Environment and Sustainability Committee

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Inquiry into Energy Policy and Planning in Wales – Evidence from Low Carbon Research Institute Marine

Executive Summary

- Wales has the resource, the grid, the ports, the **science**, the supply chain, the workforce and the political will to enable the marine renewable energy sector to flourish.
- A marine energy sector will not be built overnight in Wales. It is a long-term investment and is considered to be high risk because the sector is still in the early stages of technological development. However, the overall benefits to the Welsh economy could be substantial.
- LCRI Marine considers the term "Marine and tidal energy" to be confusing. "Marine Energy" covers wave, tidal stream and tidal range technologies.
- LCRI Marine is calling for the formation of **Marine Energy Wales** – a high level strategic group that will encompass all the initiatives currently underway throughout Wales for maximum impact.
- LCRI Marine believes that this must be done by working with UK Government, DECC in particular, as they have decision making authority over projects in Welsh waters.
- There should be meaningful dialogue with The Crown Estate as the landlord for the Welsh seabed.
- The short term aim of Marine Energy Wales should be joining up all the expertise in Wales with a medium to longer term view of creating a Welsh Marine Energy Park. The Welsh Marine Energy Park should aim to **bring the first commercial projects in English and Welsh waters to Wales**.

Introduction to the Low Carbon Research Institute

The Low Carbon Research Institute (LCRI) was set up to unite and promote energy research in Wales to help deliver a low carbon future. The multidisciplinary LCRI aims to support the energy sector in Wales, the UK and globally, to develop low carbon generation, storage, distribution and end use technologies, and to offer policy advice.

The Higher Education Funding Council For Wales (HEFCW) granted £5.1 million to develop the LCRI for 5 years from April 2008. LCRI's research is also supported by contracts from the Research Councils, Industry and Government.

In 2010 LCRI secured £15 million from the Welsh European Funding Office, a contribution to a £34 million programme to enable Wales and its industry partners to lead the way in research to cut carbon emissions, as part of the European Research Development Fund's Convergence, Regional Competitiveness and Employment programmes.

The marine energy research activities of the LCRI are managed by the Marine Energy Research Group (MERG) based at Swansea University, and involve six academic institutes, together with industrial, governmental and environmental groups from around the Welsh coast. The current programme of strategic research involves 45 scientists (engineers, oceanographers, computer modellers, mathematicians, marine biologists, and environmentalists) from around the Welsh academic institutions. The organisation of the research work has been specifically designed to answer environmental and engineering concerns and to supply stakeholders with the information required to reduce risk and instil confidence, which will ultimately lead to investment and jobs in Wales. LCRI Marine aims to:

- supply the sector with focussed, independent, multi-disciplinary research that will underpin the growth of the industry;
- develop the knowledge-base around the Welsh coast that will incubate fundamental and industrial research in partnership with UK and Europe; and
- build academic capability that will continue to offer assistance and guidance to the marine energy sector in future years.

The majority of projects will finish in March 2013 and the Low Carbon ambitions of Wales may not be achievable without the continuation of the science base that has been built up over the last four years.

Terminology

The invitation from the Environment and Sustainability Committee refers to the panel discussion topic as "marine and tidal energy". LCRI Marine considers that this terminology is unclear and can lead to confusion. The term "Marine Energy" covers all forms of "wet" devices and is usually thought to include wave, tidal stream and tidal range technologies as well as ocean thermal and osmotic potential (the latter two are not applicable to Welsh waters). It is not clear, therefore, whether the term "tidal energy" refers to tidal stream or tidal range.

Marine Energy in Wales

Marine energy is a source of low-carbon renewable energy and the extensive coastline provides Wales with significant marine energy resource. The Welsh Government has proposed ambitious targets for producing up to 14TWhrs per year of electricity from marine-based technologies (barrages, tidal stream, wave, impoundments and lagoons) by 2030. With no marine energy devices currently operating off the Welsh coast the challenge is clear and significant.

There are, however, plans to start installing devices in Welsh waters. Tidal Energy Ltd has consent to install their 1.2MW DeltaStream tidal stream device in Ramsey Sound, Pembrokeshire in late 2012. Marine Current Turbines are submitting plans for a 10MW array off the NW coast of Anglesey. Wave energy developers Wavedragon and Marine Energy are looking to site commercial devices off the SW of Wales. LCRI Marine has also been contacted by developers looking to exploit our tidal range resource using lagoons and impoundments. The feasibility of harnessing the tidal range in the Severn Estuary still continues, with strong interest from the private sector.

The Marine Renewable Energy Strategic Framework (MRESF) includes a GIS tool and has looked at a wide range of constraints to marine energy deployment ranging from military interests in Welsh waters to marine ecology. Combined with resource information, this tool suggests extraction scenarios ranging from 1.5GW to 6.4GW of installed capacity, depending on the level of constraint considered acceptable for deployment.

A Way Forward

To make Wales as attractive to investors and marine energy developers as other regions, steps must be taken to facilitate the deployment of devices. The provision of freely accessible data on key Welsh resource areas would provide confidence to investors and marine energy developers which, in turn would accelerate investment in marine renewables in Wales. Wave and current data collection will reduce uncertainty in resource which will de-risk investment. Associated environmental data may be collected which could also be used to reduce consenting costs and hence make strategic Welsh deployment locations more attractive.

It is anticipated that these data collection activities will allow potential extension into partially or fully consented sea-bed deployment areas which could be leased directly to developers. In conjunction with other projects, such as the Marine Renewable Energy Strategic Framework and the Infrastructure Study being currently undertaken, this work has the potential to identify areas where investment in support services could enhance Wales's reputation as a prime location for marine renewable energy extraction. It is suggested that this can be achieved through the following stages:

1. Identify suitable areas for wave and tidal energy deployment in Wales using existing data;

2. Determine data requirements and priorities for both wave and tidal developers; and

3. Develop a work plan for short and medium to long-term data collection and provide indicative costs for survey and monitoring.

A Unified Approach to a Marine Energy Strategy in Wales

There are a number of existing initiatives around Wales which have the overall aim of de-risking the marine energy sector and increasing the attractiveness of Wales within the marine energy sector. These initiatives include:

- Marine Energy Pembrokeshire;
- Anglesey Energy Isle;
- LCRI Marine;
- SEACAMS;
- MAREN; and
- OREIN.

From a developer's perspective Wales is giving out a confused message. There is no clear route to getting assistance/information about what we have to offer. These initiatives appear to be working to the same overall aim, however they need to be aligned centrally in order to fully exploit the potential.
Members of LCRI Marine set up the Marine Energy Task Group for Wales back in 2008. This group comprised of senior academics, Welsh Government, developers, utility companies and NGO's. Although the partnerships continue, it has not been formally active since 2010.

LCRI Marine advocates that Wales sends out a clear message to the emerging marine energy sector to enable Wales to increase its profile at the UK, European and Global marketplace. An over-arching group needs to be established to ensure existing and future programs are all working in unison. This group should be called **Marine Energy Wales**. It should set research agendas and pave the route to commercialisation. Marine Energy Wales should include representatives from industry, government, the science base and local delivery organisations. For the greatest impact we propose that this should be industry-led. It should also have a central marketing strategy that is used throughout Wales.

Site Development

Marine energy site development activities are currently being undertaken throughout Wales. The opportunities in Wales are unique in that our resource includes wave, tidal stream, barrages and lagoons, each in various locations on the coast.

We believe that the initial aims of Marine Energy Wales should be concrete and clear. They should be ambitious but achievable and have a 5-10 year horizon for initial activities. The aims should be to generate megawatts from the water and to ground key industrial organisations in Wales.

The recently published DECC marine energy roadmap sets out the support mechanisms and infrastructure available to industry. From the roadmap, a clear gap can be seen in the ocean infrastructure. Devices have a clear technology development route from scale tests at NAREC to full scale open sea at EMEC. Wave devices can be installed in very small demo arrays at WaveHub, but then beyond this there is no provision with shared infrastructure resources.

Marine Energy Wales stage 1 should be targeted at the early commercial arrays (10-30MW each), with the aim of installing the first 100MW in Welsh waters. The locations for stage 1 have already been considered by developers and are the North West of Anglesey and the St David's area of Pembrokeshire. The Anglesey site is exclusively tidal stream, while it is considered potentially feasible to combine wave and tidal stream at St David's. The first 100MW would not fill the capacity of either site.

The shared infrastructure includes:

- Data collection as discussed above;
- A seabed lease from Crown Estate;

- Environmental and other permits to deploy (with device specific elements to be added later);
- Onshore planning approval for shore stations and grid reinforcement; and
- Carefully planned and appropriately timed physical assets.

For Wales and the UK as a whole, the prospect of a new marine renewable energy industry has a multitude of advantages, beyond meeting renewable energy or carbon reduction targets. Domestically sourced energy will help alleviate energy security concerns. The creation of the industry will promote economic development as well as the potential to export energy conversion devices and expertise. Lessons can be drawn from the development of the wind industry, where the countries with the greatest domestic support have prevailed to export their devices internationally, where others, including the UK, have forgone their own industry in favour of importing. Political will is essential for barriers to be removed, investment to be encouraged and devices to be deployed, if Wales is to establish itself as the marine energy market leader.

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LCRI Marine

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