

Marine Energy Task Group for Wales

Marine Renewables and their
context within the Wales
Spatial Plan, Pembrokeshire -
the Haven

This document is in response to a request from Pembrokeshire Coastal Forum to respond to a questionnaire about maximising the marine assets in Pembrokeshire, the Haven.

Document Issued to: Tonia Forsyth, Coastal Forum Manager, Pembrokeshire Coastal Forum

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1. Introduction

The Marine Energy Task Group for Wales (METG) is a strategic group representing the key developers, utilities, environmental groups, government and academics in Wales. METG is currently applying for a £7M grant over 3 years from the Welsh Low Carbon Research Institute. Its brief is to exploit the Welsh marine resource in an environmental, economic and sustainable manner. It covers a range of technology types including tidal stream, tidal barrage, tidal lagoons and wave energy. It does not include offshore wind in its remit however some of its members are actively engaged in the offshore wind sector.

The announcement by Lord Hunt from DECC at the end of April 2009 that a Strategic Environmental Assessment of the marine resource in England and Wales will be undertaken is part of the process but it is important that Pembrokeshire (and the Coastal Forum) remains an active partner in any decision-making processes. The completion of an SEA will certainly make the Welsh coast a more attractive environment in which to set up and will inevitably act as a market “pull” to inward investment.

A number of marine renewable developers are finding the Pembrokeshire coast an attractive proposition to deploy pre-commercial demonstration devices which harness energy from the waves or the tidal streams.

The long term sustainable future of marine renewables in Pembrokeshire must look beyond these “one-off” installations and focus on attracting commercially-generating farms to the area. Is it possible that Pembrokeshire could be the site of the next generation Wave-Hub whereby large arrays of devices are able to plug into a central “hub”? Is Pembrokeshire capable of hosting Tide-Hub which would be the logical progression from pre-commercial tidal stream demonstration devices leaving the European Marine Energy Centre in Orkney?

This document gives a brief outline of the current activities of the marine renewables community in Wales. It also serves as a background information document on the Welsh and UK policies that are either in place or are planning to become enforced that will stimulate the growth of this nascent industry.

The document is set out as follows:

1. Introduction
2. Evidence of Market Demand in Wales
3. WAG Policy Developments to Strengthen Market Needs
4. Marine Renewables in Pembrokeshire
5. Proximity to Market
6. Availability of Skilled Workforce
7. Expected Economic Benefits
8. Stimulation of R&D in Business
9. Global Promotion of Wales

2. Evidence of Market Demand in Wales

Referring to the forthcoming Marine Energy Strategic Plan for Wales, Jane Davidson, Minister for Environment, Sustainability and Housing emphasised,

“This framework is critical in the delivery of renewable energy targets, identified within the Welsh Assembly’s energy strategy, in a sustainable manner, ensuring that the maximum benefit is realised whilst respecting environmental limits and meeting the social and economic needs of the population”.

Andrew Davies, Minister for Economic Development and Transport in the Welsh Assembly Government commented:

“Wales is already playing a major role in renewable energy generation through a range of established renewable technologies. The development and exploitation of future-energy related technologies, including marine, tidal and wave, will not only add to our renewable mix and contribute to security of energy supply, but could create considerable economic development opportunities.”

The market demand for marine renewables is maturing. In particular:

- Offshore wind prices are now increasing.
- Onshore wind has difficulties with planning and local opposition
- The driving force for the marine renewables market in Wales is the purchase of Renewable Obligation Certificates (ROC’s)
- Wave and tidal power is predictable and has been granted 2 ROC’s in Wales and England
- Electricity utility companies must meet ROC obligations placed on them by OFGEM and therefore will buy into utility-scale marine renewables providing twice as many ROC’s as other technologies
- There are no grid-connected, ROC-qualifying marine projects in Wales and England
- EON and RWE npower have chosen Wales to test their commercial demonstration marine devices above other countries.
- The Severn Estuary Tidal Energy Feasibility Study will make recommendations in 2010.
- Severn Estuary schemes could supply up to 5% UK electricity.
- Above all, according to the Renewable Energy Route Map, half of Wales’ electricity could be generated from the marine environment by 2025

3. WAG Policy Developments to Strengthen Market Needs

The Marine Energy Task Group is working in line with the following WAG (and where appropriate UK) policies. The METG is also a pro-active member of a number of specialist advisory committees that report back to WAG policy developers. Those WAG policies that are relevant to strengthening the emerging marine renewables industry in Wales are:

- Environmental Strategy for Wales, May 2006
 - 20 year vision from Department of Environment, Sustainability and Housing
- Wales' Climate Change Policy
 - Reduce greenhouse gas emissions 3% per year up to 2011
- Marine Renewable Research Strategic Framework, 2007
 - Understanding marine resource in Wales
- Renewable Energy Route Map for Wales, Feb 2008
 - Within 20 years, Wales to produce more electricity from renewables than it consumes. Half of this will be from the marine sector.
- Welsh Assembly Sustainability Committee, June 2008
 - Marine Energy Task Group invited to talk to committee and advise on future policies
- Marine Energy Strategic Plan, planned for mid 2009
 - 20 year plan
 - Potential targets for each type of marine renewable energy
 - Will stimulate new marine energy industrial sector in Wales
 - Currently being drawn up by RPS Ltd under subcontract to WAG
 - METG invited by RPS to discuss potential positive impacts of marine renewables in Wales
- Marine and Coastal Access Bill
 - Proposals in Bill will assist in securing better management of Wales' marine resource
- WAG/DBERR/DECC/SWRDA Severn Estuary Tidal Energy Feasibility, completed by summer 2010
 - 5% UK electricity needs
 - Short list announced Jan 2009.
 - Barrages and lagoons
- WAG/DEFRA/SWRDA
 - £0.5M to support development of innovative technologies in the Severn Estuary
- Energy Net Wales Programme,
 - Through our involvement with BWEA Cymru
 - Maximising value of Welsh economy from the energy industry.
- DECC, announced April 2009
 - Strategic Environmental Assessment (SEA) for marine renewables in England and Wales planned

- Will build on information from Welsh Marine Energy Strategic Plan

Of these policies, the announcement by Lord Hunt at the British Wind Energy Association (BWEA) Wave and Tidal Conference in April 2009 that Welsh and English coasts will be the subject of an SEA for marine renewables will undoubtedly deliver the “kick-start” that the industry has been waiting for.

4. Marine Renewables in Pembrokeshire

The Pembrokeshire coast has a significant wave and tidal stream climate. Tidal streams around the west of Ramsey Island and within Ramsey Sound can reach up to 4ms^{-1} . Waves around St Brides Bay, Carmarthen Bay and Freshwater West have a mean power of up to 20kW per metre of wave crest. SW approaches have wave power in excess of this amount.

The port of Milford Haven is ideally suited to a role of infrastructural support. Grid already exists in the area as does the energy sector skills-base but this is by no means fully investigated.

A study of the marine resource in Pembrokeshire was performed in 2006 by PMSS on behalf of the WDA (1). They concluded that shallow wave projects were likely to be located within SAC designations whereas deep wave technologies offered an attractive proposition with 700km^2 of resource, subject to navigational interests. This equates to an indicative capacity of up to 5600MW.

Tidal stream on the other hand was rather constrained in Pembrokeshire with approximately 2km^2 identified off Ramsey with an indicative capacity of $\sim 150\text{MW}$. There are a number of marine renewable developers now interested in installing off the Pembrokeshire coast including Tidal Energy Limited and Eon/Lunar in Ramsey Sound and Wavedragon NW of St Anne's Head. It must be stressed however that these projects are for testing pre-commercial demonstration devices and not for large scale farms.

5. Proximity to Market

The marine renewables energy market in Wales, and indeed in the rest of the World is a nascent industry. Although there are a number of pre-commercial devices currently under build and test around the UK, none are currently commercially available.

When referring to the proposed tidal stream development off Anglesey by Marine Current Turbines, Dr David Bean, Director of PMSS stated,

“The project and the subsequent development of tidal stream in Welsh waters has the very real potential for creating significant value for the Welsh economy, and we look forward to working with MCT on this exciting project. The territorial waters off Wales offer great potential for tidal stream technology, and an opportunity exists for

well-sited demonstration projects to provide impetus to this new and emerging form of generation."

Chris Williams from Tidal Energy Limited announced plans for a 1MW tidal stream installation in Ramsey sound, Pembrokeshire. He stated,

"Provided the prototype works well, we'd be looking to work with partners such as utilities and developers to construct arrays of devices by 2012. At full production, TEL could have a workforce in the region of 100 employees," said Williams.

6. Availability of Skilled Workforce

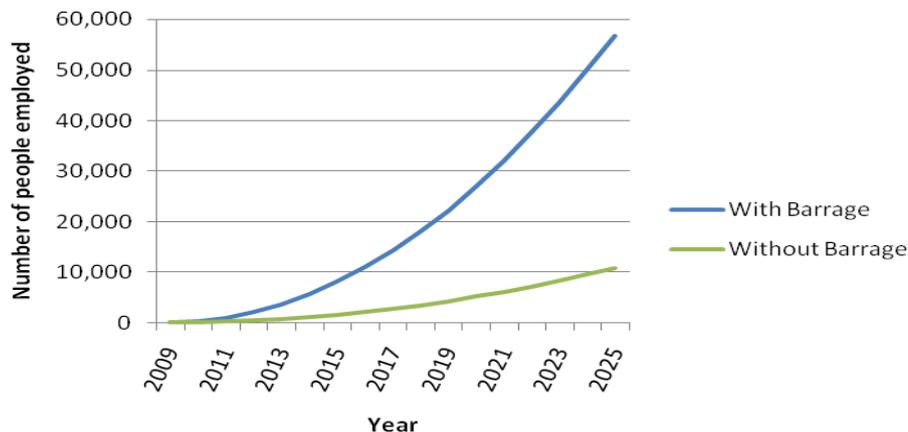
- Marine renewables Industry does not exist yet in Wales
- There are a number of companies now designing/building devices either in Wales or with a view to deploying off the Welsh coast.
- BWEA Wave and Tidal organised a Wave and Tidal Supply Chain Seminar with over 100 industry personnel attending in April 2009 covering installation, coatings, cables, grid connection and power take-off.
- Energy Sector Skills Council recognise that existing power generation workforce have the transferable skills.
- METG involved in initiative with Pembrokeshire County Council - Wales Spatial Plan, Pembrokeshire – the Haven: Maximising Maritime Assets and Links to Ireland focussing on moving to low carbon economy
- METG also working in close collaboration with Conwy County Council on marine energy project for Rhyl that is also focussed on flood defence and urban regeneration.

7. Expected Economic Benefits

- Capital costs for renewable energy vary between £3-4M per MWe installed.
- According to the Renewables Energy Route Map it could be possible to install approx. 10,500 MWe by 2025 in Wales from marine renewables.
- This equates to £40 billion capital investment in Wales over the next 15 years.
- The UK Government and its newly established Department for Energy and Climate Change have reaffirmed their commitment to green energy in March 2009 with the Secretary, Ed Miliband, proclaiming that 400,000 jobs could be created over the next eight years in the UK.
- This resonance commitment is positive for the emerging marine energy industry throughout the UK.
- Scotland's Marine Energy Group in 2004 identified the prospects of a marine energy industry in Scotland. They identified that by 2020 there could be 1300MW capacity installed, with 7000 jobs created supporting the industry.

- Using this correlation between jobs created and electricity generation capacity installed, by 2025 there is the potential to create 56,700 jobs in Wales.
- The graph below illustrates the possible job creation curve of a marine energy industry in Wales, based on WAGs 2025 renewable energy targets published in the *Renewable Energy Route map for Wales* (2008).

Figure 1. Possible job creation by a marine energy industry in Wales



- The preliminary stage research, as proposed by this LCRI bid, is essential to facilitate the growth of this industry. The slow start is a necessary hurdle has to be overcome before employment potential can be realised.

8. Stimulation of R&D in Businesses

- METG formed its strategic research plan through consultation with the marine energy sector in Wales.
- A workshop has been held by METG to engage with business about their R&D requirements.
- The close relationship that exists within the Task Group has already resulted in the commencement of industrial R&D projects.
- Funding through the LCRI will build on these relationships through focussed partnership research.

9. Global Promotion of Wales

At the BWEA Cymru Conference in July 2008 Jane Davidson also stated that Wales could become,

“A world class centre of excellence for marine energy”

Dissemination is one of the key activities of the METG both at national level and internationally at conferences, symposia, exhibitions, trade shows, public lectures and through TV and the media. Some of the recent marine energy talks given by members of the METG include:

- ICE Wales Severn Barrage and Renewable Energy Conference - Cardiff (2008)
- Coastal Futures 2008:Review and Future Trends Conference – London (2008)
- RAEng The Severn Barrage Academy Briefing, IMechE - London (2008)
- International Council of Academies of Engineering and Tech. Sc. - Netherlands (2008)
- Tsinghua University, Dept. of Sedimentation Research, Beijing - China (2008)
- Foreign and Commonwealth Office Climate Change Delegation - Cardiff (2008)
- National Assembly Sustainable Energy Group, Cardiff (2008)
- Presentation of evidence to Welsh and South West Lib Dem Party - Cardiff (2009)
- Aquaterra 2009 Second World Forum on Delta Development - Amsterdam (2009)
- A Barrage of Questions – Week in Week Out. BBC Wales, (Oct 2008)

10. References

1. WDA, Wales Marine Energy Site Selection, PMSS, 31st March 2006