Submission by Marine Renewables Industry Association on *Single Electricity Market: Treatment of Curtailment in Tie-Break situations- Consultation paper*

25 May 2012

1. Background

The Marine Renewables Industry Association (MRIA) represents all of the main interests on the island of Ireland engaged in the wave and tidal sector of marine renewables energy, also known as ocean energy[1]. The Association includes firms engaged in device development and manufacture (e.g. Ocean Energy, Open Hydro, Aquamarine Power and others), utilities and site developers (e.g. ESBI, Bord Gais and others), professional firms and consultants (e.g. Arup, Arthur Cox Solicitors), R & D businesses (e.g. IMERC), supply chain activities (e.g. B9 Energy, Port of Cork) and academic researchers. The Association is an all-island body. The relevant government agencies on the island sit on the Association's Council in an observer capacity.

The Association welcomes the Single Energy Market Committee (SEMC) consultation paper SEM-12-028 entitled *Single Electricity Market Treatment of Curtailment in Tie-Break Situations*. In essence, the issue which prompted the paper is posed at *Background:*

> 'On what basis do the Transmission System Operators make the decision for curtailment, when the plant available is seen as equal by the TSOs i.e. no deciding indicator, including a bid price differential, exists to support such a decision?'

[1] Wave + tidal energy = ocean energy (+ offshore wind) = marine renewables or marine energy

We note that the SEMC decided (SEM-11-105) to deal with this issue on the basis of 'grand-fathering' which determines curtailment issues in a tie-break on a firm access basis i.e. 'last on, first off '. Subsequently, the 'grand-fathering' provision (Section 3.5) was withdrawn and a consultation launched. The SEMC is seeking a solution which balances the requirements in the SEM Order and the SEM Act inter alia to promote the use of renewable energy; avoid discriminating unfairly between 'authorised persons' (e.g. existing generators) and those seeking to become 'authorised persons' (e.g. potential new entrants such as tidal and wave energy developers); and, particularly, protecting the interests of consumers in the Republic of Ireland and Northern Ireland.

2. Economic Potential of Wave and Tidal Energy

Ireland's offshore renewable energy resources have significant development potential and are regarded as perhaps the best in the world. Detailed assessments of Ireland's tidal and wave energy resource were performed in 2004 and 2005 respectively. Employing techniques to define Ireland's wave and tidal energy resources and allowing for technical, practical and environmental limitations, the accessible annual tidal resource was estimated to be 2.6TWh[2] whilst the wave energy resource was estimated to be 21TWh[3]. The wave energy resource alone would be sufficient to supply 75% of the Republic's 2006 electricity requirement.

Exploitation of the resource would have a significant economic impact. Wave and tidal energy would contribute strongly towards the island of Ireland becoming an *energy secure* and *exporting* area. Second, it would prompt the development of a supply chain or *enterprise* dimension - R and D, finance, legal services, education and training, operations and maintenance, high value added component design and manufacture, device assembly, etc - to support world markets. The natural consequence of this development will be substantial job creation

A study commissioned by Sustainable Energy Authority of Ireland (SEAI), through its Ocean Energy Development Unit (OEDU), and Invest Northern

2 Sustainable Energy Ireland (2004) *Tidal & Current Energy Resources in Ireland*

3 Marine Institute, Sustainable Energy Ireland (2005) *Accessible Wave Energy Resource Atlas: Ireland*

Ireland on the potential economic impact of ocean energy (*Economic Study for Ocean Energy Development in Ireland* SQW, 2010) states that:

There is currently sound quantitative evidence that by 2030 a fully developed island of Ireland OE sector providing a home market and feeding a global market for Renewable Energy could produce a total Net Present Value (NPV) of around €9billion and many thousands of jobs ....It is possible that an island of Ireland wave energy industry meeting the 500MW 2020 target could produce at least 1,431 additional FTE jobs and an NPV of €0.25bn, increasing to 17,000-52,000 jobs and an NPV of around €4-10bn by 2030.....Similarly a tidal industry providing 200MW of capacity by 2020 may deliver around 600 FTE jobs and an NPV of €111m, increasing to 8,500-17,000 jobs and an NPV of between 1.5-2.75bn by 2030 -SQW Executive Summary.

The enterprise benefits alluded to in the SQW report are only achievable if both Northern Ireland and the Republic of Ireland gain 'early mover advantage' and are involved in the earliest stages of research, development, demonstration/pre-commercial and early commercial deployment. It means utilizing our great strengths: the wave and tidal (the latter is a particular feature of Northern Ireland rather than the Republic of Ireland) resource; our world class research and development facilities located around the island in the ocean energy field; proven skill in strategic planning in grid for offshore energy; and Ireland, of course, is the source of a number of the world's leading device developers in the emerging wave and tidal energy area. Both Northern Ireland and the Republic of Ireland have targets of 40% of electricity from renewable sources by 2020. The Republic of Ireland has a stated target of 500MW of wave and tidal in operation by 2020 and Northern Ireland, through the recent marine leasing round conducted by the Crown Estate, will provide leases to developers for 200MW of tidal energy.

3. Importance of *Treatment of Curtailment in Tie-Break Situations* to Ocean Energy

If Ireland is to realise the potential of its ocean energy resource, a number of issues must be tackled and these are well documented elsewhere e.g. see various publications available on the Association's website www.mria.ie . It

is imperative-in order to realise our economic ambitions of creating huge numbers of new jobs and creating a global supply chain to the industry- that this nascent technology be allowed to reach maturity in Ireland. This inter alia means that the market arrangements must be such as to support and encourage ocean energy developments to join the grid and to give them a realistic chance of achieving dispatch- it should be noted that up to 2020 individual ocean energy developments are likely to be small scale and in the 'early commercial' category. It should also be noted that ocean energy is principally focused on the export and enterprise dimensions mentioned earlier but neither will be achieved if the industry cannot make some distinct contribution to the home market, the SEM.

The consultation paper states that 'The core of the problem is that curtailment is an unavoidable consequence of high levels of wind penetration'. The danger is that the treatment for this problem causes unwitting collateral damage to ocean energy, as 'grandfathering' undoubtedly would. 'Grandfathering' also appears to go against the RES_E directive (2009/28/EC) which states (Article 16, Section 2 (c))

"Member States shall ensure that appropriate grid and market-related operational measures are taken in order to minimise the curtailment of electricity produced from renewable energy sources "

It appears that 'grandfathering' would serve to unfairly punish late market entry (which ocean energy producers will be by definition) to the benefit of others.

It is also important to bear in mind that ocean energy should be a part of any solution from a technical perspective. This was demonstrated by Fusco, Nolan and Ringwood in their landmark study on *Variability reduction through optimal combination of wind/ wave resources – an Irish case study* Energy Vol 35 No 1 Jan 2010. They concluded:

The variability of the power produced from renewable sources and its uncontrollable nature negatively affects their effectiveness in reducing the requirement for thermal plants (it reduces their Capacity credit) and makes them a less attractive and a potentially more expensive alternative.

Ireland, together with its great wind potential, also offers an important and enviable wave resource. This study is therefore focused on the assessment of the correlation between the two resources, at different locations around Ireland, and the possibility to reduce the variability of the power extraction if mixed wind and wave off-shore farms are adopted, with respect to the exploitation of solely one resource. It is shown how the West and South coasts experience, most of the time, wave systems where the predominant (from an energy point of view) part is composed of large swell systems, generated by remote wind systems, which have little correlation with the local wind conditions. This means that the two resources can appear at different times and their integration in combined farms allows a more reliable, less variable and more predictable electrical power production. The reliability is improved thanks to a significant reduction of the periods of null or very low power production (which is a problem with wind farms). The variability and predictability improvements derive from the smoothing effect due to the integration of poorly correlated diversified sources UNDERLING BY MRIA

What this effectively means is that the system stability issues caused by large penetration of wind may not simultaneously occur at times of large penetration of wave energy. Therefore, the curtailment of wave as a result of large penetration of wind could potentially curtail wave at low energy periods which could be unfairly detrimental to the financial performance of a wave project.

In addition, tides can be accurately forecast many decades ahead and it is reasonable to conclude that tidal power will also contribute in a positive way to the 'smoothing effect' cited by Fusco, Nolan and Ringwood.

4. MRIA Recommendations

Having considered the criteria set by SEMC in the consultation paper:

- Impact on the consumer and Dispatch Balancing Costs
- Facilitation of Ireland and Northern Ireland 2020 Renewable Targets
- Efficiency of Entry Signal
- Stable Investment Environment
- Consistency of treatment for constraints and curtailment

MRIA has considered the options set out:

- Grandfathering
- Pro Rata
- Temporary Pro Rata
- Pro Rata with generators taking the risk

and has opted in favour of Pro Rata as the option which gives the best opportunity to new entrants, particularly in the period post 2020.

The MRIA also rejects the assertion of a connection between 'non-firm' connections and curtailment. It is anticipated that many early wave and tidal generators will receive 'non-firm' offers, and therefore any curtailment based on a firm/non-firm split will adversely and unfairly effect non-firm generators. It is our understanding that 'non-firm' offers are given on the basis of possible network constraints, which are a local network issue. Curtailment on the other hand is a system stability issue based on the entire SEM. Linking non-firm and curtailment will be detrimental to the emerging ocean energy industry.

In addition, the Association believes that the paper is over focused on wind and takes no account of the scope for wave and tidal energy's potential to peak at different times to wind and neither does it de facto take account of the unique enterprise and job potential dimension to ocean energy. The MRIA, as the industry representative for wave and tidal energy, welcomes the opportunity to consult on this paper and would propose a meeting in the future with SEMC to discuss the emerging ocean energy sector.