Marine Energy (Wave and Tidal) and Offshore Wind Skills Analysis

Report by

for

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1 Introduction

In July 2009, in recognition of its expertise and potential in wave and tidal technologies, the South West region was designated as the United Kingdom's **(UK)** first Low Carbon Economic Area **(LCEA)**. This designation gave the region the opportunity to take the lead in identifying and supporting the development of marine renewable energy businesses both regionally and nationally.

1.1 The Task

In order to better understand the skills needs of this sector, the South West Regional Employment and Skills Board **(RESB)** commissioned EMB Consulting Ltd to carry out a skills study. The scope of the sector to be covered in the study was Marine Energy (Wave and Tidal) and Offshore Wind, and covering all skills levels. Although not strictly part of the LCEA designation, offshore wind was included given the obvious synergies with wave and tidal. The task was to set out:

- Scenarios on employer demand to 2020;
- A summary of the type of skills required;
- Of these skills, identifying what represented 'new' skills and what could be provided by adapting existing jobs/skills in existing sectors; and
- An analysis of projected shortages and gaps and recommendations to bridge these over the short, medium and long term.

1.2 Methodology

The methodology included three stages.

1.2.1 Literature Review

Over 70 reports, documents and articles were reviewed to inform:

- The context for the study – policy, stakeholders and sector context;
- Information on demand in terms of jobs growth and skills;
- Information on labour market supply and skills provision; and
- Potential issues and solutions.

Support on this part of the study was provided by fdf, the South West RESB, the South West Regional Development Agency **(RDA)** and the South West Low Carbon High Skills Project intermediaries. A full report providing the detailed literature review is available on request. The bibliography at the end of this report details the sources for the review.

1.2.2 Consultation Process

A consultation process took place including c. 50 individuals (employers, employer representatives, government departments, regional agencies, local authorities, training providers) in face to face interviews, telephone interviews and also group sessions such as the Marine Energy Skills Forum **(MESF)** and the South West Low Carbon Cluster of Sector Skills Councils **(SSCs).** A report summarising the consultation process is available on request.

1.2.3 Reporting

Following the literature review and consultation process a draft report was produced. This was then tested and debated in three fora:

- The MESF;
- A stakeholder grouping for the Round 3 Atlantic Array offshore wind project planned for the Bristol Channel; and
- A (virtual) stakeholder grouping for the Round 3 West of Isle of Wight offshore wind project.

This report is the final report based on the findings of the study.

1.3 Structure of Report

This report is structured as follows:

- Chapter 2 outlines the context for the study – policy, stakeholders and sector;
- Chapter 3 outlines the demand for employment and skills;
- Chapter 4 outlines labour market supply issues and skills provision;
- Chapter 5 outlines issues and potential solutions; and
- Chapter 6 outlines an action plan and linkages to existing projects/partners/initiatives.

2 The Context for the Study

2.1 Sector Definitions

Marine Energy uses the natural motion of the tides and waves to drive various technologies which result in the generation of electricity. Marine Energy includes wave and tidal stream and tidal range technologies. There are three types of wave energy collector; Buoyant Moored Device, Hinged Contour Device and Oscillating Water Column. Tidal stream resource is the kinetic energy contained in fast flowing tidal currents that are generally found in constrained channels. Tidal range resource refers to the gravitational potential energy that can be found in estuarine areas that exhibit a large difference in water height between high and low tides.

Wind energy refers to utilising wind to drive turbines. Electricity is generated without the side effects of either using or emitting carbon at the point of generation. Onshore wind farms are well established in the UK. This study focuses on offshore wind. The Offshore Wind sector comprises the planning and development, design, manufacture, installation, operations and maintenance and support for large wind farm arrays comprising wind turbines. Whilst technologies are mature in this area, there are issues in the use of existing technology within the harsh marine environment. It is hoped that with ongoing innovation and new product development, there will be dedicated technologies that are more reliable for the offshore marine environment. This would lead to significant cost reductions in the next 5-10 years.[1]

2.2 The Policy Context

This study takes place within the context of a raft of strategy and policy measures in relation to the renewables sector and marine energy and offshore wind specifically, as well as skills and business policies and strategies in the UK. The UK Government is committed to generating 15% of all its energy from renewable sources by 2020. In order to reach renewable energy targets by 2010 there needs to be a seven-fold increase in the amount of total renewable energy used in the UK from a low base of 2% currently to 15%. This means that total capacity derived from wind alone (both on and offshore) will have to increase from 4GW today to over 30GW by 2020 (RenewableUK, 2010).

[1] Definitions derived from Energy and Utility Skills **(EU Skills)**, 2009b, Low Carbon Cluster, December 2009, GHK et. al. January 2010, Department of Energy and Climate Change **(DECC)**, 2010.

The previous administration under the Labour Government introduced a series of policies including:

- **Low Carbon/sector specific** strategies and policies including The Marine Energy Action Plan (DECC, 2010) and also The UK Low Carbon Industrial Strategy (BIS[2] and DECC, July 2009) which identified offshore wind, wave and tidal sectors as priorities. Up to £120 million was announced to support the development of offshore wind. Up to £60 million investment was announced to capitalise on Britain's wave and tidal sector strengths, including investment in Wave Hub in Cornwall, the Peninsula Research Institute for Marine Renewable Energy **(PRIMaRE)** and other funding to make the South West Britain's first LCEA; and
- **Skills strategies** including Skills for Growth: the national skills strategy (BIS, November 2009) and Building Britain's Future: New industries, New jobs (BERR[3], April 2009) that confirmed the importance of low carbon sectors for the future of the UK economy.

Whilst it is early days for the new Coalition Government there are some clear signals on direction of travel, notably:

- **Commitment to low carbon approaches** – The National Renewable Energy Action Plan for the United Kingdom (DECC, July 2010) identified a three point action plan (financial support for renewables, unlocking barriers to delivery and developing emerging technologies). It confirmed the importance of offshore wind in meeting 2020 renewable energy targets and also marine energy to offer flexibility and longer term development beyond 2020. DECC is currently considering, in detail, how creating a network of marine energy parks further supports the development of this sector;
- **The Skills Market** – Two consultation documents have been published by BIS in July 2010 (Skills for Sustainable Growth and A Simplified Further Education and Skills Funding System and Methodology) which confirm the Coalition Government's aspiration to make the skills market work by removing barriers. On the demand side this would involve employers and learners being fully informed on skill sets and provision. On the supply side, providers would be 'freed up' to respond to need. The intention in the future – with limited public sector funding - would be to see a different balance in investment in skills between government, employers and learners. A new national skills strategy is anticipated in October 2010 and it is anticipated that the funding for skills will change significantly in the future; and
- **Localism** – The Coalition Government has announced its intention to abolish the Infrastructure Planning Commission. It will also abolish RDAs and Government Offices in the regions, and has invited local government and the business community to consider the formation of Local Enterprise Partnerships **(LEPs)**. A White Paper confirming full details on this is anticipated in the autumn of 2010.

[2] Department for Business, Innovation and Skills
[3] Department for Business, Enterprise and Regulatory Reform

2.3 The Stakeholder Context

There are a wide range of stakeholders involved in the Marine Energy and Offshore Wind sector. Table 1 summarises stakeholders at national, regional and local level.

Table 1: Stakeholders in Marine Energy and Offshore Wind

Type of Organisation	Organisation
Employers/Companies	The South West also has a range of companies and organisations with an interest/stake in the sector. These include Universities and other research organisations; Technology, device and project developers; Consultancies and support services in Energy, Environmental, Financial, Legal and Engineering; Engineering companies; Component and Technology providers (including composite specialists); Companies specialising in offshore operations; and Ports and Construction Facilities. Regen SW produces a helpful South West Company Directory (Regen SW, June 2010) outlining these companies which is also available online at http://regensw.s3.amazonaws.com/1277811115_1.pdf
National Government Departments	DECC, BIS, Department of Education
SSCs	Core –EU Skills, SEMTA, ECITB, Others/linkages – Construction Skills, e-skills, Lantra
Other national	Technology Strategy Board, RenewableUK, The Crown Estate, Carbon Trust, Environment Agency, Energy Technologies Institute, Renewables Advisory Board, EEF, fdf, Skills Funding Agency **(SFA)**, National Apprenticeship Service **(NAS)**, Jobcentreplus **(JCP),** Young People's Learning Agency **(YPLA),** National Skills Academy – Power **(NSA-P)**
South West Agencies	South West RDA, Regen SW, PRIMaRE, Marine Energy Forum **(MEF)**, MESF, Universities South West **(USW)** and the Low Carbon High Skills Project **(LCHSP)**, Association of Colleges **(AoC)**, Association of Learning Providers **(ALP),** Government Office for the South West **(GOSW)**
Sub Regional Agencies	South West Local Authorities

2.4 The Sector Context

The global market for offshore wind is estimated at some £10 billion and is expected to increase to £24 billion by 2020. The UK accounts for 40% of the global market. The UK has many attributes that contributes to success in this field:

- It has more offshore wind capacity than any other country;
- It is at the forefront of global research efforts to improve reliability, enhance lifetimes, reduce maintenance requirements and enable sites to be developed in deeper waters;
- It has competitive strengths in research and development, wind consultancy, design of key components, and skills in production engineering and installation and grid connection;

- Its offshore industry has world class knowledge and assets to be a leading player because it knows how to deploy and integrate complex technologies in deep water (GHK et. al., January 2010).

The deployment of offshore wind is expected to accelerate over the next decade with a total potential capacity of over 40GW currently being planned. The challenge to deliver this programme is enormous, and will make offshore wind in the UK one of the world's largest infrastructure projects, with potential investment of over £120 billion by 2020 (Renewable UK, 2010). Large scale offshore wind energy could provide 25% of the UK's electricity by 2020 (Carbon Trust, October 2008). Notwithstanding this, the sector faces a number of obstacles and barriers. Various studies (Carbon Trust, 2008; GHK et. al., January 2010; RenewableUK, 2010) have identified a range of barriers that require to be overcome if the opportunities presented by the sector are to be realised:

- Finance – Rising costs, lack of competition in the supply chain, and the steep rise in price of steel;
- Planning – The need for a streamlined planning regime;
- Skills and supply chain – Without rapid growth in the supply chain and a trained workforce opportunities might not be realised;
- Grid – The wind farm sites could be limited by the inability of wind farms to plug into the grid network; and
- Infrastructure – the UK's lack of sufficient, suitable port facilities for offshore wind needs.

Compared with the Offshore Wind sector, the Marine Energy (Wave and Tidal) sector is in its infancy but it could still install 1-2GW of schemes by 2020 (RenewableUK, 2010). It is estimated that the global market for Marine Energy could be £0.57 billion by 2020 (GHK et. al., January 2010). At present, it is estimated that the UK Marine Energy market is c. £73 million which equates to approximately 25% of the global market (Innovas, March 2009). The UK has specific strengths that can give it an advantage in this sector:

- It has an excellent wave and tidal resource;
- World leading turbine technology developers are either based in or are being attracted to the UK;
- NaREC[4] and EMEC[5] have acted as catalysts and helped encourage overseas companies to move to the UK;
- Wave Hub in Cornwall in the South West provides the opportunity for real scale in test and demonstration facilities;
- Changes in the UK planning regime *(pre Coalition Government)* should streamline and fast track major developments;
- The UK has world class consultancy experience;
- There is improved co-ordinated funding between agencies; and
- UK firms leading the market will build up a track record and capitalise and consolidate their position (GHK et. al., January 2010).

[4] Narec is a national centre for the UK dedicated to accelerating the deployment and grid integration of renewable energy and low carbon generation technologies, utilising wind, wave, tidal, solar PV and thermal power

[5] The European Marine Energy Centre is at the forefront of the development of marine-based renewable energy – technologies that generate electricity by harnessing the power of waves and tidal streams.

As with the Offshore Wind sector, the Marine Energy sector faces barriers to its development (GHK et. al., January 2010; RenewableUK, 2010) such as Finance, Planning, Skills and Supply Chain and Grid issues.

As at 2009, there were 35 companies operating in the wind (onshore and offshore) sector with an average of 6 employees per company and an average turnover per employee of £75,000 (Regen SW, April 2008). 16 companies in the South West were operating in the Marine Energy sector with an average of 3 employees per company and an average turnover per employee of £69,000 (Regen SW, April 2008). There is the potential for the South West to benefit from the development of both of these sectors. A report by GHK et. al. (February 2010) identified that the South West had a "Significant and combined presence" in the Offshore Wind and Marine Energy sectors. Table 2 outlines the reasons why the South West is considered to have such a strong presence in these sectors based on the GHK et al report and also recent developments.

Table 2: Contribution to the South West's 'Significant and combined presence' in Marine Energy and Offshore Wind

	Offshore Wind	**Marine Energy**
Regional Competitive Assets	Regional strengths in research and development and consultancy and diverse offshore subsea and installation companies. Various market leading wind consultancies having headquarters in the region e.g. Garrad Hassan (Bristol), Zero Carbon Marine (Devon), Capitalising on Round 3 offshore wind projects (See Appendix 1): ❖ 1.5GW wind farm in the Bristol Channel (Atlantic Array Offshore Wind Farm) led by RWE npower renewables; and ❖ 0.9GW wind farm off the south coast of Dorset (West of Isle of Wight) led by Eneco.	Development/evaluation capability of prototypes including Wave Hub. Strengths in composites which have already been deployed in the wind turbine industry which could develop for tidal turbine blades. Strengths in composites research and development and consultancy and a range of offshore subsea and installation companies e.g. Marine Current Turbines and Tidal Generation. Good location for Wave Energy Technology developers e.g. Orecon in Cornwall. Over 250 goods and services in the sector are provided in the South West – it has a good supply chain.
International Centres of Expertise	The Advanced Composites Centre for Innovation Science (ACCIS) at University of Bristol and Vestas Wind Systems announced a partnership in 2009 to develop composites technology for future products. Leading research centres including PRIMaRE and the Met Office. Composites capabilities at the Universities of Plymouth and Bath	Wave Hub is the first consented wave farm in the world. Located in Hayle, Cornwall, it will be the first large scale wave energy farm generating up to 50MW of renewable energy and enabling wave energy companies in the UK to have a clear commercialisation pathway (See Appendix 1). Leading R&D establishments located at the Universities of Bristol, Bath and Plymouth and also PRIMaRE
Other Recent Developments	In March 2010 it was announced that SPark, the Bristol and Bath Science Park will house the UK's National Composites Centre; a brand new research facility for composite materials.	There has been investment in a £12.8 million project to create a new marine energy business park in Hayle, Cornwall and a new £18 million marine building in the University of Plymouth.

Building on this, Table 3 outlines a brief summary of strengths, weaknesses, opportunities and threats **(SWOT)** for the South West in respect of these sectors. This has been developed as a result of the literature review and feedback from stakeholders.

Table 3: SWOT Analysis for the South West on Marine Energy and Offshore Wind sectors

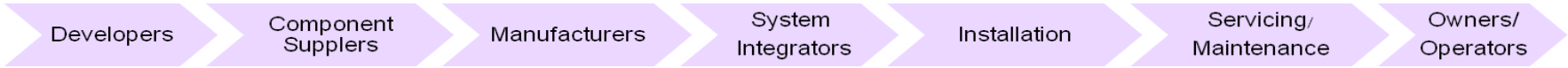
	Strengths	**Weaknesses**
Offshore Wind specific	R&D strengths, presence of leading wind consultancies, proximity to two Round 3 projects – Atlantic Array and West of Isle of Wight. Regional strengths in R&D, Good onshore wind experience, Ports for base for projects	No experience of Rounds 1 and 2 offshore wind projects – coming in on Round 3. Suitability of some Ports - tidal location, availability of space.
Marine Energy specific	Low Carbon Economic Area status, Building good capacity in research and development e.g. PRIMaRE, Joined up employer led Marine Energy Forum	Deindustrialisation of Cornwall – supply chains harder to build Lower level skills base in Cornwall to support marine energy potential Small number of indigenous companies.
Both Offshore Wind and Marine Energy	Good quality of life - attractive to live and work, Reasonable grid capacity, Natural resources Large SME base – flexible, able to adapt, Strong supply chain of companies, good skills e.g. advanced engineering/aerospace, manufacturing, composites. Some quality HEI/FEIs Supportive RDA – strong leadership and investment. Joined up	Transport and infrastructure Perception as area to retire, over reliance on tourism, grey pound Limited large employer base – would struggle to get major manufacturer to locate in region. Low wage economy Less joined up than in e.g. Scotland and Wales
	Opportunities	**Threats**
Political	Low Carbon Policy – confirming priority for these sectors Skills – Freeing up supply side to respond to need Localism – Establishment of Local Enterprise Partnerships – opportunity for joined up sub regional dialogue/action Planning – Commitment to improving system for major infrastructure projects	Low Carbon Policy - Low Carbon Economic Area status may not continue in current form Skills - Assumes market works – potential market failure on both demand and supply side. Cutbacks in public sector expenditure – availability of funding. Localism - Demise of South West RDA – legacy and long-term future of Wave Hub. Potential for fragmented rather than joined up approach. Planning – demise of Infrastructure Planning Commission.
Economic	Round 3 offshore wind projects – opportunities for local jobs and skills development of local workforce. Opportunity to utilise, adapt and enhance skills in existing strong sectors: Marine engineering; Aerospace; Composites; Logistics; ex military/armed forces. Potential for South West as leader on Marine Energy	Global marketplace. Competition - On manufacturing particularly from Europe, Other parts of the UK and European areas for ports Stage of development of companies – steep learning curve to be able to respond in time to benefit from opportunities. In current investment climate, less mature technologies will struggle for finance – investors will be risk averse. In push to hit 2020 targets, Marine Energy may be hampered by more mature industries (inc. offshore wind).
Social/ Demographic/ Skills	Potential for apprenticeships – young people and adults Workforce Planning model being developed by EU Skills - Offshore wind data ready by end 2010, Potential to pilot with Marine Energy Forum.	Competition for people from other sectors e.g. oil and gas that can pay more (also competition for plant, equipment, vessels). Ageing workforce.
Technological	Wave Hub. Also new product development e.g. Floating Wind idea – could potentially be piloted in South West	Technology for wave not moving as fast as anticipated

3 Demand

3.1 The Value Chain

Figures 1 and 2 illustrate the value chain for the sectors (UK Commission for Employment and Skills **[UKCES]**, March 2010b).

Figure 1: Value Chain for Wind

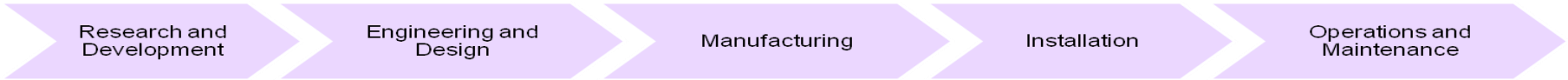


Cutting across this chain are legal, technical and financial services, referred to as wind/renewables services. Building on this, Table 4 outlines a summary of the value chain alongside the stages required for the development of an offshore wind farm (UKCES, March 2010b; BVG Associates/The Crown Estate, 2010).

Table 4: Developing an Offshore Wind Farm

Stage of Value Chain	Job Function	Description
Developers	Planning and Development	Covers process up to point of financial close or placing firm orders to proceed with wind farm construction
Component Suppliers and Manufacturers	Design and Manufacturing	Wind turbine (nacelle, rotor, tower) and components outside turbine (Cables, Turbine foundations, Offshore substation, Onshore substation).
System Integration and installation	Construction and installation	Installation and commissioning including land and sea based activity (e.g. Export cable laying, Foundation installation, Construction port, Turbine installation, Commissioning)
Servicing/Maintenance and Owners/Operators	Operations and maintenance	Ongoing operation and maintenance offered by turbine manufacturer or specialist provider.
Wind/renewables services	Technical/financial/legal services[6]	All support services

Figure 2: Value Chain for Marine Energy



[6] It was noted during the consultation period that other support roles could support these sectors offshore e.g. accommodating, catering, hospitality

3.2 Scenarios on Jobs Growth to 2020

Various studies have attempted to predict scenarios for jobs growth towards 2020 for wind/offshore wind:

- Bain and Co (Boettcher et. al., 2008) identified scenarios based on levels of political support, degree of local content in production, and development of export business. From a baseline of 5,000 employees, it was estimated that domestic employment would increase by between 23,000-57,000 jobs by 2020. Based on the highest case scenario, BWEA (January 2010) estimated that three quarters of these jobs would be in offshore wind and one quarter in onshore wind;
- Douglas Westwood (June 2008) took an alternative approach, basing scenarios on the Government's ability to attract turbine manufacturers to the UK and estimated that jobs would increase by between 5,000-34,000 by 2020;
- The Carbon Trust (October 2008) predicted that if 29GW of offshore wind capacity were installed by 2020, it could create between 40,000 and 70,000 jobs along the supply chain; and
- The most recent analysis by PricewaterhouseCooper for UKCES (March 2010b) stated that from a baseline of 4,000 jobs in 2007/8, and based on scenarios related to levels of governance and innovation, jobs growth for all wind (offshore and onshore) could be between 15,000 and 40,000.

The Marine Energy (Wave and Tidal) sector is less well developed in the UK although it is cited as a renewable energy source that could have strong prospects for the UK. In the study by PricewaterhouseCooper for UKCES (March 2010b), it was estimated that from a baseline of 500 employees in 2007/8, employment by 2020 could be in the range of 400 to 2,000. These predictions show small numbers in growth for the Wave and Tidal sectors to 2020, however three things should be noted:

- Those jobs that are generated are likely to be high value – the focus will be on post-doctoral specialists to drive innovation in wave and tidal energy businesses (RenewableUK, 2010);
- Although growth will be small to 2020 due to it being at the developmental technology stage, it is expected that it would rise more considerably from 2020 onwards; and
- The lessons that we will learn in dealing with jobs growth in the offshore wind sector to 2020 will help build knowledge and experience in responding to the potential opportunities in Wave and Tidal from 2020 onwards.

Only one study on jobs growth has been conducted at regional level. This was by Innovas Solutions Ltd. (March 2009), however the findings of this study have been questioned by employers/stakeholders as part of this study and by other research (UKCES, 2010b) so it has not been used in this analysis. Two further studies are planned or ongoing:

- BVG Associates are analysing the potential jobs growth arising from the Atlantic Array project. This is anticipated to be finalised by August 2010; and
- RenewableUK in association with EU Skills are commissioning an update to the Bain and Company report that is anticipated by November 2010.

3.3 Jobs in the Value Chain

There are issues in predicting jobs growth due to the many variables associated with it at this stage. Not all jobs will necessarily be local to the UK and there may be opportunities for UK employment from offshore wind projects in other countries. Bird/IPPR (April 2009) concluded that – generally - technical consultancy, operation and maintenance and service jobs were more likely to accrue to the UK, while manufacturing jobs were more likely to be based overseas unless there were specific competencies including certain components. The report also stated that, the development of offshore wind in other countries could result in employment benefits for the UK and this was not generally included in projections. With regard to manufacturing there has been some positive recent news with Clipper, in 2009, announcing plans to establish a new facility in the North West of England to develop and manufacture a new 10MW off-shore turbine and Siemens considering locating in the UK (See http://www.bwea.com/ref/reports-and-studies.html for other recent news). This would help improve prospects for jobs growth in the UK. Table 5 outlines an analysis of jobs nationally in the value chain based on the scenarios developed by PricewaterhouseCoopers for UKCES (March 2010a). For wind it can be observed that the majority of jobs are expected to be generated in the construction and installations stage and in operations and maintenance.

Table 5: Jobs in the value chain

Scenario name and description				**Scenario 1 Low Governance, Low Innovation**		**Scenario 2 High Governance, Low Innovation**		**Scenario 3 High Governance. High Innovation**	
Technology	**Low carbon job function**	**No. of employees in 2009**	**% of sub sector empt**	**No. of employees in 2020**	**% of sub sector empt**	**No. of employees in 2020**	**% of sub sector empt**	**No. of employees in 2020**	**% of sub sector empt**
Wind (All)	Planning and Development	489	12%	1,800	12%	2,760	12%	4,600	12%
	Design and manufacturing	711	18%	2,700	18%	4,140	18%	8,200	21%
	Construction and installation	1,289	32%	4,800	32%	7,360	32%	12,400	31%
	Operations and maintenance	1,111	28%	4,200	28%	6,440	28%	10,900	27%
	Technical, financial and legal services	400	10%	1,500	10%	2,300	10%	3,900	10%
Marine Energy	Research and development	500	100%	400	100%	1,000	100%	2,000	100%

Although no study has been conducted specifically on jobs in the value chain in the South West, utilising industry expertise[7] some speculative assumptions can be highlighted, especially in offshore wind where the largest employment is expected to be generated:

[7] Presentation by Bruce Valpy to the South West Offshore Wind Supply Chain Event 2010 and feedback from employer and stakeholder consultation

- There is the potential for employment generation through projects local to the South West (Atlantic Array and West of Isle of Wight Projects) as well as other projects within and outside the UK;
- Key opportunities for the South West would include Environmental services and support, Tower and foundation manufacture, Offshore substation assembly, Onshore substation assembly, Project construction base, Installation and commissioning support, Operations and maintenance and Project management / engineering and other professional services; and
- Both RWE npower renewables and Eneco (the developers for the South West Round 3 offshore wind projects) have expressed an interest in working with the supply chain on these projects. Although it is early days for both projects to be able to articulate potential job numbers for the projects they estimate up to 100 long term jobs will be generated in Operations and Maintenance for Atlantic Array and c. 50-75 jobs in Operations and Maintenance for the West of Isle of Wight project.

3.4 Demand for Occupations/Skills

A range of reports have identified skill needs in respect of low carbon skills. In a useful summary, the UKCES (March 2010a) states that research and development and engineering activities and skills needs, characterised by a dependence on high level Science, Technology, Engineering and Mathematics **(STEM)** skills, will be a requirement for low carbon sectors generally. As an example, there is a need for individuals with skills equivalent to levels 4 and 5 in engineering disciplines (mechanical, design, civil and structural, electrical, aeronautical and marine and geotechnical). Technicians are also required at levels 2-4 across the generation sector. More generically, there is also a need for project management, leadership and management, and technology transfer skills.

This is supported in a South West analysis by the South West Observatory (January 2010) that identified the following as essential skills in low carbon sectors:

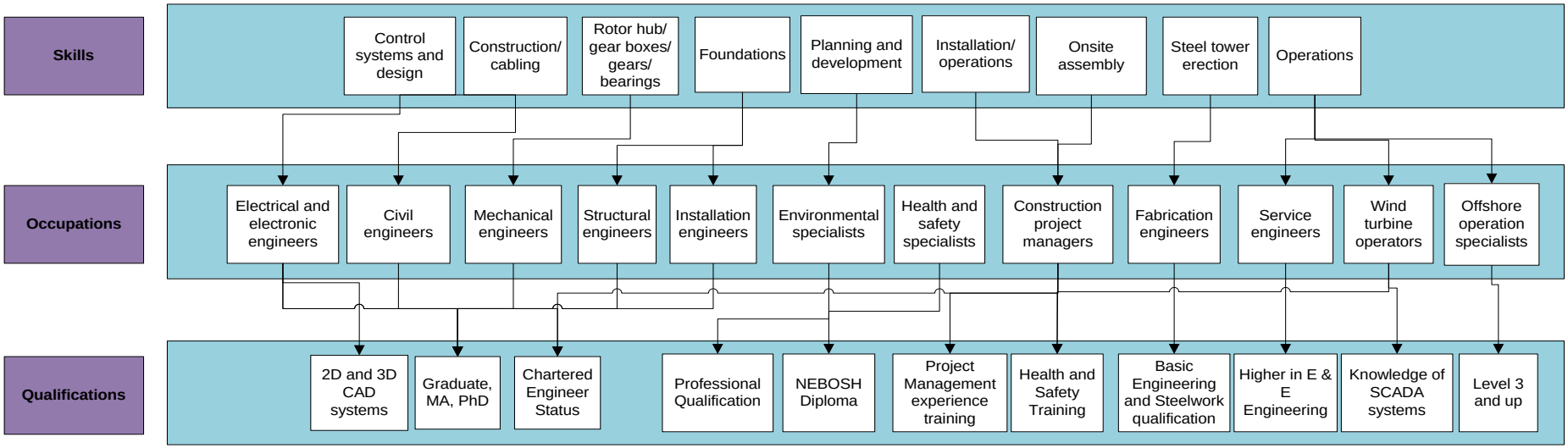
- Leaders and managers: including visioning and leadership skills; diagnostic skills, strategic and financial planning;
- STEM skills; and
- Continuing professional development opportunities for technicians to keep abreast of new technologies,

In a study by SQW Energy (October 2008), a mapping of those skills that were important to the Wind, Wave and Tidal sectors was carried out. Figure 3 (SQW Energy, October 2008) summarises the occupations with skills and qualifications mapped to those occupations identified.

Some detailed analysis of mapping of skills for offshore wind and marine energy is also currently ongoing:

- A detailed breakdown of roles has been undertaken for input to the Low Carbon Cluster of SSCs'[8] Renewable Energy Skills Strategy Data Pack (July 2010). The details on offshore wind and marine energy are yet to be released but are imminent; and
- EU Skills is developing a workforce planning tool with employers. Data on offshore wind is anticipated by the end of 2010. There is an opportunity for employers in Marine Energy to input to this work.

Figure 3: Occupations, Skills and Qualifications in the Wind, Wave and Tidal Sectors



In the meantime, Table 6 outlines a summary of the demand for skills for offshore wind as identified by this study. This is based on:

- The stages of wind farm development as outlined in BVG Associates/The Crown Estate (2010);
- The value chain, national jobs growth scenarios, occupations and NQF Levels by UKCES (March 2010b);
- Information from developers on estimated timing for South West offshore wind farm projects; and
- Feedback from the consultation process– although it was acknowledged by a number of stakeholders that it was early days to be able to be absolutely clear on demand from employers for employment and skills.

For Marine Energy, skill needs identified were primarily in research and development of marine technology. However as in the case of other low carbon sectors, STEM skills will be of vital importance and there is evidence that those skills identified as important for offshore wind will be very similar and will help support the growth of marine energy (UKCES, 2010b).

[8] **Low Carbon Cluster for Renewable Energy** - Assetskills, Cogent, Constructionskills, ECITB, EU Skills, Lantra, SEMTA and Summit Skills

Table 6: Demand for skills in offshore wind

Value Chain	Job Function	National Jobs Growth Scenarios to 2020	Timing for SW projects		Occupation	NQF Level
			Atlantic Array	West of Isle of Wight		
Developers	Planning and Development	1,800-4,600	2010-2013	2010-2014	Specialist consultants/scientists – Marine, ecology, geology, ornithology, environmental, archaeology Specialist Engineers – GIS, Building Services Directors[9], Project managers, Planners	5+
Component Suppliers and Manufacturers	Design and Manufacturing	2,700-8,200	2014-2018	2015-2018	Engineers – Aeronautical, Civil, Electrical, Environmental, Mechanical, Mechanical Design, Structural, Production, Sub sea structures design, Quality Manager, Systems Control, Systems design, Control Systems design, Control Systems, Sub sea structures design engineer, Test	5+
					Technicians - CAD, Engineering Craft Technician, Refrigeration and/or Air Conditioning Technician	3+
System Integration and installation	Construction and installation	4,800-12,400	2014-2018	2015-2018	Engineers – inc Control System, Environmental, Building Services	5+
					Construction Project manager/engineer, Construction Site manager	4-5
					Installation Technician, Control Systems Technician, Fabrication Engineers, Project Controller	3
					Cable Jointer, Linesperson, Plant Operator, Concrete Operative, Site Logistics Operative, Welder	2-3
Servicing. Maintenance and Owners/Operators	Operations and maintenance	4,200-10,900	2015-2040	2016-2066	Professional Engineers, Strategic Facilities Manager	5
					Business Development Managers, Managers[10], Supervisors[11], Project development Engineers, Estate Manager/Project manager	4-5
					Maintenance technician (Electrical, Mechanical) Facilities Manager, Production Control Engineer, Manufacturing Buyer	3-4
					Cable Jointer, Linesperson	2-3
Wind renewables /services	Technical, financial and legal services	1,500-3,900	2010-	2010-	Lawyer, Accountants, Forecasting/Taxation Specialists, Health and Safety Specialists, HR professionals	4-5
					Craneage, Divers, Construction Diving Operative, Specialist marine roles	2-3
					Clerical and admin staff, Administrative assistants, IT specialists	1-3

[9] Business development, Finance, Health Safety and Risk, Procurement, Sales, Trading
[10] Client company (Deputy, regional, assistant) and Managers - Buyer, Procurement, Risk, Sales, Service
[11] Production Supervisor and Client Company Operations Supervisors

3.5 New Skills or Adapting Skills?

The Low Carbon Cluster (July 2010) identified that renewable technologies were typically not new industries but extensions to existing industries and activities. Offshore wind was identified as a sector with potential for significant growth in the near future and Marine Energy in the longer term. It identified that there was no clear evidence that technical jobs would change significantly over the next decade but rather that up-skilling of core skills would be required. This assumption is supported by other studies.

Bird and Lawton (October 2009) in a report for IPPR on 'green skills' identified that a number of 'green skills' already existed but workers needed to transfer their existing skill sets into new and emerging industries and roles. As an example, the significant experience of the UK in offshore oil and gas could provide a good foundation for developing this sector (Crossley, March 2009). There are also opportunities to build on expertise and strengths of the South West in areas such as aerospace, engineering and composites. Hammer et. al. (July 2005) in a study involving representatives from Belgium, Denmark, Germany, The Netherlands and the UK analysed the potential for adapting existing skills for the offshore wind industry. The study identified a range of requirements for the sector for each part of the value added chain which could supplement existing skills such as project management (incorporating technical and commercial knowledge), national and international laws for offshore operations, quality assurance, composite technology, mechatronics, wind energy specifics modules, health and safety and operating in harsh offshore environments.

With regard to areas of **new** skill level, The Low Carbon Cluster (July 2010) reported that:

- Offshore generation through offshore wind, marine and tidal technologies require significant sub-sea work;
- The oil and gas industry is experienced in sub-sea construction but sub-sea High Voltage and generation roles are new;
- There are currently no occupational standards written in this area; and
- Sub-sea high voltage skills are the main, **new**, renewables specific skills identified in this project.

In addition there are still some areas of uncertainty on potential new skills:

- Offshore wind – Offshore wind should not just be defined as onshore wind solutions 'getting their feet wet'. In a presentation to an offshore wind supply chain conference in the South West, Andrew Garrad from Garrad Hassan highlighted that there may yet be new skills that emerge as a result of new product development to cope with the technical requirements for offshore wind and the harsh maritime environment; and
- Wave and Tidal – as previously stated, the technology is at an early stage of development and depending on the development of the sector may lead to new skills being required as well as adaptation of existing skills.

4 Supply

4.1 Labour Market Supply

Much of the literature on labour market supply points to there already being skills shortages and gaps for these sectors **now** (Boettcher et al, 2008; SQW Energy, October 2008; Bird and Lawton, October 2009; CBI, April, 2009; Low Carbon Cluster, December 2009; BVG Associates, 2009; UKCES, 2010b) such as:

- STEM skills at all levels;
- Shortages in engineers – e.g. Electrical, Mechanical, Civil, Aeronautical and Structural Engineers;
- Sector specific skills shortages – e.g. Turbine technicians;
- Sector specific skills gaps – offshore capabilities;
- A combination of good engineering skills and high level project management; and
- Leadership and management skills.

That said, in a study by Deloitte for BETS (April 2010) which focused on companies engaged in renewable energy, it was found that, of those companies expecting their team to grow in size over the next 12 months, 82% did not anticipate any issues with regards to skills gaps or shortages. In addition, in engaging with employers it was found that, primarily due to the current recession, skills shortages were not as big an issue as was referred to in the literature review.

Where there was agreement however, was in relation to shortages and gaps over the next 10 years. It was agreed that, in line with the forecasts of most of the literature (Boettcher et al, 2008; SQW Energy, October 2008; Bird, April, 2009; Low Carbon Cluster, December 2009; EEF, November 2009; UKCES, March 2010b; Low Carbon Cluster, July 2010),:

- The need for STEM skills will grow and there will be an imbalance between supply and demand;
- There will be shortages in most types of engineering skills particularly highly qualified engineers and experienced and skilled technicians;
- Shortages will be exacerbated by competition from other sectors of the economy – especially as some other sectors e.g. oil and gas, can offer higher salaries and packages and also due to the demographic issue of an ageing population and a smaller cohort of young people entering the labour market;
- There will be a need to adapt existing skills to tailor to the specifics of the offshore environment;
- The South West has competencies in existing sectors that could be used to support the offshore wind and marine energy sectors e.g. advanced engineering/aerospace, manufacturing, composites capability;

- There is the potential for some parts of the labour market to be up-skilled/re-trained such as ex armed forces personnel, unemployed people with STEM skills, and other adults with a desire to re-train in a growth sector (e.g. women returners);
- The development of leadership and management capability will be key to enable companies to identify opportunities in these sectors and enable – where appropriate – business transformation; and
- High level skills in project management that complement good engineering skills will be essential.

In addition to the above, the Low Carbon Cluster (July 2010) identified the following specifics in terms of skills requirements for renewable energy:

- Jobs will predominantly come from up-skilling the current sector workforce;
- With often lengthy lead-times to competence, a proactive investment in skills is needed;
- Without a proactive approach to skills investment these opportunities could migrate overseas and the UK will fail to maximise employment opportunities;
- Up-skilling and re-skilling training can be delivered quickly, but the experience to carry out the roles competently and unsupervised takes longer to develop; and
- Long term strategies rely on new entrants into STEM careers either through FE/HE routes or apprenticeships

It also reported on roles critical for renewable energy sectors and the level of risk for each of these roles. When calculating the risk assessment for each role, the impact of the role not being available was scored on a scale of 1-3, the likelihood of the role not being available (either due to the skill being a new skill or already an identified shortage) was also scored 1-3. The product of the two gave the risk associated with the role (1 being lowest and 9 being the highest). In this mapping across all sectors it was found that:

- Project managers with qualifications in engineering were needed across a number of technologies and sections of the supply chain;
- Of the 11 roles identified as 'Top Priority', 7 were at level 5 and above;
- Design and control systems roles will be needed across all industries;
- Systems integration skills will be required to enable the different technologies to work together; and
- Energy Assessment and Energy Advice were new growth areas.

Table 7 outlines the findings of this prioritisation exercise for those roles that are pertinent to offshore wind and marine energy and that are:

1. Top priority – risk score of 9 – all 11 roles identified as top priority are required for the offshore wind and marine energy sectors; and
2. High priority – risk score of 6 – 17 roles identified as high priority are required for the offshore wind and marine energy sectors.

Table 7: Roles at Risk

TOP PRIORITY ROLES – RISK SCORE OF 9		HIGH PRIORITY ROLES – RISK SCORE Of 6	
	Level		**Level**
Design Centred Roles		**Design Centred Roles**	
Systems design engineer	6-7	Mechanical/structural design engineer	6-7
Mechanical design engineer	6-7		
Control system design engineer	6-7		
Technical Roles		**Technical Roles**	
Engineering Craft Technician	3	Building Services Engineer (Electrical and Mechanical)	3-7
Systems control engineer	6-7	Refrigeration and/or Air Conditioning Technician	3
Control systems engineer	5-6	Installation Electrician	3-4
		Maintenance technician – electrical	3-4
		Maintenance technician – mechanical	3
		Test engineer	4-6
		Control systems technician	3-4
		Cable jointer	2-3
		Linesperson	2-3
Co-Ordination and Control Roles		**Co-Ordination and Control Roles**	
Project Controller	3		
Project managers	4		
Project managers	5		
Construction Site Manager	4		
Sub Sea Roles		**Sub Sea Roles**	
Sub-sea structures design engineer	6-7		
Project/Advisory Roles		**Project/Advisory Roles**	
		Project manager/engineer	4-5
		Estate Manager and Project Manager	4
		Facilities Manager	3-4
		Energy Adviser	2-4
		Energy Assessor	3-5
		Strategic facilities manager	5
Specialist Roles		**Specialist Roles**	
		Construction Diving Operative	2

4.2 Training Provision

Information on provision has come from three sources; a mapping of provision by the South West RESB, a review by fdf and information on provision in the Low Carbon Cluster Pack on Renewable Energy (July 2010). The Low Carbon Cluster Pack (July 2010) identified the following in relation to training requirements:

- Renewables training can be delivered fairly easily/quickly as the training tends to be short modules to top up existing skills;
- Much of the existing training is not formally accredited and therefore not currently funded;
- Funding solutions need to be flexible, focusing on 'top up' units of learning to up-skill the existing workforce, rather than focusing solely on new entrants;
- There is a need to consider lead in times, resources to deliver the training, and assess where there are already shortages;
- For employers and training providers willing to invest, the opportunities are significant; and
- Not all industries have proven technology, where there is uncertainty over the way forward (e.g. marine) there will need to be a rapid response to training development and funding once the dominant technology is identified.

It also mapped provision available for those roles identified as being top and high priority. Of these, much of the training is already available within the South West. There is however a new wind industry specific programme due to be launched through the Renewable Energy Apprenticeships Programme **(REAP)** project. A new UK wide apprenticeship framework and vocational qualification for operations and maintenance technicians has been developed off the back of a Skills Accord signed off by industry and key partners in 2009. The project has been coordinated by RenewableUK and EU Skills with some support from the National Skills Academy for Power, **(NSA-P)**. As a result of this employer driven work, the first cohort of wind energy service technicians will start on this new tailored apprenticeships programme in September 2010 (Carnegie College, Fife). This, new qualification has been created by City & Guilds to support the training of the Wind Turbine Technicians, and forms a Wind Turbine path through the wider suite of power sector qualifications. The course titles are as follows:

- City & Guilds Level 3 Diploma in - Wind Turbine Maintenance (Technical Knowledge); and
- City & Guilds Level 3 Diploma in - Wind Turbine Operations and Maintenance.

The range of provision offered in the region that could support the offshore wind and marine energy sectors is vast. Figure 4 aims to provide an outline of some of the main provision on offer including Diplomas, Apprenticeship Frameworks (the REAP is identified in italics as a potential future programme), Further Education and Higher Education. Foundation degrees are higher education qualifications that combine academic study with work-based learning. Designed jointly by universities, colleges and employers, they are available in a range of work-related subjects that would be suitable for these sectors. Examples are included in the final column. Many higher level programmes are modular and can be developed and delivered as short courses for up-skilling and Continuing Professional Development.

Figure 4: Skills Provision in the South West

Diploma	Apprenticeship Frameworks	Further Education	Higher Education	Foundation Degree examples
Construction and the Built Environment	**Construction Skills Summit Skills** Construction Plant operations construction	Construction Building Services Engineering Built Environment Sustainable Water Mgt/Construction Construction Site Management Architecture, Surveying & Built Environment Construction Health and Safety Construction Operations	Construction Management and Environment Construction Design and Technology Construction Management Built and Natural Environment	Construction Sustainable construction Sustainable development construction
Engineering	**SEMTA** Engineering Marine Engineering Electrical/Electronic Production/ Assembly Welding and fabrication Electrical installation	Engineering Marine Engineering Engineering Maintenance Electrical, Electronic, Mechanical and Civil Engineering Operations and Maintenance Engineering Light Marine Engineering	Civil, Mechanical, Electrinic, Electrical and Mechanical Engineering Electronics and Comms Engineering Civil and Coastal Engineering Electrical Power Engineering Civil and Environmental Engineering Marine and Composites Technology Mechanical Engineering – and CAD, and Marine Technology/Composites/Wind Power	Mechanical, Civil, Electrical and Electronic Engineering Electrical engineering/renewable energy Marine engineering Engineering – mechatronics Renewable Energies Technologies
Environmental and Land-based Studies	**Energy and Utility Skills** *New REAP to be piloted September 2010*	Marine Biology & Ecology Environmental Conservation Environmental Management Environmental Studies Renewable Energy Awareness	Integrated Environmental Management Renewable Energy Marine Law (LLM) Environmental Science and Marine Conservation	Marine Conservation Marine aquaculture Marine ecology and conservation Marine environmental management Marine/Maritime science
Information Technology	**E-skills** IT Drawing Office (CAD)	Software Development Software Engineering CAD, CAD 3D Certificate, Parametric Modelling Computer Programming Marine CAD Electronics and Computer Technology	Computer Science Applied Computing Network Systems Management 3D Computer Generated Imagery	CAD Communication &Computer networking Computing Computing Internet Technology Electronics and Computer Technology Business and ICT Software development
Manufacturing and Product Design	**SEMTA** Performing Manufacturing Operations Engineering manufacture, production	Engineering Design Technology Engineering Mechanical Design Manufacturing Engineering Electro Technical Technology Mechatronics Engineering Mechatronics Engineering - Planned and Process	Robotics Creative Product Design Design for Smart Products	Engineering Manufacturing Management Mechanical design and manufacture Lean manufacturing and processing Engineering design and manufacture

Other provision that is available includes:

- The launch, in 2010, of a new Offshore Marine Academy run by Offshore Marine Management that aims to provide foundation level training in the offshore sector;
- Short Courses such as Garrad Hassan (e.g. Wind Farm Design, Wind Farm Safety, Offshore Wind Energy) and RenewableUK Accredited Courses in Health & Safety (e.g. Marine Survival Training, Working and Rescue from Height);
- Training Provision within FE Colleges outside the South West e.g. Carnegie College, Scotland is training the Operations and Maintenance apprentices via the new Level 3 City & Guilds programme, Northumberland College Certificate in Sustainable Energies Wind Level 2, South West College, Omagh, Northern Ireland - Certificate in Wind Turbine Installations - Level 3; and
- Training offered in house by manufacturers and other companies.

In addition a number of special projects and initiatives are currently operating that support the sector such as STEM South West (STEM champion for the region is based at Petroc), the South West Low Carbon High Skills Project and Leadership and Management Development initiatives. It is also understood that work is beginning on a collaboration between the New Engineering Foundation and fdf on developing resources/modules for low carbon areas including offshore wind.

Whilst this study was not intended to be a full quality audit of provision there was the opportunity to identify some examples of good practice and perceptions on potential areas to be addressed for the future:

- Some examples of good practice in employer-provider partnerships included:
  - Babcock and Petroc – The development of a Skills Centre within the Babcock's Appledore base, the delivery of Marine Engineering Apprenticeship and other Skills for Life provision on site. Both organisations have intimated a desire to expand on provision on site and have expressed an interest in the REAP;
  - Mojomaritime and University of Exeter – Mojomaritime is sponsoring a PHD with the University and has 2 students (of its staff of 15) studying at the Tremough campus;
  - GL Garrad Hassan and the University of Bristol – Garrad Hassan is a member of the Engineering Design Partnership and provides teaching support to a module on Wind and Marine Power that has now been run twice (2009, 2010);
- Responses on quality of provision were mixed. One employer described provision as first class, some did not use provision in the South West. Two employers described some provision as "a bit fluffy";
- Key areas for action identified included:
  - Good information on availability and quality of provision;
  - Closer collaboration between industry and providers – example of the Danish model was highlighted that brings together employers and providers in local partnerships (akin to the aspirations in formation of LEPs);
  - Addressing shortages in suitable trainers in STEM generally and in renewables specifically; and
  - Supporting national approaches in (a) ensuring delivery of skills for roles at risk (b) rolling out new qualifications and (c) in the development of qualifications for new skill areas.

5 Issues and Solutions

5.1 Issues

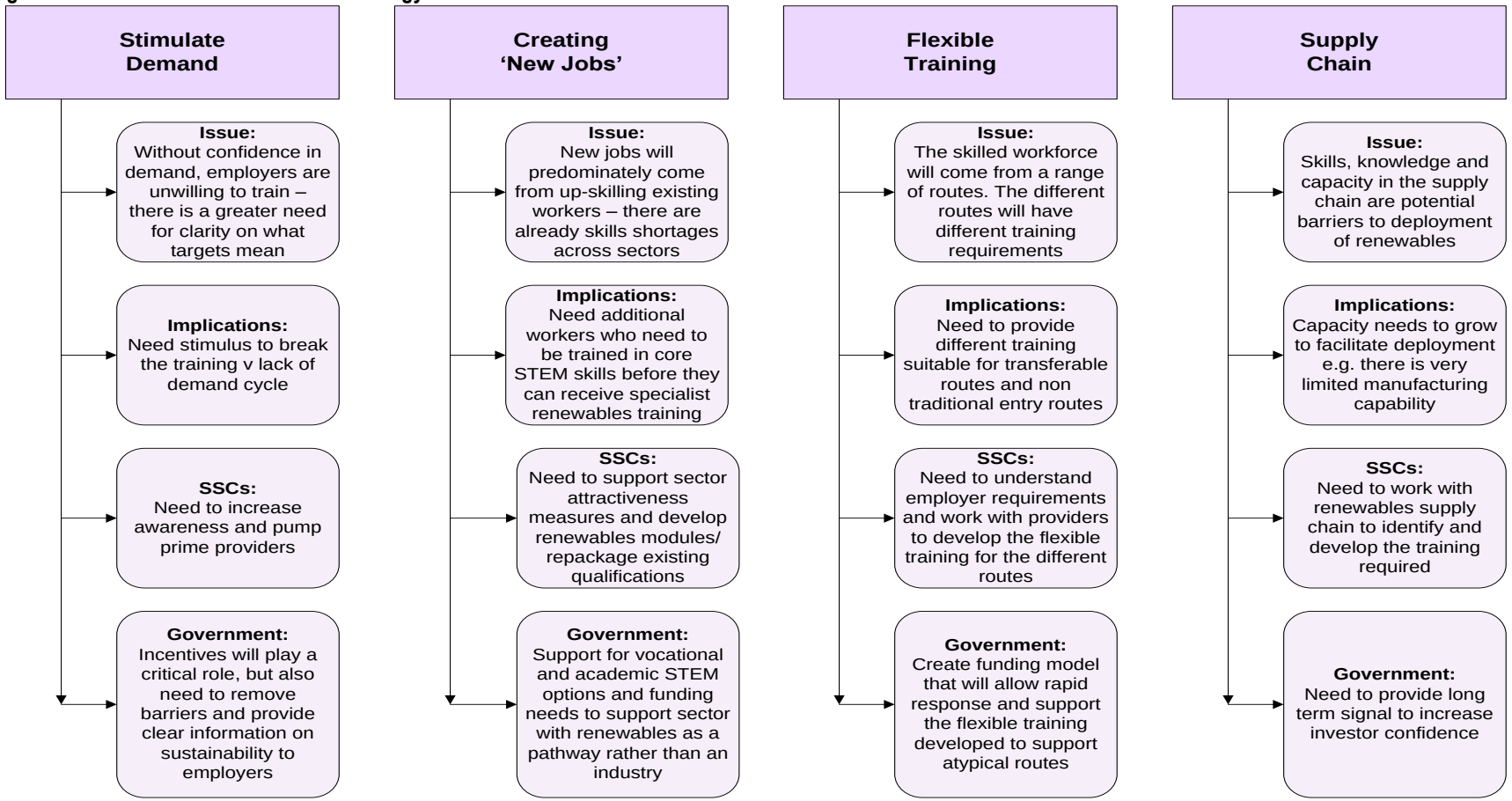
Drawing from evidence from the literature review (e.g. Boettcher et al, 2008; SQW Energy, October 2008; Bird, April 2009; Low Carbon Cluster, December 2009; UKCES, March 2010b; Low Carbon Cluster, July 2010) and the engagement process for the study, several issues can be identified:

- There is market failure on both the demand and supply side:
  - There is imperfect information on the potential for jobs growth at this time;
  - There is a lack of confidence in demand - employers are not articulating demand - but the UK has challenging targets to meet for renewable energy by 2020. A stimulus is needed to break the training v lack of demand cycle;
- Skills shortages:
  - There are clearly defined skills shortages expected over the next 10 years particularly in relation to STEM skills;
  - 11 roles have been identified that are top priority risks and 17 that are high priority that are required in the offshore wind and marine energy sectors;
- Skill gaps:
  - There is a need to top up/adapt existing skills to meet the needs of the sectors;
  - High level project management and leadership and management skills are identified as gaps;
  - This requires a flexible response;
- Provision:
  - Core provision is already in place but it may not be clearly understood/known/accessible. It may not be of the scale required and some may not be fit for purpose;
  - Some new provision is developing (e.g. REAP) but is not yet being delivered in the South West;
  - There are new skill areas being identified (sub sea high voltage skills) that currently have no occupational standards;
  - There is a shortage of experienced lecturers, trainers and assessors in STEM and in renewables specifically;
- Skills, knowledge and capacity in the supply chain are potential barriers to growth;
- There is a risk that, given so many companies operating in these sectors are foreign owned, they may not necessarily see the derivation of benefits to the UK/South West as a priority; and
- There are changes in the public sector infrastructure including changes to funding and the regional landscape (abolition of RDAs and Government Offices and development of LEPs) with the potential for loss of regional knowledge/experience/influence.

5.2 Strategic Level Solutions

The Low Carbon Cluster (July 2010) identified a range of strategic level solutions to addressing skills issues in renewable energy sectors. Figure 5 illustrates.

Figure 5: Skills solutions for Renewable Energy sectors



5.3 Principles in Applying Solutions in the South West

In identifying action in the South West it is important to establish some clear guiding principles. Action should be:

- Based on a clearly identified market opportunity;
- Based on robust evidence incorporating demand and requirements of emerging policy on renewable energy;
- South West Companies and other stakeholders to be involved in solutions – collaboration between all relevant stakeholders;
- Built on key competencies;
- Maximising benefits from specific projects and initiatives;
- Taking a long term view – looking beyond 2020 to other opportunities, especially Marine Energy;
- Linking with and applying national solutions – tailored to local circumstances;
- Offering leadership from the South West, where appropriate;
- Effective communications and profiling to demonstrate South West strengths and competencies; and
- 'Future proofing' in relation to government policy on localism.

5.4 Potential Solutions for the South West

One solution in the event of market failure is a 'do nothing' approach. Given the significant task in achieving renewable energy targets, ensuring that benefits are derived for the South West and preventing an erosion of the skills base for these sectors, it is proposed that a 'do nothing' approach is not a viable option. Potential solutions for the South West could fall into three categories – each one signifying a progressively more proactive approach and level of intervention:

- Informing and influencing;
- Specific Action; and
- Providing Leadership.

5.4.1 Informing and Influencing

This study and others should be used to influence key stakeholders with an interest and involvement in these sectors:

- **National Government** - The proposals for Government Skills Policy are currently in the consultation period – it is important for the South West to influence this in respect of confirming the market failure issue for these sectors, to confirm the

requirement for strong leadership at a national level and, whilst understanding the issue of a tight public sector budget, encouraging incentives to ensure that the targets are reached and benefits realised;

- **Public Funding/Incentives/Resources** – The findings should influence frameworks and resource allocation for public funding sources, specifically the Low Carbon High Skills project (until March 2011) and the South West ESF Framework to support low carbon sectors as well as potential national resources e.g. future potential Joint Investment Plans, Compacts– EU Skills, Skills accounts and future local resources e.g. Regional Growth Fund;
- **Foreign Owned Companies** – Given the issue of risk of foreign owned companies in the context of ensuring South West benefits from these sectors, two areas of influence are proposed in terms of influencing companies of the value of ensuring benefits to the local area (1) making the economic case and (2) influencing procurement;
- **Employers/Supply Chain** – Regen SW, in collaboration with other agencies, has worked hard with the supply chain and developers in offshore wind to help build knowledge and capacity. It is proposed that in the short-medium term this valuable work continues, building in the findings of this skills study and the national study on renewable energy and linking employers/supply chain with the supply side for skills;
- **Advisers to the Labour Market** – It is important that those advising the labour market are up to date on issues affecting these sectors:
    - Potential early win - Developing CPD covering these sectors for Jobcentreplus/providers of information, advice and guidance – possibly funded by LCHSP;
- **Providers** – Ensuring that providers are updated and informed on issues relating to skills in these sectors;
- **Preparing for Localism** - Bird, Lawton and Purnell (June 2010) identified the case for local action as a response to developing 'Green and Decent Jobs'. Key principles included:
    - Keeping it local – Local knowledge is vitally important on opportunities, barriers, local economy and skills;
    - Joining forces – partnership is vital;
    - Not just jobs – linking to tackling poverty/disadvantaged communities; and
    - Build a training to work pipeline –ensuring that local people have the skills to take on new jobs;

  There is an opportunity to influence current Local Employment and Skills Boards **(ESBs)** – and emerging LEPs to take account of the issues raised in this study to inform their future policy and practice.

5.4.2 Strategic Action

There are four issues that can be addressed through specific actions in the South West:

1. Skills shortages

To address the issue of skills shortages, the workforce will need to be enhanced by a number of routes (young people, existing workforce such as redundant workers and workforce in other sectors, and non-traditional entry routes). It is proposed that South West action focuses on three areas:

- Improving sector attractiveness – linking with the NSA-P and EU Skills on measures to improve sector attractiveness and encourage more people to choose a career in the sectors;
- Increasing take up STEM skills at all levels (this would link with activities of STEMNET and the recent appointment of a STEM champion for the region at Petroc in North Devon); and
- Increasing apprenticeships for offshore wind and marine energy by linking into support currently available through the National Apprenticeship Service, ESF and other current and future resources available at local level.

These three actions should be applied to:

- Young people (at as early an age as possible on sector attractiveness and STEM skills); and
- The current workforce – including those not in work:
    - Employers have reported that people formerly in the armed forces have proved to have good core skills that can be updated for work in these sectors – links should be made with the Ministry of Defence; and
    - There is the potential to look at addressing under representation in the sector through encouraging women returners into the sectors - The Women's Engineering Society (at a recent STEM conference) have expressed an interest in supporting this development. Support could be available from the Women in Work initiative to support this.

2. Skill Gaps

Several skill gaps were identified as part of this study and The Low Carbon Cluster (July 2010) identified the importance of working with employers to develop flexible training packages. The two areas that were consistently cited by stakeholders as potential pilot projects in the South West were:

- Leadership and Management Development:
    - Short term – an early win project to help develop leadership and management development with developers involved in marine energy and wave hub – fdf will lead on this and Marine Energy Matters has expressed an interest in supporting this development;
    - Medium-Long term – Ensuring that current resources in leadership and management development are applied to initiatives in the offshore wind and marine energy sectors;
- Project Management:

- Developing a pilot programme on project management for engineers for offshore wind – fdf has agreed to lead on this, building on existing expertise in the region e.g. Garrad Hassan; and
- Medium-Long term – Learning from pilot projects and linkages with EU Skills on development of provision.

3. Provision

With regard to provision there are four levels of action that can be identified:

- Provision that is already in place – ensuring that this is understood, marketed to employers and learners and where necessary adapted in terms of content and scale to meet future needs. There is an aspiration for the South West to be known as a 'high skills' location which will act as an incentive for indigenous company growth, inward investment and talent retention;
  - Early win – As part of this study a database of provision has been developed. EU Skills/NSA-Power are developing a national database and it is proposed that the South West information be provided to enable this to feed into an online resource for employers and learners;
- New qualifications - There are new qualifications that have been developed and are being piloted and the South West could engage. An early win project here is the REAP that is being piloted in September 2010. A working group will be formed by Regen SW, Babcock, RWE npower renewables, Petroc, North Devon Plus and local authorities to explore this further. It is intended that this early win project will also include companies involved in onshore wind projects who could be trained now, whilst the two Round 3 projects are being developed. Interest has also been expressed by stakeholders in the West of Isle of Wight project;
- New skill areas - Sub-sea high voltage skills have been identified as the main new scale area for the offshore renewables sector. Leadership on developing occupational standards on this will be provided through EU Skills. At South West level there will be the opportunity to input and influence this development and to support and implement any potential solutions; and
- Shortage of appropriate lecturers, trainers and assessors in STEM and in renewables specifically – linking with sector attractiveness measures there is a need to increase the number of lecturers, trainers and assessors (who have relevant experience of the industry) to support these sectors and to provide appropriate training for trainers (a possible early win – funded by LCHSP).

4. Preparing for Localism

Given future plans for the establishment of LEPs there is the opportunity to develop a partnership approach between developers, employers, providers and other stakeholders to addressing employment and skills in these sectors through:

- The two offshore wind projects and building relationships and capacity in their closest areas (ESBs in the short term, LEPs in the long term):

  - Atlantic Array - Devon and also Somerset (West) and West of England;
  - West of Isle of Wight – Bournemouth, Dorset and Poole;

  The discussions held as part of this study have helped to begin this process; and
- Marine Energy and Wave Hub – ensuring the long term legacy and building relationships in Cornwall and also Devon.

Given the proximity of the two offshore wind projects to other parts of England:

- Atlantic Array to Wales; and
- West of Isle of Wight to South West of England;

It is proposed that engagement takes place with these areas in order to minimise duplication of effort and to share practice.

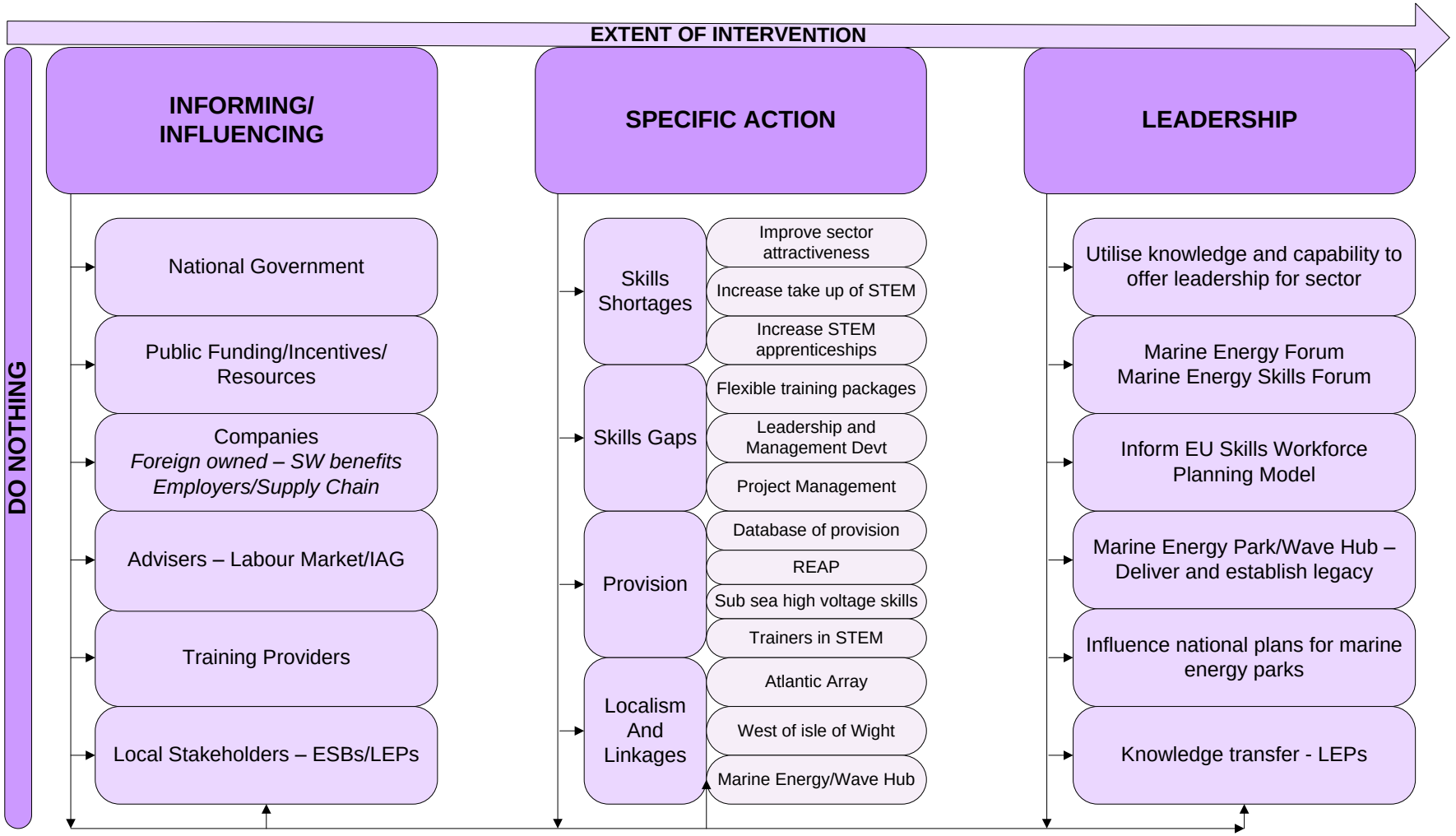
5.4.3 Leadership

The South West was the first LCEA in the country with responsibility for leadership in marine energy. Whilst the number of jobs being generated by 2010 are low, the potential for employment generation beyond 2020 will increase. The South West has established a Marine Energy Forum that is industry led and a Marine Energy Skills Forum in order to offer leadership in respect of marine energy and skills. With the new localism agenda it is important that the skills, experience and capability within these fora are not lost. There is the potential for the South West to offer leadership in the area of Marine Energy in a number of ways:

- Early win - Inform EU Skills workforce planning tool by facilitating input from the Marine Energy Forum;
- Test bed for Marine Energy Park - The ingredients are in place for the development of a successful cluster in marine energy (business leadership, angel funding, networks, HE/FE capability – Webb, 2008). This should continue to be delivered in the short term and arrangements made for a long lasting legacy in the medium-long term (including embedding skills provision) particularly given the significant investment in Wave Hub and other supporting projects. This early work should also help influence government plans for establishment of a network of marine energy parks
- Ensuring that the knowledge, experience and capability of the fora are utilised at national level and
- Transferring knowledge to new emerging LEPs in the South West – especially in Cornwall given the Wave Hub project.

Figure 6 summarises the proposed solutions for the South West.

Figure 6: South West Solutions



6 Action Plan and Linkages

Based on the solutions identified in Chapter 5, this section outlines actions in the short term (2010/11), and medium (up to 2010) - longer term (2012-).

Table 8 outlines the short term/early wins.

Table 8: Short term/early wins – 2010/11

Solution	Specifics	Leadership	Linkages
Informing/Influencing	Influence government skills policy – through combined response form MESF/MEF	SW RESB	BIS, All stakeholders
	Influence current resources in South West to ensure allocation for Marine Energy and Offshore wind e.g. Low Carbon High Skills Project (LCHSP), ESF	SW RESB	USW, GOSW, SFA EU Skills, NAS, YPLA, LCHSP
	Employers/Companies/Supply Chain – Informing and influencing	Regen SW	EU Skills, NSA-P, SW RESB, USW, AoC, ALP, South West iNets
	Updating and informing network of labour market advisers on study/potential CPD for advisers – funded through LCHSP	JCP, IAG providers	USW, LCHSP
	Updating and informing training providers on study	USW, AoC, ALP, fdf	
	Preparing for Localism – Potential round table for 'West of Isle of Wight' Project	Regen SW/ SW RESB	Employment and Skills Board, local authorities, Eneco, Supply chain companies, training providers
Specific Action	Addressing skills shortages 1 – Contacts with Ministry of Defence (MoD) on potential links for future workforce and facilities	SW RESB	Regen SW, MoD
	Addressing skills shortages 2 – Contacts with Women's Engineering Society and UKCES Women in Work programme on potential project	SW RESB	Women's Engineering Society UKCES Women in Work
	Skill gaps 1 – pilot project on leadership and Management Development with Marine Energy sector	fdf	USW, AoC, ALP, Marine Energy Matters, RenewableUK
	Skill gaps 2 – pilot project on project management	fdf	USW, AoC, ALP, RenewableUK
	Provision 1 – Provision of database to EU Skills	SW RESB	EU Skills, NSA-P
	Provision 2 – Explore development of REAP programme	Regen SW	Babcock, Petrock, North Devon Plus, RWE npower renewables, local authorities
	CPD for lecturers, trainers and assessors in STEM	SW RESB	STEMNet
Leadership	Inform EU Skills Workforce Planning Model	MEF/MESF	

Table 9 outlines the medium-long term actions.

Table 9: Medium –Long Term Actions

Solution	Specifics	Medium Term	Long term	Leadership	Linkages
Informing/ Influencing	Government skills policy	Influence future policy	Influence future policy	SW RESB	As for short term actions
	Public Funding	Ensuring sector needs are embedded in funding plans/incentives	Influencing future funding	South West RESB	EU Skills, SFA, NAS, YPLA, LCHSP, GOSW, USW
	Companies/Employers/Supply Chain	Influencing/Supporting and informing/embedding skills - regionally	Supporting at local level	Regen SW	EU Skills, NSA-P, SW RESB, USW, AoC, ALP, South West iNets
	Advisers – Labour Market	Ongoing embedding in CPD	Ongoing embedding in CPD	JCP, IAG providers	
	Training providers	Updating on sector developments	Updating on sector developments	USW, AoC, ALP, fdf	Individual providers
	Localism	Influencing ESBs/LEPs and linkages with Welsh Assembly and South East	Leadership by LEPs	SW RESB/SW RESB/ESB/LEPs	
Action	Skills shortages	Improving sector attractiveness	Improving sector attractiveness	EU Skills NSA-Power RenewableUK	JCP, IAG providers, ESBs, LEPs,
		Increasing take up of STEM	Increasing take up of STEM	EU Skills NSA-Power RenewableUK	STEMnet, USW, AoC
		Increasing apprenticeships	Increasing apprenticeships	EU Skills NSA-Power RenewableUK	NAS, AoC
	Skill gaps	Roll out from leadership and management pilot experience	Embed in provision	fdf Marine Energy Matters,	USW, AoC RenewableUK
		Roll out project management from pilot experience	Embed in provision	fdf	USW, AoV RenewableUK
		Flexible training to address skill gaps	Flexible training to address skill gaps	EU Skills NSA-Power	Training providers, fdf

	Provision	Reviewing in terms of access, scale, quality - to support SW as a high skills area	Reviewing in terms of access, scale, quality	EU Skills NSA-Power	SW RESB partners USW, AoC, ALP, fdf RenewableUK, UKTI, Talent retention programme, Specific employers and providers
		Supporting other new qualifications	Supporting other new qualifications	EU Skills NSA-Power RenewableUK	
		Sub sea high voltage skills – supporting national developments	Supporting other new skill areas, as required	EU Skills NSA-Power	
		Maintain support for STEM lecturers, trainers, assessors	Maintain support for STEM lecturers, trainers, assessors	SW RESB	STEMNet
	Localism	Influence development of local partnerships	LEPs encompass planned projects	SW RESB/SW RESB	ESBs, LEPs Developers, Employers
Leadership	Marine Energy Park/Wave Hub	Establish legacy arrangements – embed skills provision	Ensure long term leadership	South West RDA	MEF, MESF
	Influence	National – policy on marine energy parks	National - Ongoing devt of sector	MEF, MESF	BIS, DECC EU Skills NSA-Power ESBs/LEPs
		Local – Cornwall, Devon and other ESBs	Local – LEPs	MEF, MESF SW RESB	

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Appendix I: Major Projects in the South West

Atlantic Array Project[12]

RWE npower renewables was awarded the development rights for the development of a 1,500 MW offshore wind farm entitled 'Atlantic Array' to be built in the Bristol Channel Zone (Round 3, Zone 8) which is located in the outer Bristol Channel between North Devon and South Wales.

As it is early in the development process the megawatt size of the turbines to be used is undecided, however it is expected the proposed Atlantic Array project would consist of some 250 turbines. The proposed project already benefits from having a connection agreement with the National Grid, which will enable first power to be exported from the project in late 2015. The annual generation expected at the site would be equivalent to the approximate domestic needs of around 1.1 million average UK households (Note 1). This is equivalent to over 40% of the domestic electricity consumption for the South West of England and over 90% of the domestic electricity consumption for Wales (Note 2). The site extends over approximately 492 km2 in water depths of 23 to 56 metres. At the closest point to shore it would be around 14 kilometres from the North Devon coast and 16 kilometres from the South Wales coast.

Note 1
Energy predicted to be generated by the proposal is derived using long term wind speeds calculated by meteorological models seeded with historical weather data obtained from satellite, surface-based and airborne measurement systems. This enables a calculation to be made to estimate the average annual energy production for the site based on 250 turbines each of rated capacity 6.15 MW. The energy capture predicted and hence derived homes equivalent or emissions savings figures may change as further data are gathered.
Equivalent homes supplied is based on an annual electricity consumption per home of 4700 kWh. This figure is supported by recent domestic electricity consumption data available from The Digest of UK Energy Statistics and household estimates and projections from the UK Statistics Authority.

Note 2
Regional and local electricity consumption statistics sourced from The Department of Energy and Climate Change Energy Trends December 2008.

[12] Extracted from http://www.rwe.com/web/cms/en/354740/rwe-npower-renewables/sites/projects-in-development/wind/atlantic-array-offshore-wind-farm/the-proposal

West of Isle of Wight Project[13]

The West of Isle of Wight offshore wind project will be located off the Dorset and Hampshire coasts and to the west of the Isle of Wight, an area known as 'Zone 7'.

The project will deliver UK-sourced clean and efficient energy to the south coast making a valuable contribution to national climate change mitigation targets. Eneco believes that around 30 per cent of the 723 sq km zone could be developed providing 900 MW of capacity. However, the final design and ultimate capacity will only be determined after comprehensive engagement with all parties involved including the general public, local authorities, community and environmental groups.

At the end of 2009, Eneco was awarded the exclusive development rights for an offshore wind park within Zone 7. Over the next four years it will carry out vital surveys, environmental assessments and full consultation activity with key parties. It is anticipated that, subject to obtaining the relevant consents, construction of the wind park will commence in 2016 and it is hoped that the wind park will be operational by 2018.

The site was awarded to Eneco by The Crown Estate, after discussion with many key stakeholders and a Strategic Environmental Assessment by the Department of Energy and Climate Change. Eneco will continue to work in partnership with The Crown Estate throughout the lifetime of the project.

Facts and figures	
Location	South Coast, United Kingdom
Target capacity	Eneco believes that around 30% of the zone could be developed, providing approximately 900MW of capacity*
Production	Approx. 2.8 TWh/year*
Equivalent to	Approx 615,000 homes (based on 900MW installed)*
CO2 emissions avoided	Approx. 1,186,000 tonnes (based on 900MW installed)*
Project status	In design and appraisal

*All capacity, production and carbon reduction figures are estimates and subject to change as further data is gathered.

[13] Adapted from http://www.enecowindoffshore.co.uk/project.aspx

Wave Hub[14]

The South West wants to take a prominent position in marine renewable energy. The region has the potential to generate substantial amounts of electricity from its wave and tidal stream resources, and has the skills and facilities to support development of the industry. The South West RDA recognises the potential of the marine energy industry for the region and has decided to support demonstration projects in this sector.

The Wave Hub concept is to build an electrical grid connection point approximately 16km (10 nautical miles) offshore into which wave energy devices will be connected. It will provide a well defined and monitored site with electrical connection to the onshore electricity grid and will greatly simplify and shorten the legal consents process for developers. Wave Hub will reduce the risk for developers of the first pre-commercial wave machine arrays.

Many different devices are being developed in the UK and elsewhere to generate electricity from the power of the waves. After the devices have been tested as prototypes elsewhere, the Wave Hub provides an area of sea with grid connection and planning consent where arrays of devices can be operated over several years.

The infrastructure involves a sub-station building at Hayle in Cornwall adjacent to a connection point to the distribution network. From there, a cable will be taken through a duct beneath the sand dunes and then across the sea bed to an eight square kilometre area within which the devices will be moored. This area will be indicated with navigational markers.

The system will operate initially at 11kv but can be upgraded to 33kv operation once suitable connectors and other components have been developed by the industry.

The project will work with up to four different technologies at any one time. A 1km x 2km sea area will be leased to each developer for installation from 2010 onwards. Leases will run for approximately five years, and will allow each developer to generate a maximum of 4-5MW of power. The Wave Hub will record the strength of the incoming waves and will enter into a power purchase agreement on behalf of all developers using the project.

Consents for the project were granted in September 2007. Installation is expected to be completed in late summer/early Autumn of 2010.

[14] Adapted from http://www.southwestrda.org.uk/working_for_the_region/areas/cornwall__the_isles_of_scilly/wave_hub/q__a.aspx