# British-Irish Parliamentary Assembly

# Committee C (Economic Affairs)

# Report on Renewable Wave and Tidal Energy

**October 2013**

## 1. Introduction and Background

1.1 At its meeting during the BIPA 46th Plenary Conference in Letterkenny, County Donegal in March of this year, BIPA Committee C decided to undertake an inquiry into renewable wave and tidal energy. Its aim was to examine:

a) the potential of wave power and tidal flow sources to deliver a proportion of the energy requirements of Ireland and the UK;
b) whether current policy and funding frameworks for marine renewables are adequate and appropriate to ensure that these technologies deliver to their full potential.

1.2 The Committee decided to invite contributions from the principal actors in the sector in the UK and Ireland. In the course of its inquiry, at its meeting in London on 20 May 2013, it took evidence from Renewable UK, The Carbon Trust and the Department of Energy and Climate Change. The Committee, at its meeting in Dublin on 24 June, took evidence from Sustainable Energy Authority of Ireland, the Hydraulics and Maritime Research Centre, UCC (including Mr Eoin Sweeney, formerly Head of Ocean Energy Programme in Sustainable Energy Authority of Ireland).

1.3 In order to inform itself of current technologies and research and development "on the ground", the Committee also decided to undertake a fact-finding mission to Orkney in Scotland to view the development of wave and tidal energy in the Orkney Islands off the north Scottish coast. In the course of the mission the Committee received briefings from the European Marine Energy Centre (EMEC), Orkney Highlands and Islands Enterprise, Orkney Islands Council and Pelamis Wave Power.

## 2. Attendees and Participation

2.1 In the course of its inquiry, the Committee received assistance from the following persons/organisations in London, Dublin and Orkney:

Mr David Krohn, Wave and Tidal Development Manager, Offshore Renewables, Renewable UK
Mr Nick Medic, Director of Offshore Renewables, Renewable UK
Mr Charlie Blair, Technology Accelerator Manager, Marine, The Carbon Trust
Ms Barbara Garnier-Schofield, Head of Marine Energy and Tidal Range, Department of Energy and Climate Change
Mr Trevor Raggatt, Head of Small Scale and Emerging Technologies, Department of Energy and Climate Change
Dr Brian Motherway, Chief Executive Officer, Sustainable Energy Authority of Ireland
Mr Declan Meally, Head of Department, Emerging Sectors, Sustainable Energy Authority of Ireland
Professor Anthony Lewis, Energy Engineering (School of Engineering) and Director, National Ocean Test Facility (NOTF), Hydraulics and Maritime Research Centre (HMRC), University College Cork
Mr Eoin Sweeney, formerly Head of Ocean Energy Programme, Sustainable Energy Authority of Ireland

Mr Neil Kermode, Managing Director, European Marine Energy Centre (EMEC)
Mr Graeme Harrison, Head of Operations, Orkney Highlands and Islands Enterprise
Ms Shona Croy, Strategic Adviser for Renewables, Orkney Islands Council
Mr Rob Ionides, Operations Manager at Pelamis Wave Power, Orkney

2.2 The Committee would like to record its thanks to all of the above mentioned persons.

2.3 Participation by Members at Committee meetings and fact finding visit was as follows:

*London on 20 May 2013:*
Mr Jack Wall TD (Chairman), Mr John Robertson MP (Vice-Chairman), Lord Empey OBE, Senator Paschal Mooney, Mr Lindsay Whittle AM, Mr Paul Flynn MP, Mr Oliver Colvile MP

*Dublin on 24 June 2013:*
Mr Jack Wall TD (Chairman), Ms Ann Phelan TD, Lord Empey OBE, Mr Lindsay Whittle AM, Senator Paschal Mooney, Senator John Crown, Mr Arthur Spring TD, Mr Sean Rogers MLA

*Visit to Orkney on 7-8 July 2013:*
Mr Jack Wall TD (Chairman), Ms Ann Phelan TD, Lord Empey OBE, Senator Paschal Mooney, Mr Arthur Spring TD, Lord Rogan, Ms Mary Scanlon MSP

## 3. Current Policy Position

3.1 The UK and Irish Governments, along with most developed countries with access to the marine energy resource are currently pursuing policies to develop, harness and operate marine (wave and tidal) energy. The policy intention is to reduce dependence on imported and finite energy sources and thus increase security of energy supply.

3.2 *United Kingdom:* The UK Government has made a clear commitment to developing marine renewables. It has put in place a comprehensive policy framework to achieve this. The Government's Marine Energy Programme was established in 2011 with the aim of developing a co-ordinated policy to support the sector. It is based on Government - industry collaboration and its steering occurs at ministerial level. Its outputs include innovation funding and most importantly the establishment of Marine Energy Parks in the South West of England and in Pentland Firth / Orkney waters to build critical mass to attract investment.

3.3 Public funding for innovation in the sector is co-ordinated through the Low Carbon Innovation Co-Ordination Group. A sum of £80 million in the current spending round is dedicated to the sector. In the area of market support mechanisms, five Renewable Obligation Certificates have been issued to double the level of support for wave and tidal stream.[1] The Green Investment Bank and the Electricity Market Reform are

[1] The Renewables Obligation, which will be replaced by Electricity Market Reform measures (See below) has been in place since 2002 to provide incentives for the deployment of large-scale renewable electricity in the UK. The RO requires licensed UK electricity suppliers to source a specified proportion of the electricity they provide to customers from eligible renewable sources.

potential sources of support in the future. [2] A sum of £20 million has been awarded through the Marine Energy Array Demonstrator (MEAD) for the SeaGen Skerries tidal project and the MeyGen tidal project off the Welsh coastline, which are expected to be in operation by 2016. A sum of £40 million has been awarded through the EU NER 300 1st Call, to projects in the Sound of Islay and Kyle Rhea, planned to be operational by end 2016. The UK and Scottish Governments have set up a Steering Group to address any issues in relation to the Scottish Islands. Regulation and spatial planning is devolved to the Scottish Government. In addition, coordinating the effort of the marine energy and trade sector are a number of organisations, for example, Renewable UK represents itself as the UK's leading renewable energy trade association specialising in onshore wind, offshore wind and wave and tidal energy and its membership ranges from small independent companies to large international corporations and manufacturers. It acts as a central point of information for its membership.

3.4 *Ireland:* The Irish Government has stated its determination to ensure that Ireland's ocean wealth will be a key component of its economic recovery and sustainable growth, generating benefits for all its citizens.

3.5 Ireland's strategy for the marine renewable energy sector originated in 2005 when 'An Ocean Energy Strategy for Ireland' was proposed to advance Ireland's capability to deploy ocean energy technology and develop an industry sector in this field of emerging energy technology. The programme is structured into four phases as follows:

- Phase 1 Development: This phase focuses on furthering the research and development capabilities in Ireland, both institutional and industrial. Support will be given for the design and construction of scale model prototypes that will confirm performance predictions for devices. Additionally, support will be given to strengthen research facilities, and to develop offshore test facilities.

- Phase 2 Pre-Commercial Single Device: Following demonstration of commercial potential in Phase 1, this phase is focused on taking successful designs from the prototype stage and constructing a fully operational pre-commercial wave energy converter supplying power directly to the electricity network. The results of this phase will be used to assess the commercial viability of the technology and the resulting industrial opportunities available to Ireland.

[2] However, the Green Investment Bank is focused on investment in offshore wind rather than tidal or wave energy; it has so far provided for two off shore wind farms, one in England and one in Wales. Electricity Market Reform (EMR) is the UK Government's principle initiative for investment in low-carbon technology; it is being taken forward by an Energy Bill, which is under consideration in the House of Lords at the time of writing. The Bill introduces a new system of support for low-carbon energy generation, known as 'contracts for difference' (CfDs), which will in time replace the current Renewables Obligation (although EMR encompasses nuclear, and carbon capture and storage, as well as renewables). A CfD is a long-term contract that pays the generator the difference between an estimate of the market price for electricity and the long-term price needed to bring forward investment in a given technology; the latter is known as the 'strike price'. Finalised strike prices have not yet been published. Renewable UK emphasized the need for strike prices for wave and tidal energy to be set at levels that will give the sector the confidence to invest further, and for the contracts to be set at the length mirroring the lifespan of the technology involved.

- Phase 3 Pre-Commercial 10MW Array: The cost of ocean energy systems will reduce as the numbers of devices produced, per offshore development, increase. However, unless the devices can be arranged effectively in an array, large scale deployment will not be commercially viable. The array must be structured to minimise spacing requirements and installation costs while maximising energy yield. It is therefore necessary to construct an array of multiple devices and demonstrate that the array can operate successfully by delivering electricity to the network for a sustained period of time. Following the success of this phase, a precise estimate of the cost of a fully integrated wave or tidal farm will be available. This information will then be used to determine the nature of support required to support full-scale deployment of ocean energy in Ireland.

- Phase 4 Commercial Deployment: In this final phase of development support measures will be offered to ensure the continued growth in the deployment of ocean energy systems. Areas of support could include electricity price support, research and development support for further industrial development and further investment in 3rd Level facilities etc.

3.6 Within this overall strategy, Sustainable Energy Authority of Ireland has developed an ocean energy programme which is assigned an annual budget by the Department of Communications, Energy and Natural Resources. It has been given an increased budget in 2013 to provide additional resources for the following work programme;

1. The continued development of the ocean energy test sites

    a. At the Atlantic Marine Energy Test Site (AMETS) in Mayo to enable progress on the test site infrastructure and completion of the licensing process for the offshore test locations
    b. The further development of the Galway Bay test site infrastructure.

2. To increase the Prototype Development fund which is designed to support feasibility studies, tank testing and open sea trials.

3. To assist the Department of Communications, Energy and Natural Resources to finalise the Ocean Renewable Energy Development Plan and associated Strategic Environmental Assessment and other related policy research and support.

4. To enable the completion of further seabed surveys, wave resource and environmental data collection and analysis, and supporting studies. These will form the basis for potential ocean renewable energy developers to determine suitable offshore development sites. This work also includes the maintenance of the existing ocean resource and environmental monitoring infrastructure.

3.7 Other work supported under the Sustainable Energy Authority of Ireland ocean energy programme includes participation in the International Energy Agency (IEA) ocean energy works.

## 4. Challenges

4.1 *United Kingdom:* The Committee was informed that issues around access to national grids, particularly in relation to Orkney and perhaps other remote test/production sites, remained major challenges. This problem is particularly acute for the Scottish Islands and is resulting in projects being delayed. The extension of grid transmission to Shetland is being delayed from 2016 to 2018. Leaseholders who are struggling to get projects going as a consequence are sitting on very large fixed assets, paying just to keep their sites open. At least one engineering firm has pulled out of tidal projects because of the uncertainity of the grid. However, it was noted that while much of the need for grid connections in the immediate future are for offshore wind facilities, marine sources will be able to piggyback on that infrastructure when in place.

4.2 Another major challenge is certainty for investors in terms of financial viability. For instance, while a decision has not yet been made on transmission charges, companies are being asked to sign contracts in the absence of a decision on these charges.

4.3 It is reported to the Committee that grid arrangements are having a major negative impact on industry contribution to bringing marine energy potential into play in the UK. Private companies find themselves with no choice but to finance upgrades, as the Scottish Islands Renewables project does not support transmission infrastructure and Marine Energy Array Demonstrator (MEAD) funding is due to be cut off before grid connections are in place. Transmission charges make up a significant element of the cost of marine electricity and there remains uncertainty about the level of these in a reformed electricity market.

4.4 *Ireland:* The same technological and financial problems in regard to the grid were articulated in respect of Ireland, particularly in relation to the intermittent nature of renewable electricity supply. Also, however, there are issues in relation to attracting small and medium enterprises and large providers and inevitably issues about access to development funds, Government and/or industry. The Committee noted that considerable work was planned in Ireland in relation to grid expansion to the west coast (e.g. Belmullet) and that this will ultimately benefit resource development in that area.

4.5 It was reported to the Committee that developing emerging technologies is recognised as extremely challenging and the costs at this stage of early development are therefore comparatively high. This has limited the Ocean Energy (OE) developer's ability to prove their devices capabilities and effective operation. There are however a small number of promising technologies (wave and tidal) in Ireland with up to a number of years of in-sea operational experience, and utilities are showing significant interest in scaling up their OE ambitions. It is important that these OE developers have test facilities that will allow their devices to scale up appropriately.

4.6 *Collaboration:* It is clear to the Committee that Ireland and the UK possess probably the most significant marine energy resource in Europe. The coasts and surrounding sea areas under Irish and UK jurisdictions contain extensive and high energy wave and tidal environments. For example, Ireland alone has over 7,500 km of coastline and the UK considerably more. The works being done by both countries in terms of resource assessment and surveys, technology testing, licensing and collaboration with

industry can be pooled more intensively without compromising commercial privacy. It is possible that the opportunities are being lost in both jurisdictions as a result of the absence of an intensified collaborative effort. The Committee recognises that a level of collaboration currently exists but considers this should be strengthened and perhaps formalised. Indeed, everything should be done to ensure that the UK and Ireland maintain their current position at the cutting edge of marine energy resource development, and secure a commensurate share of the industrial base for the sector, in competition with economies such as Germany and Japan.

## 5. Recommendations

5.1 Having heard evidence at its meetings in the UK and Ireland and at its site visit to Orkney, the Committee wishes to make recommendations as follows:

1. An intensified effort should be put in place in the UK and Ireland to understand, address and remove barriers and constraints on commercial or trade participation in the marine energy sector in the areas of:

   - grid access and costs
   - technological development to reduce the negative impact of the 'intermittant supply' issue
   - research and development support and financing
   - planning and licensing (environmental and grid access/supply)
   - enterprise supports

2. Arrangements for collaboration (at State, agency and trade levels) should be intensified both internally within each jurisdiction and particularly *between* jurisdictions (under the Good Friday Agreement institutional arrangement[3] or otherwise); collaboration should cover:

   - access to Government, marine energy resource surveys and assessments (wave and tidal data in all jurisdictions) and best practice methodology and technologies for such work
   - coordinated licensing arrangements and policy collaboration for the environmental impact assessments and for grid arrangements for test and established electricity producers
   - access to test sites in the UK and Ireland, whereby different test technologies are permitted to operate in the differing test environments around the UK and Irish coasts

3. <u>Policy in the UK and Ireland should strive to exploit fully our unique marine energy resource as well as to maintain the position of our two States at the cutting edge of energy development.</u>

5.2 Structures for sharing ongoing policy and technological development, experience, resource assessments and other aspects of development should be put in place; a sub-committee should be set up to produce a further report on this matter.

[3] The Committee noted that a sub-group of the British-Irish Council is also looking at this issue.