National Renewables Infrastructure Plan

Report from Scottish Enterprise and Highlands and Islands Enterprise

HIE
Highlands and Islands Enterprise
Iomairt na Gàidhealtachd 's nan Eilean

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Scotland's Enterprise, Innovation and Investment Agency

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Stage 1 Report - Executive Summary

This report sets out the conclusions of the first stage of the development of the National Renewables Infrastructure Plan (N-RIP).

The development of the N-RIP has three stages:

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- **Stage 2** - Development of investment plans for first phase sites by Delivery Group facilitated by SE/HIE, further development of funding approaches and clarity on private and public sector investment support
- **Stage 3** - Delivery of phased investment at first phase sites based on industry demand

The development of the offshore renewables industry is an economic growth opportunity that can bring benefits to many areas of Scotland. To take this opportunity there is a need to bring forward a first phase of locations that establish a competitive position for Scotland in this market. As the industry develops, and builds on existing strengths, a wider range of locations will play important roles.

The total capital expenditure for offshore wind projects for developing 30GW of offshore wind in the UK is an estimated £72bn to £84bn. In Scottish Territorial Waters alone capital expenditure is an estimated £15bn to £18bn 2010-2020. Initial focus on a first phase of locations will complement other actions drawing on Scotland's energy and engineering expertise that are geared to ensuring that Scotland benefits from this opportunity.

The Infrastructure Challenge

The development of appropriate locations is critical to Scotland becoming the base for construction and assembly of wind turbines and marine devices. Suitable locations are also required to grasp the opportunity to develop operations and maintenance hubs for offshore wind farms both in Scottish waters and more remote from the coast of Scotland.

If these sites are not available there is the danger that offshore wind developers and wave and tidal manufacturers could source the manufactured equipment for projects which secure Crown Estate leases from outwith Scotland, and outwith the UK. If this happens the economic benefit to Scotland will be minimal, despite the country's unmatched renewable energy generation potential. This risk and the scale of the economic opportunity are the key drivers behind the development of the National Renewables Infrastructure Plan. If Scotland is successful in developing a strong supply chain in offshore renewables many of our ports and harbours will be involved in related economic activity.

This report sets out the background and economic growth aims of the National Renewables Infrastructure Plan, the nature of infrastructure required for offshore wind and wave and tidal sectors, the locations that over the medium term are well placed to provide this, the consultations that have shaped the spatial framework of first phase sites, the criteria used to identify the first phase sites that form the spatial framework of N-RIP and the actions that will be taken forward in Stage 2 of the development of the plan.

The first phase sites identified in the N-RIP spatial framework related to offshore wind and the infrastructure need they could support ranked by score are:

Site	Offshore Wind Infrastructure Need Supported
Leith	Integrated Manufacturing
Dundee	Distributed Manufacturing and Operation/Maintenance
Nigg	Integrated Manufacturing
Energy Park Fife at Methil	Further Manufacturing
Aberdeen	Distributed Manufacturing and Operation/Maintenance
Hunterston	Integrated Manufacturing
Arnish	Distributed Manufacturing
Campbeltown/ Machrihanish	Further Manufacturing and Operation/Maintenance
Ardersier	Integrated Manufacturing
Peterhead	Distributed Manufacturing and Operation/Maintenance
Kishorn	Distributed Manufacturing

Priorities for investment to support the **wave and tidal sector (device testing, manufacturing, assembly, operations and maintenance)** in the Pentland Firth and Orkney Waters area will be included in Stage 2 once a further final series of consultations with lease holders has been concluded.

Stage 2 of the N-RIP is the development of investment plans for the spatial framework of first phase sites identified above. **This next stage has four elements:**

- Continuing and intensive industry and port owner engagement about infrastructure needs and their potential investment plans.
- Rapid development of investment propositions at the first phase sites to ensure they can be made ready for use
- Identification of funding streams that can deliver these investment plans
- Further engagement with relevant parties in the planning and consenting systems to enable timely delivery of investment plans

To support these Stage 2 elements, a Delivery Group will be established consisting of Scottish Government, key port owners, Crown Estate and Round 3/Scottish Territorial Waters (STW) developers to drive the finalisation of agreed investment plans for the first phase sites in the spatial framework. Scottish Enterprise (SE) with input from Highlands and Islands Enterprise (HIE) will facilitate this work.

The following actions will form Stage 2 of the development of N-RIP:

Action	Description	Timeline
N-RIP Delivery Group	Establish a Delivery Group	First meeting in February 2010
First Phase Sites investment cases	Development of fundable investment cases at first phase locations	June 2010
Wave and Tidal Infrastructure investment cases	Identification of investment cases for infrastructure to support Pentland Firth and Orkney Waters Area leases	June 2010
Funding for Infrastructure Investment	Identify a funding approach for first phase site investment accessing public and private sources of support	June 2010
Further engagement with Planning and Consenting systems	Develop the process to ensure that the first phase sites achieve necessary planning and other consents in appropriate timescales	June 2010
Installation Process Study	Agree need for technical study to address the issue of future installation approaches	As agreed by Delivery Group (indicative September 2010)

1. Introduction

At the request of Ministers, Scottish Enterprise (SE), with support from Highlands and Islands Enterprise (HIE), has led the development of the National Renewables Infrastructure Plan (N-RIP).

This report sets out the conclusions of the first stage of the development of the Infrastructure Plan. Two further stages are required and the next steps set out in this report indicate how these will be progressed.

The development of N-RIP has three stages:

- **Stage 1**
  Development of spatial framework of first phase sites
- **Stage 2**
  Development of investment plans for first phase sites by Delivery Group facilitated by SE/HIE, further development of funding approaches and clarity on private and public sector investment support
- **Stage 3**
  Delivery of phased investment at first phase sites based on industry demand

This report sets out a spatial framework of first phase sites required to support the development of the offshore renewables industry (wind, wave and tidal). It distinguishes the infrastructure needs of the offshore wind and wave and tidal sector in terms of both timing and nature/location of infrastructure.

It sets out an approach to move to early, appropriate private and public investment in infrastructure at first phase port locations. For wind a set of first phase sites is identified. For wave and tidal the need for sites to support the current testing phase is recognised and a short further stage of industry liaison is set out to move to a clear view on first phase sites.

The development of the offshore renewables industry is an economic growth opportunity that can bring benefits to many areas of Scotland. To take this opportunity there is a need to bring forward a first phase of locations that establish a competitive position for Scotland in this market. As the industry develops, and builds on existing strengths, a wider range of locations will play important roles. Initial focus on a first phase of locations will complement other actions drawing on Scotland's energy and engineering expertise that are geared to ensuring that Scotland benefits from this opportunity.

2. National Renewables Infrastructure Plan Background

The development of a National Renewables Infrastructure Plan (N-RIP) is a key action identified in the Scottish Government's Renewables Action Plan published in June 2009. It also takes forward the action agreed by the First Minister's Energy Advisory Board. The foreword to Renewables Action Plan states:

> "Energy has long been part of Scotland's story, and Renewable Energy represents one of our most powerful areas of competitive advantage. The dawn of the boom years of North Sea oil and gas are now being replicated three decades on, as a unique partnership between public and private sectors emerges to exploit not fossil fuels but the power of our wind and our seas."
>
> (Jim Mather)

The Government's aim is to maximise the sustainable economic growth potential of a Scottish based offshore renewables industry that delivers offshore wind, wave and tidal energy with devices that are "made in Scotland". The objective of the N-RIP is to make sure that appropriate sites are available in the right locations to provide the platform for the growth of this industry. Having the right locations for the industry is critical if Scotland is to become a home for the offshore renewables supply chain. However on its own it is not sufficient to meet the government's aim. Other actions need to be taken and dependencies addressed.

These include actions:

- to support the development of a workforce to service the industry;
- that enable potential supply chain companies to compete for orders; and
- that sustain and develop Scotland's position as a location where the industry can innovate and test new devices.

Work is being progressed in each of these areas to ensure that Scotland secures new jobs and growing businesses from the programmes of commercial investment in offshore renewables.

A critical dependency for the development of offshore renewables across Scotland is the upgrading of transmission capacity to enable power generated in more remote locations to be carried by the grid. The announcement by the Scottish Government on 6th of January 2010 approving the Beauly – Denny power line upgrade removes a key uncertainty from the process and will increase confidence amongst developers and investors.

Alongside these supporting actions from Government there is also the need for momentum to be sustained in the Round 3, Scottish Territorial Waters (STW) and Pentland Firth and Orkney Waters Leasing Processes. The announcement by The Crown Estate on 8th January 2010 of its Round 3 Offshore Wind Development Partners will greatly assist the process of supply chain development as it gives certainty around who the key developers will be. As part of Stage 2 of the development of N-RIP SE/HIE will conduct further discussions relating to infrastructure with STW and Round 3 developers to inform the development of infrastructure at first phase sites identified in the spatial framework.

Scale of Opportunity

In February 2009 the Crown Estate issued exclusive rights to 9 consortia to develop 6.4 gigawatts of offshore wind power in Scottish Territorial Waters (STW). This amounts to double the total renewable electricity capacity currently in operation across the whole of Scotland. The Scottish Territorial Water developments will require around 1300 offshore structures at today's turbine scale. On 8th January 2010, the Crown Estate announced UK Round 3 licences for a nine new offshore wind development zones around the UK to develop over 32 GW of offshore wind power generation, requiring a further 6400 offshore wind structures[1]. Round 3 offshore wind energy generation aims to deliver a quarter of the UK electricity needs by 2020[2]. Delivery of this capacity will require a massive investment in onshore and offshore energy infrastructure and supply chains.

To deliver the targets requires a peak installation rate of 6-8 GW per year (1200 to 1600 turbines) which will bring economic benefits and investment to the UK of £6-8 billion per annum. The sector has the potential to generate 45,000 to 70,000 jobs in the UK by 2020. The scale of planned development makes the UK the number one market for offshore wind. A recent KPMG survey concerning the attractiveness of the European Market shows that the UK achieves a significantly better rating than all other European countries[3].

The total capital expenditure for offshore wind projects for developing 30GW of offshore wind in the UK is an estimated £72bn to £84bn. In Scottish Territorial Waters alone capital expenditure is an estimated £15bn to £18bn 2010-2020.

1. Assuming at 5MW turbine size
2. Source: BWEA Employment opportunities and challenges in the context of rapid industry growth, Bain and Company, 2008.
3. KPMG Offshore wind farms in Europe Survey 2007.

The strategic rationale for actions that support the development of the offshore renewables industry are:

- the opportunity to secure economic growth through the development of a Scottish based supply chain supporting the manufacture, installation and ongoing maintenance of turbines and wave and tidal devices in Scottish and UK waters and the wider North Sea; and
- through the development of this supply chain and the UK's position at the leading edge of offshore renewables, the potential for companies based in Scotland to service international markets as offshore renewables develops throughout the world.

The Infrastructure Challenge

The development of appropriate locations is critical to Scotland becoming the base for construction and assembly of wind turbines and marine devices. Suitable locations are also required to grasp the opportunity to develop operations and maintenance hubs for offshore wind farms both in Scottish waters and more remote from the coast of Scotland. If these sites are not available there is the danger that offshore wind developers and wave and tidal manufacturers could source the manufactured equipment for projects which secure Crown Estate leases from outwith Scotland, and outwith the UK. If this happens the economic benefit to Scotland will be minimal, despite the country's unmatched renewable energy generation potential. This risk and the scale of the economic opportunity are the key drivers behind the development of the National Renewables Infrastructure Plan. If Scotland is successful in developing a strong supply chain in offshore renewables many of our ports and harbours will be involved in related economic activity.

3. Infrastructure Demand Analysis and Port Location Consultations

The development of offshore renewable energy generation around the coast of Scotland is driven by Crown Estate leases of sites for wind and testing sites for wave and tidal devices. The timing of demand for sites to install, manufacture and maintain wind turbines and wave and tidal devices arises from these leasing rounds. Developers have a range of processes to complete prior to the start of installation and operation.

As the processes are different for offshore wind and wave and tidal generation, the nature, timing and location of infrastructure required have been viewed separately.

In the development of this spatial framework of first phase sites that can meet industry requirements a range of expert views on infrastructure needs of the industries were used and discussions with key stakeholders were conducted.

3.1 Offshore Wind

Three main sources of structured assessment have been used to identify infrastructure need for offshore wind:

- Department for Energy and Climate Change Report February 2009 – UK Ports for the Offshore Wind Industry: Time to Act
- Scottish Development International (SDI) company enquiries
- SE/HIE Interviews with Offshore Wind Developers for STW (FREDS Offshore Wind Industry Group)

As a result of the Crown Estate Round 3 and Scottish Territorial Waters leasing rounds and the UK and Scottish Government Climate Change targets there is a strong expectation that Offshore Wind programmes will begin large scale installation processes by 2014/15. These rounds of installation will build upon Round 1 sites and ongoing Round 2 sites. Developers are currently in the process of identifying delivery programmes for the sites they hold under STW and will develop under Round 3. As part of this they need to identify construction and installation locations and operation and maintenance bases. Their potential suppliers are also seeking sites to service these programmes.

The table below gives a sense of the scale and estimated timing of installation at STW, Round 3 sites around the Scottish coast, in the north east section of the North Sea and the Irish Sea. These estimates show that by 2020, around 3700 wind turbines may be installed in sites within immediate reach of Scottish manufacturing and installation locations[4]. Whilst this is indicative it does give a sense of the scale of the "near to" Scotland opportunities.

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

4. Indicative analysis prepared for N-RIP in consultation with BVG Associates. Indicative of potential installation using 5MW turbine for STW and turbine size growing to 5.9MW in R3 Sites. Based on R3 estimates in October 2009. Pre 2014/15 reflects existing R2 Leases.

A number of conclusions should be drawn from this indicative turbine installation build up:

- Firstly that Scotland should develop locations that not only can compete for STW and Scottish Renewable Zone Round 3 sites but should ensure that the locations that are developed can supply locations across the northern North Sea for example Dogger Bank. 9GW of the 32 GW of potential generation identified in Round 3 are in the Dogger Bank zone. East coast locations may be required earlier and will have the ability to service a wider range of locations. In Round 3 27GW of the 32 GW total is in the North Sea. Competition to service the installation phase will be strong from ports in continental Europe but Scotland's potential key locations are no further away from central North Sea locations than some of these ports. It is envisaged that the manufacturing supply chain will cluster around the strongest installation locations.
- Irish Sea locations may also be accessible from sites in Scotland and should also be viewed as serviceable from Scotland alongside West Coast STW releases.
- 2014/2015 is seen as the start of the scaling up of installation of sites leased under STW and R3. Developers and their supply chains will need to make decisions about locations in 2011/12. This means that Scotland needs to develop investment plans for first phase sites during 2010 to enable consideration both by the developers and by their supply chains in time for decisions by 2011/12.

In view of these timescales for offshore wind, Scotland needs to agree and quickly implement its strategy to ensure that our best sites are ready for consideration. To be attractive these sites need to offer the right combination of water depth, area at quayside for fabrication and assembly and suitable labour market.

Identifying sites that can be developed to meet these requirements has drawn upon the analysis presented in "UK Ports – Time to Act". This report was produced by BVG Associates for the UK Department of Energy and Climate Change (DECC) and published in February 2009. The Report identifies the following indicative requirements in three key areas of demand:

Construction Port Requirements

Typical requirements for a construction base with the capacity to handle 100 turbines a year include:

- At least 80,000 m^2 (8 hectares) suitable for lay down and pre assembly of product;
- 200–300 m length of quayside with high load bearing capacity and adjacent access;
- Water access to accommodate vessels up to 140m length, 45m beam and 6m draft with no tidal or other access restrictions;
- Overhead clearance to sea of 100m minimum (to allow vertical shipment of towers); and
- Sites with greater weather restrictions on construction may require an additional lay-down area, up to 300,000 m^2 (30 hectares).

Other requirements relating to cranes and load bearing points are also important and can be achieved through investment in the site. In addition sites should have good land-side transportation access to facilitate their use, and to allow transportation to onshore wind farm sites.

Manufacturing Facility Requirements – Integrated and Distributed Sites

A number of wind turbine manufacturers preferred strategy is to establish their own turbine assembly facilities alongside key component manufacturing facilities on a single new coastal site. Depending on the range of products and scale of operations, these could employ up to 5,000 people on each site.

The requirements for such sites are:

- Located on North Sea or English Channel to enable export to Continental projects as well as supplying to UK offshore projects;
- Up to 500 hectares of flat area for factory and product storage;
- Direct access to dedicated high load bearing deep water quayside (minimum 500m length); and
- Ease of landside logistics and access to skilled workforce.

Another opportunity is to establish key component manufacturing facilities in UK where the components can be produced on a distributed basis and brought together at an installation port. This scenario is relevant for foundations, towers and blades, for example, with specific port and space requirements for each.

Inspection, Repair and Maintenance/Operations and Maintenance

Although the BVG Report for DECC describes the need for operation and maintenance locations it does not specify infrastructure requirements. However it comments that "once a wind farm is operating, the maintenance of the wind farm is usually carried out from a nearby port. These ports house the maintenance crew and vessels needed to respond to wind farm faults, plus storage and repair facilities. As wind farms get larger and further out to sea, the use of helicopters and offshore accommodation facilities for this function is likely to become more common."

For N-RIP the requirements of operation and maintenance sites are being modelled on recently established locations for Round 2 developments. A typical example would be a base servicing c150 Turbines. Long term employment at this site in support of this array is projected at c100 full time employees, working for a range of companies within the operation and maintenance supply chain .

As a result of experience of servicing the oil and gas industry there are a range of locations that are already able to service the needs of offshore wind operations and maintenance, particularly on the east coast. Developers indicate that there will be a need for local bases which are used to service more regular maintenance needs and whilst the east coast has a range of options that could support this, west coast locations may need to be developed. In addition to these local bases, there may also be an opportunity for the development of more specialised hub locations that can act as bases for the supply chain supporting less routine repair and maintenance for a wider group of wind arrays. This would mirror the role that Aberdeen has played in supporting oil and gas IRM where the specialist service supply chain has developed over time.

Further discussions with developers about operation and maintenance locations are being progressed.

3.2 Wave and Tidal

The initial needs of the wave and tidal energy sector are different from those of offshore wind. The Crown Estate leases in the Pentland Firth and Orkney Waters area give Scotland the opportunity to be at the leading edge of development of this new sector.

To enable this testing phase to succeed companies will need quayside and port facilities to install and maintain devices. The development of this infrastructure needs to be staged and timed to ensure no delay in the wave and tidal process. Supporting facilities such as buildings for assembly, maintenance and prototyping need to be developed. The current port infrastructure need is focused in the Pentland Firth and Orkney Waters.

However as this industry develops the infrastructure needed will be more widespread. Discussions with developers indicated interest in a range of locations:

- For wave devices key locations could include the north-west coast of Scotland, the west coast of the Western Isles and locations in Shetland.
- For tidal devices future key locations could include the Kintyre peninsula, the coastal areas of Galloway and locations in Shetland

The concentrated geography of the initial testing area means that it will be possible to target support to a small number of locations and to work with the lease holders to develop infrastructure at these locations that is appropriate and can be scaled up in phases depending on future needs. To service potential future locations it will be important to ensure that investments made at some locations initially to support the offshore wind industry needs are designed with longer term shared wave and tidal use in mind.

The Marine Energy Group (MEG) of FREDs published a Road Map for the industry's development in September 2009. This MEG Group Report states that "Fit for purpose ports, harbours, vessels and manufacturing facilities will be required to enable and support the growth of a commercial marine renewables sector. Coupled with the emerging offshore wind opportunities around Scotland, the rewards for Scotland's economy could be high. Scotland has a relatively strong baseline from which to build a strong infrastructure base to support the marine renewables industry; EMEC is established in Orkney, there are a number of ports and harbours showing interest in marine renewables, and there already exist useful infrastructure and skills in the servicing of Scotland's oil and gas sector."

"MEG considers such public intervention is likely to be necessary to provide infrastructure owners with confidence that offshore renewables is a growing source of opportunity. It will also allow the necessary upgrades in ports, harbours, manufacturing and testing facilities to be achieved within a timescale that enables marine renewables and offshore wind projects to contribute to the 2020 targets."

Two phases of infrastructure demand are identified for the wave and tidal sector:

- Testing and development – currently focused on Pentland Firth and Orkney Waters
- Future Commercial Installation – where the supply chain will have the same range of infrastructure needs as identified for Offshore Wind, albeit with some scaling down of some requirements due to smaller device size.

To ensure that the first phase locations identified for offshore wind are market focused SE with HIE have discussed infrastructure needs with developers identified in the Crown Estate STW Licensing Round. To mirror this further discussions are being conducted with those holding licences for the Pentland Firth and Orkney Waters Test Site leases to ensure port sites are developed to meet the range of initial needs. The locational needs of supply chain companies hoping to manufacture devices following successful testing are emerging both from the flow of enquiries that SDI is progressing in this sector and wave and tidal developers future locational aspirations for installation.

3.3 Identifying Potential Locations

The process of identifying locations that meet these infrastructure needs (both wind and wave and tidal) has been taken forward by SE and HIE through strategic dialogue with a broad range of port operators in Scotland.

The purpose of this dialogue has been threefold:

- To gauge port owner understanding of the future requirements of these industries and to bring the opportunities to support the development of this industry to their attention where they had not previously been engaged
- To identify current investment plans that are being developed by port owners to support the industry and refine requirements and potential positioning in the context of the known requirements of the industry;
- To discuss and develop linkages between the needs of offshore renewables and other port industry strategic opportunities such as Oil and Gas decommissioning, cruise infrastructure development, oil and gas industry inspection, repair and maintenance (IRM) and general port development.

The N-RIP spatial framework of first phase sites has been developed within the context of this dialogue with port owners. It is clear that Scotland's ports can service the needs of the industry and there is a desire to do so.

A range of locations can readily service operations and maintenance, particularly on the east coast. However there is no site currently fully ready to meet the future needs of the supply chain.

A key output of the strategic dialogue process has been the fostering of greater understanding of the industries timescales, needs and recognition that competition to service this industry is faced by Scotland from locations in the rest of the UK and Europe. However ports as a group have demonstrated a willingness to engage with Scottish Government and its agencies in pursuing a strategic and focussed approach. There is also an appetite to continue a dialogue about the evolving needs of the industry.

As part of the development of the Infrastructure Plan and to foster further strategic dialogue, Jim Mather, Minister for Enterprise, Energy and Tourism led a delegation of port and offshore renewable stakeholders in a visit to Bremerhaven in October 2009. During this visit the delegation were given an insight into that region's approach to securing industrial growth in the offshore wind sector. Presentations were made by locally based companies, industry support bodies and local and regional authorities. This visit both enabled those present to view the scale of opportunity that had been realised and to understand the importance of the early provision of key sites with port access in enabling companies to locate and grow in Bremerhaven and the surrounding area.

Following this visit a half day stakeholder session was hosted by the Minister in Glasgow on 3 November2009 to ensure that the approach and emerging conclusions of Stage 1 of the N-RIP were informed by a wide range of industry and port related views. Emerging conclusions on implementation approach, first phase sites for the industry, the role of Scottish Government and its agencies in supporting the development of these sites so that they were appropriate for industry needs were presented. Over 80 attendees discussed these emerging conclusions and fed back views. A list of attendees is attached as Appendix 1.

Key conclusions that arose from the stakeholder session confirmed:

- a need for tailored investment at a small group of first phase sites;
- that sites selected should focus on meeting identifiable market need; and
- During 2010 the N-RIP process must ensure that investment plans are made ready for first phase sites so that they are fully deliverable in the required timescale for use (e.g. 2012/13) otherwise the opportunity for these sites to be used by supply chain companies might be missed.

Stakeholders also made clear the importance of planning and consenting processes operating in a way that enables sites to be ready in time for use in line with the overarching installation timelines.

4. Identification of First Phase Sites - Criteria and Site Assessment

The key output of Stage 1 of the National Renewables Infrastructure Plan is a spatial framework of first phase sites that can act as the catalysts for the development of the offshore renewables industry around three key infrastructure needs:

- Construction/Installation
- Manufacturing – Integrated Sites and Distributed Sites
- Inspection, Repair and Maintenance/Operations and Maintenance

As explained above the different timescales of demand for infrastructure for offshore wind and for wave and tidal generation mean that this report identifies a spatial framework of first phase sites for offshore wind as detailed below. Further consultations required to finalise views on the investment required to support the Pentland Firth and Orkney Waters Crown Estate Leasing process are explained below.

This spatial framework identifies a group of first phase sites which are "best fit locations" which should be focussed upon in the immediate future as part of an approcah to ensure Scotland can offer a range of key locations for the offshore wind industry. These sites are shown in the attached First Phase Site map (Appendix 2 (a)). In addition the analysis has identified a medium term list of locations that could support the industry. This medium term view of potential future locations is shown on the indicative medium term map attached as Appendix 2(b). This shows potential locations for wind and wave and tidal.

Industry feedback has strongly supported the need for the spatial framework to focus on putting forward the best sites first to attract industry. How these sites are used in future depends on the strength of growth of the industry and decisions by companies about locational strategy. Demand from developers and supply chain companies will drive the ultimate use of these sites so it will be important that the assessment of requirements is reviewed on an ongoing basis.

Few of these first phase sites are public sector owned so partnership with the owners will guide the implementation of the sites identified.

The identification of the first phase sites from the longer list of potential sites is the result of analysis using a set of evaluation criteria. The criteria used, the weighting of the criteria and the scoring of sites was carried out with input from BVG Associates. The approach taken is detailed in Appendix 3.

Arising from this approach the following first phase site list has been identified:

Site	Offshore Wind Infrastructure Need Supported
Leith	Integrated Manufacturing
Dundee	Distributed Manufacturing and Operation/Maintenance
Nigg	Integrated Manufacturing
Energy Park Fife at Methil	Further Manufacturing
Aberdeen	Distributed Manufacturing and Operation/Maintenance
Hunterston	Integrated Manufacturing
Arnish	Distributed Manufacturing
Campbeltown/ Machrihanish	Further Manufacturing and Operation/Maintenance
Ardersier	Integrated Manufacturing
Peterhead	Distributed Manufacturing and Operation/Maintenance
Kishorn	Distributed Manufacturing

Wave and Tidal

As part of the development of the N-RIP to date the approach to supporting testing and development processes has been discussed with a range of stakeholders in the Pentland Firth and Orkney Waters area. Proposals for investment at Scrabster and Lyness in Scapa Flow that will support companies who are awarded leases for testing by the Crown Estate are being advanced by the relevant owners at these locations. To ensure that the needs of the testing leaseholders are met at these locations and others that may have supporting roles to play a set of structured discussions with the companies holding "provisional preferred bidder" status are being progressed. These discussions will confirm lease holders' requirements and enable priorities for investment that meet these needs to be established. These will then be implemented as part of the ongoing delivery of the N-RIP programme.

Port owners and operators in this area have engaged in discussions with industry and prepared infrastructure investment options to meet the potential needs of the lease holders. The further stage of discussion is intended to speed the delivery of appropriate infrastructure and an operational environment that enables the most efficient use of scarce port locations and limited public investment.

The delivery approach in stage 2 of the N-RIP will include those locations identified through the focussed discussions outlined above. The need to ensure timely availability of infrastructure for this phase of the development of the wave and tidal sector in Scotland is fully recognised.

5. Delivering First Phase Sites – Stage 2 of N-RIP

The implementation of the N-RIP is an ongoing process. Stage 1 of the plan identifies a spatial framework of first phase sites to meet the needs of offshore wind industry.

The first phase sites identified will enable further growth of the sector and build upon the existing investments at Campbeltown/Machrihanish and at the Energy Park Fife at Methil. These two existing locations, alongside the use of Nigg for the Beatrice Demonstration Project, have put Scotland on the map as a potential manufacturing location and through their pioneering approach given credence to the view that Scotland is a viable location for servicing this industry.

Extensive discussions with port owners, industry stakeholders and the detailed needs expressed by a range of supply chain companies in their discussions with SDI have informed the development of this spatial framework. This engagement process will continue during the development of Stage 2 of N-RIP. This industry engagement will assist in focussing on key actions and determining where investment should be focused.

In addition, following further discussions as described above, sites to support the Pentland Firth and Orkney Waters Area will be identified and investment cases developed as part of Stage 2.

Stage 2 – Development of Investment Plans

Stage 2 of the N-RIP is developing investment plans for the spatial framework of first phase sites identified on page 15.

This stage has four elements:

- Continuing and intensive industry and port owner engagement about infrastructure needs and their potential investment plans.
- Rapid development of investment propositions at the first phase sites sites to ensure they can be made ready for use
- Identification of funding streams that can deliver these investment plans
- Further engagement with relevant parties in the planning and consenting systems to enable timely delivery of investment plans

Stage 3 of N-RIP will be the actioning of these investment plans. This should be done on a site by site phased basis when there is sufficient confidence in market interest to ensure that the risk of the location not being used for offshore renewables is minimised. Market interest will inform the process of delivery of these sites.

To progress these Stage 2 elements, a Delivery Group will be established consisting of key port owners, Crown Estate and R3/STW developers to support and drive the finalisation of agreed investment plans for the first phase sites sites in the spatial framework. The Delivery Group should meet for a limited period until these first phase plans have been developed. Periodic updating of wider stakeholders through focussed stakeholder sessions should take place. The Delivery Group should be supported by SE/HIE with involvement from Scottish Government and update reports on N-RIP should be provided to the Scottish Government's Energy Advisory Board as required.

In addition this Delivery Group should consider the need for actions relating to:

- planning and consenting
- future installation vessel design/port infrastructure design

The proposed terms of reference of the Delivery Group are attached as Appendix 4. Further background on the issues relating to planning and consenting and installation approach is set out in Appendix 5.

6. Conclusions and Next Steps

The development of the offshore renewables industry is an economic growth opportunity that can bring benefits to many areas of Scotland.

To take this opportunity there is a need to bring forward a first phase of locations that establish a competitive position for Scotland in this market. As the industry develops, and builds on existing strengths, a wider range of locations will play important roles.

The total capital expenditure for offshore wind projects for developing 30GW of offshore wind in the UK is an estimated £72bn to £84bn. In Scottish Territorial Waters alone capital expenditure is an estimated £15bn to £18bn 2010-2020. Initial focus on a first phase of locations will complement other actions drawing on Scotland's energy and engineering expertise that are geared to ensuring that Scotland benefits from this opportunity.

Stage 1 of the National Renewables Infrastructure Plan process has identified first phase locations that can service offshore wind industry needs. This spatial framework of first phase sites has been developed using criteria based on industry demands and the ability to move to address these in the relatively short window of opportunity. For wave and tidal, following further discussions with lease holders, first phase locations related to the Pentland Firth and Orkney Waters Area will be identified.

To make these sites fit for use requires investment in infrastructure. Stage 2 will finalise investment plans for these first phase locations. Industry stakeholders have considered the conclusions of the N-RIP and broadly endorsed the approach. Stakeholders have emphasised the need to move quickly to delivery of sites, to ensure that planning and consenting processes aid the delivery of sites and have asked for ongoing strategic dialogue following the model pursued in the development of N-RIP to date.

In Stage 2 SE with support from HIE will lead the following actions to progress the implementation of the plan:

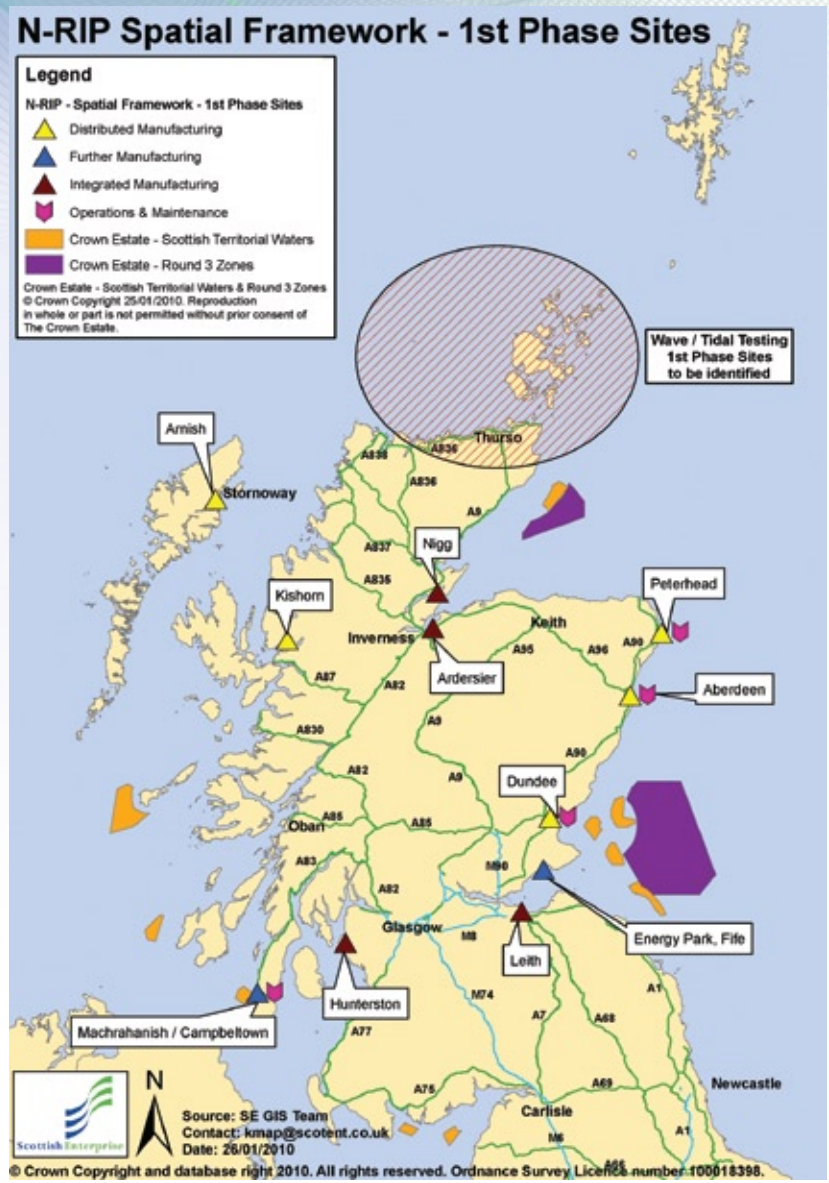
Action	Description	Timeline
N-RIP Delivery Group	Establish a Delivery Group	First meeting in February 2010
First phase Sites investment cases	Development of fundable investment cases at first phase locations	June 2010
Wave and Tidal Infrastructure investment cases	Identification of investment cases for infrastructure to support Pentland Firth and Orkney Waters Area leases	June 2010
Funding for Infrastructure Investment	Identify a funding approach for first phase site investment accessing public and private sources of support	June 2010
Further engagement with Planning and Consenting systems	Develop the process to ensure that the first phase sites achieve necessary planning and other consents in appropriate timescales	June 2010
Installation Process Study	Agree need for technical study to address the issue of future installation approaches	As agreed by Delivery Group (indicative September 2010)

Appendix 1

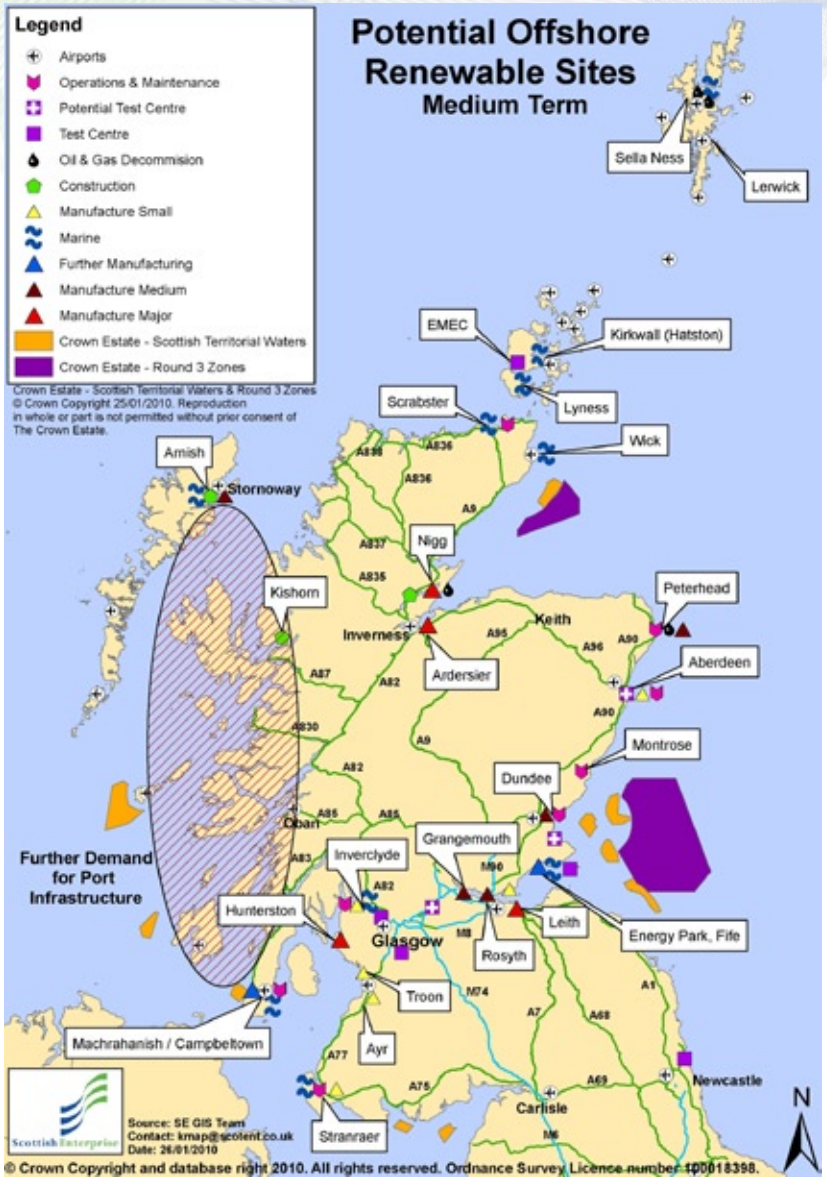
Delegate List – N-RIP Stakeholder Session – 3 November 2009

Anderson, David	Industrial & Power Association Ltd
Anderson, Keith	ScottishPower
Bates, Dan	RWE Npower Renewables Ltd
Baxter, George	SSE
Begg, Mhairi	Scottish Enterprise
Boyd, Stephen	STUC
Burnett, Robin	Airtricity
Burns, Allan	Forth Ports plc
Calder, William	Scrabster Port Authority
Clark, Jane	SNH
Clarke, Steve	Mainstream Renewable Power
Coghill, Derek	
Couper, Ian	North of Scotland Industry Group
Dobson, Euan	Scottish Enterprise
Douglas, Callum	Risktec Solutions, Glasgow
Ferguson, Alasdair	Ferguson Transport Ltd
Finch, Dan	Sea Energy Renewables
Fulton, Jack	
Gale, Richard	EON Engineering
Gemmill, Jim	SEPA
Ghibaldan, Sam	Firth Tidal Energy Ltd
Gillespie, Adrian	Scottish Enterprise
Gilmour, Phil	Marine Scotland
Gordon, Gemma	Scottish Futures Trust
Gorman, Dave	SEPA
Grains, Calum	Lerwick Port Authority
Grant, Ken	HIE
Gray, Ken	Cromarty Firth Port Authority
Gray, Sylvia	East Dunbartonshire Council
Greenhil, Gordon	Shetland Islands Council
Gunn, Carol	HIE
Haag, Matthias	Aquamarine Power
Henry, Richard	North Ayrshire Council
Hillyear, Sarah	Aberdeen City Council
Hume, Jamie	Scottish Government
Hutchison, Ian	Aquatera Ltd
Jamieson, Andrew	Scottish Power
Jamieson, Euan	Clydeport Limited
Jerome, David	Clydeport Limited
Johnstone, Rod	Scrabster Port Authority
Kermode, Neil	EMEC
Kerr, Robert	SEPA
Kinninmonth, Andrew	Briggs Group
Klein, Stephen	Peel Holdings
Knott, Erica	SNH
Lamb, Tom	Scottish Development International
Lewis, Paul	Scottish Enterprise
Macinnes, Kenny	The Highland Council
MacIver, Audrey	HIE
MacKenzie, Ross	Fife Council
Matheson, Roddy	Aberdeenshire Council
McCorkindale, Morag	Aberdeen Renewable Energy Group
McGregor, Robin	Lunar Energy
McNair, Robert	McNair, MacFarlane & Kerr Associates
Michael Sutherland	Scottish Fisheries Federation
Minto, James	IPMD Ltd
Moran, Kevin	Wood Group Renewable Energy
Moran, Martin	National Grid
Murray, Elma	CE North Ayrshire Council
Nicol, Bill	Riverside Inverclyde
Nixon, Brian	Scottish Enterprise
Orr, Robert	SDS
Parker, Colin	Aberdeen Harbour Board
Parsons, Lucy	Scapa Flow Development Project
Presswood, Robin	SLAED
Puttock, Simon	ETP
Rankin, Alasdair	The Crown Estate
Reddish, John	SeaEnergy Renewables
Robertson, John	Bi-Fab
Rodger, David	Vattenfall
Roland Bean	Perth & Kinross Council
Rose, Tony	Scottish Futures Trust
Rougvie, Jane	Scottish Government
Russell, Simon	Leiths (Scotland) Ltd - Kishorn Port
Sainsbury, Jeremy	Natural Power
Scott, Mike	Fluor
Slipper, Richard	GVA Grimley
Tait, Albert	Orkney Islands Council
Thorp, Julian	East Ayrshire Council
Tulloch, Martyn	Saltire Foundation
Watt, Willie	Subsea 7
Wilcock, Chris	Scottish Government
Wilson, Alastair	Scottish Government
Woodburn, Pamela	Scottish Enterprise
Zahran, Darah	EU Skills

Appendix 2(a)



Appendix 2(b)



Appendix 2(c)

Listing of Sites Shown on Medium Term Potential Locations Map

Site	Offshore Wind Infrastructure Need Supported
Leith	Integrated Manufacturing
Dundee	Distributed Manufacturing and Operation/Maintenance
Nigg	Integrated Manufacturing
Energy Park Fife at Methil	Further Manufacturing
Aberdeen	Further Manufacturing and Operation/Maintenance
Hunterston	Integrated Manufacturing
Arnish	Distributed Manufacturing
Campbeltown/Machrihanish	Further Manufacturing and Operation/Maintenance
Ardersier	Integrated Manufacturing
Kishorn	Distributed Manufacturing
Peterhead	Distributed Manufacturing and Operation/Maintenance
Inverclyde	Distributed Manufacturing and Operation/Maintenance
Burntisland	Distributed Manufacturing
Rosyth	Distributed Manufacturing
Montrose	Distributed Manufacturing and Operation/Maintenance
Grangemouth	Distributed Manufacturing
Highland Deephaven	Distributed Manufacturing
Ayr	Distributed Manufacturing
Troon	Distributed Manufacturing
Stranraer/Cairnryan	Distributed Manufacturing, Operation/Maintenance

Wave and Tidal Potential Locations Indicated
Sella Ness
Lerwick
Lyness
Hatston (Kirkwall)
Scrabster
Wick
Arnish
Energy Park Fife
Inverclyde
Campbeltown/Machrihanish
Stranraer/Cairnryan

Appendix 3

Site Criteria Analysis and Scoring

	Type	Proximity		Site		Location		Timescale		Weighed Total
	Weighting	25		40		15		20		
Leith	IM Con	3	18.75	4	40	3	15	2	13.33	87.08
Dundee	DM OM	3	18.75	3	30	3	15	3	20	83.75
Nigg	IM Con	2	12.5	4	40	2	10	3	20	82.5
Methil	DM	3	18.75	3	30	3	15	2.5	16.66	80.41
Aberdeen	DM OM	2.5	15.725	2	20	3	15	3	20	70.725
Hunterston	IM Con	2.5	15.725	3	30	3	15	1	6.67	67.395
Arnish	DM/WM	2	12.5	3	30	0	0	3	20	62.5
Machrihanish/Campbeltown	DM WTM OM	3	18.75	3	30	0	0	2	13.33	62.08
Ardersier	IM Con	2	12.5	3	30	2	10	1	6.67	59.17
Peterhead	DM OM	2.5	15.725	2	20	2	10	2	13.33	59.055
Kishorn	Con/WM/DM	2	12.5	3	30	0	0	2	13.33	55.83
Montrose	DM OM	3	18.75	2	20	2	10	1	6.67	55.42
Burntisland	DM	3	18.75	2	20	3	15	0	0	53.75
Rosyth	DM	3	18.75	2	20	3	15	0	0	53.75
Inverclyde	DM TM OM	1.5	9.25	2	20	3	15	1	6.67	50.92
Grangemouth	DM	3	18.75	1.5	15	3	15	0	0	48.75
Highland Deephaven	DM	2	12.5	2	20	2	10	0	0	42.5
Ayr	DM	2	12.5	1	10	3	15	0	0	37.5
Troon	DM	2	12.5	1	10	3	15	0	0	37.5
Stranraer/Cairnryan	OM DM W/T M	2.5	15.725	1	10	1	5	0	0	30.725

IM= Integrated Manufacturing; Con = Potential Construction Installation Location
DM = Distributed Manufacturing Location
OM Hub = Operation and Maintenance Hub location
WTM = Potential Location for Wave/tidal device manufacturing

Explanation of Scoring Criteria

The scoring criteria were developed with BVG and seek to reflect the core determinants of a location's attractiveness to the industry. Market interest in sites is developing as propositions for the locations are refined. The scoring reflected in this report reflects the assessment of the sites as they are currently viewed.

Set out below are the main issues that are reflected in the scores for each site at the current time.

Site				
Criteria and Weighting	**Proximity (25%)**	**Site (40%)**	**Location (15%)**	**Timescale (20)**
Description	**Total Potential Score = 4.** Relates to distance from R3 and STW sites and potential to serve wave and tidal desired locations. Up to 3 for distance from STW/R3 Site; 0.5 for future tidal wind; 0.5 for future wave.	**Total Potential Score = 4** Potential Available Area out of 2. Sites that have scale for Integrated manufacturing, 2. Space for distributed/component manufacturing 1. Appropriate Water Depth = 1. Current market use or sustained market interest for offshore wind fabrication = 1.	**Total Potential Score = 3** Based on labour market catchment derived from drivetime data. Within 45 minutes: >100,000 – 3 > 50,000 – 2 >10,000 – 1 < 10,000 – 0	**Total Potential Score = 3** Investment Plan Developed and Costed, or site ready – 3. Investment Plan process underway - 2. Plan concept agreed and feasibility start agreed – 1.
Leith	3 – Moray Firth, Forth, Dogger Bank	4 – 2 for potential available area, 1 for water depth, 1 for sustained market interest	3	2 – owner developing costed options
Dundee	3 – Moray Firth, Forth, Dogger Bank	3 – 1 for potential available area, 1 for water depth, 1 for sustained market interest	3	3 – costed plan for key elements
Nigg	2 – Moray Firth, Forth	4 – 2 for potential available area, 1 for water depth, 1 for sustained market interest	2	3 – KBR developing proposals
Methil	3 – Moray Firth, Forth, Dogger Bank	3 – 1 for potential available area, 1 for water depth, 1 for sustained market interest	3	2.5 – costed plan for key elements of existing energy park and discussions underway re wider area
Aberdeen	2.5 – Moray Firth, Forth, 0.5 for Dogger Bank	2 – 1 for potential area, 1 for water depth	3	3 – investment committed on space that could be used for manufacturing
Hunterston	2.5 – West Coast STW, Irish Sea R3 and 0.5 for Tidal	3 – 2 for potential available area, 1 for water depth	3	1 – investment plan discussions underway

Explanation of Scoring Criteria (cont'd)

	Proximity (25%)	Site (40%)	Location (15%)	Timescale (20)
Arnish	2 – West Coast STW, 0.5 for wave, 0.5 for tidal	3 – 1 for potential available area, 1 for water depth, 1 for current use	0	3 – costed plan for key elements
Machrihanish/ Campbeltown	3 – West Coast STW, Irish Sea R3, 0.5 wave, 0.5 tidal	3 – 2 for potential area, 1 for current use	0	2 – further development planning in process
Ardersier	2 – Moray Firth, Forth	3 – 2 for potential area, 1 for market interest	2	1 – initial discussions
Peterhead	2.5 – Moray Firth, Forth, 0.5 for Dogger Bank	2 – 1 for potential area, 1 for water depth	2	2 – owner developing costed options
Kishorn	2 – 1 West Coast STW, 0.5 wave, 0.5 tidal	3 – 1 for potential area, 1 for water depth, 1 for market interest	0	2 – owner developing costed options
Montrose	3 – Moray Firth, Forth, Dogger Bank	2 – 1 for potential area, 1 for water depth	2	1 – investment plan discussions underway
Burntisland	3 – Moray Firth, Forth, Dogger Bank	2 – 1 for potential area, 1 for water depth	3	0
Rosyth	3 – Moray Firth, Forth, Dogger Bank	2 – 1 for potential area, 1 for water depth	3	0
Grangemouth	3 – Moray Firth, Forth, Dogger Bank	1.5 – 1 for potential area, 0.5 for water depth	3	0
Inverclyde	1.5 – West Coast STW and 0.5 for tidal	2 – 1 for potential area, 1 for water depth	3	1 – investment plan discussions underway
Highland Deephaven	2 – Moray Firth, Forth	2 – 1 for potential area, 1 for water depth	2	0
Ayr	2 – STW West and Irish Sea	1 for water depth – limited space	3	0
Troon	2 – STW West and Irish Sea	1 for water depth – limited space	3	0
Stranraer/Cairnryan	2.5 STW West and Irish Sea, 0.5 for tidal	1 for water depth – sites need to be developed dependent on future use	1	0

Appendix 4

Proposed Delivery Group Terms of Reference

Purpose of N-RIP Delivery Group

The Delivery Group will support the development of the N-RIP by Scottish Government and its economic development agencies, (Scottish Enterprise and Highlands and Islands Enterprise).

Key Tasks

The Delivery Group will provide advice on:

- investment cases developed for first phase sites during Stage 2 of N-RIP
- potential sources of private sector funding that could support the delivery of the investment cases
- further engagement with planning and consenting regimes to enable them to assist the growth of a Scottish offshore renewables supply chain
- how to progress an industry led study of future installation processes and the potential infrastructure needs of different approaches
- other infrastructure related requirements of the developing offshore renewables industry

Membership

The group will be small. Membership will be made up from key port owners, some R3/STW Developers, Crown Estate and Scottish Renewables Forum representatives. Scottish Enterprise, HIE, SDI and Scottish Government will also be members of the group.

Support

The work of the group will be supported by Scottish Enterprise with input from HIE. SE/HIE will circulate papers for the group and will take forward actions agreed.

Chairing

The group should be co-chaired between public and private sector.

Duration and Frequency of Meetings

The group should review its role after the completion of Stage 2 of the N-RIP. Meetings should be held on a six weekly basis initially.

Linkages and Updating

The Group should ensure that reports as required are made to the Energy Advisory Board. The group should keep the wider range of port and industry stakeholders informed of the progress being made on N-RIP through stakeholder events. The FREDs Offshore Wind Group and the Marine Energy Group will be used as the core wider groups to which progress/updates will be given. Liaison with relevant UK Government interests (DECC) should be carried out by the group.

Appendix 5

The development of the N-RIP spatial framework has focused on ensuring that the first phase sites identified can meet market need both in terms of location and critically in terms of timescale for use. Viable sites have to be ready for use when developers trigger their programmes of investment.

Stage 2 of the N-RIP development is the identification of investment plans for the first phase sites. Two related issues may need to be progressed in Stage 2 to ensure that these investment plans are fit for purpose and future proofed:

1. Planning and Consenting

At the Stakeholder session securing planning consents for first phase sites was seen as a key milestone in process of making sites ready for use. The recent National Planning Framework and the emerging marine spatial planning regime offer a platform to ensure that planning and consenting systems enable the timely development of key sites. The Delivery Group proposed to take forward the N-RIP should consider how the reformed Scottish planning approach can be a platform for success in developing the key locations. Scotland can use its planning and consenting approach to create a competitive advantage.

2. Logistics and Installation

The offshore wind industry is still young and wave and tidal devices are still under testing. Installation methodologies will evolve over the next decade. It is clear however those locations that can support the most efficient installation approaches will create efficiencies for developers and enable installation to progress quicker. Quick installation creates savings in full cycle costs of offshore wind farms and offshore wave and tidal arrays. Scotland, through a systematic approach that considers the interface between land based infrastructure at port side, supply chain logistics and location, vessel design and installation approach, can position itself as the pioneer in large volume installation approach and be identified as the fastest location for installation. The Delivery Group should consider how SE/HIE facilitate a study led by developers and involving relevant stakeholders that explores installation methodologies, vessel design and the land-side implications of particular options at a selection of first phase sites. The conclusions of this study may inform further development of infrastructure and the potential for joint approaches on installation.

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Scotland's Enterprise, Innovation and Investment Agency

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HIE
Highlands and Islands Enterprise
Iomairt na Gàidhealtachd 's nan Eilean

Scottish Enterprise