Submission to Public Consultation

Commission on the Defence Forces

9 March, 2021

1. Introduction

The Marine Renewables Industry Association (MRIA) represents the offshore renewables[1] industry on the island of Ireland with an emphasis, historically, on the Marine Renewables Emerging Technologies (MRETs) of wave, tidal, floating wind and 'hybrids' e.g., between floating wind and wave energy conversion technologies. Our members range from offshore site developers and device makers to utilities to professional bodies and to research organisations. More details may be found at www.mria.ie and in the Appendix.

This Submission responds principally to Question 4 ('Any other comments') posed in the Consultation but also deals with Questions 1 and 3 ('Capabilities' and 'Structure') and does so in respect of matters that directly impact on offshore renewable energy. It builds on the groundwork undertaken by the Association in its response in 2019 to the public consultation on *The Development of a National Security Strategy*[2]. The offshore renewable energy ambition of the Irish Government has expanded significantly since the national security strategy consultation two years ago and there are consequent implications for the defence forces, as will be outlined later.

2. Offshore Renewable Energy Resource

The *Offshore Renewable Energy Development Plan*[3] published in 2014 set out Government's view of Ireland's offshore renewables: with one of the best offshore renewable energy resources (particularly wind and wave) in the world, significant potential to generate carbon free renewable electricity was identified. The development of this offshore renewable energy resource is central to overall energy policy in Ireland. It will reverse our energy security position- we are among Europe's least energy secure countries. Imported gas plus coal are vital drivers of our electricity generating system at present[4]. Moreover, greenhouse gas emissions will be reduced, we can develop an export market in green energy and new jobs will be delivered to the economy. The island of Ireland is the location of perhaps one-third of all of the European *Union's total renewable energy resource based on all sources of*

[1] Wave + tidal energy = *ocean energy* + floating wind, solar marine and 'hybrids' = *marine renewables emerging technologies* + bottom fixed offshore wind energy = *marine renewables* or *offshore renewable energy*

[2] Available at www.mria.ie

[3] *Offshore Renewable Energy Development Plan* (OREDP), 2014, Department of Energy, Communications and Natural Resources

[4] www.seai.ie/publications/Energy-Security-in-Ireland-2015.pdf

energy[5]*, on and offshore*. The offshore energy resource off Ireland is of remarkable scale as is illustrated in Table 1 below.

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**

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

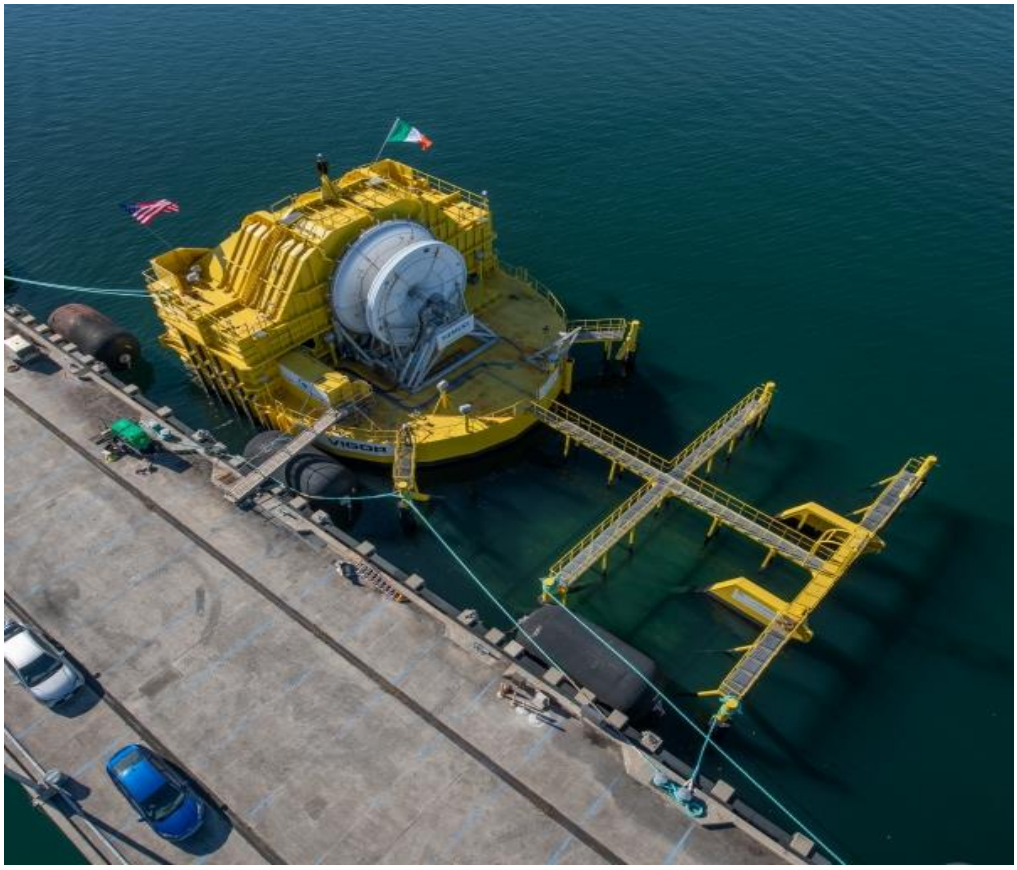
Towering over every other EU country in terms of potential for wave energy is Ireland with a forecast wave potential capacity of up to 31 GW together with up to 3 GW of tidal energy. It should be noted, however, that Northern Ireland[7] has a substantial tidal resource whereas the lower tidal flows in the Republic of Ireland require significant further technological development before cost-effective exploitation can take place. In addition, Irish waters are one of the world's best places for offshore wind of all types with the following features:

- *High wind speeds*: average 10.2m/s, and > 9.5m/s in many regions
- *Large potential:* Nearly 40GW (with no potential significant adverse effects on the environment.)
- *High full-load hours*: > 40%; floating wind to exceed 50%.
- *Near shore sites*: lower Installation, operations & maintenance costs.
- *Significant floating wind site potential*: key to the west coast offshore renewables resource
- *Substantial research capacity*: MaREI programme run from the new Beaufort Building and the associated LíR National Ocean Test Facility at University College Cork is, according to peer review, ranked as world leading [8]

[5] Extrapolated from a Siemens presentation (on file), 2012
[6] OREDP op cit
[7] Ireland and Northern Ireland operate a unified electricity market.
[8] Figures from *EirWind* at MaREI www.marei.ie

University College Cork's Beaufort Building and LíR National Ocean Test Facility, opened in 2015 in Ringaskiddy. Home to the MaREI ocean energy research programme, one of the largest globally.

A *Principle Power* floating wind device about to be deployed off Portugal. Floating wind technology can be deployed in deep water and, therefore, will in time become the dominant offshore wind technology for Ireland. Note that oil and gas rigs in deeper waters are all in the floating category, with mooring systems to the seabed.



The Cobh, Co Cork wave device company, Ocean Energy Ltd, will ‘plug and play’ their €10m demonstration device at a US Navy test facility in Hawaii once the Covid crisis is over.

A major wind farm off the UK coast. Utilises bottom fixed offshore wind technology, suitable only to water depths of 60m at the very most. Will feature in early developments in the Irish Sea, to some extent off the south coast and to an extremely limited extent off the west coast.

3. Government Policy for Offshore Renewable Energy (ORE)

Apart from the existing 25MW Arklow wind farm[9], Ireland has no offshore renewable assets at present. This is about to change and to do so dramatically. The *Climate Action Plan*[10] in 2019 set a target for ORE of 3.5GW by 2030. This target was revised upwards to 5GW by the *Programme for Government* in 2020 and the *Climate Action Plan* is currently being revised to provide for the new goal. The ORE target is a key part of an overall national target, agreed with the European Commission, whereby inter alia 70% of electricity generated in 2030 would arise from renewables.

The goal of 5GW of ORE operational by 2030 is a daring one. For example, ORE developments take about 9 years from conception to 'switch on' while 5GW *exceeds* by c35% the currently installed capacity of wind, solar etc energy on land in Ireland today! This challenge to developers, the grid operator etc is matched by the daunting task facing policy makers who are engaged in weaving a complex tapestry of new policies and legislation to govern developments in our maritime territory. The forthcoming *Maritime Area Planning* Bill will be among the most complex Bills dealt with by the Oireachtas (Parliament) in recent years. It will impose a comprehensive planning system in our enormous marine territory (9 x the size of terrestrial Ireland) - the remit, for instance, of An Bord Pleanála will run to at least 200nm from land.

To simplify matters for the purposes of illustration, the Government's plan is to set long-standing projects (known officially as 'Relevant Projects') off on their development journey as soon as possible, with the first offshore RESS auction planned for 2022[11]. These projects are concentrated in the Irish Sea. Next up will be projects located off the south coast and, also, the coast off Co Clare. The position is shown in the map attached in the Appendix which illustrates the areas developers are *seeking to investigate,* as of January 2021. The map, thus, shows overlap and exaggerates the likely extent of sea space that will be exploited ultimately.

Looking to the longer term, the *Programme for Government* calls for a plan to be drawn up to exploit 30GW of floating wind (and wave) off the west coast in the 2030s. This enormous jump in capacity will be used by an expanding domestic market arising due to a combination of economic growth, the move towards a zero-carbon economy including electric vehicles and a major change in building heating practices. The indications are that our electricity system may be entirely driven by renewables as early as 2040 and offshore wind and wave farms will be key to this. There will also be exports of Irish renewable electricity and, to facilitate this, two new 'interconnectors' - between Cork and France (known as the 'Celtic Interconnector') and between Wexford and Britain ('Greenlink') - are under development at a cost of several billion Euro[12]. They will be the first in many offshore renewable grid developments as the EU, with an

[9] Opened in 2004 and one of the oldest commercial offshore wind farms in the world
[10] *Climate Action Plan*, 2019, Government of Ireland
[11] *Offshore Renewable Energy Support Scheme* (ORESS 1)
[12] There is an existing - 'East-West' - interconnector between Meath and the coast of Wales

ambition of a carbon free society by 2050, gears up inter alia to link continental Europe in to Ireland's massive offshore renewable energy bounty.

4. Offshore Renewable Energy Security

Offshore renewable energy is going to be critical to Irish life going forward. The planned and foreseen developments outlined above will be vital to the national electricity supply and, as time goes on, will be important to Europe too. All offshore renewable devices are unmanned and, as technology develops into floating offshore wind and wave energy, they will be located over-the-horizon. Moreover, major energy interests are already looking at utilising offshore renewables to power co-located hydrogen facilities well out in the ocean and, of course, there will be hub facilities to prepare, so to speak, and transmit electricity to land. To put the Government's 2030 ambition of 5GW offshore in context, as many as 600[13] separate devices may be involved and the cost of the devices plus installation alone will be well over €10bn.

A good example of what the medium-term future may hold for offshore Ireland is the recently approved Danish offshore wind hub. Denmark's government has agreed to take a 51% stake in a £35bn artificial "energy island", which is to be built 50 miles (80km) offshore, in the North Sea. The 'island', to the west of the Jutland peninsula, will initially have an area of 120,000 square metres – the size of 18 football pitches – and, in its first phase, will be able to provide 3 million households with green energy. It will be protected from North Sea storms on three sides by a high sea wall, with a dock for service vessels taking up the fourth side.

[13] This assumes an average 8MW per turbine (the current Arklow wind farm has 2MW turbines, a size category which is no longer built). Technology is now moving towards even larger devices of as much as 16MW and more. The extent to which the latter will be allowed off Ireland will largely be determined by the Government's planned offshore consenting ('planning permission') regime which will be operated by An Bord Pleanála.

The project builds on a Danish inter-party deal struck in June, 2020 on energy policy in which the parties agreed to construct two wind energy hubs, one artificial and another centred on the Baltic island of Bornholm. The two hubs will initially support 5GW of wind generation and triple Denmark's current installed offshore wind capacity. This capacity may be expanded later to as much as 12GW.

Renewable energy generated offshore from waves and wind is, by definition, difficult to predict and is subject to the vagaries of nature. Thus, any further 'disruptions' e.g., arising from a 'security event' will be challenging for what will become a tightly balanced electricity system. Thus, the nature of offshore renewable energy, the increased dependence on it for the overall Irish electricity generation system and the export dimension all combined means that the security of our offshore renewable energy network must be regarded as being of paramount importance, including by the Defence Forces.

5. Nature of security concern

Offshore wind farms and wave arrays have several common characteristics:

- They are, and will be, expensive at any level – the typical *device* investment cost amounts to at least c€2m+ per 1MW and a lot more for early wave energy.
- As already stated, wind and wave devices will be unmanned and, as the technologies develop, will be located far offshore, over the horizon. There may be no local 'eyeballs' to exercise surveillance and to react to intruders and accidents.
- They will be clustered together - which may impact on their vulnerability - and may involve other complex facilities such as offshore 'sub-stations', hydrogen facilities etc.
- Offshore renewables operate in an extraordinarily hostile weather environment, particularly off the west coast.
- They will be vulnerable to accidental collisions with e.g., abandoned hulks - see below.
- Support for offshore renewables after deployment requires 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 new port facilities on the west coast[14], possibly at Rossaveal, Co Galway.

Offshore renewable energy will be open to damage by hostile parties and, consequently, our members, investors and insurers etc - all parties engaged in marine renewables - consider it imperative that an appropriate security 'ecosystem' be put in place by Government.

The potential sources of 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

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

offshore electricity infrastructure and destroy jobs, energy security, income and expensive assets.

The MV Alta was abandoned by her crew at sea in August 2018 ahead of a hurricane. She was subsequently spotted at one stage off the West African coast and eventually washed up on the East Cork coast in February 2020. She has cost the local County Council €200k in remediation measures so far and it is estimated that it would cost €10m to remove her! Such a drifting hulk or a disabled manned vessel could play havoc in offshore renewable energy farms.[15]

6. Offshore Renewables Security Architecture

A national security 'architecture' is 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 *the plans, structures and resources* to *detect and respond to threats (the milieu of the Defence Forces)* and how these features are bound together.

Against that background, we make the following suggestions:

High Level

1. As recommended in our Submission to the National Security Strategy consultation, the NATIONAL SECURITY ANALYSIS CENTRE, DEPARTMENT OF AN TAOISEACH should take the lead role in prompting and leading the development of a security policy for offshore renewable energy involving all of the relevant Departments, Government agencies and industry. The Department of the Taoiseach is already co-ordinating the development of legislation for offshore renewable energy in light of its strategic importance to the State. We understand that the National Security Strategy will be published later this year.

[15] www.rte.ie/news/munster/2021/0302/1200350-mv-alta/

2. As part of this, a DIALOGUE should be opened by an early date 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. 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. This should not be an extension of the National Marine Operations Centre (which largely deals with lifesaving matters) operated by the Irish Coastguard who do not have the skills, full-time numbers of staff or experience to deal with what are essentially security matters although, of course, the Coastguard should be represented in the proposed fusion centre.

4. An urgent examination should be made of the requirement, if any, for LEGISLATIVE CHANGES needed to provide security to offshore renewables. For example, recent research[16] shows a major gap in international legal arrangements to protect undersea cables on which internet traffic flows. The forthcoming *Maritime Area Planning* Bill will provide for Ministers to propose Strategic Marine Activity Zones (SMAZs) to Government e.g., to provide for offshore renewables, for aquaculture, for defence firing ranges etc. It should be feasible to impose a security regulations regime (e.g., some restrictions on entry to Zones designated for offshore renewables) via this mechanism...but legal advice should be sought by an early date.

5. We urge the Commission on the Defence Forces in its Report to infuse the whole of Government with a sense of urgency about planning and preparing for the security of a vital and potentially vast new offshore renewable energy asset whose 'arrival' is quite imminent.

Defence Forces specific

1. Principal responsibility for leading OFFSHORE SECURITY PLANNING AND OPERATIONS lies 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 neither An Garda Síochána nor the Irish Coastguard have (and nor do they claim to have!).

2. The National Maritime Security Committee, Department of Transport appears to be focused on port security etc. The DEPARTMENT OF TRANSPORT IS NOT THE APPROPRIATE BODY to take the lead on the security issues dealt with in this paper.

3. Nonetheless, the Naval Service must work in this area within a STRUCTURE THAT ENGAGES ALL STAKEHOLDERS (see recommendation above about a national offshore intelligence fusion centre) and, also, within a CLOSELY CO-ORDINATED MILITARY STRUCTURE to enable an appropriate all-force capacity to deal rapidly and effectively with offshore renewable energy security events.

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

4. The headquarters of the Naval Service (Cork) and the Air Corps (located in Dublin and important to offshore surveillance and reaction) are located away from the overall DEFENCE FORCES HQ (Kildare) which has a strong terrestrial orientation. The lack of integration ('jointness') reflected in this arrangement and in the structure of Defence Forces HQ will pose challenges to the development and implementation of effective plans and operations to deal with offshore security emergencies.

5. Extensive and credible research about organizations in a variety of spheres shows that geographical and structural proximity fosters the flow of knowledge, collaboration and quick response to new events[17]. Serious consideration, therefore, should be given TO CO-LOCATING THE HQ STAFF OF ALL THREE SERVICES AT DEFENCE FORCES HQ IN NEWBRIDGE, CO KILDARE and developing a STRUCTURE WHICH BRINGS ALL THREE TOGETHER AT THE TOP DECISION TAKING LEVEL.

6. Deliberation is required on the best way to PATROL, EXERCISE SURVEILLANCE OVER AND DISPLAY 'PRESENCE' AROUND 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[18] such as radars and surveillance cameras. A further issue to be teased out with the industry is the provision of a local response to low-threat intrusions by e.g., yachts wandering into wind farms out of curiosity - an appropriate educational programme may be the key need here.

7. The Commission should pay special attention to the NAVAL DIVING SECTION to ensure that it will be staffed and equipped adequately to detect and deal with underwater threats in our offshore renewable energy 'farms'. This may require a dedicated vessel.

8. In addition, thought must be given to how a potential STANDBY REACTION FORCE should be organised and equipped to deal quickly and effectively with both security and accidental (e.g., drifting hulks) events offshore.

9. We note that consideration is being given to locating NAVAL SERVICE VESSELS AT A FORWARD OPERATING BASE ON THE EAST COAST. This would simplify the protection etc of the first generation of offshore renewable energy assets which will be commencing their journey to initial energisation shortly - see 3. above.

7. Energy and Security Challenge

The extract from the EirGrid[19] Dashboard on p12 illustrates our energy challenge perfectly. It shows that, at 1500hrs on March 4th 2021, the average position over the previous 24 hours (when the weather was calm) saw the bulk of the electricity demand being met by gas (including imports from Scotland, some of which may have come

[17] See, for e.g., *Workspaces that move people* Harvard Business Review, October 2014
[18] See *Achieving Information Superiority of the Maritime Domain in the Network Age* Lt (NS) Steven Ryan, Defence Forces Review 2019
[19] EirGrid, Ireland's grid operator, also owns the Northern Irish grid

ultimately from Russia) and coal (from the Moneypoint, Co Clare coal-fired station which will close in 2025) and by imports via the 'East-West' interconnector from Britain. Renewables, mostly terrestrial wind energy, accounted for only c7.29% of the 'fuel mix' due to the prevailing calm weather.

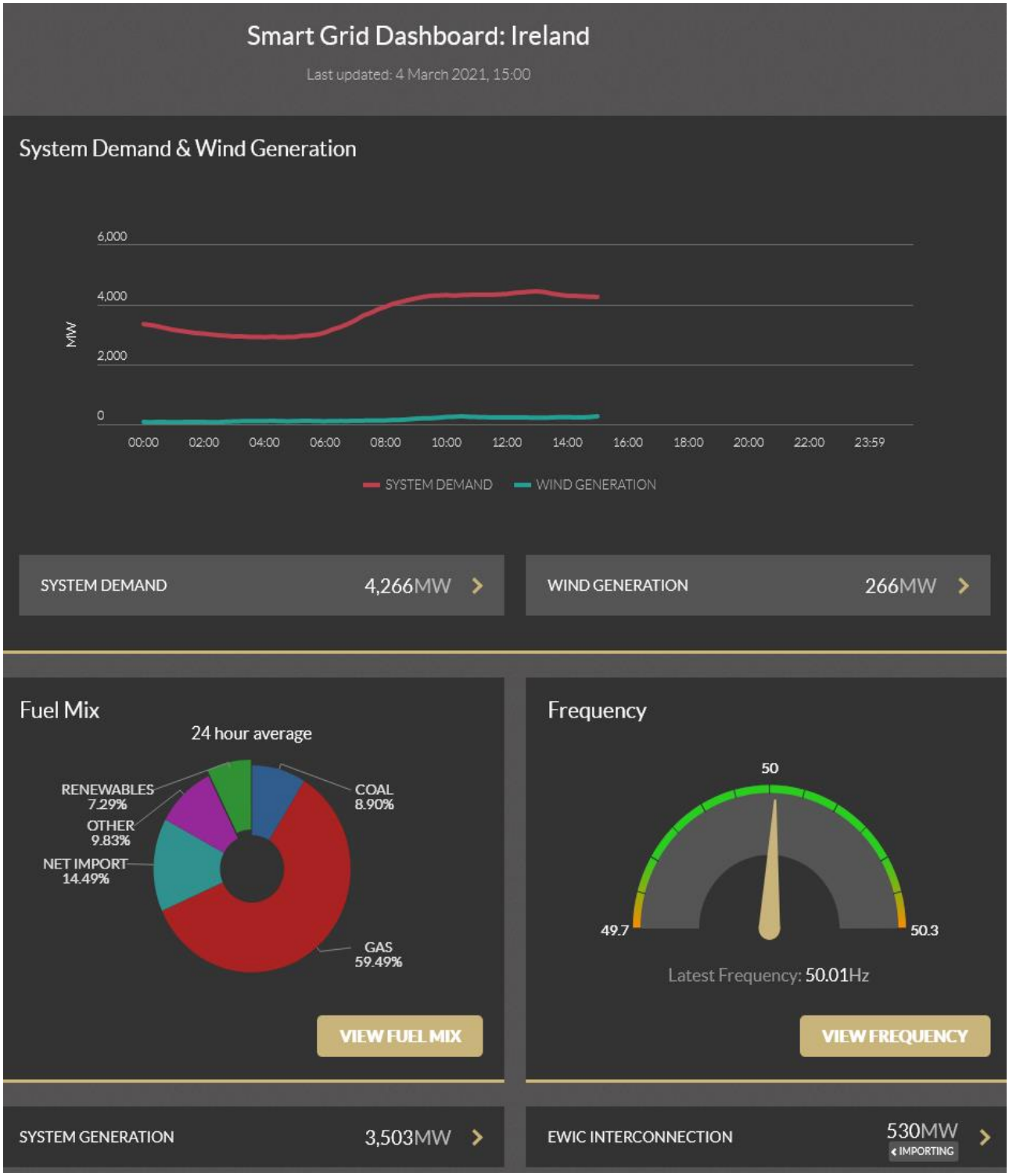
However, the electricity position in Ireland today will change out of all recognition in coming years as coal-powered generation is phased out and domestic gas runs out[20]. The current Irish *Climate Action Plan* has targeted a further 8GW of wind energy and 1.5GW of solar energy ashore as well as 5GW of wind offshore by 2030. The 2030 installed base coupled with the massive floating wind and, hopefully, wave developments under consideration for the west coast in the 2030s plus, in time, electricity storage (e.g., 'batteries') will transform the electricity system[21].

The scale, geographical spread and diverse technology sources of renewable energy, each with different forecast time frames, including wind on and offshore, biomass, solar, wave, perhaps tidal (from Northern Ireland) and 'hybrids should enable Ireland to depend on domestic renewable sources for electricity generation and provide significant export earnings. But it will be a huge engineering challenge to develop and operate this pioneering system based on intermittent energy sources[22] and any further tests, such as security 'events', could cause enormous problems for our national energy security and, indeed, international relations in an EU which in future will have some dependence on electricity exports from Ireland.

[20] The Kinsale field has closed and the only other gas field, Corrib, is running out. Imported gas accounts for c50% of the gas mix today in Ireland and this is forecast by the Department of Environment, Climate and Communications to rise to 90% in 2030 in the context of an electricity market that is forecast to rise by 50% over the same period

[21] A residual gas based generating capacity will be retained for many years as a back-up

[22] The pioneering work of Professor John Ringwood of Maynooth University and others indicates that wave and wind energy combined 'smooths out' the discontinuity inherent in each source: *'...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 and diversified sources*.' From VARIABILITY REDUCTION THROUGH OPTIMAL COMBINATION OF WIND/WAVE RESOURCES – AN IRISH CASE STUDY by Francesco Fuscoa, Gary Nolan, John V. Ringwood in ENERGY, 2010

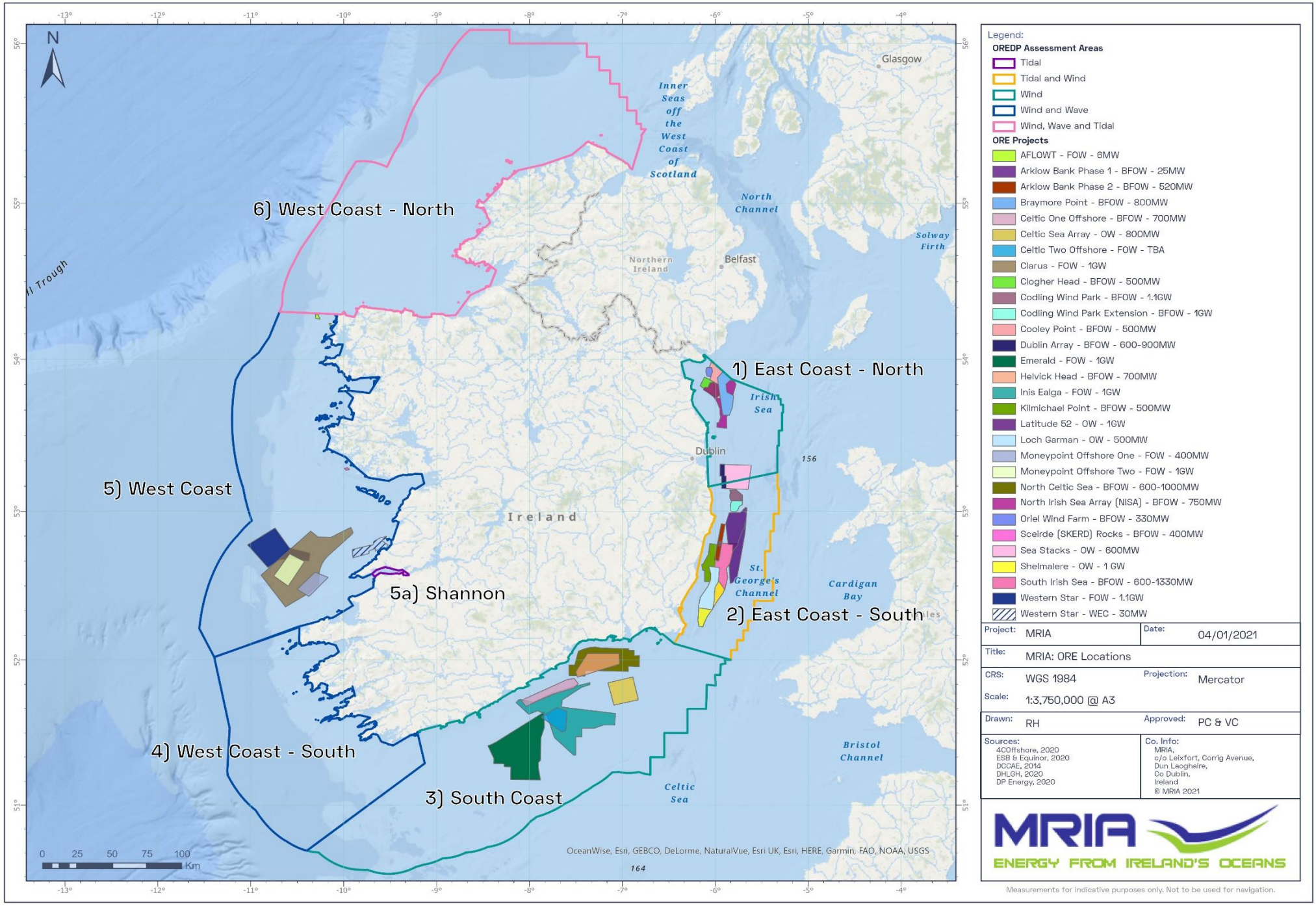


Source: www.eirgrid.com

Appendix

- *Map showing location of potential ORE projects which have sought Foreshore Investigative (i.e., exploration of possible sites) Licences* as of early January 2021. It is believed that the 'pipeline' of projects has expanded since then. This map has been cross-checked with the Marine Institute and deemed accurate at the time. The Marine Institute are in the course of finalising a suite of maps relevant to offshore renewables and marine spatial planning generally

- *Members of the MRIA*. Does not show official organisations e.g., SEAI that attend the MRIA Council in an 'observer' capacity.



Legend:

OREDP Assessment Areas

- Tidal
- Tidal and Wind
- Wind
- Wind and Wave
- Wind, Wave and Tidal

ORE Projects

- AFLOWT - FOW - 6MW
- Arklow Bank Phase 1 - BFOW - 25MW
- Arklow Bank Phase 2 - BFOW - 520MW
- Braymore Point - BFOW - 800MW
- Celtic One Offshore - BFOW - 700MW
- Celtic Sea Array - OW - 800MW
- Celtic Two Offshore - FOW - TBA
- Clarus - FOW - 1GW
- Clogher Head - BFOW - 500MW
- Codling Wind Park - BFOW - 1.1GW
- Codling Wind Park Extension - BFOW - 1GW
- Cooley Point - BFOW - 500MW
- Dublin Array - BFOW - 600-900MW
- Emerald - FOW - 1GW
- Helvick Head - BFOW - 700MW
- Inis Ealga - FOW - 1GW
- Kilmichael Point - BFOW - 500MW
- Latitude 52 - OW - 1GW
- Loch Garman - OW - 500MW
- Moneypoint Offshore One - FOW - 400MW
- Moneypoint Offshore Two - FOW - 1GW
- North Celtic Sea - BFOW - 600-1000MW
- North Irish Sea Array (NISA) - BFOW - 750MW
- Oriel Wind Farm - BFOW - 330MW
- Sceirde (SKERD) Rocks - BFOW - 400MW
- Sea Stacks - OW - 600MW
- Shelmalere - OW - 1 GW
- South Irish Sea - BFOW - 600-1330MW
- Western Star - FOW - 1.1GW
- Western Star - WEC - 30MW

Project:	MRIA	Date:	04/01/2021
Title:	MRIA: ORE Locations		
CRS:	WGS 1984	Projection:	Mercator
Scale:	1:3,750,000 @ A3		
Drawn:	RH	Approved:	PC & VC

Sources:
4COffshore, 2020
ESB & Equinor, 2020
DCCAE, 2014
DHLGH, 2020
DP Energy, 2020

Co. Info:
MRIA,
c/o Leixfort, Corrig Avenue,
Dun Laoghaire,
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MRIA
ENERGY FROM IRELAND'S OCEANS

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