Wave Energy Policy in Ireland

Introduction

It has been widely recognised for a number of years now that Ireland has one of the best wave energy resources in the world. The reality today, however, is that, after a number of years of investment in Ocean Energy in this country, no full-scale Wave Energy Device has been deployed anywhere around the coast of Ireland. The nearest have been two 1:4 scale devices deployed at the Galway Bay test site – a site which remains totally under-utilised. Taking the longer-term view, it is evident that individual commercial wave farm installations will require investment of tens to hundreds of million euro but the pathway to having Irish companies well-positioned to either lead or otherwise be involved in these projects is littered with obstacles and unclear as one looks to the future.

As the association of Irish wave energy development companies, whose members have already collectively invested their own monies to the tune of several million euro, IWEDA is not happy with the very limited state support that our members have received to date. In terms of policy, we want to highlight the fact that there have been several state bodies involved in developing Ocean Energy in Ireland now for a number of years: having spent large sums of money they have failed to deliver in any practical sense.

This paper looks at the reasons for this failure of policy and how we can build an industry using the existing infrastructure.

Background

Institutions

The state institutions involved in Ocean Energy are.

1. Department of Communications Energy and Natural Resources (DCENR).
2. SEAI - Ocean Energy Development Unit (OEDU)
3. HMRC - Hydraulics & Maritime Research Centre in UCC, now being renamed the Beaufort Centre
4. IMERC- Irish Marine Energy Research Centre
5. MaREI which includes UCC, NUIG, UL, NUIM, UCD, NMCI, the Marine Institute, Teagasc, and The Geological Survey.
6. Smart Bay
7. ESB

The above list contains 15 different state institutions involved in Wave Energy in some form or another. IWEDA estimate that there are 15 wave energy development companies in Ireland. In effect, we have a situation where for every company involved in wave energy development there is one state institution. .

Infrastructure

Ireland has some of the finest test facilities in the world with the capability of bringing a project from concept stage towards full scale commerciality.

- **Hydraulics & Maritime Research Centre** currently based at University College Cork has an Ocean wave test basin with full 6 DOF data capture, a wave flume, a rotational test rig and a linear test rig. It can test 1:20 to 1:50 scale devices and power take off devices. These facilities will be improved and enhanced when they move to the new Beaufort research centre which is currently under construction.
- **Galway Bay Test Site.** This is a 1:4 scale site. It is located 1.5Km offshore with a water depth of 23m and has 2 berths. The test site includes a power and data cable which runs to/from the shore station in Spiddal which transmits power to the site as well as relaying data from the site. The cable will also be connected to a large power buoy which will be used to dissipate power from devices being tested.
- **Atlantic Marine Energy Test Site.** This is a fully-exposed full scale test site being developed off the coast of Mayo. The purpose of AMETS is to test the performance of pre-commercial wave energy devices in extreme open ocean conditions.
- **West Wave** The ESB is currently going through the consenting process for a full-scale 5MW grid-connected wave farm off the coast of Clare. It is not clear where the technology to be deployed in this site is going to come from. In their latest newsletter they say: *"ESB will continue to monitor progress against our technical maturity requirements".*

Funding
Under The Ocean Renewable Energy Development Plan recently announced by Minister Pat Rabbitte there will be an additional €16.8M allotted to Ocean Energy (€14M in capital and €2.8M current). This will bring the total budget for 2013 to 2016 up to €26.3M. A further €19M has been granted to the MaREI project by Science Foundation Ireland. In addition to this, Minister Rabbitte has committed to an extra €30M for the prototype development fund for 2016 to 2018. It may appear that there is no shortage of funding.

Where has it all gone wrong?

As can be seen from the above we have numerous institutions involved in developing Ocean Energy. We have (or will have) world-class infrastructure for testing devices from concept to commerciality, and substantial funding.

So why have we come to the point where there is not one Wave Energy Device deployed anywhere around the coast of Ireland, and the Galway Bay test site is largely lying idle and has been for a number of years?

The policy seems to be "*If we build it, they will come".* As with the tech world, it was believed that multinational companies would set up in Ireland and create an Industry. This is now unlikely to happen. The large players are all strapped for cash and some have gone to the wall as equity investment for Ocean energy has completely dried up. Those still operating have opted for Scotland.

In 2009, the Ocean Energy Development Unit within SEAI produced its Ocean Energy Road Map. The first step on this road was *Support pilot projects, new concepts.* This was to be done through the Prototype Development Fund. The administration of this turned out to be a disaster with some of our members waiting up to 18 months to get approval for relatively modest grants. This was potentially a killer punch to the industry and made it nearly impossible to keep teams together. This proposed grant was administered alongside domestic home improvement grants. The bureaucratic constraints imposed were not at all suited to research and development. Recent discussions between IWEDA and SEAI have led to some improvements but much more radical reform is needed.

As a result of all the foregoing domestic Irish developers are struggling to get past the early prototype stage. Two Irish companies did manage to get to ¼ scale testing in Galway Bay but one has since gone into liquidation.

How can we build a Wave Energy Industry?

First we should re-consider "Why" we should devote resources to this sector. Much is spoken about Ireland's geographic location advantage in agriculture and in wind energy. In fact there are other countries with various agricultural advantages, and steady wind flows in the US prairies are preferable to Irish wind conditions. But there is no country in the world, repeat none, with a wave energy resource as intensive as ours in Ireland. In the right circumstances this offers firstly significant possibilities of electricity generated from wave energy that also greatly improves the usefulness of wind energy. But the real clincher for putting serious effort into wave energy is that while we have long since lost any possibility

of leadership in wind and must buy in the technologies and most of the hardware, there is still no successful wave energy in the world so that with many dedicated technology developers in Ireland we stand a real chance of achieving world leadership. This could employ thousands and be a major contributor to the economy. Such a potential prize for Ireland is unique to wave energy. – But only if we put the right measures in place.

At the moment we have an expensive, publicly-funded Ocean Energy ***Research and Infrastructure*** industry. This is not sustainable in the long run. The political will to fund this will not last forever. The most it is likely to achieve, and that at very high cost, is the use of imported equipment, expertise and technology to generate some Irish electricity from waves.

We need to build a **Real**, economically-viable Industry. We need our own technology and manufacturing. We need to go back to the first step in the 2009 Ocean Energy Road map – "***Support pilot projects, new concepts".*** This will require a complete restructuring of the Ocean Energy Development Unit.

There has been considerable success in Ireland at developing software companies from start-up to global success. This didn't happen by having them wait 18 months to get grant approval for very specific projects from a system designed for domestic insulation grants. No, they were channelled into the Enterprise Ireland High Potential Start-Up unit where there is a huge range of supports. There they are assigned an EI advisor, a mentor, and there is a range of feasibility and R&D grants available to them. In contrast to most EI start-ups, continuity of funding at a low to medium financial level in the early years is absolutely essential in the wave energy domain. Uncertain, stop-go funding is not adequate or useful to the wave energy entrepreneur and to the taxpayer and most likely a waste of money.

All Ocean Energy start-ups are HPSUs. If even one is successful, the global market for the technology is very large - worth at least several billion euros. This overall view is supported by evidence such as the recent €130M DCNS investment in OpenHydro, the Irish tidal stream energy company, bringing its total ownership share to close to 60%.

The Ocean Energy Development unit is not short of funding but it is short of staff. There are only 2 people and even these are not full time. How the public service is organised, is way beyond the scope of this paper, but a way has to be found to expand and radically change this situation. This may involve moving the OEDU to another home such as The Marine Institute or IMERC or to EI if that were possible.

The Prototype Development Fund as it stands is reasonably fit-for-purpose for early stage concept verification. But if Irish companies are to succeed we need improved funding mechanisms. The 70% funding of certain costs (no overhead costs are accepted) that may be obtained through the existing SEAI OEDU funding may seem very generous, but in a field of R&D that moves forward over a long time in increments of development, finding the other 30% plus overheads plus funding when no grant is being received, becomes quite impossible for the enthusiastic entrepreneurs involved. They / we do not expect it should be a free ride – far from it, most of our entrepreneurs and their staff run for years on little or no pay for themselves – we accept it is reasonable that funding assistance should bear a reward for the funder, in this case for the taxpayer. We need a mechanism that allows e.g. the OEDU to invest in us by way of Redeemable Preference Shares similar to a High Potential Start-Up

funding for Wave Energy. This might usefully be administered by Enterprise Ireland who have major such experience.

Another anomaly in the prototype development fund is the fact that when a company deploys a device at sea the support reduces from 70% to 45%. This makes no sense. When a company reaches the most expensive point in its development the support is reduced.

As already described, we have over 15 different state institutions involved in Wave Energy. We have 135 full-time researchers working on Ocean Energy. The output from these 135 researchers seems to be academic papers which are delivered at International Conferences and thus are of little direct benefit to Ireland. Research institutions such as IMERC and MaREI have not yet been of any help to IWEDA members. When we use the facilities at HMRC we are charged full commercial rates. These bodies should also become more involved with IWEDA members to help them improve their technical competence.

Currently, the leading R&D of a number of IWEDA members has been carried out under the EU MARINET programme. While being very useful, the limitations of this support are that it is strictly for testing only and all the funding passes through the research institutes. It is also due to run its course shortly with uncertainty over future plans. This scheme offers no financial support to companies to develop prototypes or technical projects prior to testing.

A number of IWEDA companies have reached the stage where they are looking to test their devices at a benign site at roughly 1:10 or 1:15 scale and consider this an important and cost-effective step before venturing on to larger test facilities like Galway Bay. Both sheltered marine sites and lake sites with sufficient fetch and other conditions are being considered. IWEDA expects this to enable its members to minimise the expensive errors and mistakes that can arise at larger scales and that have been the costly experience of others.

Currently the OEDU is supporting the AMETS test site and is also grant-aiding the ESB in developing West Wave. There is a lot of duplication of effort involved. Both have to:

- measure the resource
- consult with local stakeholders
- carry out bathymetric surveys
- obtain required permissions
- lay submarine cables
- build sub-stations and connect to the grid
- Administer all of the above.

We should look at the possibility of merging these 2 projects onto one site. The site could start off as a test site and develop into a full-scale wave farm. The savings achieved could be used to finance the recommendations contained in this paper.

Funds are still being spent on infrastructure that is unlikely to be used for some years at best – akin to building the motorway before there is any traffic. A re-examination of priorities could well release the funding that would enable the technology development sector that IWEDA represents to flourish.

Conclusions

We can build a self-sustaining economically-viable Wave Energy Industry in Ireland but we need a change of direction in policy and the way that policy is administered.

Recommendations

- The Ocean Energy Development Unit should be completely restructured to *Support Pilot projects, new concepts.*.
- It or some other body should establish a High Potential Start Up unit for Wave Energy Companies
- This should enable offering the same range of incentives to Wave Energy Companies that Enterprise Ireland offers to Tech Start ups
- Consideration should be given to moving the OEDU to The Marine Institute, IMERC or Enterprise Ireland.
- The staff shortage in the OEDU should be addressed.
- HMRC, IMERC, MaREI should give technical encouragement and support to early-stage Wave Energy Developers
- Access to test facilities; HMRC should be allocated a % of the overall development budget so that developers could apply directly to HMRC for certain specific supports, simplifying the current admin circle. An Irish version of Marinet should be considered.
- IWEDA should be afforded on a stand-alone basis the moral support all of the relevant aforementioned agencies by way of recognition of its status in representing the wave energy technology and development industry with inclusion in all relevant activities and sharing of information.
- Support for companies who wish deploy in the Galway Bay test site should be 70% rate not 45% as at present.
- AMETS and West Wave should be merged with resulting savings used for the High Potential Start Up unit for Wave Energy

We believe that these recommendations could be carried out within existing Ocean Energy budgets without any extra cost to the exchequer.

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