Marine Renewables Industry Association

22 December, 2019

Submission to Public Consultation on *The Development of a National Security Strategy*

A. Introduction

The Marine Renewables Industry Association (MRIA) represents the Marine Renewables Emerging Technologies (MRETs) of wave, tidal and floating wind[1] on the island of Ireland. More details may be found at www.mria.ie while MRIA is located on Twitter at @Marineireland.

This Submission responds to the Questions posed in the Consultation notice only in respect of matters that directly impact on offshore renewable energy and builds on the groundwork undertaken by the key renewables' representative bodies in their joint response in 2013 to the White Paper on Defence[2].

The early sections of this Submission set the scene for the responses later to the specific questions posed by the Consultation.

B. Offshore Renewable Energy Resource

The *Offshore Renewable Energy Development Plan* set out Government's view of offshore renewables:

With one of the best offshore renewable energy (wind, wave and tidal) resources in the world, there is very significant potential in utilising these resources to generate carbon free renewable electricity. The development of this offshore renewable energy resource is central to overall energy policy in Ireland [3]. It can enable Ireland to develop an export market in green energy and enhance security of supply.

[1] Wave + tidal energy = ocean energy + floating wind energy = marine renewables experimental technologies + bottom-fixed wind and 'hybrids' of wind and wave = marine renewable energy or marine energy or offshore renewable energy.

[2] www.mria.ie/documents/3634a44cd976462a3cf1f8871.pdf

[3] Emphasis added by MRIA

Greenhouse gas emissions will be reduced, while growth and jobs are delivered to the economy....[4]

The island of Ireland has about one-third of all of the current European Union's total renewable energy resource based on all sources of energy[5]. The offshore energy resource off Ireland is of remarkable scale - see Table 1:

Table 1: Ireland's offshore renewable energy resource. Source: OREDP[6]

Assessment Area	Total amount of development (MW) that could potentially occur within each assessment area without likely significant adverse effects on the environment (taking into account mitigation).				
	Fixed Wind (MW)	Wave (MW) 10 to 100m Water Depth	Wave (MW) 100m to 200m Water Depth	Tidal* (MW)	Floating Wind** (MW)
1: East Coast (North)	1200 to 1500***	–	–	–	–
2: East Coast (South)	3000 to 3300****	–	–	750 to 1500	–
3: South Coast	1500 to 1800	–	–	–	6000
4: West Coast (South)	600 to 900	500 to 600	3000 to 3500	–	5000 to 6000
5: West Coast	500	5000	6000 to 7000	–	7000
5a: Shannon Estuary	–	–	–	Limited potential	–
6: West Coast (North)	3000 to 4500	7000 to 8000	6000 to 7000	750 to 1500	7000 to 8000
Total Development Potential (MW) (without likely significant adverse effects)	**9800 to 12500**	**12500 to 13600**	**15000 to 17500**	**1500 to 3000**	**25000 to 27000**

Towering over every EU country in terms of potential for wave energy is Ireland with a forecast wave potential capacity of 14-31 GW together with up to 3 GW of tidal energy. It should be noted, however, that Northern Ireland has a substantial tidal resource whereas the lower tidal flows in the Republic of Ireland require significant further technological development before cost-effective exploitation can take place.

In addition, Ireland is one of the World's best places for offshore wind of all types:

- ✓ *High wind speeds*, average 10.2m/s, and > 9.5m/s in many regions
- ✓ *Large potential* >35GW (no potential significant adverse effects on environment.)

[4] *Offshore Renewable Energy Development Plan* February 2014, Department of Communications, Energy and Natural Resources

[5] Siemen's presentation, attended by MRIA, on file

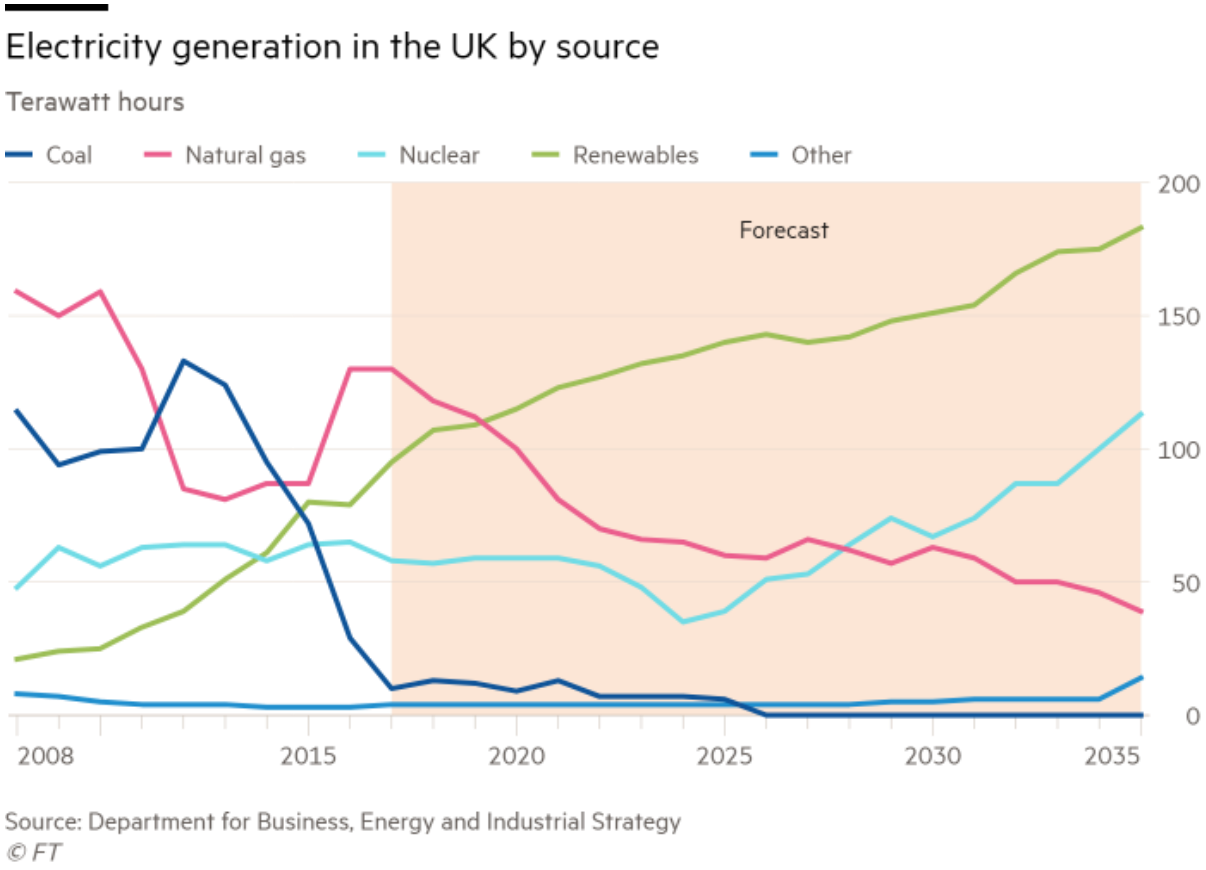
[6] *Offshore Renewable Energy Development Plan* op cit

- ✓ *High full load hours*: > 40%, floating wind to exceed 50%.
- ✓ *Near shore sites*: Low Installation, Ops & Maintenance costs.
- ✓ *Floating sites*: More potential for cost reduction
- ✓ *Multi-disciplinary capacity*: MaREI, Lir NOTF & Industry partners[7]

C. Economic Opportunities

Ireland's support for offshore renewable energy will not just be about exploiting our abundant resources to meet domestic energy needs but also about export - notably to the UK in the first instance, notwithstanding Brexit. The UK's electricity supply is heavily dependent on nuclear energy, as is shown in Figure 1 below

Figure 1: Sources of UK electricity generation. Source: *Financial Times*[8]



[7] From EirWind at MaREI www.marei.ie

[8] *Hitachi pull-out throws UK nuclear policy into disarray* Financial Times 17 January 2019.

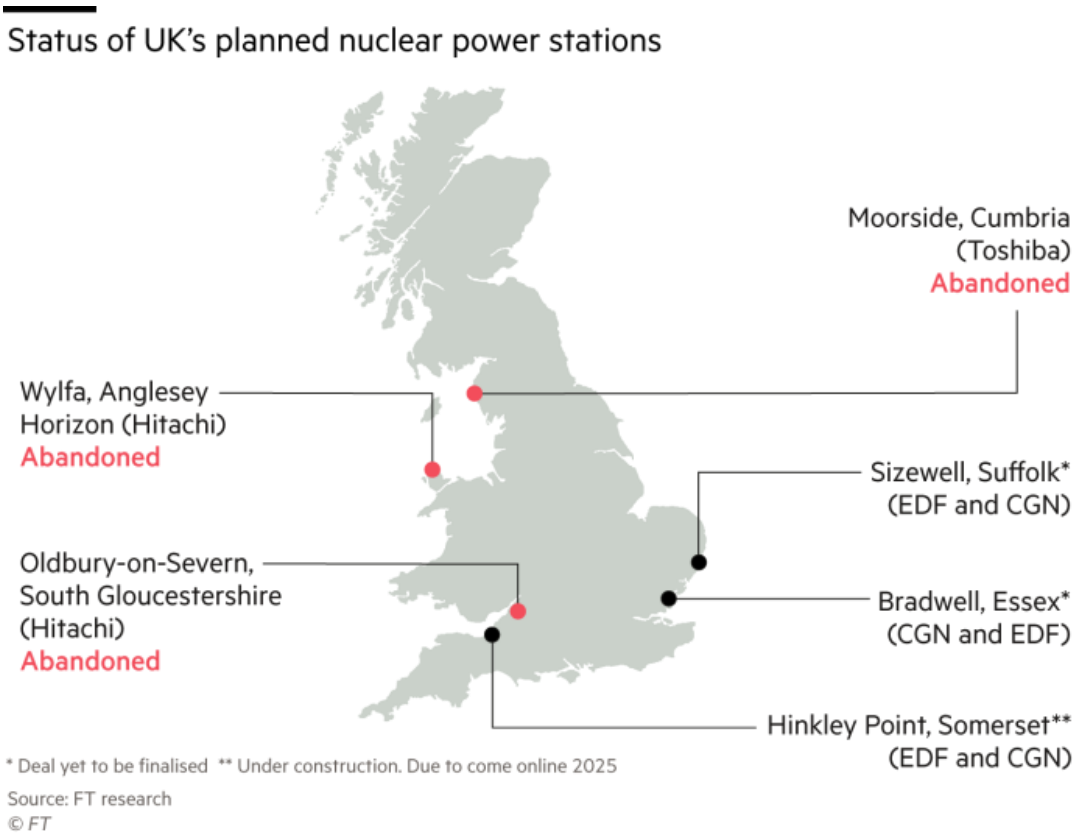


Figure 2: Nuclear challenges Source: *Financial Times*[9]

Despite generous UK Government support (e.g. guaranteed prices to 2035, debt guarantees), three of the key nuclear projects have recently been abandoned (see Figure 2), essentially on grounds of technical and, therefore, financial risk. The indications are that the remaining projects may be at risk. The consequences of this situation are likely to move to the forefront of British political and public concern once the Brexit issue has been finally determined: The UK will scramble for substantial new electricity generation capacity (both to provide for growth and to replace worn-out capacity) and is targeting an extra 30GW from the offshore sector alone by 2030 (with strong suggestions by the Conservatives during the recent election that this target may be raised to 40GW). This will only meet part of the need and Irish offshore renewable energy, commencing with wind projects in the Irish and Celtic Seas, should be well placed to exploit this exceptional export prospect.

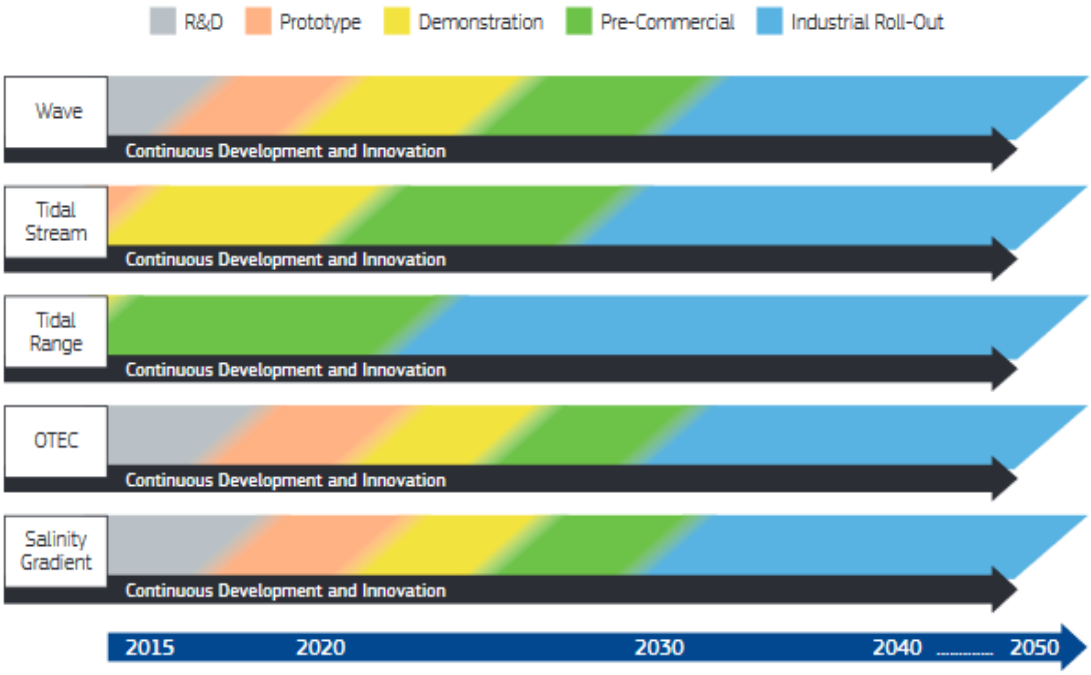
Moreover, Ireland is aiming to exploit the extraordinary opportunity for job and income creation represented by world offshore renewables and become a force in the global offshore renewable energy supply chain.

[9] Financial Times op cit.

D. Deployment Timeframes

Wave and tidal energy are in their formative phase and the current time horizons envisaged i.e. tidal energy being commercially deployed from c2025 and wave energy from c2030, are in line with historic data and trends for *energy technologies as a whole*[10]. Figure 3 shows the consensus European view on deployment timings for wave and tidal:

Figure 3: Time horizons for development and deployment of ocean energy. Source: Ocean Energy Forum[11]



Source: Generated through consultation with the Ocean Energy Forum.

Irish Government policy, set out in the recent *Climate Action Plan 2019*[12], seeks a total of 3.5GW of offshore renewable energy to 2030 for domestic consumption. Initially, this need will be addressed by traditional bottom-fixed wind turbines in the Irish Sea. This type of turbine comprises almost all of the current European offshore wind population of c19GW. Such devices 'stand' on the seabed and are confined to water depths of 50m or less[13].

The early importance of floating wind to Ireland must not be underestimated. Figure 4 shows the relatively limited availability of Irish waters with a depth of 50m or less (the

[10] *Measuring the duration of formative phases for energy technologies* Bento and Wilson published in *Environmental Innovation and Societal Transitions Journal 2016, Vol 21, pp.95-112.*

[11] *Ocean Energy Strategic Roadmap Building Ocean Energy for Europe* 2016 Ocean Energy Forum

10 www.dccae.gov.ie/en-ie/climate-action/publications/Documents/16/Climate_Action_Plan_2019.pdf

[13] There are two known exceptions which go marginally over 50M - SSE's Beatrice farm off Scotland and the possible SSE site at Braymore Point, Dublin

parameter within which bottom-fixed offshore wind generally must operate) particularly in the Irish Sea. This consideration, plus the likely impact of restricted areas due to environmental considerations, and, also, the potential for public reaction to projects deemed visually intrusive (i.e. bottom fixed wind farms installed near to shore) all suggest that the need for floating offshore wind and wave energy (both normally require a minimum depth of 50m to operate in) will arise faster than currently anticipated. Floating wind developments will take place mostly in the Celtic Sea to begin with and later off the west coast.

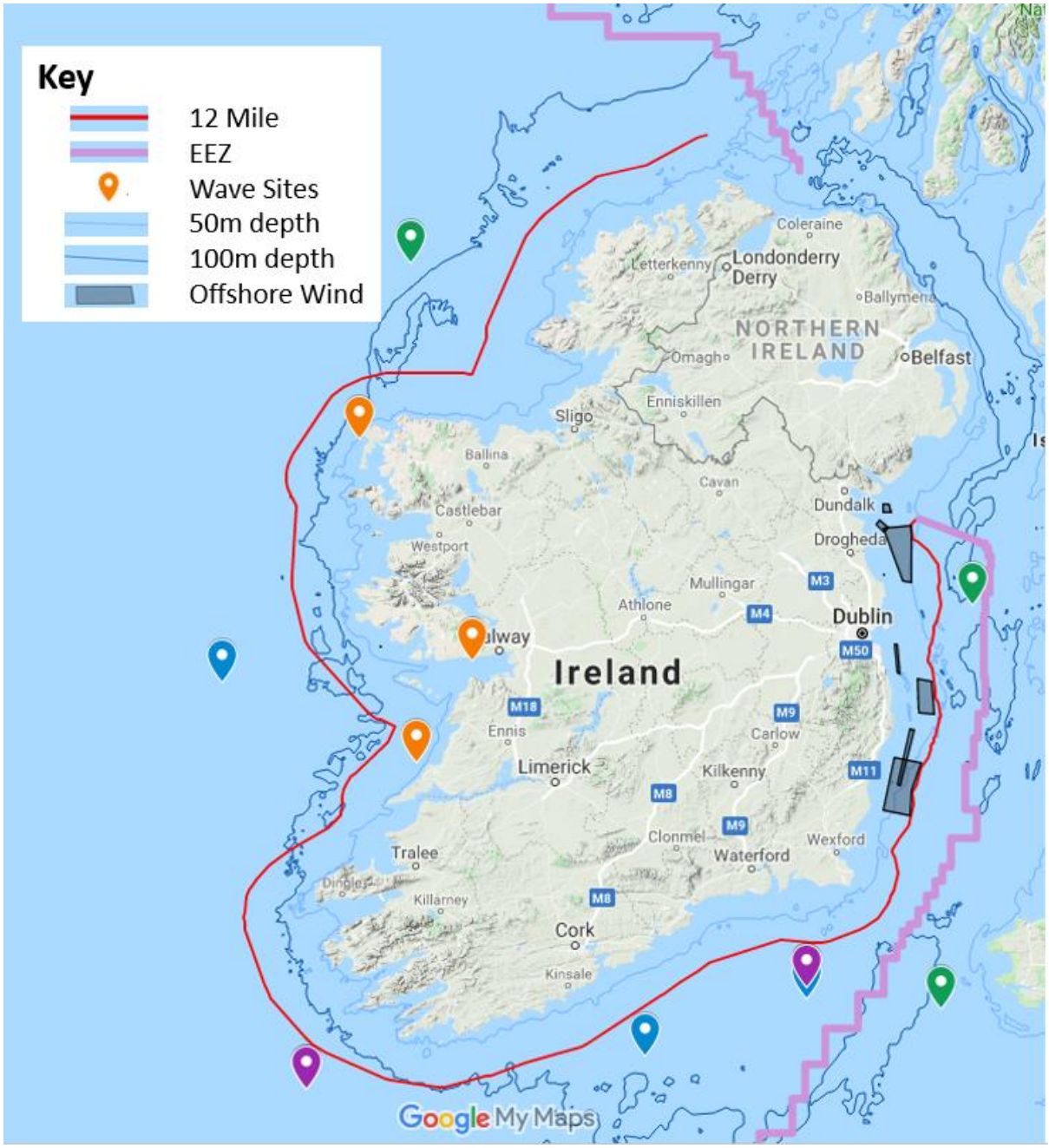


Figure 4: Availability of sea space with depths to suit different marine renewable technologies. Source: MRIA[14]

[14] See *Marine Spatial Planning Needs of Marine Renewable Emerging Technologies 2018*. Available at www.mria.ie/publications

There is a growing consensus that floating wind will have developed to technology maturity by the mid-2020s although today the floating wind industry consists almost entirely of Equinor's[15] Hywind 30 MW park off the Scottish coast. Global growth to at least 30 GW is forecast by 2030 - see Figure 5 - and will entail a more accelerated rate of growth than was seen in practice for onshore and bottom-fixed offshore wind. The potential for Ireland is obvious: we have Europe's highest offshore wind speeds with a potential of 35-40GW (of which 25-27 GW is near to shore and thus particularly economical to develop) of floating offshore wind electricity generation potential[16]. Floating offshore wind is likely to have a lower visual impact and will in time be located 'over the horizon' (as will wave energy) which will both address public concerns about visual impact and open up new resources.

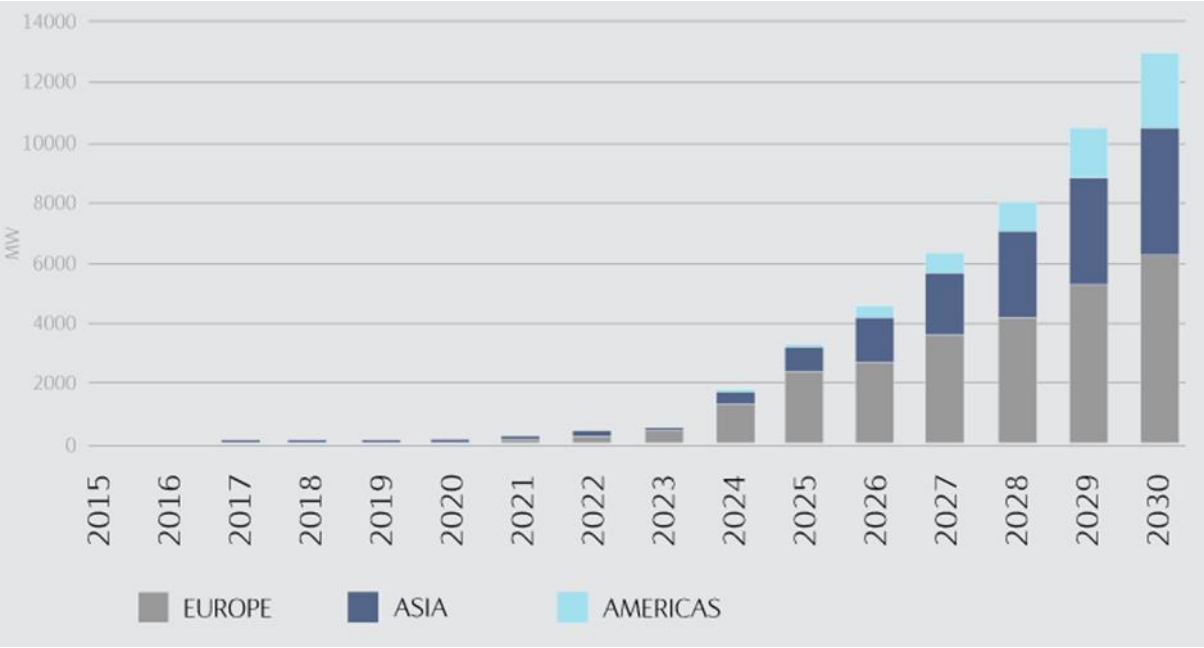


Figure 5: Forecast market for floating wind. Source: Equinor

The key driver for Irish offshore renewable energy is, of course, the recently adopted *Climate Action Plan 2019*[17] which inter alia has set a target of RES-E: 70% by 2030. In practical terms, this means that, on average, 70% of our electricity generation will be from renewable sources by 2030. This is a remarkably ambitious target - no country has achieved anything close to RES-E of 70% and in time it may have to be raised e.g. in light of the new EU Commission's developing *Green Deal*[18] drive. The scale of the investment

[15] Previously known as Statoil
[16] Source: see Eirwind project at www.marei.ie
[17] www.dccae.gov.ie/en-ie/climate-action/publications/Documents/16/Climate_Action_Plan_2019.pdf

[18] www.ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

required by the 70% RES-E target alone is illustrated by the fact that Irish onshore wind generation capacity today is at about the same level as the amount now targeted for offshore (3.5GW) in just ten years' time and from almost a standing start - Arklow, the world's second oldest offshore wind farm, has a capacity of only 25MW.

E. Summary of offshore renewable energy background

Ireland has a remarkable renewable energy resource in its on-and-off shore wind resource plus its wave energy capacity in the Celtic Sea and particularly off the west coast. The key new technologies involved in floating wind and wave are developing along a well-worn pathway set by many other energy technologies and will be major contributors to Irish energy needs and to energy exports in time and to the development of a significant Irish position on the global supply chain for offshore renewables.

Ireland's *Climate Action Plan 2019* sets a demanding, highly ambitious target for offshore renewable energy which must be met, from a standing start, within ten years and which will be added to significantly as Ireland and the EU drive inter alia to a carbon free electricity system by 2050.

OFFSHORE RENEWABLES ARE GOING TO BE CRITICAL TO IRISH LIFE GOING FORWARD. THEY WILL BE VITAL TO NATIONAL ELECTRICITY SUPPLY, LOCATED OFFSHORE, UNMANNED AND, AS TECHNOLOGY PROGRESSES, WILL BE OUT OF SIGHT AND OVER THE HORIZON.

THE DEGREE OF RENEWABLE CAPACITY AND PENETRATION TARGETED BY THE *CLIMATE ACTION PLAN 2019* POSES HUGE TECHNICAL CHALLENGES TO THE NATIONAL GRID. RENEWABLE ENERGY ARISING FROM WIND (ON AND OFF SHORE) AND WAVES IS, BY DEFINITION, DIFFICULT TO PREDICT AND SUBJECT TO NATURE AND, THUS, ANY FURTHER 'DISRUPTIONS' E.G. ARISING FROM A SECURITY EVENT WILL BE VERY CHALLENGING FOR WHAT WILL BECOME A FINELY BALANCED ELECTRICITY SYSTEM. THE NATURE OF OFFSHORE RENEWABLES COUPLED WITH THE INCREASED DEPENDENCE OF THE OVERALL IRISH ELECTRICAL GENERATION SYSTEM ON THEM MEANS THAT THE SECURITY OF OUR OFFSHORE RENEWABLE ENERGY NETWORK MUST BE REGARDED AS BEING OF PARAMOUNT IMPORTANCE.

F. Question 1- *in a rapidly changing world what in your view will be the principal threats to Ireland's national security from 2020-2025?*

Climate change poses a fundamental threat to Ireland's safety because of its likely impact on our food supply and on our energy security. We cannot continue to depend on fossil fuel to e.g. power our electricity generation stations. Government's response to this emerging national crisis has, correctly, placed a great emphasis on moving rapidly to a renewables based electricity system and offshore renewable energy has been set ambitious targets as part of this national drive.

There is unlikely to be any significant scope for threats to offshore renewables in the 2020-2025 timeframe as the first large offshore, bottom fixed wind farms will be deploying only towards the end of the period.

Specifically, RESS-2 (the first State 'auction' for which offshore renewables will be eligible for financial support - Renewable Energy Support Scheme-2 - financed through consumer bills) is planned for 2022. The key wind farms deemed likely to 'win' RESS-2, such as SSE off Arklow and Parkwind off Louth, are already at an advanced planning stage and so could deploy relatively quickly if successful at the auction.....but still will only be operational at full scale towards the end of the 2020-2025 period.

THREAT LEVEL

There may be some potential for conflict between local stakeholders (communities; fishers etc) and the offshore renewables industry but these are most unlikely to pose a serious security threat in 2020-2025. The Government's various recent initiatives to support offshore renewable energy contain, or are being planned to contain, various instruments to build relationships between renewable energy and other stakeholders e.g. opportunity for community investment in offshore projects; formation, initially on a pilot basis, of Coastal Partnerships, perhaps along the lines of those that have proved effective in the UK; and a dispute resolution scheme.

SCALE OF OFFSHORE RENEWABLE ENERGY ASSETS POST-2025

The pace of offshore renewables deployment post-2025 should pick up if the planned 3.5GW of capacity required under the *Climate Action Plan 2019* is to be in place and operational by 2030. Assuming an average of 6MW capacity per turbine for broad illustrative purposes, then current targets will require nearly 600 turbines in Irish waters at a cost of many billions of Euro by 2030!

This offshore capacity will be added to post 2030 as EU and national policies demand a totally carbon free electricity system by 2050. Other building blocks could be added on as export opportunities open up. Moreover, there is always the possibility that planned new terrestrial wind etc capacity - 8.5GW - to 2030 under the *Climate Action Plan 2019* proves impossible to achieve in full due to public reaction. This would undoubtedly lead to an addition to the offshore capacity requirement.

NATURE OF THREAT POST-2025

Offshore wind farms and wave arrays have several common characteristics:

- They are, and will be, very expensive at any level – the typical *device* investment cost projected at maturity of at least c€2m+ per 1MW (and probably a lot more) of wave energy is an example of this.
- Wind and wave devices will be unmanned and, as the technologies develop, will be located far offshore, over the horizon.
- They will be clustered together - which increases their vulnerability - and may involve other complex facilities e.g. consideration is already being given by a number of large companies to utilising floating wind farms off the south and west coasts in the 2020s for the production in situ of hydrogen which can then be transported by converted oil tankers to power electricity generating stations located at ports.
- Offshore renewables will operate in an extraordinarily hostile weather environment, particularly off the west coast.
- Support for offshore renewables after deployment involves port facilities to sustain operations and provide maintenance facilities, both on site and in port. The (substantial) scale of what might be required for Ireland has been spelt out in an MRIA Paper and e.g. may require the development of a new port on the west coast[19].

OFFSHORE RENEWABLE ENERGY WILL BE OPEN TO DAMAGE BY HOSTILE PARTIES AND, CONSEQUENTLY, OUR MEMBERS, INVESTORS AND INSURERS ENGAGED IN MARINE RENEWABLES WILL ALL SEEK TO BE SATISFIED BY THE SECURITY 'ECOSYSTEM' PUT IN PLACE BY GOVERNMENT.

THE POTENTIAL THREATS RANGE FROM EXTREME PROTESTORS WITH A 'CAUSE' TO TERRORIST ATTACKS (E.G. USING TRADITIONAL NAVAL MINES OR IMPROVISED EXPLOSIVE DEVICES OR UNMANNED AIR AND SEA DRONES) SEEKING TO MAKE A MASSIVE IMPACT ON MAJOR IRISH AND, INDEED, EUROPEAN OFFSHORE ELECTRICITY INFRASTRUCTURE AND DESTROY JOBS, INCOME AND EXPENSIVE ASSETS. THE FUTURE OFFSHORE NETWORK IS GOING TO BE UNIQUELY VULNERABLE

[19] www.mria.ie/documents/c4a46712f4cf756fb277c60bc.pdf

AND WILL REQUIRE COMPLEX PROTECTION ARRANGEMENTS RANGING FROM THE GARDAÍ ASHORE TO THE NAVAL SERVICE OFFSHORE AS WELL AS INVOLVING OTHER AGENCIES E.G. THE IRISH COAST GUARD IN A TIGHTLY ARRANGED 'ECOSYSTEM'.

Question 2 *-In your opinion, what strategic goals should Ireland adopt for national security?*

The traditional national security goals have revolved in practice around participation in international peacekeeping and peace support as a part of overall foreign policy, internal security and the provision of a contingency military capability to cater for possible State-on-State conflict. There has been growing development too of a goal about maintaining the security and providing law enforcement in Ireland's vast maritime territory.

The arguments made elsewhere in this Submission make the case for adding a specific goal around offshore renewable energy. Our offshore renewable resource is vast, our electricity generation system in future will depend on it to a significant extent and the potential for exports and supply chain creation is significant and would involve substantial new job creation, particularly in coastal communities[20].

MRIA recommends the adoption of a new National Security Goal:

TO DESIGN, RESOURCE AND OPERATE AN EFFECTIVE SECURITY REGIME FOR THE IRISH OFFSHORE RENEWABLE ENERGY SYSTEM

Question 3 *-In your view, will the traditional national security policies and approaches remain relevant over the coming decade?*

It is beyond the scope of MRIA's remit to comment on wider, new national security issues such as cyber security. However, the comments we make below may apply to other areas of security policy in some measure as well as to offshore renewable energy.

The MRIA is not concerned about the 'hardware' aspect of delivering security services. We are reasonably confident that all of the equipment needed to secure our future wind and wave farms is or will be available in the commercial market place and that the relevant authorities (e.g. Department of Defence) have the experience and skills to procure and to operate them....and should be provided with the financial and people resources to do so.

[20] For supportive arguments, please see, for example, the study commissioned by SEAI and InvestNI: *Economic Study for Ocean Energy Development in Ireland SQW, 2010*

We are concerned, however, about the security 'architecture' needed to safeguard what will become a core asset of the country as a whole. Security architecture might be defined as the legislation, the inter-institutional arrangements, the intelligence fusion arrangements, the contingency planning and how these features are bound together.

Against that background, we make the following suggestions:

1. The National Security Analysis Centre, Department of Taoiseach should take the lead role in drawing together a security plan for offshore renewable energy involving all of the relevant Departments and Government agencies

2. As part of this, a dialogue should be opened with the offshore renewable energy industry about security and such an arrangement should become institutionalised in time by the establishment of a Standing Consultative Committee

3. An urgent examination should be made of any legislative changes needed to provide security to offshore renewables. For example, recent research[21] shows a major gap in international legal arrangements to protect undersea cables on which internet traffic flows. The forthcoming Marine Planning and Development Management Bill will provide for Ministers to propose Strategic Marine Zones to Government e.g. to provide for offshore renewables, for aquaculture, etc. It should be feasible to impose a security regulations regime (e.g. restricted entry to Zones designated for offshore renewables) via this mechanism...but legal advice should be sought by an early date.

3. Lead responsibility for leading offshore security operations should lie with the Naval Service, identified in past Defence White Papers as the State's leading agency at sea. The Naval Service has the experience, expertise and capability to deal with this area which An Garda Síochána do not have (and do not claim to have!) and neither do the Irish Coastguard.

4. A key element will be to create a national offshore intelligence fusion centre with strong links to the Naval Service and with representation from all of the security bodies and other relevant agencies e.g. Eirgrid.

[21] *Patrolling below the horizon: Addressing Ireland's Awareness of our Geospatial Domain* Lt (NS) Shane Mulcahy, Defence Forces Review 2019

Perhaps it is envisaged that the National Security Analysis Centre will segue into that role?

5. The Defence Forces will play a key part in the any contingency plans to respond to security threats. The headquarters of the Naval Service (Cork) and the Air Corps (Dublin) are located away from the Defence Forces HQ (Kildare) which has a strong terrestrial orientation. The lack of integration ('jointness') reflected in this arrangement, in the structure of Defence Forces HQ may pose challenges to the development and implementation of effective plans to deal with offshore security emergencies. We urge that Project 26 of the current Defence White Paper which broadly deals with this issue should be advanced as a matter of priority[22]

6. Generally, we urge that the new National Security Analysis Centre should infuse the whole of Government with a sense of urgency about planning and preparing for the security of a vital and vast new offshore renewable energy whose 'arrival' is quite imminent. One example of why a sense of urgency is required is Project 10 of the Defence White Paper designed to review maritime security requirements.... and marked as 'Paused' in the recent White Paper Review[23].

Question 4 -*What strategic capabilities will the State need to enhance its capacity to support the State and the people from current and emerging threats*

The core missing strategic capability has already been identified in our response to Question 3 above: the lack of a Government architecture to secure offshore renewables.

There are four specific additional issues which require attention from an early stage as developing capability to deal with them will be a multi-year challenge.

First, there will be a requirement to monitor remotely the security aspect of wind and wave farms, possibly including the establishment, for safety as well as security reasons, 'no entry' zones. The experience of the Commissioners of

[22] See *White Paper on Defence- Update 2019* www.gov.ie/en/news/faf1b8-white-paper-on-defence-update-2019/

[23] *White Paper on Defence- Update 2019* op cit

Irish Lights with remote monitoring of navigation aids is one body of expertise that could be drawn upon in this regard and underlines the need for institutional arrangements which draw from the 'whole of Government' and beyond.

Second, a serious potential threat to offshore assets is posed by the rapid development of 'drones' such as unmanned air vehicles and unmanned sea vehicles. These can be purchased readily in the market by individuals and groups and can easily be modified to carry explosives etc. The challenge here is to identify ways and means of identifying and countering such devices if they approach or enter restricted areas around wind and wave farms.

Third, a serious threat will be posed by naval mines which can be readily procured on the 'black' market or built by people with modest engineering skills. The havoc wreaked in the Persian Gulf by simple mines in recent years bears witness to this danger. The Defence White Paper identified this as a capability that needed to be developed and it is disappointing to learn that the relevant Project (No.29F) has been 'paused'[24]. Mine Counter Measures (MCM) have benefited from technology advances in recent years: the modern approach seeks to utilise remotely operated vehicles and is less tied to specialist vessels than hitherto fore. The Naval Service has made some progress in building skills and acquiring at least one remotely operated detection device but much work needs to be done. This area needs to be given priority as developing skills and expertise is a multi-year task.

Finally, deliberation is required over the best way to *patrol* offshore renewable energy assets - for regular physical visits will be required by aircraft and patrol ships in light of 'bad actors' capability to 'ghost' or 'spoof' remote sensors[25] such as radars and surveillance cameras. In addition, thought must be given to how a potential *standby reaction force* should be organised and equipped.

[24] *White Paper on Defence- Update 2019* op cit

[25] See Achieving *Information Superiority' of the Maritime Domain in the Network Age* Lt (NS) Steven Ryan, Defence Forces Review 2019