Submission, Part 3, to Department of Environment, Communications and Climate concerning aspects to *Offshore Renewable Energy Development Plan 2*

The first Part of this Submission[1] established the development position of Floating Offshore Wind (FLOW) and, also, provided data in a chart form[2] of all known prospective Offshore Renewable Energy (ORE) projects *seeking investigative licences*, as of January 2021. The second Part dealt with the issues around achieving 5GW deployed at sea by 2030[3]. This, final, Part concerns Marine Renewables Emerging Technologies (MRETs).

1. Background

The Marine Renewables Industry Association (MRIA) was established, in February 2009, to support marine renewables of all types. It focused initially on wave and tidal energy ('ocean energy') which were the principal public policy interests at the time. The Association has since turned to marine renewables generally as the market opportunity in Ireland for offshore electricity has opened up. Nonetheless, we retain a particular interest in the emerging technologies - we term them the Marine Renewables Emerging Technologies (MRETs) - which today not only include wave and tidal energy but also floating solar energy and 'hybrids' which are single platforms which can extract power from two or more renewable energy sources, e.g., wave and wind. Indeed, floating wind technologies are just graduating from the MRET category and are vital to exploiting our Atlantic resource in particular while our wave resource remains an outstanding prospect for the future. Ireland has, arguably, the world's most energy intensive waves with a resource estimated by *Offshore Renewable Energy Development Plan* 1[4] (OREDP 1) at as much as 31GW, principally off the Atlantic coast. Exploiting that resource has long been an ambition of the State. Minister Ryan, as far back as 2007, set a deployment target, which became policy, of 500MW of 'ocean energy'[5] (wave and tidal) in the water off Ireland by 2020.

This pioneering effort was backed up by substantial investment during the Great Recession: the Beaufort Building and the LíR National Ocean Test Facility in University College Cork were built at that time to facilitate the development of MRETs; the 'SmartBay' and AMETS State test sites advanced; SEAI operated a crucial Prototype Development Fund; and the SFI MaREI Centre with a focus on marine and renewable energy was established which has since collaborated with in excess of 50 industry partners and, through peer review, has been recognised as a global leader in the offshore renewable energy research field.

[1] Submitted to DECC on 22/12/2020
[2] The latest update on this was sent to the DECC on 5/1/2021
[3] Submitted to DECC on 11/1/2021
[4] *Offshore Renewable Energy Development Plan* Department of Communications, Climate Action and Environment, February 2014
[5] wave + tidal energy = *ocean energy* + wind energy etc = *Marine Renewable Energy* or *Marine Energy*

This investment has been translated into tangible impacts including:

- A number of technologies progressing through TRLs to securing real-sea projects (e.g., Ocean Energy, GKinetic, Sea Power)
- Early-stage technology developers achieving success in international competitions and programmes such as the EU's Horizon 2020, Wave Energy Scotland and the US Department of Energy *Wave Energy Prize*.
- Publicly funded technologies finding commercial applications outside wave and tidal, including offshore wind, floating wind and aquaculture.
- Irish R&D funding was shown to have been the most cost-efficient in delivering installed ocean energy capacity in the period 2007-2016[6]

However, wave energy technology - the main component of ocean energy for Ireland[7] - has been slower to reach commercialisation than anticipated. This led, for example, to the ESB placing their WestWave project (5MW off the Clare coast) on hold, although the Western Star project[8] has since emerged in approximately the same area[9] which reflects recent advances in wave energy knowledge. All offshore energy technology takes time to 'hatch' and become competitive. It is instructive to recall that no commercial offshore wind farms existed anywhere pre-2000 and, indeed, the existing Arklow wind farm is among the oldest in the world. There are now over 22GWs of European offshore wind capacity (including over 3.6GW commissioned in 2019 alone, the most recent date for which data is available) with a total of 5000+ turbines installed off 12 countries[10].

Wave and tidal energy technologies are now firmly located on the development pathway. They are being supported internationally - €3.84bn (€2.7bn from the private sector) was spent on R&D in the period 2007-2019 on wave and tidal energy. Wave and tidal energy have recently become a priority of the European Commission[11] which has just set a target of 100MW deployed by 2025; 1GW (c90% in Europe[12]) by 2030 and 50GW (5% of forecast European electricity demand) by 2050.

A major driver of this ambition is the fact that the world *wave and tidal* (i.e., wave and tidal) sector is dominated by EU companies, patents etc and the Commission has high expectations of major new supply chain companies and a new EU industrial sector emerging. There are over 300 ocean energy technology companies globally - most of them are in the micro category; the EU accounts for the bulk of them and as much as 10% of the

[6] Hannon & van Diemen (2016) *An international assessment of ocean energy innovation performance*
[7] Ireland has no significant tidal resource although it has been a pioneer in the field with companies such as GK Kinetic. Northern Ireland has a notable tidal resource off the Antrim coast.
[8] www.westernstarmarine.com
[9] Western Star is promoted by Simply Blue Energy and also involves 5MW
[10] *Offshore Wind in Europe - key trends and statistics in 2019* www.europwind.org
[11] *An EU Strategy to harness the potential of offshore renewable energy for a climate neutral future,* European Commission, November 2020. The targets set by the Commission do not differentiate between tidal and wave energy

[12] *2030 Ocean Energy Vision* Ocean Energy Europe 2020

global total are located in Ireland[13]. The Irish Climate Action Plan supports emerging offshore renewables technologies (Action 26 *Support the ocean energy research, development and demonstration pathway for emerging marine technologies (wave, tidal, floating wind) and associated test infrastructure)* as does the Programme for Government (*Introducing a transformational programme of research and development, to ensure that Ireland is at the cutting edge of scientific and technological innovation in meeting our climate change targets, including..... in wave technology,* p33).

The Irish NECP[14] includes the potential to develop up to 30MW of ocean energy by 2030 (110MW by 2040 - considered a significant underestimate by MRIA) under the 'With Additional Measures' (WAM) scenario.

2. The case for supporting the emerging technologies

The Irish offshore renewables opportunity is twofold: the GENERATION OF ELECTRICITY and the development of an IRISH SUPPLY CHAIN to service both the indigenous and international markets.

As illustrated in Table 1 below, the electricity opportunity (i.e., the generation and sale in domestic and export markets of electricity generated offshore) is being addressed by actions to achieve the 5GW target, the proposed plan for 30GW of FLOW off the Atlantic referenced in the Programme for Government etc. The early supply chain opportunity is married to some extent to its electricity counterpart: individual, project-related (perhaps temporary) final assembly facilities, O&M support etc will occur naturally although 'choke points' in terms of port facilities, for example, may yet arise at an early stage.

ORE technology	Irish resource	Electricity opportunity	Supply chain opportunity	Comment
Bottom fixed wind	Excellent wind resource - speeds, availability etc - off all coasts	Key to achieving 2030 target of 5GW of ORE	Focus will be on final assembly, installation and on-going Operations and Maintenance (O&M). Limited export opportunity?	A mature technology. Scale of possible local market is limited
Floating wind (FLOW)	As above	As above, and key to exploiting west coast - *Programme for Government:* 30GW FLOW 2030s ambition	Ireland's resource represents a significant global FLOW opportunity. Opportunity for Irish companies/ opportunity to attract FDI across the supply chain spectrum	FLOW is maturing fast. Consensus that it is at an early commercial stage

[13] Source: www.emec.org.uk

[14] *Ireland's National Energy and Climate Plan 2021-2030,* 2020, www.gov.ie/en/publication/0015c-irelands-national-energy-climate-plan-2021-2030/

Wave	Excellent off west & south coast, one of the most energy intensive wave regimes world wide	Substantial opportunity in 2030s with focus on exports	Important Irish presence already in global emerging sector. Again, scope to develop Irish companies/attract FDI across the supply chain spectrum for both domestic and global markets	Wave is now part of EU energy policy with significant ambitions in 2030s
Tidal	Limited to locations of high current speeds with technology as currently envisaged but opportunity now off Antrim coast	Limited	Given Irish expertise (companies; R&D), opportunity to develop local companies and attract FDI (ORPC, Verdant already here)	Opportunity is confined to developing supply chain for global markets. Also, tidal is an EU priority
Other	'Hybrids' - wave/FLOW + floating solar etc at early stage	Limited for local market but could contribute to electricity exports in 2030s	Again, opportunity to develop supply chain to cater for upper-end opportunities based on Irish facilities, expertise and reputation	Opportunities are medium term

Table 1: status of offshore renewables technologies and potential opportunity for Ireland. *Source*: MRIA

However, the core of the supply chain opportunity lies in generating significant onshore investment and the creation of sustainable employment in coastal communities through the MRETs - particularly floating wind and wave energy. Ireland has a natural and major advantage in terms of its wind and wave resource and its micro companies, its facilities and its expertise (including in tidal energy) are to the forefront globally. These new technologies are on a typical technology development journey[15] and at this stage no dominant country or companies have appeared. In contrast, fixed offshore wind has seen a convergence in suppliers of high-value components such as turbines (the top two suppliers account for 90% of all connected capacity) and cables (three suppliers account for all projects in Europe)[16]. There is, therefore, an opportunity to 'shape' a new Irish energy technology sector to cater for both domestic and export needs in an industry that has yet to see such consolidation. Uniquely, it would largely be focused on and directly benefit coastal communities, notably those in traditionally deprived west of Ireland areas.

Why should this be of direct importance to *energy* policy makers, given that the Department of Enterprise Trade and Employment (DETI) and its agencies (IDA Ireland and Enterprise Ireland) have primary responsibility for industrial development issues? There are three valid responses. First, the DETI family focuses, and always has done so, on relatively short-term targets (e.g., exports, jobs approved). *They do not deal at all with the micro companies, early*

[15] This is elaborated on, and sources cited, at *Collaboration and Innovation challenges faced by the Ocean Energy sector and possible solutions*' May2018 www.mria.ie

[16] WindEurope, *Offshore Wind Energy: 2020 mid-year statistics*

R&D support, test facilities etc that are a feature of the MRETs sector at this stage of its development. Thus, second, the agencies will 'take over' the supply chain challenge some years hence once the MRETs sector begins to mature e.g., Irish companies of the scale necessary to qualify for Enterprise Ireland support start to emerge (see EI Offshore Wind Cluster launched in 2019[17]) and an FDI 'market' (in e.g., wave technology firms) grows to the point where it makes sense for IDA Ireland to compete. However, there won't be any sector of note to mature unless a support regime is put in place again now.

Finally, there may be public support challenges for offshore renewables - now evident in Scotland[18] for example - if the perception of local interests is that Ireland has failed to reach out for opportunities which are currently open to us. The principal scope, as Table 1 above illustrates, is to advance quickly and make visible a proactive effort to extend beyond the electricity opportunity (and its related O&M etc) to a strong and sustainable supply chain opportunity by providing support to the emerging technologies.

3. Strategy to support the MRETS

The Association is cognisant of the pressure on Departments to finalise and implement the offshore renewables legislative (e.g., MPDM) and policy (e.g., OREDP 2) framework to enable the energy community - industry, utilities and Government and its agencies - to achieve the 2030 target of 5GW deployed at sea. One side effect already is that support for the Marine Renewables Emerging Technologies - n.b. reinstatement of SEAI's Prototype Development Fund; implementation of findings in DECC's Interim Review of OREDP 1[19] - has stalled and is, e.g., 'out of sync' with the ambitions in this area as stated in the Programme for Government etc.

We are concerned that OREDP 2 may be focused solely on the 5GW 2030 goal and/or the ambitions for the 2030s without significant, or perhaps any, reference to the Marine Renewables Emerging Technologies.

In light of these issues, MRIA propose that a two-stage approach to the support of the Marine Renewables Emerging Technologies be adopted. In summary, the focus in OREDP 2 should be on some defined 'quick wins' to put Ireland back into the MRETs business with wider development issues being tackled in a separate policy effort at an agreed later date.

It is critical to the future of MRETS and, arguably, to the sectors survival in Ireland that five issues be tackled immediately: restoration of the Prototype Development Fund; extension of the de facto definition in policy of emerging technologies as being just wave and tidal energy to include other approaches; revision of the special tariff incentive set for emerging technologies in OREDP 1; provision of multi-annual funding towards the costs associated

[17] https://irishadvantage.com/irish-offshore-wind-technology/

[18] See e.g., the *Financial Times* 'Vision of industrial rebirth from wind runs out of puff', 8/01/2021, for a report of issues in Scotland arising from concerns about the industrial benefits, or more accurately, a perceived lack of benefits, from offshore wind development

[19] *Offshore Renewable Energy Development Plan (OREDP) Interim Review* May 2018. Department of Communications, Climate Action and Environment

with the operation of *existing* State (Galway Bay Marine & Renewable Energy Test Site - 'SmartBay' - and the LíR National Ocean Test Facility) and *developing* (Atlantic Marine Energy Test Site) test facilities ; and priority assessment for MRETs in the consenting process.

All of these tasks are possible without significant further policy work being required. The measures proposed are summarised in Table 2. They are consistent with the recommendations of the Interim Review of OREDP 1 published in 2018[20]

Initiative	OREDP 1 *Interim Review* recommendation	Comments
1.Restore Prototype Development Fund	R.09	Assessment of PDF recommended in the *Interim Review* has been completed and made available by SEAI. Further studies e.g., by MRIA[21] and SEAI have presented further funding mechanisms suited to advancing MRET development, and a wealth of learning has been gained through Irish leadership in European initiatives such as OPIN[22] and MEA [23] to influence the refinement of the model. Also, the European Commission has committed to review and simplify State Aids procedures for such schemes.
2. Extend support tariffs for emerging technology demo projects	R.13	The extension proposed was to include floating wind and hybrid wind/wave technologies. Suggest that this be amended to *'marine renewables emerging technologies as determined from time to time by SEAI'* to enable inclusion of technologies as yet unknown and, also, in time to eliminate categories that reach maturity.
3. Review proposed tariff of €260/MWhr and 30MW quantum	R.13 Note: 'delivery date' set in OREDP Interim Review as 2018/19'!	OREDP 2 could *propose* a short consultation on these twin issues prior to determining revisions. Note that approval of both the level of support and the quantum of MW involved are likely to benefit from the 'State Aids' review, including approval processes, referred to above.
4. Multi-annual Test Site funding	Linked to R.05, R.22	Facilities to support the trial and validation of novel technologies are vital to allow developers to commercialise technology developments.

[20] Interim Review of OREDP op cit

[21] *Funding the Development of the Ocean Energy Industry in Ireland* (2016), http://www.mria.ie/documents/a524d9555b5a39944adbd8d7c.pdf

[22] Ocean Power Innovation Network https://www.nweurope.eu/projects/project-search/opin-ocean-power-innovation-network/

[23] Marine Energy Alliance https://www.nweurope.eu/projects/project-search/nwe-mea-north-west-europe-marine-energy-alliance/

5. Give priority in the consenting system to demonstration projects and to State test facilities	Linked to R.05, R.22	New technologies need to be tested and demonstrated. Quick execution, in line with the MPDM, is vital to maintain national competitiveness and to protect small companies' vulnerable cash positions which are always highly 'delay sensitive'. Facilities at the State test facilities e.g., 'AMETS' need to be amended from time to time e.g., deployment of new cables and, as such, provisions should exist to facilitate this

Table 2: Proposed initiatives to support MRETs under OREDP 2 *Source*: MRIA

The second part to the support strategy for MRETS would be to tackle support for demonstration projects at 1. the higher Technology Readiness Levels and 2. demonstration projects at the pre-commercial TRL (TRL8) to give Ireland a comprehensive 'offer' to attract entrepreneurs and to enable the later development of a commercial offshore renewable energy supply chain. We have developed views[24] on how both categories should be supported but have focused here on the priority issue of restoring the core supports for the emerging technologies, typically at the early TRL levels. In our view, development and implementation of the second part of the policy should be a commitment for execution in 2022 i.e., post the completion of OREDP 2.

[24] See Funding the development of the ocean energy industry in Ireland., 2016, MRIA http://www.mria.ie/documents/a524d9555b5a39944adbd8d7c.pdf