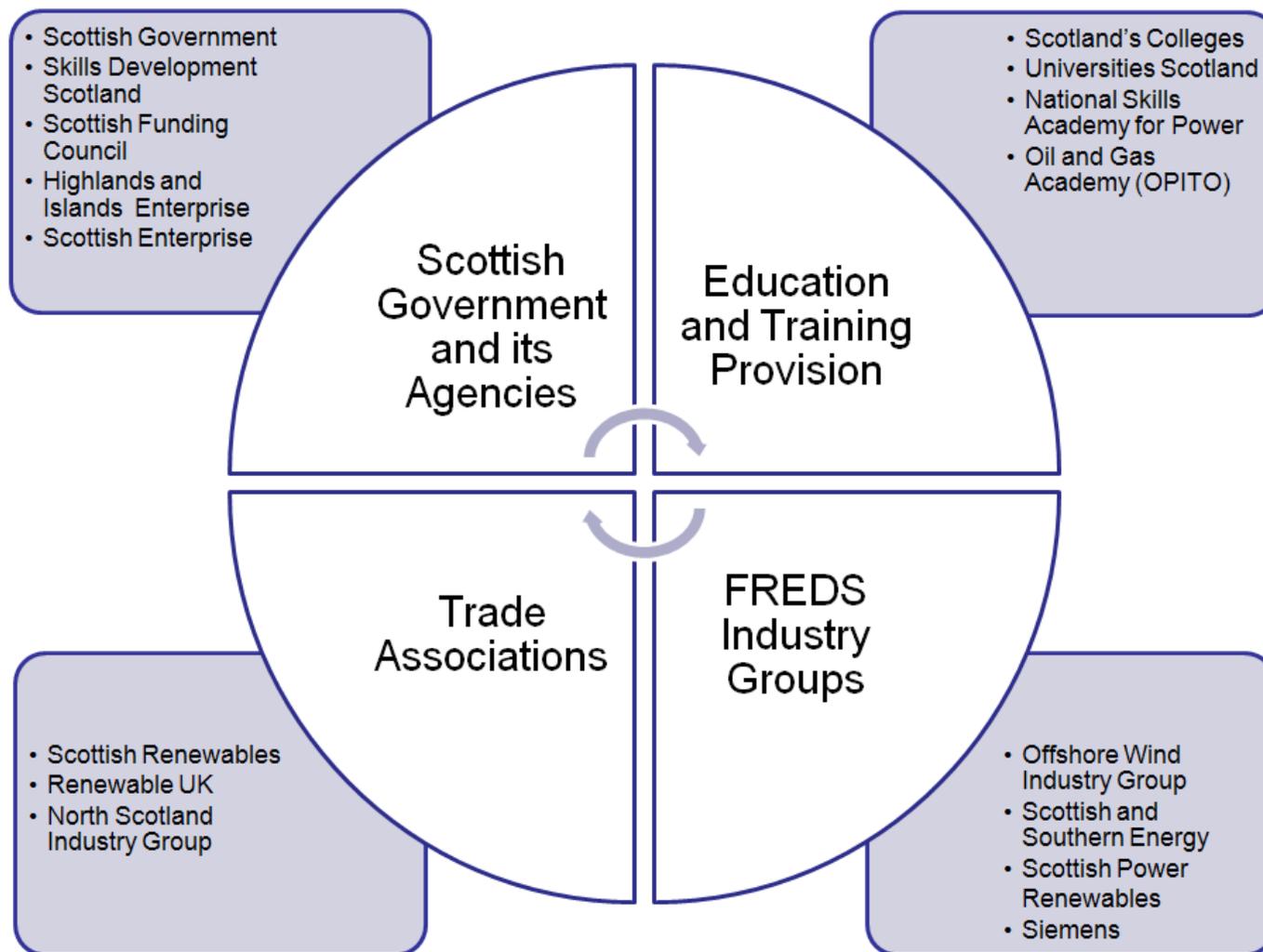


Figure 2

As well as linking into the skills agencies and the FREDS Skills Group will also report to FREDS and through to the Energy Advisory Board as well as the Joint Skills Committee

Ongoing Activities

Scotland is well placed to address the issues highlighted above with the Renewables Action Plan, the FREDS Skills Group and the Skills Framework for Action being developed by Skills Development Scotland, but additionally:

- The power companies have already identified the skills challenges across the traditional aspects of the sector and are now working with trade bodies such as RenewableUK to quantify the issues.
- RenewableUK have developed Skills Accord's in conjunction with its members and partners to provide clear direction for the sector.
- The Power Sector Strategy Group has supported the establishment of the National Skills Academy for Power which will have a particular focus on renewables.
- Energy and Utility Skills have developed a Workforce Planning Model for the electricity and gas networks which is recognised by OFGEM. This is now being developed for the renewables sector and will produce detailed projections through to 2025.
- A new Wind Turbine Technician Apprenticeship programme is scheduled to commence in September 2010.
- We have a wealth of experience gained from the oil and gas sector from which we can learn and transfer skills from.

Although there is much activity, we must not be complacent and it will be crucial to understand the skills requirements into the future, develop industry standards and qualifications where required, ensure provision is in place and funding is directed to support the sector.

Recommendations

2010/11

- 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.
- **Skills Development Scotland** to work with partners to establish an Energy Skills Investment 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.
- A need to establish a Strategic Rapid Response Fund that provides flexible support for employers to meet their needs and not align with government/agency targets as has been the case in the past. **Scottish Government** to work with the **Funding Agencies** to establish a flexible Strategic (Rapid Response) Fund to support offshore wind where significant skills requirements emerge.
- There is a need to grow the Scottish skills base and **Scottish Government** and its agencies to support the successful delivery of the Wind Turbine Apprenticeship.
- There is a need to attract the right people in sufficient numbers into the sector and the **FREDS Skills Group** should develop a work plan to support the Sector Recruitment and Attractiveness agenda across Scotland.
- **FREDS Skills Group** to work with the Offshore Wind Industry Group to identify priorities for action and take forward the recommendations from this Route Map and provide a 'One Stop Shop' to tackle skills related issues support the industry.
- **National Skills Academy for Power** to be charged with ensuring the quality and quantity of education and training provision is established to meet the needs of the sector.

- **Energy Advisory Board** to investigate the setting up of a joint group of representatives from both the offshore wind and oil and gas industries to focus on areas of joint interest and collaboration.

SECURING THE FINANCE

Context

Unprecedented levels of resource and investment are going to be needed, particularly in the first half of the decade, to make Scotland's offshore wind ambitions a reality. All of the issues outlined within this Route Map will need action at the earliest possible opportunity, accompanied by adequate levels of finance to ensure the relevant infrastructure, skills and technologies are in place to support developers in fulfilling their ambitious development plans.

Funding of offshore infrastructure

OWIG welcomes the previous UK Government's recent announcement of the £2bn Green Investment Bank and the £60m UK Offshore Wind Site Development Competition. 'Fit for purpose' infrastructure, including port and harbour facilities, is key to allowing developers to realise their projects whilst also securing long-lasting economic opportunities for local communities. As outlined earlier in this document, the Scottish Enterprise and Highlands & Islands Enterprise led National Renewables Infrastructure Plan (N-RIP) has been instrumental in identifying the sites across Scotland which could have an influential role to play in the construction, deployment and maintenance of offshore wind farms in Scotland, and beyond.

The N-RIP Energy Delivery Group tasked with compiling possible investment plans for some of the sites identified within the report comprise the enterprise agencies, offshore wind developers and port and harbour owners. It has presented potential investment

proposals and is now working on delivering viable investment proposals to deliver the relevant upgrades needed across sites. These investments will involve an element of public funding as leverage for greater private sector funding. To ensure best value for public expenditure, public funding will only be invested in proposals if an end user for the site has already been identified.

OWIG welcomes the valuable work that has been done in producing the N-RIP report and welcomes its initial findings. However, it urges the Delivery Group to invest in attractive proposals at the earliest possible opportunity. 'Fit for purpose' infrastructure across Scotland will not only incentivise developers to take forward their Scottish based developments given the relevant infrastructure to hand but, it is hoped, will also act as a magnet for clusters of relevant innovation and supply chain companies able to service the offshore wind market.

Fossil Fuel Levy

The Fossil Fuel Levy was introduced to compensate power companies for the higher costs involved in meeting the terms of contracts to purchase renewable electricity under the previous renewables support mechanism, the Non-Fossil Fuel Obligation (NFFO). Changes introduced in 2005, which allowed the proceeds from the sales of Renewable Obligation Certificates (ROCs) attributable to Scottish NFFO contracts to be used to meet the Fossil Fuel Levy costs, have led to the accumulation of a surplus within OFGEM's Fossil Fuel Levy Fund. Scotland's Fossil Fuel Levy surplus now stands at £189 million. The Energy Act 2004 contains a provision which enables Scottish Ministers to direct OFGEM to transfer surplus money from this fund to be used to promote renewable energy in Scotland.

The Scottish Government has made numerous representations to the UK Government requesting access to these funds. Thus far, there has been no transfer of funds as the Treasury has refused to classify the funds as additional to the Scottish budget – meaning

that any direction to Ofgem to transfer the money as things stand would lead to a corresponding reduction in Scotland's overall budget.

It is the Scottish Government's strong view that these funds, raised from Scottish electricity consumers for the promotion of energy from renewable sources, must be treated as additional funds to Scotland's overall budget allocation. Access to these funds would provide a much needed financial boost to the development of the renewables industry in Scotland. This much needed investment over the first half of this decade could secure the development and delivery of offshore renewables and its associated infrastructure in Scotland. Since the establishment of the new Government in Whitehall, Scottish Ministers have been pleased with the constructive discussions that have already taken place on this issue and have welcomed the commitment by the coalition to review the Fossil Fuel Levy arrangements as a long overdue step in the right direction. Scottish Ministers urge the UK Government to follow up this progress with an agreement to release the Fossil Fuel Levy surplus, at the earliest opportunity, in a way that is additional to the Scottish budget.

Renewables Obligation

OWIG welcomes the UK Government's commitment to maintain banded Renewable Obligation Certificates (ROCs) for the foreseeable future. The previous administration's extension of these certificates was welcome. Further changes could, arguably, run the risk of decreasing investor confidence and making access to finance more difficult or expensive. A stable funding situation is to be welcomed. OWIG would appreciate early contact to discuss any proposed amendments to the system that currently exists, including the possible introduction of a Feed-In Tariff (FIT) to replace the current Renewables Obligation.

Accessing European Commission funding

The two Scottish Government bodies tasked with engaging with the EU Commission: Scottish European Green Energy Centre (SEGEC) and Scotland Europa, will need to target various elements in the EU funding mechanisms and seek to influence EU policy to maximise the opportunity for offshore wind in Scotland.

This will involve activity in the following areas:

- FP7 Research funding programmes.
- INTERREG and ERDF funding.
- Development of the North Sea SuperGrid.
- Renewable energy trading mechanisms between member and associate member states.
- Infrastructure and project investment involving the European Investment Bank (EIB).
- Environmental training opportunities e.g. training observers / consultants.

Seeking new investment solutions

Given the enormity of investment needed to support the development of the offshore wind sector in Scotland, existing budgets and funding mechanisms, whilst useful, will not meet the scale of the investment challenge. New ideas and funding models will be needed to secure the magnitude of capital needed for investments in offshore wind.

With a view to encouraging new investment opportunities, Scotland's First Minister, Alex Salmond MSP, will be hosting a Low Carbon Investment Conference in Edinburgh on 28/29 September 2010. The aim of this conference is to engage the international financial communities with the low carbon sectors to find imaginative ways of funding low carbon projects. Offshore wind is

considered one of the priority sectors for this conference, looking at investing in the issues identified within the Route Map to ensure Scotland can secure the top scenario to which we aspire.

Recommendations

2010

- **UK Government** to issue further details of the Green Investment Bank at the earliest opportunity with advice on how the offshore wind sector can benefit from its establishment.
- **UK Government** to launch the £60m UK Offshore Wind Site Development Competition in the short term and give due consideration to Scottish bids, taking into account the level of offshore wind activity in Scotland with both Round 3 and Scottish Territorial Waters.
- **N-RIP Delivery Group** to work with sites identified in the N-RIP report to ensure a strong presence of Scottish sites participating in the UK Offshore Wind Site Development Competition.
- **UK Government** to agree that OFGEM immediately release 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.
- **Scottish Government/Scottish Enterprise and Highlands & Islands Enterprise** to engage with **OWIG** in preparation for the Low Carbon Investment Conference for ideas on priority areas of funding needs and participants to be invited.

2010-11

- **N-RIP Delivery Group** to make swift progress in taking forward some of the relevant proposals by providing adequate levels of public sector investment to attract private sector investment.

- **Scottish and UK Government** to maintain the stability around the Renewables Obligation and to consult OWIG immediately to discuss any plans to alter those arrangements and move to a replacement Feed-In Tariff.
- **Scottish and UK Government** 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.

SPREADING THE OFFSHORE WIND STORY

This Route Map has illustrated what Scotland can gain from the development of a competitive offshore wind sector. Whilst developers, Government and other interested parties are familiar with the many benefits and opportunities this emerging sector can bring to Scotland, the support of local communities and local companies is absolutely vital if the sector is to succeed in reaching the top scenario.

Engaging with Local Communities

The development of onshore wind projects and the 2 offshore wind projects in Scotland's seas has taught developers important lessons in developing, deploying and operating renewable projects. One of the overriding success factors is engaging directly, and at the earliest possible opportunity, with local communities, local authorities and interested stakeholders. This early engagement allows developers to set out their plans to local communities, addressing the impacts a new development could have on those communities but also highlighting the benefits these projects could bring.

Direct benefits will come in the form of:

- direct investment in the local economy via the use of local services such as hotel accommodation, shops and restaurants as developers plan and construct their projects;
- supply chain contracts for local companies during the surveying, installation and long-term operation and maintenance of sites;
- expansion of ports/harbours facilities; and
- creation of skilled jobs for local people.

Experience has shown that the earlier and more openly developers engage with local communities, the easier it can be to resolve issues at the earliest opportunity.

Engagement with other users of the sea

Of course, local communities are just one element of society which offshore wind developments may impact upon. Other users of the sea, such as the fisheries and shipping industries and recreational users, may also be concerned that their own activities will be impacted upon in a negative manner, perhaps during the installation phase or indeed over the longer term once the site is operational. Again, early and open dialogue with other sea users by developers is key to identifying potential issues/conflicts at the earliest opportunity allowing sufficient time in the planning stages for negotiation between the various parties with a view to resolving potential conflicts.

What benefits will offshore wind developments bring?

There is already growing anticipation across many local communities and industries that the anticipated boom in offshore renewables will bring significant economic rewards to local communities and developers alike. It is true that the large scale potential of offshore renewables in Scotland has comparisons with the oil and gas boom of the 1970s in the North Sea. As a result, many communities are looking to the Shetland Oil Fund as an example of the benefits that can flow directly to local communities although that example is not necessarily applicable in all circumstances. Of course, there will also be benefits to local communities in the form of investment in local communities, training opportunities, creation of skilled jobs and supply chain contracts for local companies. These are opportunities that all local authorities and communities will grasp, particularly in areas of Scotland which are suffering from population decline due to limited opportunities and job prospects.

Given the strength of interest from local communities and local authorities, Scottish Ministers will give consideration to how Scotland can best benefit from the large-scale development of offshore renewables in Scottish waters over the coming decades although the same issues are often faced in the onshore sector too. Developers, local authorities, local communities and other interested stakeholders will all have a role to play in helping Ministers develop their thinking in this area. Ministers are also aware that a balance needs to be struck between, on the one hand, ensuring that all of Scotland benefits over the long-term from the development of offshore wind but, on the other hand, ensuring that the Scottish market remains an attractive and competitive environment for developers to realise offshore wind developments.

Recommendations

2010

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

2010-11

- **OWIG** to be consulted on Scottish Ministers' thinking as to how Scotland can benefit in the long-term from the large scale development of offshore wind.
- **Scottish Ministers** to seek the views of local stakeholders, local communities as its thinking developers on how to secure long-term benefits from the development of offshore wind as well as of other renewable/low carbon energy sources.

CONCLUSION

To ensure that Scotland captures the biggest sustainable economic growth opportunity for a generation, it is essential that everybody plays their part in the development of large scale offshore wind.



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NEXT STEPS

Following publication of the Route Map, OWIG will continue with its programme of work, driven by the recommendations within the Route Map. OWIG will undertake a fundamental review of progress against the Route Map's objectives at the end of 2012.

Scotland's renewable energy target of 80% of Scotland's electricity consumption coming from renewables sources by 2020 is a challenging one. However, the recommendations detailed within this Route Map, if met, will ensure that offshore wind will make a significant contribution.

These recommendations charge not only the public sector but industry itself to take action. The Route Map rightly focuses on the short term (2010-2012) actions that need to be taken now to ensure that the necessary components are in place, to support the sector in reaching its full potential of an estimated GVA of £7.1bn and the creation of 28,277 jobs (indirect and induced employment would increase this figure) by 2020.

Offshore Wind Industry Group (OWIG)

Remit

The Offshore Wind Industry Group has been formed to provide a forum for the public sector (SG, SE, HIE and SDI), offshore wind developers active in Scotland and other relevant parties to drive the success of this 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.

Background

The development of the Offshore Wind industry in Scotland will make a substantial contribution to Scotland's renewable energy targets and climate change measures. It will also bring about significant economic opportunities in terms of manufacturing, installation and operation and maintenance - demonstrating that offshore wind is a key driver of Scotland's economic recovery. However, as an emerging industry and a new user of the sea, it is important that the sector's introduction into Scotland is taken forward in a collaborative and strategic manner to ensure maximum success.

Actions

After agreeing the Offshore Wind Industry Group Work Plan, the Group will take forward specific actions to meet the workstreams laid out in the plan. The Group will also contribute to the drafting of the Offshore Wind section within the Scottish Government's Renewables Action Plan to be published later in the year.

The work of the Offshore Wind Industry Group will be fed into the work of the Marine Energy Group (MEG) and the Marine Energy Spatial Planning Group (MESPG) ensuring consistency across the offshore renewables industries.

The Offshore Wind Industry Group will also be provided with feedback from MEG and MESPG.

Membership

Scottish Government

DECC

Department of Energy & Climate Change

Scottish Enterprise

Scottish Development International

National Grid

Fred Olsen Renewables

SeaEnergy Renewables

Vattenfall

The Crown Estate

Wood Group

Natural Power Consultants

SSE Power Distribution

Renewable UK

Airtricity

ScottishPower Renewables

EU Skills

Fluor

Highlands & Islands Enterprise

The Carbon Trust

Mainstream Renewable Power

E.ON Climate & Renewables

Dong Energy

Siemens

Scottish Natural Heritage

Scottish Renewables

BiFab

SSE

Joint Nature Conservation Committee

University of Strathclyde

SCOTTISH OFFSHORE ENERGY PROGRAMME BOARD

Role

As a sub-group of the Energy Advisory Board (EAB), the role of the Offshore Energy Programme Board is to strategically drive and co-ordinate the public sector's collective contribution to the growing offshore energy opportunities, seeking maximum benefit for Scotland. Overseeing the newly emerging offshore energy sectors will allow for strategic linkages and priorities to be drawn out within the existing work of the public sector authorities, influencing the direction of future work.

Remit

The Offshore Energy Programme Board's scope will cover the following key areas of offshore energy – offshore wind, marine renewables and offshore grid.

Agreed areas of activity/interest

The Offshore Energy Programme Board will take forward the following activities, of which others may be added.

- To influence and drive forward the production of an offshore renewables strategy for Scotland's public sector bodies.
- To integrate existing route maps and action plans for marine renewables with the Offshore Wind Route Map, to set out an evolving programme of delivery for the offshore renewables sector.

- To co-ordinate progress on key issues of joint importance such as marine planning, grid, supply chain/infrastructure and skills.
- To oversee the production of a series of proposals for Ministerial decision setting out the future direction of policies to support Scotland's low carbon offshore energy sectors.
- To promote internally within our organisations, to public bodies and to industry, the work of the Programme Board and the strategic importance of offshore renewables to Scotland.
- To assess overall resource allocation (staff and programme budgets) across the public sector, in supporting the growth of the low carbon offshore energy sector, and to drive any required changes.

Position with other SG groups

As a sub-group of the Energy Advisory Board (EAB), the Offshore Energy Programme Board will feed directly into the work of the EAB. Sandy Cumming, as Chair, will represent the Offshore Energy Programme Board's views on the EAB. The Offshore Wind Industry Group (OWIG), the Marine Energy Spatial Planning Group (MESPG) and the Pentland Firth & Orkney Waters Delivery Group will feed directly into the work of the Offshore Energy Programme Board as formal sub-groups.

A close reporting relationship will also be maintained with the FREDS and the other EAB sub-groups to ensure consistency across all renewables activity.

Membership

Adrian Gillespie (Senior Director, Energy and Low Carbon Technologies, Scottish Enterprise)

Alan McIntyre (Director, Scottish Development International)

Mike Neilson (Director, Marine Scotland, Scottish Government)

David Wilson (Director DG Energy, Scottish Government)

Ian Jardine (Chief Executive, Scottish Natural Heritage)

Kathy Cameron (Policy Manager, COSLA)

Martin Simpson (Head of Energy and Technology, The Crown Estate)

Gordon McGuinness (Director, Skills Development Scotland)

Duncan Botting (Chief Executive, Scottish European Green Energy Centre)

Audrey MacIver (Head of Energy, Highlands and Islands Enterprise)

Experts in specific fields will be invited to attend Programme Board meetings on an ad hoc basis as and when agenda items merit wider input to the Board's discussions.

Chair

Sandy Cumming (Partnership Director Offshore Energy, Scottish Government)

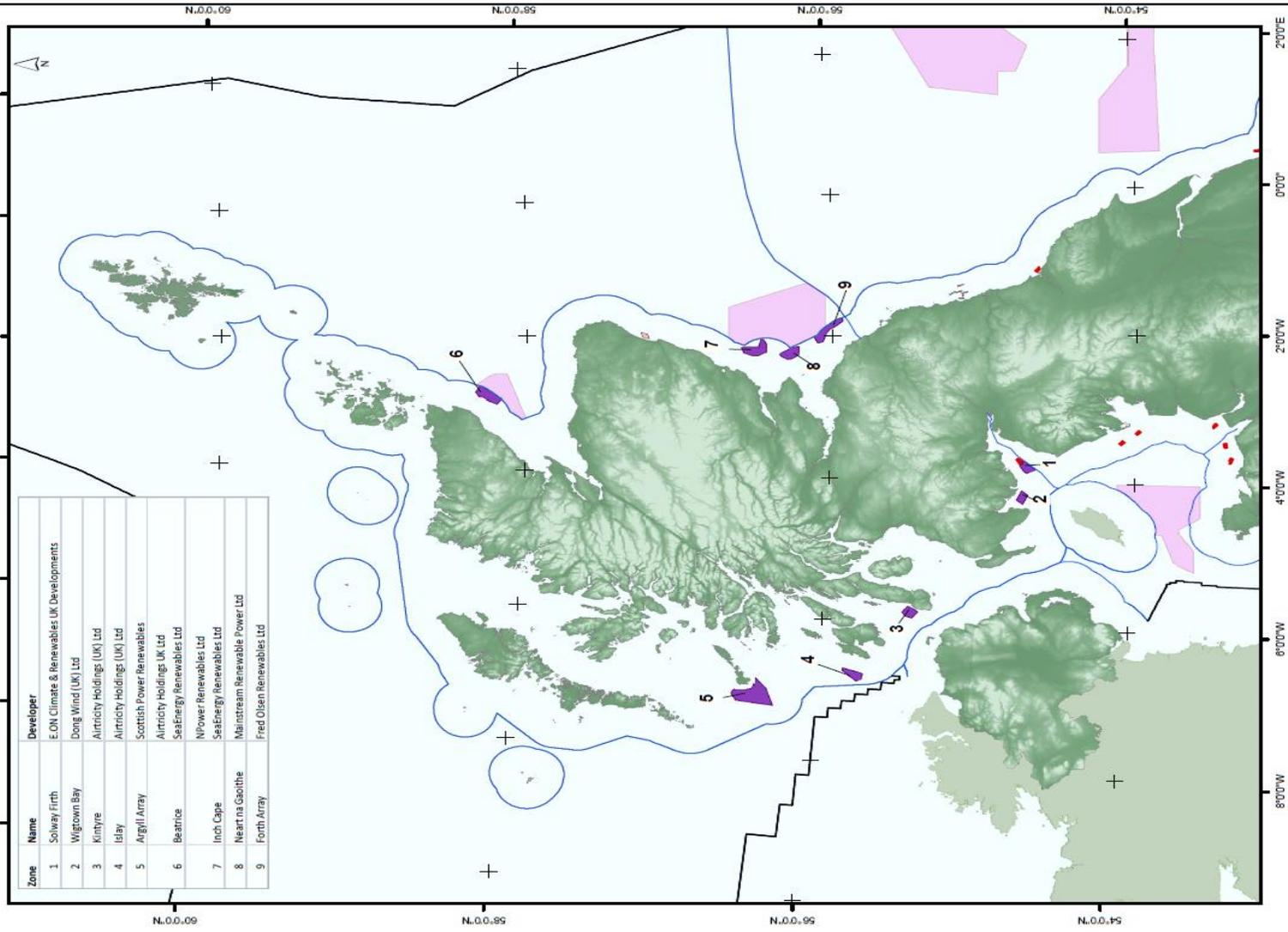
Secretariat

Alex MacDonald (PA to Sandy Cumming, Scottish Government)

Lynne Vallance (Head of Offshore Renewables Team, Scottish Government)

David Stevenson (Senior Policy Officer – Offshore Wind, Scottish Government)

August 2010 - Current Offshore Wind Activity in Scotland



| Zone | Name | Developer |
|------|------------------|---|
| 1 | Solway Firth | E.ON Climate & Renewables UK Developments |
| 2 | Wigwain Bay | Dong Wind (UK) Ltd |
| 3 | Kintyre | Airtricity Holdings (UK) Ltd |
| 4 | Islay | Airtricity Holdings (UK) Ltd |
| 5 | Argyll Array | Scottish Power Renewables |
| 6 | Beatrice | Airtricity Holdings UK Ltd |
| 7 | Inch Cape | NPower Renewables Ltd |
| 8 | Heart na Gaoithe | Seabnergy / Renewables Ltd |
| 9 | Forth Array | Mainstream Renewable Power Ltd |

Wind Activity

- Round 1 Wind Farm Site
- Wind Demonstration Site
- Scottish Wind Farm Exclusivity Award
- Round 3 Wind Farm Zone

Base Map

- Territorial Waters Limit
- Renewable Energy Zone
- UK Continental Shelf Limit
- Round 3 Wind Farm Zone

MaRS
Marine Resource System

1:4,000,000 Size: A4 Author: JM QA: SR 23 Aug 2010

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