BWEA Supply Chain Workshop
Wednesday 11th November
Inverness

Introduction

On the 11th of November in Inverness BWEA held the second Marine Renewables supply chain event, in conjunction with Scottish Renewables and sponsored by NaREC. Presentations were given by the BWEA, NaREC, Pelamis Wave Power and the Technology Strategy Boards (Presentations are available from the BWEA website).

Over 100 delegates discussed the specific Marine Renewable industry supply chain topics of;

- Blade Design
- Minimisation of environmental impact
- Subsea deployment techniques
- Specialist deployment vessels
- Project Management
- Wet electrical connectors
- H&S and training
- Design for increased reliability

These topics had been highlighted from the previous BWEA and NaREC supply chain event on the 29th of April 2009.

Background

The UK is currently the world leader of the Wave and Tidal energy industry, with a capacity of 1.95MW currently installed. The UK also has world class testing facilities at the European Marine Energy Centre in Orkney, the New and Renewable Energy Centre in Blythe, QinetiQ in Gosport and Wave Hub in the south west. Combined with one of the best wave and tidal resources in the world, the UK is in an ideal situation to become "natural owners" and establish a world leading industry. The Carbon Trust has already highlighted wave energy as a prioritisation area for development within the UK.

The comparison between the emerging wave and tidal industry and the wind industry of the early nineties is obvious. Since 1993 the Danes have invested £1.3bn in their wind industry, this has resulted in a 50% global market share which provides annual revenue of £2.7bn[1]. If the UK were to invest strategically and secure a similar global market share of the wave and tidal industry; the potential revenue could reach £4.2bn per annum by 2050[2]. It is well understood that industry market value lies within the supply chain, the Marine Energy Group of the Forum for Renewable Energy Deployment in Scotland estimate that from 1GW installed capacity in Scotland by 2020 £2.4bn and 5,000 direct jobs will be created. Scottish Enterprise predicts a total of 12,500 direct and indirect jobs from the same installed capacity[3].

The BWEA Marine Renewable Energy – State of the Industry Report[4] provides an estimated installed capacity of 1 to 2 GW by 2020. The majority of this development is expected between 2015 and 2020 (figure 1). Taking an industry standard rating of 1 MW per device, the UK will need to fabricate 4 – 8 units per week over a 5 year period to reach the above targets. The UK already has a legacy of marine industry development from offshore oil and gas, ship building and more recently offshore wind; indicating that many of the skills and facilities required to deliver the targeted expansion of marine renewables already exists within the UK. However the current supply chain will require sound understanding of the generic issues facing the marine renewables industry, facilitated knowledge transfer and industry coordination. With this in mind BWEA, with technical assistance from NaREC, organised a supply chain workshop to identify issues that need addressing and stimulate future supply chain development in the UK.

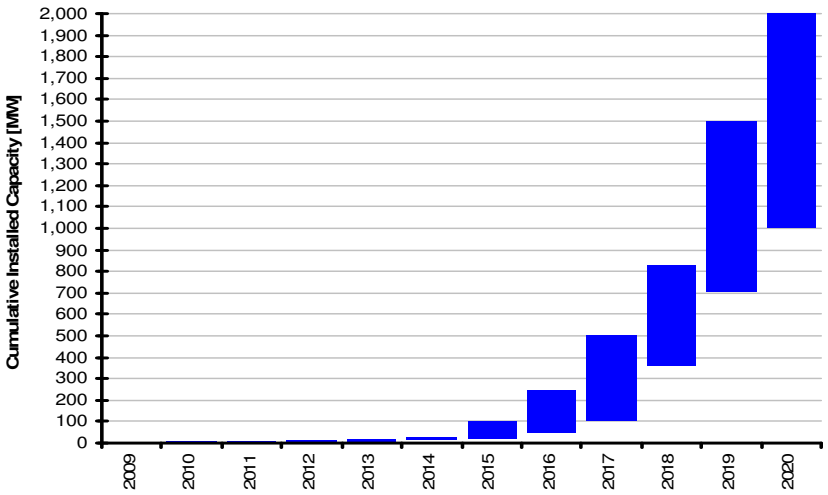

Figure 1 – Predicted UK installed capacity until 2020[1]

Methodology

The delegates were divided into groups of between 7 and 10 in order to apply themselves to addressing the following topics (see appendix 1 for a list of companies represented).

1. Identification of Issue – Please summarise the issue within a brief statement articulating the nature of the supply chain issue faced by the marine renewable sector.
2. Identification of State of the Art – Description(s) written or diagrammatic of the existing solutions available and/or current industry best practice.
3. Gap Analysis – Identification of practical and functional short comings of State of Art.
4. Wish List – Development of headings or statements capturing idealised solutions based upon the issue.

The groups were also asked to identify the UK's ability to secure the supply chain, government intervention required and the role of BWEA in developing the supply chain.

The workings of the groups were both captured as a written record on flip charts and also verbal feedback to the entire group of delegates as part of the end of wrap up and feedback time.

Results - Working group questions

Area of Expertise	1. Identification of the Issue	2. State of the Art	3. Gap Analysis	4. Wish List
Blade Design	Affordability. Severity of the environment. Interaction with marine life and ecosystem. No industry contact focal point. Hard to design. Understand the loading dynamics of the sea.	Hydrodynamics could learn from aerodynamics. Capitalising on know how and expertise.	Investment is limited (too risky). Poorly understood. Fragmented. No consensus position.	The manufacturing supply chain needs to know the needs of the device developers. Affordability. Time and money.
Minimisation of environmental impact (a)	Limited Skilled Staff. Shortage of survey support boats. Identification of Environmentally friendly materials.	Submerged devices minimise visual impact. Current monitoring requirements are onerous. Scottish National Heritage expected to deliver guidelines.	No centralised information store.	Centralised data share. Environmental device development. Guidelines should always be up to date. Academic/Industry collaboration.
Minimisation of environmental impact (b)	Impact Unknown lack of data. Precautionary Principle Need to identify common components and associated environmental impact. Skills shortage.	Use established offshore experience. In Oil & Gas sector information is shared via the licencing process	Lack of standards. Data is not shared	Centralised Data share. Provide standards and guidelines. Collaboration between industry and academia.
Vessels	Availability of fit for purpose vessels contracting arrangements for multiple users Varying vessel sizes for installation and operation and maintenance.	Ability to design bespoke specialist vessels exists, however demand for bespoke vessels does not. Existing vessels are optimised for O&G.	skills base is limited Port infrastructure in the right locations. Timeline to design/build bespoke vessels is ~2-3 years Availability of investment funding is unclear	Targeted investment Generic handling requirements – more standardisation of designs. Targeted strategies from government for infrastructure Clear targets with time lines to attract potential investors.

Results - Working group questions (continued)

Area of Expertise	1. Identification of the Issue	2. State of the Art	3. Gap Analysis	4. Wish List
Subsea deployment techniques and Specialist deployment vessels	Current supply chain based around O&G. Lack of confidence in Marine Renewables future market leading to insufficient collaboration with O&G supply chain.	Device developer's acting independently is leading to lack of consolidation and establishment of best practise. Lack of relevant skills in sector.	Funding is supporting technology device developers rather than generic deployment methodologies.	More industry and supply chain collaboration. More emphasis on developing skills and training. Greater shared knowledge of where business opportunities are.
Subsea deployment techniques	High Costs. Varying seabed types require bespoke solutions.	Best practice not established. Lack of communication.	No obvious development path for market as resolutions is project specific.	Supply chain coordination. Standardisation.
Wet electrical connectors	Lack of standardisation. Integration of power and signal in single cables and connectors. Harsh environment not suited to ROV and diver techniques. Need for products with service of 25 years.	Current design life of existing connectors is only 5 years. Dry mate connectors for 11kv. Existing power and signal wet mate connectors. OREAD failure database.	Power levels and durability of existing equipment is insufficient. Not enough commercial demand for the justification of development costs by a single company. 11kv wet connectors do not currently exist.	Torsional Cables. Stab Connections Longevity. High Voltages. Reduced costs Standardisation of export loads Scaling up of exist off the shelf designs.
Design for increased reliability Group A	Fledging industry results in attracting limited interest from supply chain	Some Developer's are activity developing a supply chain partnership strategy. Solutions based upon other Maritime sectors.	Developer reluctance to share IP and experience. Current generation of prototypes are prototype – not commercial machines. Lack of availability of sector specific strategic supply chain market study.	Availability of sector specific strategic supply chain market study e.g. Supply Chain education. Mechanisms to consolidation best practise like Wave and Tidal OREAD database.

Results - Working group questions (continued)

Area of Expertise	1. Identification of the Issue	2. State of the Art	3. Gap Analysis	4. Wish List
Design for increased reliability Group B	System redundancy vs single point cost analysis tools needed to bench mark and inform design.	Comprehensive environmental data. Standards and Certification schemes emerging. Experimentally validated simulations.	Cost and risk of new component development by suppliers. Risk ownership. Commercial IP ownership.	For more funding (eg TSB/ETI) support for joint technical development programs. Component standardisation. Bring supply chain and technology developers closer together
Project Management	Poor project management leads to delays and extra costs.	Limited experience though more projects getting underway.	Local knowledge. Formal project management qualifications.	Higher recognition of skills and knowledge that already exists – e.g. local fishermen and other sea users. Better knowledge transfer – sharing forum of good and bad experiences.
Training and Health & Safety	Identification of levels to target.	Oil & Gas sector has much experience in these areas.	More funding needed – lack of training facilities	Forum (or similar) to bring best practice and accreditation from other industries.

Results – UK Retention: Does the UK have the technical expertise to tackle these issues, if not suggest what is needed to overcome the supply chain issue?

Blade Designs - The group felt that the UK could retain this area of the supply chain, however it was noted to be very IP sensitive.

Sub sea deployment techniques - The group felt that the UK could retain this area of the supply chain, however only by working collaboratively with other sectors.

Specialist deployment vessels - The UK has sufficient expertise in bespoke vessel design but the cost of manufacture in UK may make it non-competitive for larger vessels. The UK manufacturing base has sufficient capacity to build additional platforms but possibly not at a competitive market price and may therefore require subsidy.

Wet electrical connectors - It was concluded that there are a handful of world leading companies within the UK that can make cables and connections.

Design for increased reliability - The UK Oil and Gas expertise should follow into the retention of increasing reliability of marine renewables. However the group suggested that the market should determine which parts of the value chain can be economically retained within the UK. This implies that the UK should focus on what it already does well …..

However to ensure this it was important to educate different industries about the market and opportunities, with the long term goal of ring fencing the resources available within the UK.

Project Management - The group highlighted the fact that the UK had the skills to project manage future developments; however bespoke regulation would be required for a new industry.

Results - Government Intervention: Is there anything Government could do to facilitate this? (E.g. tax incentives, development of the TSB knowledge Transfer network, and provision of specialised water side development areas).

Comments from the groups fell into the 5 areas listed below:

Grant Support - It was noted that both the TSB and ETI programmes should be maintained, as these programmes are particularly important for generic shared industry issues and challenges that do not infringe on developers IP, which is their main asset. This could notably take the form of component development. The Carbon Trust could run a programme similar to the offshore wind accelerator with its foundations competition, but focusing on subsea deployment techniques. Alternatives to this were the suggestions of more direct grants and greater incentives. Consideration should be given to targeted investment from central government in infrastructure to support operation, local to deployment zones.

Cost Sharing - It was suggested that a system to should be developed to share the costs of development until the market matures. Government should address the practical difficulties in developing tax relief for R&D and assist in funding R&D.

Knowledge Transfer - Large amounts on information already exists from developed industries; this should be pooled through the TSB KTN.

Domestic Market Development - The need for a strong market pull for marine energy devices was highlighted, in relation to develop a strong domestic market; this will in turn allow the UK to secure the wealth generation from export. The potential to introducing incentives for using the local supply chain was thought to be beneficial, as would investment in local infrastructure.

Education and co-ordination - One group suggested that funds should also be made available for further education. Another group suggested that the industry required a single body to take charge of operational co-ordination. Government needs to help the industry fully articulate the scale of the deployment challenge so that investors can see the potential benefits of investing in this market.

Results – Coordination: In answer to the following question; How can BWEA help enable supply chain development in the UK? The groups rated the following suggestions from 1-5 indicating priority/effectiveness.

Organise more events such as this?
5 – But with a more focused agenda to address specific supply chain themes.

Provide an online forum to discuss supply chain issues?
2.5 – Some delegates felt that an online forum would be unworkable

Provide an online supply chain map (companies & technological competencies) of our marine renewables industry. If so should it include only companies already supplying the sector or also include companies that are interested in supplying the sector?
3 This activity would be of most benefit if it included a list of accredited contractors and allowed for notification of work to be shared (e.g. tenders). The group also felt that this area needed further investigation and definition.

Stronger messaging to government & stakeholders about the issues faced?
5 Particular emphasis should be on utilising strength of organisation (membership representation) to lobby for more support / activity in key supply chain gaps.

Other areas of suggested development included:

Standardisation - Help define standardised requirements, by bring together device developers, utilities and manufactures to define standards and R&D topics.

Raise Awareness – There is a need to provide awareness of supply chain needs and encourage the establishment of accreditation and associated qualifications. There was also a call to raise awareness of the marine renewables industry in other relevant industries (e.g. oil & gas)

Additional Focus - One group felt that there was a need to develop industry focus beyond technology, in terms of the supply chain, e.g. environmental consultancies, project management, education, etc.

H&S – Provide safety guidelines for working offshore.

Conclusions

Standardisation of Product Designs
This will lead to greater supply chain development and reduced costs. However without the acknowledgement of the need for technology developers to provide generic specifications the supply chain and subsequent investment will be fragmented.

Knowledge Sharing
Te development of an online data store and report data base would provide up-to-date knowledge, allowing information on best practice needs and environmental reports to be shared where possible.

Continued Engagement
Engagement is required with other sectors (especially oil & gas) to provide transfer of knowledge and skills.

Government Funding
There is a continued need for the UK Government to provide funding to the marine renewables industry as the current economic climate prevents the industry from accessing Venture Capital. Funds should also be provided to stimulate areas of the supply chain that will help to drive down the cost of energy.

The Energy Generation and Supply Knowledge Transfer Network (EGS KTN)
The EGS KTN provides an excellent opportunity to liaise with other industries and facility development of the marine renewables industry. Maximum use should be made of this potential to engage all levels of the supply chain.

UK Retention
Currently the UK has the capabilities to develop and maintain the majority of the marine renewables industry supply chain, allowing UK plc to achieve huge economic rewards. However this will require active industry facilitation and future government funding.

Future Events
Consistent messaging was given for BWEA to hold future events and provide messaging to government. However additional time and focus should be provided to the individual subject areas; to allow more in-depth analysis and conclusions to be developed. Industry experts should also be identified prior to meetings and invited where relevant.

Strong Messaging
BWEA should continue is effective messaging to Government and other relevant parties, providing the unified voice of the industry.

Overall the event was perceived as positive and provides a platform for future focussed events. BWEA would like to thank all those that participated.

Feedback on this document should be sent to o.wragg@bwea.com.

As is the nature of such workshops, it is possible that some ideas have not been captured in this document and so BWEA welcome comments for future reference and planning.

References

1 - Building Options for UK Renewable Energy, Carbon Trust, October 2003.

2 - Policy Framework for Renewable Energy, L.E.K. Consulting and Carbon Trust, July 2006.

3 - Marine Energy Road Map, Forum for Renewable Energy Development in Scotland, Marine Energy Group, 2009.

4 - Marine Renewables, State of the Industry, Entec report for BWEA, October 2009.

Appendix 1

Delegate Companies and Areas of Interest.

Company	Interest
NaREC	Blade Design
HIE	Blade Design
Caithness Chamber of Commerce	Blade Design
Capella IP Limited	Blade Design
Current2Current Ltd	Blade Design
Huppeng	Blade Design
NaREC	Design for increased reliability
Pelamis Wave Power	Design for increased reliability
BAE Systems	Design for increased reliability
Green Ocean Energy Ltd	Design for increased reliability
HIE	Design for increased reliability
J P Kenny Renewables	Design for increased reliability
MacTaggart Scot	Design for increased reliability
RES	Design for increased reliability
Romax Technology Ltd	Design for increased reliability
Sgurr Energy	Design for increased reliability
The Scottish Association for Marine Science	Design for increased reliability
Trelleborg Offshore UK Ltd	Design for increased reliability
WaveGen	Design for increased reliability
HIE	H&S
BSc (Hons) Natural and Environmental Science	H&S
Evolve Training (Highlands)	H&S
hydrosphere	H&S
Imarest	H&S
Intellectual Assets Centre	H&S
North Scotland Industries Group	H&S
Oceanlinx (UK) Limited	H&S
Scottish European Green Energy Centre	H&S
OPT	Minimisation of environmental impacts
SRF	Minimisation of environmental impacts
Arcus Renewable Energy Consulting	Minimisation of environmental impacts
DECC	Minimisation of environmental impacts
Halcrow Group Ltd,	Minimisation of environmental impacts
HIE	Minimisation of environmental impacts
MacTaggart Scot	Minimisation of environmental impacts
Northern Lighthouse Board	Minimisation of environmental impacts
Orkney Research Centre for Archaeology	Minimisation of environmental impacts
Aberdeen Renewable Energy Group	Minimisation of environmental impact
Environmental Research Institute UHI Millennium Institute	Minimisation of environmental impact
Marine Scotland – Science	Minimisation of environmental impact
Orkney Archaeological and Environmental Site Investigation Services	Minimisation of environmental impact
International Power	Sub Sea deployment
SeaRoc	Sub Sea deployment
HIE	Sub Sea deployment
Centre for Renewable Energy Sources	Sub Sea deployment

Company	Interest
Forsyths Ltd	Sub Sea deployment
Ledingham Chalmers LLP,	Sub Sea deployment
NES Engineering	Sub Sea deployment
Osiris Marine Services Ltd	Sub Sea deployment
Setech-uk	Sub Sea deployment
Shearwater Marine Services Ltd	Sub Sea deployment
The Crown Estate	Sub Sea deployment
UBC Group Limited	Sub Sea deployment
QuinetiQ	Vessels
All Energy	Vessels
Buckie Shipyard Ltd.	Vessels
Corpach Boatbuilding Co. Ltd	Vessels
Current2Current Ltd	Vessels
Dunberry Marine Limited (Orkney)	Vessels
HIE	Vessels
HIE	Vessels
North West Marine Services	Vessels
ODS-Petrodata	Vessels
Scrabster Harbour Trust	Vessels
Shepherd and Wedderburn	Vessels
A&P Group Business Development Manager	Vessels
TSB	Wet electrical connectors
HIE	Wet electrical connectors
SRF	Wet electrical connectors
Grants (Dufftown)Ltd	Wet electrical connectors
Hydro Group	Wet electrical connectors
JDR Cables	Wet electrical connectors
MacArtney UK	Wet electrical connectors
BWEA	
AWS Ocean Energy Ltd	
C Power	
E.On	
FenderCare Marine	
Gareloch Support Services (Plant) Ltd	
International Power	
MacLay Murray & Spens LLP	
RWEnpower	
SRF	
Synergie	
UHI Millennium Institute	
XODUS GROUP	