Rialtas na hÉireann
Government of Ireland

Future Framework for Offshore Renewable Energy

Policy Statement

2024

Prepared by the Department of Environment,
Climate and Communications
gov.ie/DECC

Table of Contents

Minister's Foreword 3

Executive Summary 5

1 Background 12

1.1 Maritime Spatial Planning 13
1.2 National Policy Context 13
1.3 A Phased Approach to ORE 16
1.4 Components of an ORE System 18

2 The Future of ORE 22

3 Pathway to Success 26

3.1 Government Priorities 27
3.2 The Plan-Led Process Aspects 32
3.3 The Plan-Led Process Sequencing 40
3.4 Infrastructural Alignment 42
3.5 Role of the State and the Role of ORE Industry 46

4 Resource Assessment and Considerations 48

4.1 Marine Data Acquisition 49
4.2 ORE Resources in Irish Waters 51

5 Domestic Industry and Infrastructure Considerations 53

5.1 Domestic Demand 54
5.2 Grid Infrastructure 55
5.3 Ports 57
5.4 Other Considerations 58

6 Export Potential 62

6.1 Interconnection 63
6.2 Renewable Hydrogen 64
6.3 Export Opportunities and Implications 66

7 Domestic Opportunities 69

7.1 Return to the State and Community Benefits 70
7.2 Jobs and Skills 71
7.3 Technology 71

8 Next Steps 73

Appendices 76

Appendix A – Table of Actions 77
Appendix B – Export Potential Market Analysis 83
Appendix C – Jobs and Skills Analysis 88
Appendix D – Glossary of Terms 90

Minister's Foreword

Ireland has the potential to be a world leader in offshore renewable energy. The abundance of our significant natural resources means that with the right ambition, focus and collaborative approach, we can have our own secure supply of clean, renewable and affordable energy. At the same time developing indigenous green growth and taking full advantage of the emerging export market opportunities. This will also enable Europe to meet our goal of making the EU climate-neutral by 2050, in line with the Paris Agreement.

This potential can only be achieved with national ambition and with a strategic long-term approach. The *Future Framework Policy Statement for Offshore Renewable Energy* addresses both of those things. It outlines our long-term ambitions of 20GW by 2040 and 37GW by 2050, and our objectives, and it lays down a roadmap of how they will be achieved. We have outlined what we need to deliver to be successful in our ambitions, and where further work is needed, and we have quantified what the potential economic benefits to Ireland could be.

Offshore renewable energy (ORE) is a dynamic, fast-paced and evolving landscape, with new technologies being developed all the time. We are setting out our Future Framework now so that we will be ready, along with our local communities and business partners, for the future of offshore renewable energy. We are considering, exploring and open to all potential renewable energy sources, including wind – both fixed bottom and floating turbine - as well as wave and tidal renewable energy. Even though some of these technologies are nascent we will support research and innovation programmes to accelerate their development.

The Future Framework Policy Statement is part of a suite of policy initiatives that has been launched by this government and co-ordinated by my department through the Offshore Wind Delivery Taskforce.

As part of the development of the DMAP (Designated Maritime Area Plan) process we will consult widely with local communities around the country to hear their views on the development of the local areas and activities that they know best. Environmental considerations and protections are also of the utmost priority during the development of ORE in Ireland's maritime area, as an essential requirement of the DMAP process.

We are already well advanced in this process in the South Coast having completed almost 10 weeks of informal consultation in the second half of 2023. We met with and listened to members of the public, wind and supply chain industry, local elected members and council officials, fishers and seafood producers, environmental groups and many more interested stakeholders.

We will continue and complete this South Coast DMAP process in 2024. This is what a robust consultation process looks like. It means taking the time to listen to, and learn from, the local knowledge of coastal areas. This is the standard we have set for ourselves, and we will maintain that standard for future DMAPs to support development, protect biodiversity and enhance communities. We are planning for a robust future renewable industry that will deliver enormous benefits to communities around the country. The benefits of our offshore renewable industry will spread out from the local communities into surrounding counties, ultimately benefitting the whole country.

To achieve our offshore renewable energy targets, after the South Coast DMAP process, in alignment with requirements under Ireland's Climate Action Plan we will be engaging with communities around our island including on the east, west, and north coasts. We will proactively engage with communities, local businesses and international investors on future technologies such as deepwater fixed wind, floating wind and wave. We plan to advance DMAPs and routes to market for these technologies well ahead of time, so that when they are ready for deployment at scale, we, as a country, will be ready to take full and immediate advantage.

As a country, we can deliver on our long-term climate goals, ensure the long-term energy security of our country, and develop green industrial opportunities for the abundant energy resources we have off our coasts. We are planning for a future where we are more deeply connected to neighbouring states through increased electricity interconnection and export markets.

This Future Framework is our plan for the future. We will be ready for that future by working across government and alongside local communities, Irish industry, and international energy partners.

Eamon Ryan TD

Minister for the Environment, Climate and Communications

Executive Summary

Ireland has significant potential for the development of offshore renewable energy, including wind, wave and tidal energy that can aid in the delivery of our long-term climate goals. The key reasons for sustainably developing Ireland's considerable offshore resources are threefold:

1. Decarbonising the Irish economy in line with legally binding national and international climate ambitions;
2. Ensuring long-term energy security; and
3. Developing green industrial opportunities for energy utilisation and for export markets.

Ambitious targets have been set for the delivery of Offshore Renewable Energy (ORE) in Ireland's exclusive economic zone: 20GW by 2040; and at least 37GW in total by 2050[1, 2]. Deploying ORE at this scale in Ireland will result in a significant increase in revenue to the State as well as both direct and indirect job opportunities. There are also enormous potential benefits to the State through the delivery of a new ORE industrial base which will add employment and investment opportunities to communities across the country.

The Future Framework Policy Statement outlines our ambitions for the post-2030 period, the key processes needed for successful deployment, and a pathway to maximise economic benefits to the State. To sustainably achieve our ambitions, the Future Framework Policy Statement has been developed in line with the following nine Guiding Principles:

- Protection of environment and biodiversity
- Engagement with stakeholders and public consultation
- Illuminate opportunities for return to the State
- Equitable return to communities
- Affordability of energy for consumers
- Alignment of key policies to deliver ORE
- Offer clarity and inspire confidence for investment
- Alignment of infrastructure
- Innovation with new technology

[1] gov - Policy Statement on the Framework for Phase Two Offshore Wind (www.gov.ie)

[2] Joint Statement on the North Seas Energy Cooperation (europa.eu)

Protection of the marine environment is also of the utmost priority during the development of new ORE projects in Ireland's maritime area. Potential impacts to the marine environment during the various phases of development are considered in the plan-led approach, from project planning to project decommissioning. An ecosystems-based management approach will be taken, allowing for sustainable use of the marine environment whilst maintaining a healthy and thriving ecosystem as required in the Designated Maritime Area Plan (DMAP) process under the regulations set forth by the *Maritime Area Planning (MAP) Act, 2021*[3]. This approach is also crucial when assessing cumulative impacts such that co-location of ORE with existing marine activities does not present additional and significant detrimental effects to the marine environment.

The use of sub-national forward maritime spatial planning such as DMAPs, will ensure that future developments in Ireland's maritime area take place in a managed, strategic and sustainable way. It will provide comprehensive opportunities for public and stakeholder engagement, and most importantly for local coastal communities.

Public engagement and statutory consultation will ensure that future development of ORE takes place with consideration of marine activities including fishing, aquaculture, shipping, marine tourism, and marine leisure. These activities are vital socio-economic activities and sources of income and employment for many coastal communities.

Consistent with global efforts to combat climate change, Ireland has committed to reaching net zero greenhouse gas emissions by 2050, which will require a dramatic increase of utilisation of indigenous renewable energy sources, wholesale electrification of domestic demand, increasing electricity interconnection, and the development of an emergent renewable hydrogen industry targeted towards hard-to-abate sectors. Realising Ireland's indigenous renewable energy potential will enhance our energy security by mitigating our dependence on volatile international imports, through which Ireland received over 80% of current primary energy requirement in 2022[4].

Furthermore, as Ireland continues to develop its ORE sector there will be increased opportunities for supporting the domestic green growth agenda and export market opportunities. For example, the co-location of large energy users with renewable

[3] Maritime Area Planning Act 2021 (irishstatutebook.ie)

[4] Energy In Ireland | Key Publications | SEAI

generation, electricity interconnection with neighbouring states, and the export of renewable hydrogen and its derivatives. Creating a flagship ORE sector will enable Ireland to achieve its binding climate targets while bolstering the security and prosperity of the Irish State.

An economic analysis was commissioned by DECC and conducted by AFRY Managing Consultants and BVG Associates to support the ORE targets and export ambitions set out in the Future Framework Policy Statement. The consultants applied a power system model using various ORE deployment capacities including a 16GW domestic net zero scenario and a 37GW export-focused scenario. This external analysis suggests that with 37GW ORE capacity the power sector in Ireland will reach net zero emissions in advance of 2050, as further examined in Appendix B of this document and supplementary materials.

The conducted economic market analysis further suggests that Gross Value Added (GVA) could sum to €69 billion over the lifetime of the projects – between 2022 and 2060 – including €8.8 billion in GVA accrued to the State by 2050 purely through exports independent from employment benefits and GVA associated with domestic uses.

This presents opportunities not only for domestic use via direct connection to the all-island Single Electricity Market (SEM) electricity grid, but also, opportunities to add value domestically via green industrial developments, for export to the EU and UK via electricity interconnectors, and through the production of renewable "green" hydrogen and other sources of renewable energy, such as electrofuels.

With the adoption of a plan-led approach to ORE comes a government responsibility to set forth a robust pathway for the achievement of Ireland's ambitious targets out to 2040 and 2050. The purpose of the Future Framework is to set out the future of ORE development in Ireland from 2030 in a manner which will maximise environmental and social welfare. The Future Framework will be delivered through collaboration between State, industry and local communities.

The Future Framework Policy Statement is aligned with and complementary to, Ireland's existing climate, renewable energy and ORE policy and legislative frameworks. It reiterates and supplements the government objectives contained within *Powering*

Prosperity – Ireland's Offshore Wind Industrial Strategy[5] and the upcoming *Offshore Transmission Strategy*. As this is an overarching Framework for long-term delivery of ORE, the intention is not to encapsulate the intricacies of the energy landscape in Ireland and beyond. The Future Framework sets out a number of key actions, future directions and intergovernmental dependencies that will be addressed through subsequent policy to develop and initiate the long-term, plan-led approach to Ireland's ORE future. A full list of the Future Framework actions, including a description of the priority actions, are recorded sequentially in Appendix A. To reflect the innovative and multifaceted nature of Irish ORE policy, the Future Framework is intended to be a dynamic document and will undergo annual progress reviews with updates to be published as appropriate.

[5] Powering Prosperity – Ireland's Offshore Wind Industrial Strategy - DETE (enterprise.gov.ie)

The Future Framework will:

Future of ORE	▪ Reiterate Ireland's ambitious targets of 5GW of ORE by 2030, 20GW by 2040; and at least 37GW in total by 2050.
Pathway to Success	▪ Outline key government priorities for ORE development including environmental such as protecting marine biodiversity, social, economic and delivery of objectives. ▪ Describe the plan-led approach and sequencing involving DMAPs, MACs, route to market, grid connection and development permission. ▪ Prioritise infrastructural alignment of generation, grid, route to market, and offtake. ▪ Emphasise the critical role played by the maritime industry and various government departments and agencies in developing the ORE sector.
Resource Assessment and Considerations	▪ Summarise the gross technical ORE resource capacity assessment in Ireland's Exclusive Economic Zone, without full consideration of environmental, economic, or other constraints. ▪ Underline the government commitment to significantly scale up the maritime data acquisition to support DMAP establishment and other relevant processes.
Domestic and Industrial Considerations	▪ Develop the ORE sector with consideration of domestic demand and supply chain expansion, grid infrastructural requirements, and port facility build-out. ▪ Acknowledge additional considerations including our security of energy supply, co-existence with other maritime uses, and defence and cyber security.
Export Potential	▪ Identify opportunities for surplus ORE energy to be exported by interconnection or converted into alternative energy products and services such as renewable hydrogen and its derivatives. ▪ Describe an economic analysis which suggested €69 billion GVA will accrue to the State between 2022 and 2060, including €8.8 billion GVA by 2050 from exports – independent from employment benefits and domestic uses.
Domestic Opportunities	▪ Reference financial measures including seabed levies and community benefit funds, which were analysed for their economic potential. ▪ Focus on ensuring an equitable return to local communities, the expansion of the ORE jobs and skills sector, and promoting technological innovation.

The Future Framework will:

Set forth 29 medium-term actions to deliver Ireland's ORE ambitions, including seven priority actions that will be resourced accordingly:

7 Provide the structures and supports necessary to establish a future DMAP roadmap.

10 Explore the feasibility of implementing a competitive MAC framework.

1 Explore the possibility of a roadmap for future ORE development.

12 Design and develop a successor support scheme to ORESS.

13 Maximise capacity from alternative routes to market.

16 Align infrastructure efficiencies to consider generation, grid, and route to market.

2 Assess the potential to deploy floating offshore wind at scale in Irish waters.

1 Background

The *Phase Two Policy Statement*[6] adopted by government in March 2023 provides for a plan-led, centralised approach to future ORE delivery in Ireland, previously indicated in the *2021 Policy Statement on the Framework for Ireland's Offshore Electricity Transmission System*[7]. The move to a plan-led approach for ORE development in Ireland has taken place within the overarching frameworks of EU and national Marine Spatial Planning (MSP) policy and legislation. The first proposed South Coast DMAP[8] was initiated as a response to energy security requirements, however future DMAPs under the *MAP Act* will explore the untapped potential of ORE in Irish Waters, in a method which keeps pace with technological advances.

1.1 Maritime Spatial Planning

The *EU Maritime Spatial Planning* (MSP) *Directive*[9] provides for the establishment of maritime spatial planning at EU Member State level, including the development of ORE, which must take place according to an ecosystem-based management approach and include opportunities for public participation. In line with the *MSP Directive*, the *National Marine Planning Framework* (NMPF)[10] was adopted by government in May 2021 as Ireland's first statutory maritime spatial plan. To facilitate sustainable maritime spatial planning, inter alia in a manner that ensures environmental protection and comprehensive public participation, the *NMPF* commits government to the use of sub-national forward spatial planning through the establishment of Designated Maritime Area Plans, or DMAPs. It provides that DMAPs may be used to develop multi-activity area plans; to promote use of specific activities (such as ORE); and/or for the purposes of the sustainable use and for consideration of sensitive habitats.

1.2 National Policy Context

ORE policy and ambitions are developed within the broader context of both national, EU and international climate, energy and environmental policy and legislative frameworks. The Future Framework builds on previous commitments, strategies and

[6] gov - Policy Statement on the Framework for Phase Two Offshore Wind (www.gov.ie)

[7] gov - Policy Statement on the Framework for Ireland's Offshore Electricity Transmission System (www.gov.ie)

[8] gov - South Coast Designated Maritime Area Plan (DMAP) Proposal (www.gov.ie)

[9] Directive - 2014/89 - EN - EUR-Lex (europa.eu)

[10] gov - National Marine Planning Framework (www.gov.ie)

directions as outlined by both national policy – including the *Climate Action Plan 2023*[11] (CAP23), the *National Energy and Climate Plan*[12], the *NMPF*, the *National Planning Framework*[13], the *National Policy Statement on Electricity Interconnection*[14], and the *National Hydrogen Strategy*[15] – and EU policy such as *RePowerEU*[16] and the *EU Strategy on Offshore Renewable Energy*[17]. Critical components of Ireland's ORE system including generation, storage, ports, and grid infrastructure are informed by the *National Development Plan* (NDP)[18]. The *NDP* highlights the need for focus on the creation of the right investment environment together with an enhanced regulatory framework. Given that the *NDP* is scheduled for review in 2024, ORE policy must be closely linked to upcoming infrastructural policy and other national-scale development plans.

[11] gov - Climate Action Plan 2023 (www.gov.ie)

[12] gov - Ireland's National Energy and Climate Plan 2021-2030 (www.gov.ie)

[13] gov - National Planning Framework - Ireland 2040 Our Plan (NPF) (2018) (www.gov.ie)

[14] gov - National Policy Statement on Electricity Interconnection 2023 (www.gov.ie)

[15] gov - National Hydrogen Strategy (www.gov.ie)

[16] REPowerEU (europa.eu)

[17] EUR-Lex - 52020DC0741 - EN - EUR-Lex (europa.eu)

[18] gov - National Development Plan 2021-2030 (www.gov.ie)

ORE Policy Timeline

- OREDP 2014
- NECP 2021-2030 2019
- EU Strategy on ORE 2020
- Offshore Electricity Transmission System Policy Statement 2021
- NMPF 2021
- CAP 2021 2021
- MAP Act 2021
- RePowerEU 2022
- Phase Two Policy Statement 2023
- National Hydrogen Strategy 2023
- National Policy Statement on Electricity Interconnection 2023
- Future Framework Policy Statement 2024
- Offshore Wind Industrial Strategy 2024
- Draft South Coast DMAP 2024
- ORE Technology Roadmap 2024
- Offshore Transmission Strategy 2024

Categories: Spatial · Climate · General · Systems

Ireland's Offshore Wind Delivery Taskforce (OWDT) was established in April 2022 to drive delivery of offshore wind targets in the *CAP23*, and to mobilise the Irish economy towards realising associated economic and societal opportunities through effective cross-government collaboration. Membership of the OWDT, chaired by the Department of the Environment, Climate and Communications (DECC), comprises senior officials from the government departments and agencies considered vital to the delivery of Ireland's ORE ambitions.

Among others, relevant objectives of the OWDT include:

- Developing a consolidated plan, collating all activities underway across departments and agencies to ensure delivery of offshore wind and related targets as set out in the Programme for Government[19] and *CAP23*, ensuring the potential economic and societal benefits from establishing the offshore wind industry are maximised; and
- Ensuring alignment in the development of the ORE sector with work being progressed to improve and protect marine biodiversity through designation of Marine Protected Areas (MPAs), Marine Special Areas of Conservation (SACs) and Marine Special Protection Areas (SPAs) and implementation of the Birds, Habitats and Marine Strategy Framework Directives more broadly.

The 2023 Key Actions of the OWDT were published in March 2023[20] across all workstreams including supply chain, ports policy, skills and workforce, and regulatory consenting. A progress report will be submitted for government approval in Q2 2024, with publication soon afterwards, including Key Actions for 2024.

One key workstream of the OWDT is the development of this Future Framework policy document and subsequent actions for ORE policy beyond 2030.

1.3 A Phased Approach to ORE

To reach Ireland's commitments to reduce emissions by 51% and have 80% of electricity generated by renewables by 2030, a target of 5GW of ORE will be deployed by the end of the decade. The government has adopted a phased approach in

[19] gov - Programme for Government: Our Shared Future (www.gov.ie)

[20] gov - Offshore Wind Delivery Taskforce (www.gov.ie)

transitioning the sector to a plan-led regime so as to maximise the social and environmental welfare of ORE development in Ireland.

Phase One is intended to deliver the maximum competitively procured offshore wind capacity at the earliest feasible deployment stage, with the six most advanced offshore wind projects in Ireland awarded rights to occupy seabed via Maritime Area Consents, or MACs, in 2022 in order to participate in Ireland's first competitive offshore wind auction in 2023, known as the Offshore Renewable Energy Support Scheme, or ORESS 1. This was the largest renewable energy auction in the history of the State and procured over 3GW of capacity across four projects on the East and West Coasts[21]. A further 1.2GW of capacity across the two projects unsuccessful in this auction have a time-limited opportunity to secure an alternative route to market, totalling over 4.2GW in this phase. A recent regulatory decision[22] has clarified the grid pathway for non-ORESS 1, or Merchant Phase 1 projects. Therefore, all six Phase One projects now have seabed rights, a grid pathway and are actively engaged in the planning process ahead of formal application for planning permission from An Bórd Pleanála (ABP) in 2024. Deployment in this phase is expected to take place over 2028-2030.

Phase Two aims to procure the remainder of Ireland's 5GW capacity target by 2030 through further competitive ORESS auctions and pathways to facilitate alternative markets such as Corporate Purchase Power Agreements (CPPAs). All future offshore wind developments are to be plan-led and located within marine zones designated as suitable for offshore wind development, known as DMAPs. The plan-led approach and designation of renewable energy development areas by the State through DMAPs and, separately, grid access requirements[23] aims to provide greater investment and planning certainty for ORE projects. The first proposed DMAP, on the South Coast, will identify marine areas for development of fixed bottom offshore wind for delivery by both 2030 and post 2030. Fixed bottom offshore wind is more cost effective in the short term, has been delivered at scale in other jurisdictions, and offers the best prospects for the accelerated delivery of future offshore wind at an affordable cost to Irish electricity consumers in the next 5-10 years. Once a DMAP is approved by government and the Oireachtas, it has a statutory basis which will guide future planning application

[21] RESS | Customer information | EirGrid

[22] Offshore Grid Connection | CRU.ie

[23] Offshore-Grid-Connection-Pathway-for-Phase-2-Proposed-Decsion.pdf

decisions. The South Coast DMAP is expected to be submitted for Oireachtas scrutiny and approval by summer 2024.

The final phase of offshore wind deployment is referred to as the Future Framework which builds on previous ORE policy both published and in development, is informed by all previous public consultation carried out by DECC, and is complimented by independent economic analysis commissioned by DECC. The publication of this Future Framework Policy Statement in April 2024 coincides with the publication of *Powering Prosperity – Ireland's Offshore Wind Industrial Strategy* by the Department of Enterprise, Trade and Employment (DETE).

1.4 Components of an ORE System

To realise Ireland's potential for offshore renewables, extensive build-out of the appropriate structures is required, all of which are governed by distinct authorities and regulatory procedures.

Physical components include specific ORE technologies, both onshore and offshore grid infrastructure, port facilities, energy storage mechanisms, interconnection components, and the nascent renewable hydrogen industry.

Technological innovation is constantly altering system efficiency, price, and regulatory constraints but will ultimately drive industry participation and enhance Ireland's competitiveness in global markets.

Key Components of an ORE System:

1.4.1 Technology

All ORE technologies will play a vital role as we aim for 20GW of ORE generation by 2040 and 37GW by 2050. This includes both fixed bottom and floating offshore wind turbines as well as other ocean energy generation including wave and tidal devices. Key ORE generation technologies will be detailed within the upcoming *ORE Technology Roadmap to 2050* being developed by the Sustainable Energy Authority of Ireland (SEAI). This Roadmap is intended to be updated at least every 5 years or as significant innovations on ORE generation technologies arise.

- **Maximisation of more competitive technologies:** Each of the ORE technologies above have respective costs and technical considerations and thus have varying

degrees of commercialisation. It is imperative that more competitive technology resources are maximised in the short-term, specifically fixed wind turbines, while simultaneously preparing for additional technology to mature, such as floating wind.

- **Innovative technologies:** Innovation is driving larger capacity devices as well as the potential for marine multipurpose sites and ORE technological co-location and the emerging opportunity for minimisation of environmental impacts. Innovative technologies will also play a role in data collection and management facilitated by remote operating vehicles and artificial intelligence; advanced cabling and grid infrastructure design including interconnection; energy storage mechanisms; and hydrogen electrolysis and related technology.

1.4.2 Grid

Given the targeted increase in offshore capacity and domestic electrification ambitions, Ireland's onshore transmission grid must be strengthened, specifically leading up to 2040. Grid development will accommodate the greater electricity supply and demand, variability in renewable generation, and spatial discrepancies between energy generation and demand centres. This means reinforcing existing and developing new grid infrastructure through increased construction of cables, overhead lines, substations and related infrastructure.

As the offshore Transmission System Operator (TSO), EirGrid will oversee the development of all offshore cabling, grid connections, and enabling infrastructure such as substations or converters. Offshore grid delivery will consider onshore connection points, non-grid limited offtake opportunities such as renewable hydrogen, and export ambitions via electricity interconnection. Any offshore grid infrastructure development will be considered in the context of the plan-led approach to align with other critical components of the ORE system and the onshore transmission grid.

1.4.3 Storage

Due to the inherent intermittency of wind and ocean energy, discrepancies between supply and demand necessitate energy storage mechanisms including batteries, pumped hydro, electric vehicles, and renewable hydrogen. There are several battery options available including short-term lithium-ion batteries ranging from two to eight hours and longer term 100-hour iron-air batteries. Energy storage options should consider storage duration, generation technology cost, additional storage costs,

reliability, storage space, and the end-to-end efficiency of the energy storage technology or vector.

1.4.4 Interconnection

Another method for ensuring security of supply is interconnecting electricity markets between neighbouring jurisdictions. Exporting electricity can represent a source of revenue to the country-of-origin contingent on energy price differentials between importing and exporting jurisdictions. Currently, the predominant technology for electricity interconnection are point-to-point interconnectors. The upcoming DECC *Offshore Transmission Strategy* intends to align development of interconnection with the generation potential identified through the DMAP process. It will also explore the potential for multipurpose interconnectors in the context of Offshore Bidding Zone configurations.

1.4.5 Renewable Hydrogen

As described by the *National Hydrogen Strategy*, renewable hydrogen production through electrolysis addresses carbon emissions while also improving Ireland's energy security. Additionally, by diverting surplus electricity generation into electrolysers electricity curtailment is minimised. Renewable hydrogen effectively stores electricity for use in its generated form or it can be converted into derivatives such as ammonia or methanol, which could substitute carbon-intense fuels in the aviation and maritime industries and in high temperature refining or industrial processing industries such as steel manufacturing. However, renewable hydrogen is also likely to be more expensive and less energy efficient than direct electrification, and it is therefore important to target its usage towards more hard-to-abate sectors.

1.4.6 Ports

Port facilities are required during various project stages including installation, operations and maintenance (O&M), and decommissioning. Distinct infrastructures are required depending on the technology, particularly in the case of fixed bottom compared to floating wind. Extensive resources are required to build, store, repair, and tow out machinery to project sites. This will include physical space and buildings to carry out activities both in onshore facilities and in offshore wet storage, access to a variety of vessels, and proximity to other components of the supply chain. Ireland's port requirements should be aligned between commercial State ports under the remit

of the Department of Transport and coordinated with other ports in Ireland that may play a supporting role in facilitating ORE deployment. A dedicated workstream of the OWDT, led by the Department of Transport, is facilitating the development of Irish ports to meet these needs.

The Future Framework policy sets out the evidence base for Ireland's ORE targets as well as commits to the plan-led approach by outlining key priorities and processes to ORE delivery from 2030 to 2050. This includes identifying realistic potential for ORE generation as well as interconnection and renewable hydrogen production post-2030. Additionally, this document consolidates information provided by existing policy to clarify the regulatory pathway to successful delivery including any opportunities or barriers to implementation. Crucially, the Future Framework policy outlines how a plan-led approach will link all relevant components of the energy system, streamline the ORE regulatory process, and integrate key priorities – such as environmental assessments and consultation processes – into the foundation of a sustainable regime for ORE delivery in Ireland.

2 The Future of ORE

Ireland has commitments for renewable electricity to reach 80% of demand by 2030 and extensive plans to electrify end uses as outlined in the *CAP23*. Ideally, grid capacity should maximise the domestic use of ORE in Ireland resulting in significant in-country benefits. As examined in EirGrid's *Tomorrows Energy Scenarios*[24], energy demand in Ireland is expected to at least double largely as a result of increased electrification, especially in the transport and residential sectors.

Domestic utilisation of the greatest possible proportion of indigenous ORE should maximise climate, economic and social benefits for Ireland. Domestic demand opportunities are further examined by *Powering Prosperity: Ireland's Offshore Wind Industrial Strategy* developed by DETE. Additional domestic industrial demand opportunities and associated considerations are further considered in Section 5. Any surplus ORE will be exported directly as electrons to neighbouring jurisdictions by interconnection or else converted into products and services that can be fed into international markets, such as renewable hydrogen and derivatives. Ireland's ORE export ambitions and rationale for electricity interconnection and renewable hydrogen are further analysed in Section 6.

Given the domestic demand and export considerations, Table 1 outlines the targets for ORE delivery in Ireland along with anticipated timelines. The ORE capacity ambitions are consistent with the ambitions of the revised *EU TEN-E Regulation*[25], as well as Ireland's climate and energy commitments – including the goal to become an annual net exporter of ORE. Our ambitions take into consideration practical constraints such as environmental concerns, area limitation for other marine activities, and project costs. Timelines have evolved from assumptions on technology readiness, policy and regulatory processes, and project planning and construction. These targets are ambitious but necessary in order to meet our commitments to become a net zero economy by 2050.

[24] eirgrid.ie/site-files/library/EirGrid/Tomorrows-Energy-Scenarios-2023-Consultation-Report.pdf

[25] Trans-European Networks for Energy (europa.eu)

	2030 Target	2040 Target	2050 Target
Generation capacity	5 GW	20 GW	37 GW

Table 1. ORE generation capacity targets from 2030 to 2050

To meet these ambitious targets the plan-led approach to ORE is coordinated across all relevant government departments and agencies by the OWDT to deliver the necessary policy and regulatory procedure, financial supports for projects, grid build-out, port development, supply-chain management, opportunities for skills advancement, domestic demand prospects, and structures for export of ORE. Electricity interconnection will support the potential export of ORE that is surplus to domestic supply and improve energy security. ORE deployment post-2030 however will no longer be strictly limited by grid availability, with a range of potential applications for green products and services (including renewable hydrogen and data from renewable-powered data centres), which may be entirely off-grid, or with a partial connection to the domestic grid to facilitate system flexibility. In this way, at least 2GW of non-grid limited capacity is targeted to be in development by 2030.

	Actions	Owners	Timeline
1	Explore the possibility of developing a more detailed roadmap for future ORE development, including the potential for interim ORE capacity targets and sub targets for innovative technologies.	DECC	Q1 2025
2	Conduct a study to assess the potential to deploy floating offshore wind in Irish waters at scale, assessing capacity at key strategic locations in Ireland and taking account of the upcoming global auctions dedicated to floating wind, including in France, in 2024.	DECC DETE	Q2 2024

Actions		Owners	Timeline
3	Investigate the feasibility of a floating offshore wind demonstrator site including optimal capacity.	DECC DETE	Q3 2024
4	Maintain State support for our existing or planned test sites and explore the feasibility of supporting additional test sites.	DECC SEAI	ongoing
5	Conduct an analysis to determine the economic and practical viability of various innovative ORE technologies.	DECC SEAI	Q3 2024 – Q4 2025
6	Establish a dedicated ORE technology innovations research and development advisory group including research, industry and government representatives, chaired by SEAI.	SEAI	Q2 2024

3 Pathway to Success

This section provides a detailed pathway for ORE projects under the plan-led approach in the post 2030 period, including timelines relative to other objectives and deliverables. The framework also highlights a requirement for further policy development to ensure timelines are met, eliminate delays and meet Ireland's ORE targets.

From 2030 onwards, all ORE development in Ireland will be led by the State including the establishment of DMAPs, designing project auctions such as ORESS and identifying other routes to market, coordinating onshore grid connections and leading offshore grid build-out and connections, increasing domestic demand opportunities, developing export market regulations, and overseeing the financial return to the State and local communities. Government will play an increasingly involved role during pre-planning stage of ORE development, including through the oversight and commissioning of marine surveys and environmental assessments for the purpose of establishing DMAPs, and de-risking subsequent planning stages. In accordance with the *MAP Act*, the State will identify broad marine areas for prospective future offshore wind development within DMAPs, noting that this will be dependent on location-specific environmental conditions for each DMAP. This is the plan-led approach. Government will work with industry to ensure ORE operations are undertaken with utmost consideration of cost-competitiveness and delivery timelines.

3.1 Government Priorities

There are several key priorities that will remain at the centre of the Future Framework. First and foremost is a consideration of the three pillars of sustainability: environmental, social, and economic. An additional priority is to ensure the deliverability of the ORE targets set forth in the Future Framework.

3.1.1 Environmental

Biodiversity and ecosystems:

Environment considerations and protection is of the utmost priority during the development of new ORE projects in Ireland's maritime area. As such environmental concerns must be at the forefront of the plan-led approach, from project planning to project decommissioning. An emphasis should be placed on taking an ecosystems-based management approach with full consideration for the protection of marine environment and biodiversity as required in the DMAP

process under the regulations set forth by the *MAP Act*. Environmental assessments will be conducted in accordance with the mitigation hierarchy whereby avoidance is preferable over minimisation followed by mitigation, in line with the *NMPF*. This approach is also crucial to assessing cumulative impacts such that co-existence of various marine activities with ORE development does not present additional and significant detrimental effects.

The ORE planning and development process must comply with all relevant environmental legislation including Environmental Impact Assessments, Strategic Environmental Assessments and Appropriate Assessments, as required. Extensive consideration will be given to relevant MPAs including SACs, SPAs and other biodiversity and environmental protections as under the authority of Department of Housing, Local Government and Heritage. Environmental surveys and consultations with relevant environmental groups and interest parties are required. Following proper environmental procedure, in part facilitated by data collection and data sharing as well as extensive consultation practice, will streamline the regulatory process for ORE projects.

Climate:

The climate crisis is one of the most pressing issues of our time with impacts being felt worldwide, including in Ireland. To combat climate change, Ireland has committed to reaching net zero emissions by no later than 2050 under *CAP23*. As a renewable energy source, ORE will play a critical role in decarbonising the Irish economy in line with legally binding national and international climate ambitions. Domestic uses of ORE will be prioritised to meet Ireland's decarbonisation goals, largely facilitated through increased electrification of the economy as well as the emergence of ancillary energy sources such as renewable hydrogen for hard-to-abate sectors.

3.1.2 Social

Social wellbeing:

As Ireland strives to establish itself as a global leader in ORE a focus must be placed on advancing the Irish quality of life and fostering beneficial relationships across relevant industries including developing a sense of connectivity to ORE. Social wellbeing must be prioritised at a national level but with due consideration

to our regional and local communities. An effort will be made to consider local and regional development plans with ORE policy. In the context of significant changes to Ireland's energy system, an emphasis should be placed on ensuring a just transition, particularly for more vulnerable and more affected communities. For example, consideration will be given to impacts on other relevant industries which play a vital role in the social and economic welfare of coastal communities, such as the fishing and seafood sectors. Central government will work alongside regional and local authorities as well as specific communities and industry to align ORE development expectations particularly through early, ongoing, and meaningful engagement.

Public and stakeholder consultation:

Government acknowledges the potential socio-economic impacts of ORE on communities including visual impact, construction disturbance, and economic displacement among others. In line with the *NMPF*, opportunities for early and comprehensive public participation will remain central to the establishment of future ORE policy and development of ORE and associated infrastructure. Targeted engagement will take place with local coastal communities and other marine users to avoid, minimise and mitigate impacts of the development of ORE and associated infrastructure. Maritime users with financial, social and cultural dependencies on areas designated for ORE use including fishers and fishing communities will receive particular attention. We are committed to pursuing both informal and statutory consultation proceedings with affected fishing communities, in part facilitated by the Seafood / ORE Working Group.

3.1.3 Economic

Return to the State and local communities:

The delivery of ORE will seek to maximise associated economic benefits to the State and to relevant local communities. For the State this means securing the maximum investment return for the export of electricity and energy products, fair sea-bed levies for the use of State assets, development of indigenous supply chains through opportunities arising in the construction and operational phases of ORE projects, and knowledge sharing and dissemination to foster the development of indigenous ORE enterprises. For local communities this means

enhanced and diversified career opportunities within their coastal communities and direct investment by ORE project developers in local communities during the construction and operational life of ORE projects, including through mandatory Community Benefit Funds (CBFs). Consideration will be given to balanced regional development and equitable distribution of local benefits.

Cost competitiveness:

Specific ORE competitiveness varies given that some technologies are more viable for commercialisation since expenditure varies significantly between projects depending on scale, geographic location, generation profile and technology. To meet ORE targets, government will support a diverse landscape of ORE technology supplied through various developers including through efforts to attract investment opportunities. Additionally, efforts will be made to promote economic returns to the State and local communities associated with the development of ORE that will target energy exports in international markets, particularly in the UK and the EU. There should be an emphasis on increasing access to international markets, reducing production costs in Ireland and analysing price differentials and policy constraints to ensure the highest cost-competitiveness of Irish exports.

Cost of energy and consumer affordability:

The targeted level of ORE capacity in Ireland will have implications for energy costs and resultant prices, which necessitates a consideration of the knock-on effect to energy consumers. Importantly, ORE delivery must be designed and implemented in such a way as to minimise or mitigate Irish consumer impact with a focus on affordability for households and businesses in line with the commitments set out under the package for *Energy Security in Ireland to 2030*[26]. ORE energy policy requires careful consideration of the impact on the customer including risks to security of supply for those living in or at risk of energy poverty. As outlined in the *NDP*, private investment has significant potential to advance the delivery of Ireland's ORE ambitions. Opportunities for both private domestic investment and foreign direct investment should be encouraged. In addition to prioritising private investment opportunities, we recognise the importance of

[26] gov - Energy Security in Ireland to 2030 (www.gov.ie)

looking towards EU and other support funds[27] in order to fund ORE projects thereby optimising energy affordability associated with high levels of ORE capacity deployment. Government will consider a variety of support schemes including domestic and international funding as well as potential private capital.

3.1.4 Deliverability

Delivery of targets:

Ireland will meet its energy and climate commitments if ORE development continues in alignment with previously outlined timelines. Timeline adherence will be impacted most significantly in the planning and development stage of ORE development including spatial mapping, project planning, consent applications, environmental assessments, determining a route to market, and project investment in addition to securing supply chain components and construction. A strong emphasis will therefore be placed on streamlining government procedures while signposting relevant timelines to ensure advanced investment opportunities. DECC will strive to consider all options in order to meet the long-term vision for offshore renewable energy in Ireland. The *Renewable Energy Directives*[28] provide Ireland with an opportunity to broaden the scope of ORE project delivery under Renewables Acceleration Areas, where they are in appropriate locations as per requisite planning and environmental assessments.

Availability of relevant data:

Access to high-quality information and data on our seas and on the maritime environment, including data of a technical, economic, social and environmental nature, will help inform how Ireland can sustainably deliver our ORE potential. The integration of high-quality evidence and data into these processes will create conditions that bring investment certainty and strong competition to the Irish ORE sector while elucidating the impact of ORE policies on the environment and on wider society.

Technology and supply chain development:

[27] EU funding for offshore renewables (europa.eu)

[28] Directive - EU - 2023/2413 - EN - EUR-Lex (europa.eu)

The development of indigenous supply chain capability, new innovative technologies and the potential for Ireland to maximise the value of the offshore energy opportunity is clear. This will in the short-term focus on the domestic supply chain demand, but also target the global export market. The global market for offshore wind, predicted to be 2.5TW by 2050 should be a target for Irish exporting companies and multinational development in Ireland. Development sites must also be established in context of access to relevant components of the supply chain including jobs and skills, specifically focusing on educating and enabling a higher proportion of Irish local content and supporting innovation.

Infrastructural alignment including grid connections, port facilities and offtake opportunities:

ORE project sites must be located within economic distance to key onshore and offshore infrastructure be it existing, planned, or prospective. Cables, substations and other grid infrastructure must be constructed in concert with ORE projects whether the intent is to land energy generation domestically or to export via interconnectors. Given the potential scale of offshore resources, the works required for grid connection are likely to be substantial. Critically, project construction is enabled by port facilities capable of building, storing, and transporting components as well as proximity for ongoing O&M activities. Along with the industrial requirements needed to facilitate ORE deployment, generation sites must be aligned with targeted offtake opportunities such as onshore connections, interconnection, and renewable hydrogen networks. Ongoing alignment is needed to ensure ORE targets are coordinated with existing, planned, or prospective infrastructure development.

3.2 The Plan-Led Process Aspects

The plan-led process is underpinned by a series of related but independent processes and components, each regulated by distinct competent authorities. Each relevant component is detailed below:

3.2.1 ORE Designated Maritime Area Plans

An important step in advancing the plan-led approach is the use of marine spatial planning, and specifically the requirement to establish DMAPs according to provisions within the *MAP Act*. DMAPs will determine the marine areas where all future ORE

projects can be developed and will act as a management plan for specific areas of our marine waters. In line with provisions in the *MAP Act*, the Minister for the Environment, Climate and Communication has been designated as the competent authority for the purposes of preparing ORE DMAPs.

The use of sub-national forward maritime spatial planning such as DMAPs, will ensure that future developments in Ireland's maritime area take place in a managed, strategic and sustainable way. As required under the *MAP Act*, the establishment of DMAPs will take place according to an ecosystem-based management approach, with full consideration for the protection of marine environment and biodiversity. It will provide comprehensive opportunities for public and stakeholder engagement, and most importantly for local coastal communities.

Public engagement and statutory consultation will ensure that future development of ORE takes place with consideration of other marine activities and usages, including fishing, aquaculture, marine tourism and marine leisure, which are vital amenities and sources of income and employment for many coastal communities.

The stages for DMAP establishment are as follows: publication of DMAP Proposal; DMAP Proposal area refinement through ongoing public and stakeholder consultation(s), Strategic Environmental Assessment, and other expert analysis of maritime areas to assess suitability for ORE development; publication of a draft DMAP; commencement of statutory consultation period; final refinement and the approval to be sought of both Houses of the Oireachtas.

The plan to establish an initial South Coast DMAP for ORE was approved by both Houses of the Oireachtas in May 2023. Following publication of a South Coast DMAP Proposal in July 2023, and subsequent periods of extensive 10-week public consultation, approval of both Houses of the Oireachtas will be sought for the South Coast DMAP in summer 2024. The South Coast DMAP will identify marine areas for development of ORE for deployment by 2030 and post 2030. It is further anticipated that further future ORE DMAPs will be announced by summer 2024, with the location and timing of these plans to be determined by the evolution of energy and climate policy, and decarbonisation objectives.

For the avoidance of doubt, State-led development means that DECC, in consultation with other government departments and agencies such as MARA, the National Parks

and Wildlife Service (NPWS) and Department of Agriculture Food and the Marine (DAFM), decide where the ORE generation development sites will be situated as defined under Article 22(2)(c) of the *MAP Act*. This will be done through DMAPs. All supporting infrastructure, including and in particular grid, will align or as may be the case, review their strategies to ensure timely and efficient delivery of electricity from these sites.

Actions		Owners	Timeline
7	Provide the structures and supports necessary to establish a future DMAP roadmap including criteria and timelines for deployment. This roadmap should be produced in accordance with all relevant legislative and regulatory processes and in alignment with technology maturity and offtake availability.	DECC	Q4 2024
8	Assess the potential for accelerating the development of a West Coast DMAP and examine the cost and viability of initiating floating offshore wind projects in this DMAP as Ireland seeks to support the development of this sector in line with Action 7.	DECC	Q4 2024

South Coast **DMAP** Sequence

Explore

- Determine the areas most suitable for offshore development
- Use marine data and stakeholder input

Propose

- Publish a Public Participation Statement
- Refine and test the area through stakeholder engagement
- Publish a DMAP Proposal

Assess

- Carry out environmental assessments
- Consider expert analysis

Draft

- Publish a Draft DMAP
- Publish Draft Environmental Assessment reports

Consult

- Conduct public consultation and outreach
- Engage with the public and other stakeholders

Refine

- Review the Draft DMAP
- Incorporate outcomes from consultation

Approve

- Present the Draft DMAP to the Oireachtas
- Publish the Final DMAP

The DMAP sequencing visualised here is based on the process currently underway for the South Coast DMAP, Ireland's first DMAP for ORE.

3.2.2 Maritime Area Consent

The Maritime Area Regulatory Authority (MARA), established on 17 July 2023, marks the transition to the new maritime regulatory regime. The new agency has responsibility for assessing applications for rights to occupy seabed, known as Maritime Area Consents (MACs). MACs are required ahead of the planning application stage. MARA's functions include the enforcement of the MAC conditions and conditions that may be attached to a development consent by ABP. Post ORESS 2.1, and once a given DMAP is established, MARA will launch a process for a MAC, which could be based on pass/fail criteria (as per Phase One), integrated with a competitive process (as with ORESS 2.1) or a stand-alone competitive process.

MARA is keen to explore the potential to develop a competitive MAC process in a sustainable manner in collaboration with its key partners and stakeholders. Sections 93 and 103 of the *MAP Act* enables MARA to introduce a competitive process for the awarding of a MAC. Experience from other jurisdictions can inform how we develop this policy, for example, using financial criteria, non-financial criteria or a combination of both. This will signal a long-term ambition for ORE development in Ireland, build confidence in supply chain and provide certainty to civil society and regulatory bodies in respect of robust forward planning.

Actions		Owners	Timeline
9	Continue to support the consenting process for ORE projects including support of necessary environmental procedures.	DECC MARA	ongoing
10	Explore the feasibility of implementing a competitive MAC framework with consideration to requirements under the *MAP Act* including appropriate criteria and indicative timelines for implementation.	DECC MARA	Q2 2024 – Q4 2024

3.2.3 Route to Market

The State supports for the development of ORE to date, for Phases One and Two has taken place through the Offshore Renewable Electricity Support Scheme, ORESS. This scheme comprises competitive auctions which invites renewable energy developers to compete against each other in order to select the optimal project developer. Winning

bidders are awarded 2-way Contracts for Difference, financed by the Public Service Obligation (PSO) fund, which itself is financed via a levy on electricity consumer bills. When the Irish wholesale market price is lower than the price secured at auction (the strike price), the generator is supported by the PSO fund up to this strike price, and conversely, when the wholesale price is greater than the strike price, the generator refunds the difference back to the PSO fund. This mechanism reduces costs both for generators and consumers by providing price predictability, enhancing financial viability and competition, while also protecting consumers against price shocks. To enhance the competitiveness of Ireland and minimise costs borne by the Irish consumer, deliverability and cost reduction have been the priority outcomes of this process to date.

The ORESS scheme expires at end-2025, with the last auction, ORESS 2.2, provisionally scheduled for 2025. A successor scheme is therefore required, and in order to avoid a stop-start in the market, this new scheme, must be designed, State-Aid approved and operating by 2026.

Design parameters for this new scheme are broad, but at a minimum the development phase, to take place in 2024, will consider:

- accounting for the very high levels (80%+) of variable renewable electricity on the Irish system from the mid-2030s, including by considering variable support levels depending on time of generation or the level of curtailment on the Irish electricity system at a given interval;
- integration with other electricity market interventions such as capacity auctions and procurement of system services;
- broadening support from renewable electricity to renewable energy, enabling support for renewable fuels such as green hydrogen, which would require consideration also of broadening financing of the scheme beyond electricity consumers;
- pre-qualification and award criteria to include qualitative criteria to achieve other policy objectives such as cybersecurity, energy security, green energy requirements, environmental protection and a thriving and competitive EU ORE manufacturing and supply chain, specifically taking account of the *Net Zero*

Industries Act (NZIA)[29], and the *European Wind Charter*[30], signed by Ireland in December 2023.

In addition to the successor scheme to ORESS, alternative routes to market are emerging in other offshore markets, such as projects financed by merchant means or via Corporate Power Purchase Agreements (CPPAs). In addition, new types of projects, such as Power-to-X, multipurpose interconnector projects or non-grid limited projects (this could include projects that are shallow connected to the transmission grid) may require bespoke supports or frameworks to achieve broader objectives. Export only projects will be complex to achieve and may require multilateral transmission projects and also be supported via EU mechanisms such as the Joint Projects or the Cross Border Project processes. EU level development work under the EU Commission's *Action Plan for Grids*[31] will be fundamental to facilitating success.

At a minimum Ireland has committed, at the North Seas Energy Ministerial in November 2023[32], to procure over 11.5GW additional offshore wind capacity by end-decade, comprised of 2GW of non-grid limited connected capacity and at least 9.5GW of capacity to be procured via the successor scheme to ORESS. This 2GW capacity is intended to provide the initial step to addressing challenges associated with grid limitations and will be procured in coordination with existing ORE development plans. Government will work towards providing financial supports to achieve our ORE targets in an economically viable manner – factoring in both domestic and international demand, realistic reductions in renewable energy costs, the expansion of domestic industry, risks to consumers, and other constraints.

Actions		Owners	Timeline
11	Maintain a single schedule for all upcoming State tenders for ORE, including non-grid limited ORE, in alignment with Action 7.	DECC	ongoing

[29] Net-Zero Industry Act - European Commission (europa.eu)

[30] European Wind Charter.pdf (europa.eu)

[31] Grids, the missing link - an EU Action Plan for Grids (europa.eu)

[32] NSEC tender planning.pdf (europa.eu)

Actions		Owners	Timeline
12	Design and develop a successor support scheme to ORESS, and obtain State Aid clearance, to be in operation from 2026-2030. This successor support scheme will be subject to domestic and international demand assessment.	DECC	2024 – 2025
13	Identify and assess the enabling supports and/or frameworks that may be required to maximise capacity from alternative routes to market.	DECC	Q1 2024 – Q4 2025
14	Design a competitive process to facilitate sea-bed access designated for 2GW of non-grid limited capacity in 2025, to be in development by 2030 in alignment with Action 10.	DECC MARA	Q1 2024 – Q2 2025
15	Explore and develop routes to markets as required for the 2GW non-grid limited generation capacity in alignment with Action 4 of the *National Hydrogen Strategy*.	DECC	2025 – 2028

3.2.4 Grid Connection

A key advantage of the plan-led system is that designating marine areas as suitable for ORE deployment provides guidance for onshore and offshore transmission development thereby facilitating proactive planning. Government and the CRU will continue to develop an appropriate regulatory framework that maximises long-term societal value by enabling anticipatory investment in transmission infrastructure, futureproofing our onshore and offshore grid and streamlining the grid connection process. The EU has committed to developing guidance on anticipatory investment by Q1 2025 under their *Action Plan for Grids*.

3.2.5 Development (Planning) Permission

Following the receipt of a MAC, a project is required to obtain development consent in the form of a planning permission as set out in the *MAP Act*. The responsibility to assess development permission falls to ABP. As part of the planning permission procedure, ABP will request and assess all appropriate environmental assessments.

Development of other elements of the ORE system may require permissions under Local Authority governance, such as ports and O&M facilities.

3.3 The Plan-Led Process Sequencing

Government recognises that the efficient operation of the planning system, including in terms of expected decision making timelines and clarity on the sequencing of the plan-led process, can assist in project deployment by providing the certainty that is required to support financing and timely delivery.

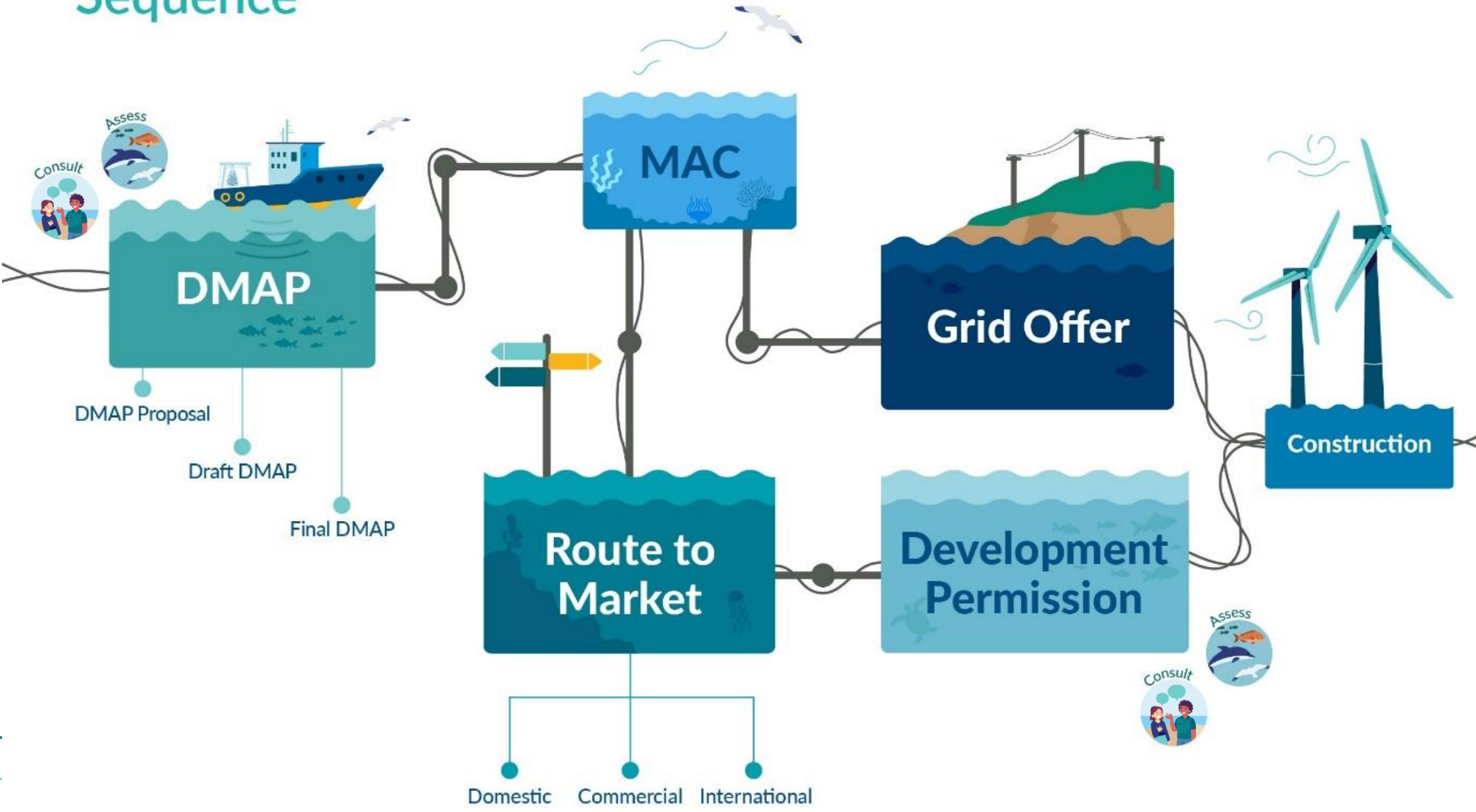
The current sequencing for the ORE plan-led process, as established in the *Phase 2 Policy Statement*, is as follows: DMAP delineation, MAC, grid assessment, route to market such as auctions, development permission and grid offer.

Table 2.
Summary table of the plan-led process components during the ORE development stage.

Development stage	Description	Competent Authority
DMAP	A broad area within which ORE projects can be developed within specific sub-areas identified for that purpose by government.	DECC
MAC	A consent to occupy a defined maritime area.	MARA
Route to market	An agreement to retail electricity, often at an agreed price.	▪ DECC ▪ Private sector ▪ Third country
Grid offer	An agreement for generation to connect to the grid.	EirGrid[33]
Development permission	Consent for the physical development of ORE projects including construction, operations, and decommissioning.	ABP

[33] Additionally, CRU decides overarching grid connection policy as well as issues generation licences and authorisations to construct.

ORE
Planning and Development
Sequence



Importantly, this sequence may not necessarily be the only sequence employed for all future ORE development. One potential alteration to the plan-led sequencing will be to delay the auction or price bidding mechanism until after project development permission has been secured. In that altered scenario, the modified sequence would become: DMAP delineation, competitive MAC, development permission, and route to market such as auctions. This adjustment would seek to reduce financial risks to developers who are currently required to model supply chain and associated costs 5-6 years prior to engaging in binding contracts. However, this sequencing pattern would only be feasible with the introduction of a competitive MAC process. To prevent pre-emptive policy, the consideration of this sequencing model will be examined more thoroughly if competitive MACs are pursued under Action 10 of this Future Framework and therefore are not proposed in this iteration.

If pursued, careful consideration will be given to mitigating against developers recuperating costs in any subsequent route to market auction process which could incur undue costs to consumers. The sequencing must be properly designed to mitigate against project delays and strongly discourage abandonment in the latter stages of the sequence if projects fail to secure a route to market. This includes managing late-stage attrition through the facilitation of alternative routes to market such as CPPAs. Additionally, this sequencing pattern requires the early identification of explicit offtake opportunities and routes to market which will be clearly described during the DMAP stage. Government will work to align these offtake opportunities in accordance with Section 3.4 below and Actions 7 and 16.

To reiterate, while the purpose of this document is not to identify alternative sequencing for ORE planning there is potential to re-examine the current sequence in subsequent iterations to this Future Framework alongside the progression of key actions. Discussions on updated sequencing will be conducted with reference to all applicable legislation and in consultation with relevant government departments and agencies, industry representatives and other stakeholders.

3.4 Infrastructural Alignment

Aligning infrastructure efficiencies is intended to consolidate the vast structural and interdepartmental complexities throughout the ORE planning and development process. Infrastructure alignment will occur with consideration to DMAP designation, availability of marine data, environmental and cumulative impact analysis, quality of

offshore resources, proximity to demand opportunities, access to port facilities, availability of supply chain components, coordinating generation capacity and grid infrastructure, implementation of energy storage mechanisms, facilitation of electricity interconnection with reference to curtailment risk, connections to other offtake opportunities such as renewable hydrogen, and available routes to market. A key component to ORE delivery is adopting a coordinated approach to Ireland's energy system with consideration to system-wide integration across all relevant components stated above. Infrastructural alignment will be progressed in accordance with Action 6 of the *National Hydrogen Strategy* and Action 36 of *Ireland's Offshore Wind Industrial Strategy*.

Actions		Owners	Timeline
16	Rollout of EirGrid's *Grid Implementation Plan* and future iterations to aid in the alignment of infrastructure efficiencies in a manner which considers offshore generation, grid, and routes to market.	EirGrid DECC	Q2 2024 – Q2 2025
17	CRU to consider provision for anticipatory investment for the development of offshore and onshore grid through the regulatory framework following publication of EU guidance scheduled for Q1 2025.	DECC CRU DPENDR	Q1 2025 – Q4 2025
18	Identify the resourcing needs both, current and capital, across government departments and agencies to ensure all government bodies in relevant marine, ecology, planning, relevant industrial development and ORE disciplines are properly resourced to discharge the expanded responsibilities to attract the economic value as set out under the Future Framework. DECC to facilitate inter-departmental analysis to identified needs and report to government in Q3 2024 with a business case for strategic investment in the future framework. This should include the identification of specific leadership roles to deliver the scale and pace of regulatory and policy functions to deliver on the opportunity laid out in the future	DECC [34] D/Taoiseach	Q3 2024

[34] An all-government approach facilitated by the OWDT.

Actions		Owners	Timeline
	framework. Alignment of these resources should be completed via the annual budgetary process and the NDP allocations for capital investment and overseen by the Climate Action Delivery Board and Cabinet Committee on the Environment as required.		
19	Develop an Alignment Strategy action plan by end 2024, to support the delivery of 2040 and 2050 ORE targets, with a built-in review structure to assist implementation. This strategy, to be place by end 2025, intends to ensure that ORE generation, transmission, and demand – both traditional and non-traditional – are in alignment both from a geographic and temporal perspective. It will apply to current and future DMAP areas. As per Action 18, develop appropriate resourcing and leadership in DECC that can work with government and industry stakeholders, including with the Project Ireland 2040 Board.	DECC	Q4 2024

ORE
Concept Map

Ocean Energy

Hydrogen Electrolyser

Floating & Fixed Turbine

Cables & Interconnector

Substation

Ongoing O&M

DMAP

MPA, e.g. SPA, SAC

Port Activities

Route to Market, e.g. data centres, transmission grid

3.5 Role of the State and the Role of ORE Industry

The success of Ireland's future ORE development depends on collaboration across government departments and agencies, as well as between government and industry.

DECC will continue to engage with colleagues in the DETE, the Department of Public Expenditure, NDP Delivery and Reform (DPENDR), DAFM, MARA, SEAI, NPWS, Geological Survey Ireland (GSI) and EirGrid among others. Additionally, increasing efforts should be made to involve regional and local government with particular focus on engagement across government levels and with relevant industry. Regional and local government authorities play critical roles in advocating for ORE development within their relevant jurisdictions and therefore must be engaged with appropriately.

Government recognises the crucial role that industry holds, and will continue to hold, in the future of plan-led ORE development. Ongoing industry participation will involve extensive consultation across a range of topics. Feedback is encouraged regarding practical considerations for DMAP delineation, price competitiveness, promoting technological innovation, securing alternative routes to market, and aiding in data collection for site selection. Industry collaboration can not only provide meaningful insights into policy drafting, but also spur innovative and technological advancements, initiate community engagement, contribute to the open sourcing of critical marine data, and guide interactions across maritime sectors.

Additionally, government wishes to acknowledge the importance of other industry partners, beyond the ORE and energy sectors. These include industry representatives of the seafood and fishing communities, shipping, maritime tourism, and environmental groups among others. Working alongside industry across relevant sectors is crucial to securing a positive socio-economic impact on Ireland's coastal communities. One positive development is the establishment of the Seafood / ORE working group which facilitates discussion between these two influential industries. Future directions will include maintaining and bolstering existing inter-industry and industry-government relationships, whilst simultaneously exploring additional inter-industry engagement.

Actions		Owners	Timeline
20	Establish a joint government and industry working group as facilitated under the OWDT industry forum to discuss the prioritisation, delivery and implementation of the actions set forth under the Future Framework.	DECC	Q2 2024
21	Consider the establishment of additional working groups to provide opportunities for policy input regarding the Future Framework between government and other stakeholders, which may include environmental groups or community representatives.	DECC	Q2 2024

4 Resource Assessment and Considerations

4.1 Marine Data Acquisition

Access to high-quality information and data on our seas and on the maritime environment, including data of a technical, economic, social and environmental nature, will help form a rounded picture of how Ireland can protect the marine environment and biodiversity as we deliver on our world-recognised ORE potential. In the context of the plan-led approach for ORE, government is committed to significantly scaling up the collection of data on the maritime environment to support the ORE DMAP establishment process and associated environmental assessments as required under Article 22 of the *MAP Act*. The integration of high-quality evidence and data into these processes will create conditions that bring investment certainty and strong competition to the Irish ORE sector while also helping us better understand the impact of our policies on the environment and on wider society. It will support and inform the ecosystem-based management approach to designating areas in our seas for ORE through DMAPs, to ensure that environmental impacts of ORE are minimised in line with relevant *NMPF* policies. It will also provide the chance to explore and maximise opportunities for coexistence of different maritime activities with future ORE developments. In addition to informing DMAP delineation and site selection, data acquisition will de-risk subsequent ORE planning stages and provide guidance for the coordinated designation of MPAs and fill gaps in critical environmental information.

As prescribed by the *MAP Act*, ORE delivery must be supported by extensive data including areas of potential constraint on ORE deployment, environmental factors, socio-economic factors, including fishing and shipping, and heritage factors (non-wildlife heritage such as shipwrecks). A priority is to collect, analyse and utilise valuable data with respect to technical opportunity for ORE related to geophysical, geotechnical and metocean data; environmental and biological data; maritime activities data including human usage like fisheries; and other barriers such as topographical and heritage site data.

Under the *MAP Act*, data should be collected using a coordinated, efficient, and pro-active approach and be made more readily open and accessible to improve transparency and project planning efficiency. Research must be conducted in alignment with data standards and be adaptive as per continuous monitoring and adaptation principles. A range of EU and national policy documents, including the *Public Service*

Data Strategy 2019 – 2023[35], recognise the need for a more aligned integrated and consistent approach to data across government, which enables the secure reuse of data and services. This could be adopted further with the development of a data strategy or policy targeted at ORE.

Government is committed to leading and coordinating stakeholders across the public sector, ORE industry, fishing industry, shipping and navigation, and research communities in the environmental and academic sectors to collaboratively share and produce data relevant to effective maritime spatial planning for ORE. Open sourcing of ocean data will more greatly inform the development of DMAPs and de-risk State auctions. As such, private data acquisition will become less competitively advantageous. DECC may procure data and related services as necessary to ensure the timely delivery of ORE climate and environmental targets. Additionally, DECC will work with Geological Survey Ireland, the Marine Institute, and private survey operators to conduct surveys in areas where data is either unavailable or not forthcoming. An expert data group for ORE has been established by DECC with representation from industry and government departments and agencies to align expectations and standards for ORE data acquisition.

Actions		Owners	Timeline
22	Procure, consolidate and publish all relevant data to support the open sourcing of ocean data available for the protection of the marine environment and biodiversity during development of ORE.	DECC Marine Institute	Q3 2023 – ongoing
23	Establish a priority process to incorporate cumulative impact studies into the DMAP process as required by the *MAP Act*.	DECC	2024
24	Conduct additional studies and data modelling to inform future ORE DMAP delineation given increasing frequency of weather extremes and future climate and environmental conditions.	DECC	Q3 2024 – Q1 2025

[35] gov - Public Service Data Strategy 2019-2023 (www.gov.ie)

Actions		Owners	Timeline
25	Develop an overarching ORE data policy and governance statement.	DECC	Q4 2024

4.2 ORE Resources in Irish Waters

A national-scale assessment[36] was carried out by the Sustainable Energy Authority of Ireland (SEAI) to estimate the potential scale of opportunity for ORE technologies in Ireland's waters. The assessment considers the potential for wind, wave and tidal technologies. It involved:

1. Identifying and mapping the areas of Ireland's maritime waters where characteristics are most favourable to ORE development as a starting point; and
2. Estimating the overall theoretical potential for wind, wave and tidal technologies within these maritime areas through modelling carried out by the SEAI.

The theoretical and technical opportunities for offshore energy are based on assumptions on water depth, bathymetry, wind speed, tidal currents, and wave potential. It is important to note that these are theoretical potentials, based on gross geographic areas and significant assumptions. Certain environmental, economic and socio-cultural factors will reduce the sustainable potential of ORE in Ireland. However, technological innovation will increase ORE opportunity in Irish waters, for example, anticipating that fixed turbine technology will evolve to become viable in deeper water depths over the coming years, and that there will be a trend towards larger and more efficient turbine devices.

The total gross technical resource capacity for ORE technologies in Ireland is outlined in Table 3. These are estimates based on significant model assumptions and do not fully take into account other constraints, such an environmental constraints, technological constraints, economic constraints or other activities which will be evaluated and assessed at DMAP stage in line with the relevant provisions of the *MAP Act*.

[36] gov - The Second Offshore Renewable Energy Development Plan (OREDP II): Public consultation (www.gov.ie)

Technology	Gross technical resource capacity (GW)
Fixed bottom wind (10-70m)	62
Floating wind (70m-1000m)	579
Wave	23.8
Tidal	7.9

Table 3.
The gross technical resource capacity for various ORE technologies within Ireland's Exclusive Economic Zone.

In addition to considering potential environmental constraints and other existing maritime activities and usages at DMAP stage, there will be areas in our seas that are less practical and economically viable to develop in than other areas depending on, for example, proximity to grid infrastructure and to port facilities including accessibility year-round during challenging weather conditions. Infrastructural considerations to ORE delivery including domestic demand opportunities, grid infrastructure, port facilities and other considerations are further examined in Section 5. The infrastructural requirements depend on the intended end use of the energy generated, for example, connection to the national electricity grid for domestic consumption, electricity export, or the production of hydrogen or e-fuels. These considerations are driven by economic, practical, and logistical rationale as further examined in Section 6.

5 Domestic Industry and Infrastructure Considerations

5.1 Domestic Demand

Given the significant economic benefits associated with a growing ORE industry, a priority is to capture the largest amount of ORE energy generation for domestic consumption as possible, either via direct connection to the SEM electricity grid or opportunities to add value domestically via industrial developments. This requires a considerable expansion of domestic demand opportunities while maximising the value and development of Ireland's supply chain including jobs and skills. Capturing ORE generation in Ireland will require extensive electrification of end uses especially in the transport and residential sectors, in line with the electrification and decarbonisation ambitions under *CAP23*. New domestic industrial opportunities can also be created for existing businesses to expand operations or new businesses to locate in Ireland due to its potential abundance of green renewable energy. DETE explored domestic demand and supply chain considerations as part of *Ireland's Offshore Wind Industrial Strategy*. The overarching objective of the Strategy is to ensure that Ireland maximises the economic benefits associated with government targets to deliver 37GW of offshore wind by 2050. This includes identifying measures to build a capable and resilient supply chain and to achieve the greatest economic impact possible arising from Ireland's future energy demand for our renewable energy.

It is intended that the Strategy will be an iterative piece of policy development, reflecting the timelines envisaged under the OWDT and prioritising the most immediate requirements of industry to deliver offshore wind energy (OWE) projects of scale. It is therefore intended that the first iteration of the Strategy will focus on measures to maximise Ireland's participation in the domestic and international OWE supply chain, in addition to setting out the main opportunities for Ireland to develop a globally recognised OWE research, development & innovation (RD&I) sector to promote collaboration between small and medium-sized enterprises (SMEs), multinationals, and further and higher education institutes.

The first iteration of *Powering Prosperity – Ireland's Offshore Wind Industrial Strategy* signposts subsequent Strategy development, including a scoping of additional measures required to develop enterprise opportunities associated with increased use of offshore wind energy in Ireland and export demand for energy derived from OWE. Consideration should be given in the development of future policy direction, including the strategic direction of EirGrid and CRU, to the benefits of the co-location of

industrial demand for renewable energy with development of large offshore wind projects, in line with the *National Planning Framework* and the *NMPF*.

The Strategy, published in Q1 2024 by the DETE, was developed in close collaboration with industry and key government departments and agencies, and within the frame of the OWDT.

Actions		Owners	Timeline
26	Explore potential investment incentives which could be developed to encourage both domestic investment opportunities and foreign direct investment in domestic supply chain facilities.	DECC DETE	Q3 2024 – Q1 2025

5.2 Grid Infrastructure

5.2.1 Onshore Grid

Grid infrastructure is crucial to maximising the domestic consumption of ORE in Ireland. Energy generated from ORE projects must be delivered to end users, meaning ORE development including the associated offshore grid must be aligned with the onshore transmission grid. While onshore grid capacity has been identified as a limiting factor for delivering Ireland's 2030 ORE target, government is working to prevent grid capacity limiting delivery in the lead up to 2040 and beyond. This will require major onshore grid reinforcements to accommodate 20GW and subsequently 37GW of ORE.

A functional, integrated grid system will include increasing capacity and voltage uprating of existing infrastructure, developing new infrastructure, constructing subsidiary infrastructure including substations and converters, and coordinating with proximity to ORE project development sites. To realise these reinforcements, extensive collaboration and financing is needed across relevant departments and agencies facilitated by clear policy direction. The ORE delivery targets established according to the *Ten-Year Network Development Plan* (TYNDP), for example, will provide a useful roadmap for strategic development.

While the national grid must be developed and expanded, we must also seek to utilise the assets already in place and this includes facilitating hybrid connections on the national electricity grid for electricity generation. Separately we must also seek to

enable off grid solutions which may assist us in meeting our climate targets and sectoral ceilings. DECC is currently looking to develop a policy on Private Wires and is reviewing responses received during the public consultation period in Q4 2023. We will explore the potential role for which onshore private wires may play in grid balancing and flexibility thereby reducing major grid reinforcements and associated costs which fall to consumers. Private wires may additionally play a role in the emerging renewable hydrogen industry or similar non-grid limited offtake opportunities.

5.2.2 Offshore Grid

EirGrid, as the offshore TSO, will lead the future development of the offshore grid as part of the plan-led approach and within the context of DECC-led DMAPs and in response to sites designated as part of the DMAP process. DECC will coordinate with EirGrid, CRU and other relevant agencies to align offshore grid development at a national scale to ensure appropriate infrastructural build-out. Additionally, consideration must be given to ORE export ambitions through interconnection as this requires significant construction of both onshore and offshore grid capabilities.

Where the intended end-use of energy is connection to the national electricity grid for domestic consumption, it is important to note that project costs generally increase with distance of ORE developments to grid connection points. Energy transmission cables connecting project sites to the terrestrial electricity grid are currently particularly expensive components of ORE projects. These costs are ultimately borne by electricity consumers. From the perspective of ensuring that the best price of electricity for end-users can be secured, distance from a generation site to grid connection points is therefore a key consideration in the development of ORE.

In addition to connections to terrestrial and international electricity grids, the optimal locations and configurations for the necessary enabling infrastructure such as substations and offshore converter stations is a key consideration in the development of ORE. This also includes future proofing of the infrastructure to enable phased development of generation through anticipatory investment, particularly with reference to nascent technologies. Furthermore, the potential to develop offshore HVDC or HVAC cabling will be explored which have the potential to reduce the level of required onshore grid infrastructure.

A workstream under the OWDT is taking action to address the grid requirements of offshore wind in Ireland. While DECC oversees this workstream, there is close collaboration with EirGrid to achieve described actions. Forward planning facilitated by the plan-led approach will promote the alignment of offshore generation with requisite grid development to minimise consumer costs and optimise planning process timelines. A clear strategy for the forward planning of Ireland's offshore grid will be described in the upcoming *Offshore Transmission Strategy*, scheduled for release in Q2 2024.

5.3 Ports

ORE developments will typically require access to large-scale port infrastructure for project marshalling and assembly (M&A), and smaller-scale port facilities to provide ongoing O&M services after ORE structures are installed. It is understood that project costs associated with construction and deployment of ORE projects can increase the further a development site is located from its associated assembly port. Additionally, the further away from an appropriate port(s) an ORE development site is located, the more challenging it is to access that project site year-round to support ongoing O&M throughout the lifecycle of ORE developments. This is due to the limited number of days annually that sites can be safely accessed during challenging weather conditions, particularly in winter seasons.

An economic analysis was conducted by AFRY Managing Consultants and BVG Associates to assess the viability of Ireland's long-term ORE goals and export potential, as outlined in Section 6. This study assumes that several port facilities in Ireland are required to meet 2040 and 2050 targets based solely on initial assembly and tow-out requirements not including the Belfast port, which already has capacity to service ORE projects and may contribute to Irish ORE development. This is consistent with the minimum Irish port capacity assessment conducted by the Irish Maritime Development Office (IMDO), which after assessing existing and planned port infrastructure in Ireland and abroad, concluded that at least four Irish deployment ports – inclusive of the Belfast port – are required to deliver 2030 and 2050 targets. The conclusions of this report are based in technical capacity constraints, namely terminal dimensions, observed in similar jurisdictions. Actual productivity will be determined by the unique circumstances of individual projects and associated port requirements aggregated for each ORE-capable port.

As recognised in the *National Ports Policy 2013*[37], commercial State ports under the remit of the Department of Transport have an important role in servicing the offshore energy sector and offshore energy was identified as an emerging capacity requirement at that time. Given the degree of port capacity required to facilitate ORE ambitions, it is important to consider the role of other ports in Ireland under the remit of the DHLGH, DAFM, or private operators. A supporting role may emerge for other smaller scale port facilities or ports predominantly dedicated to other maritime activities such as major Fishery Harbour ports, to support ORE development in tandem with their existing port responsibilities. The *National Ports Policy* is in the process of being updated by the Department of Transport and is expected to be published in 2025. Future directions on ports policy will be signposted by the Department of Transport as the relevant competent authority for Irish ports and co-ordinated by the OWDT under a dedicated transport and ports workstream.

5.4 Other Considerations

5.4.1 Security of Supply

Renewables energy generation is inherently variable given the intermittency of wind, wave, and tidal resources. However, taking an energy diversification approach through the deployment of assorted ORE technologies such as wind, wave, tidal and solar will ultimately promote energy security. Ensuring a secure energy supply is critical to safeguarding the resilience of Ireland's energy system especially looking towards the 2050 net zero economy ambitions as oil and gas alternatives will be less frequently available for system backup. The transition to renewables power generation and fossil-free back-up options will be carefully managed to ensure security of electricity supply.

Energy security will be predominantly facilitated by:

- **High-capacity factor renewables:** High-capacity factor renewables, such as offshore wind in Irish waters which may reach capacity factors above 60%, reducing the need for energy storage solutions.
- **Battery fleet:** Battery storage expected to increase particularly in short and medium duration battery capacity ranging from 1-8 hours. There is also opportunity to introduce a limited amount of 100-hour battery capacity, for

[37] gov - National Ports Policy (www.gov.ie)

example from iron-air batteries. While batteries offer some energy security, they have limitations in their efficiencies and physical storage requirements.

- **Interconnection:** Electricity imports from neighbouring jurisdictions help balance electricity supply and demand between countries and provides a valuable back-up power supply for when electricity systems have reduced capacity. New interconnections will also allow for increased energy imports in the case of an adverse shock, which may occur during extreme weather events.
- **Long Durational Energy Storage:** In the long term as we move beyond an 80% renewable electricity power system, long durational storage of energy in the form of pumped hydro and renewable hydrogen and its derivatives will be required to supply the thermal fleet and balance supply and demand across the system over longer durations spanning from weeks to potentially years.
- **Thermal fleet or other dispatchable generation:** Currently the thermal fleet and backup energy generation is reliant on gas generation. Ireland's thermal fleet is anticipated to play a diminished role as other security of supply mechanisms come on board, representing a small proportion of total generation on the system. By 2050, around half of the existing (and thus old, by 2050) natural gas-fired capacity on the system may be replaced by hydrogen-fired capacity particularly for open cycle turbines. The capacity of the natural gas thermal fleet will need to increase initially on the back of rising demand to ensure security of supply as other more harmful fossil fuel plants close, although the higher levels of renewables may mean this fleet runs increasingly infrequently.

5.4.2 Co-Existence

The *NMPF* recognises the important role that different maritime activities and sectors play in Irish economic, cultural and social development - including seafood and fishing, tourism, recreation, shipping, cultural heritage, biodiversity and, in the future, ORE. It is also recognised that many of these activities are spatially concentrated in coastal areas despite the vastness of our seas, where a number of increasingly congested locations aspire for further growth across different activities and sectors. This has brought the importance of effective forward marine spatial planning to the fore, which will ensure that we manage the development of maritime sectors in a manner that is sustainable and spatially efficient, to achieve ecological, economic and social objectives.

The transition to a plan-led regime for ORE development provides a significant opportunity to facilitate and promote the successful spatial coexistence between different maritime sectors where appropriate, such as coexistence between seafood and commercial fishing activity and fixed bottom offshore wind. There may also be future opportunities for different ORE technologies, such as wind and wave technologies, to co-locate with each other. There are multiple potential benefits associated with providing for maritime coexistence, including improving spatial efficiency, increasing socio-economic benefits, and minimising environmental impacts. The facilitation of coexistence and co-location opportunities between ORE and different sectors will be informed by extensive engagement and consultation with local communities and impacted stakeholders through the DMAP establishment process, in accordance with the relevant provisions of the *NMPF* and *MAP Act*.

Through the DMAP establishment process, targeted, sector-specific policy objectives to facilitate co-existence between ORE and other maritime sectors where appropriate will be established, informed by public consultation and environmental assessments in alignment with the relevant provisions of the *MAP Act* and *NMPF*. These policies will collectively ensure that seafood and commercial fishing activity can continue to take place within and around windfarm areas where appropriate. Examples of what these policy objectives may relate to will be included in the draft South Coast DMAP, although it must be noted that these policy objectives are specific to the South Coast regional area and relate to fixed bottom offshore wind. Coexistence policy objectives will be drafted with respect to the unique regional and technology characteristics associated with each individual DMAP.

5.4.3 Defence and Security

ORE development sites must be managed appropriately to ensure the energy infrastructure itself is well protected from external activities while limiting repercussions to existing defence and security procedures. For example, the large-scale deployment of ORE could have adverse impacts on air defence radars or at-sea patrols. Efforts must be made to protect Ireland's energy generation sites while maintaining the quality of existing responsibilities under the Department of Defence.

Beyond considering physical security, future ORE projects should proceed with a view to optimising cybersecurity. To reduce susceptibility to security concerns, ORE development should align with the recommendations under the *National Cyber Security*

Strategy[38] and be in compliance with relevant EU Directives including the *EU Network and Information Systems Directive 2016/1148*[39]. Additional policy may be developed to address the role of cyber security in Ireland's ORE future including the potential for pre-qualification criteria in the successor scheme for ORESS as described in Section 3.2.3 of this document.

[38] gov - National Cyber Security Strategy (www.gov.ie)

[39] Directive - 2016/1148 - EN - EUR-Lex (europa.eu)

6 Export Potential

6.1 Interconnection

While increasing interconnection capacity is crucial to the achievement of ORE goals and compliance with broader EU commitments, consideration of costs and national benefits will remain a pre-requisite for future interconnector development. To facilitate interconnector delivery, future surveys and studies must be conducted to assess the practical barriers and risks associated with interconnector projects including seabed feasibility. Ensuring that meaningful engagement occurs with local communities and industries and collaboration with neighbouring jurisdictions is essential to project success. In striving to reach the objectives of the *EU Green Deal*[40], Offshore Bidding Zones (OBZs) have been identified by ENTSO-E as a promising means of facilitating the deployment of multi-purpose electricity interconnection solutions[41].

The OBZ concept aligns closely with the intention to identify geographically proximal generation potential through the DMAP process. It is a new concept with few established models and none that have yet progressed to operation. Development of the concept to meet Ireland's specific circumstances is dependent on EU level policy work and through cooperative fora such as the North Seas Energy Cooperation (NSEC). Future interconnector policy, including the upcoming *Offshore Transmission Strategy*, will examine the potential for a more holistic model of interconnection in Ireland, including the potential for multi-purpose interconnectors and associated OBZs and map out the necessary actions required for implementation.

The *Offshore Transmission Strategy*, intended to be delivered in Q3 2024, will detail the post-2030 action plan for Ireland's transmission grid and interconnection with a focus on integrated and forward planning. Refer to Appendix B for further detail on the economic evidence-base for interconnection in Ireland.

Actions		Owners	Timeline
27	Establish Offshore Bidding Zone Frameworks necessary to maximise the efficient use of offshore renewable energy and interconnector capacity, in order to meet the objectives of the EU Green Deal.	DECC	TBC in Offshore Transmission Strategy

[40] The European Green Deal - European Commission (europa.eu)

[41] ENTSO-E's Views on Offshore Development (entsoe.eu)

6.2 Renewable Hydrogen

To deliver Ireland's ambitious targets for ORE capacity new industrial demand opportunities must be developed, electricity interconnection must increase, and a significant renewable hydrogen economy must exist. In Ireland, there is an opportunity to deliver up to 3.5Mt of renewable hydrogen production. An effective renewable hydrogen industry will require a multi-faceted approach including significantly increasing our domestic demand, establishing a commercially viable ammonia and methanol industry, producing sustainable aviation fuels and other heavy transport demand, and installing a hydrogen pipeline to Europe to facilitate exports.

As set out in the *National Hydrogen Strategy* there is a focus on efforts to scale up the production of renewable hydrogen to support both our economy's decarbonisation and energy security needs, given our vast indigenous renewable resources. It is envisioned that, renewable hydrogen uses in Ireland will play a role as a zero-emission source of dispatchable flexible electricity, as a long duration store of renewable energy, in decarbonising industrial processes, and as a transport fuel in sectors such as heavy goods transport, maritime and aviation.

Currently, domestic demand for renewable hydrogen is small and is expected to remain below 1TWh up to 2030. The economic analysis shows domestic demand expanding as much as 24TWh by 2050. To be economically viable, increasing domestic use for renewable hydrogen will require the establishment of new high demand hydrogen industries such as ammonia for fertiliser production, methanol for refining purposes or sustainable aviation fuel industries; however, such production would need to be developed at considerable scale to be commercially viable.

European hydrogen demand will likely outpace supply underpinning the need for import in the near future. The predominant demand opportunities for Ireland's hydrogen and derivatives are located in northwest Europe, specifically in Germany though also in France and the UK. Northwest Europe imports its hydrogen needs from North Africa and the Middle East, as well as facilitates production domestically. Ireland has an opportunity to enter this market given its proximity to demand centres.

Hydrogen production costs from dedicated ORE in Ireland are broadly competitive globally but maintains no outright competitive advantage relative to other European production economies. While this presents challenges in getting Irish products out to

market, several tactics could boost the competitiveness of Irish hydrogen economics. The economic analysis conducted by AFRY Managing Consultants and BVG Associates suggests the most economically advantageous opportunity is to establish a pipeline to northwest Europe, likely developed from repurposed gas pipelines where possible, since shipping hydrogen is costly. Further studies and cooperation with other member states and neighbouring jurisdictions is required to explore the feasibility of a hydrogen interconnection pipeline from Ireland.

Additionally, diverting curtailed wind to hydrogen electrolysers reduces the opportunity cost associated with curtailed ORE generation. Another option is to prioritise the production of hydrogen derivatives which adds value to the supply chain, but production scale would have to increase considerably to be competitive. Finally, Ireland could strive to exploit first mover advantage in exporting renewable hydrogen as there is currently small quantities of hydrogen production in Europe relative to demand. First mover advantage in this context refers predominantly to signalling intent to stimulate a growing hydrogen industry with potential for a diverse sector to develop domestically and export internationally. As a relatively small industrial economy compared to other European countries, Ireland will strive to attract key industry players and develop meaningful partnerships with European demand centres.

The scale of production and security of supply, especially in context of Ireland's extensive ORE target build-out, are the key selling points of Irish hydrogen. There is a clear opportunity to produce significant volumes at parity with other producers in northwest Europe and consequently the key question is whether to scale up domestic industry or export. Hydrogen could be used in several different industries that are currently not present in Ireland. Such industry needs will need to be considered with regard to the infrastructure to support them. Careful consideration will need to be taken to ensure the industry matches the available production profile as well as the broader skills, infrastructure, and storage opportunities available in Ireland, even before considering global competitiveness. The approach to producing an effective, long-term hydrogen industry in Ireland is further outlined in the *National Hydrogen Strategy*.

	Actions	Owners	Timeline
28	Further assess the feasibility of hydrogen export markets and routes, including the costs and	DECC DETE	Q3 2024 – Q2 2025

Actions	Owners	Timeline
viability of transport options, including export pipeline routes.		

6.3 Export Opportunities and Implications

6.3.1 Opportunities

Deploying 37GW of ORE in Ireland will result in a significant increase in revenue to the State as well as both direct and indirect job opportunities. In the economic analysis conducted by AFRY Managing Consultants and BVG Associates[42], the consultants applied a power system model using various ORE deployment capacities including a 16GW domestic net zero scenario and a 37GW export-focused scenario. This analysis suggests that with 37GW ORE capacity the power sector in Ireland will reach net zero emissions in advance of 2050, further examined in Appendix B of this document and supplementary workstream materials.

The conducted economic market analysis further suggests that Gross Value Added (GVA) could sum to €69 billion over the lifetime of the projects – between 2022 and 2060 – assuming 37GW of ORE capacity and 12.2GW of interconnection. GVA was provided as the aggregate of labour costs and operation profits. Total in-country GVA could peak to about €2.4 billion in 2049. Of the total €69 billion, €8.8 billion in GVA could be accrued to the State by 2050 purely through exports of products and services related to ORE independent from employment benefits and GVA associated with domestic uses. Total GVA does not include employment benefit which could accrue to 820,000 full-time equivalent (FTE) years in Ireland between 2022 and 2060, reaching a peak of about 31,000 FTE in 2049. The methodology and results from the economic analysis can be further explored in the commissioned reports by external consultants, particularly in reference to workstream 4.

6.3.2 Implications and Risks

All export opportunities must expertly navigate the discrepancies in policy and regulatory frameworks between connected states. Cooperation will be facilitated through ongoing and transparent communication with all relevant parties. Government

[42] See supplementary materials for Economic Analysis workstreams (WS) 1-5

will strive to streamline the planning process as well as signal to industry to move to these lucrative fields and encourage investment. Local and foreign direct investment should be encouraged through statements of ambition backed by clear, timely and predictable frameworks for DMAPs, MACs, permitting, offtake and grid connection.

The economic analysis produced an assessment of the risks and uncertainties associated with pursuing an energy export economic model, summarised as follows. Facilitating market competition must balance ORE deployment levels with real European demand, the deployment of alternative renewables in the EU such as solar, and external supply from the Middle East or north Africa. Appropriate deployment capacity of ORE must be informed by an expert understanding of EU demand and supply fluctuations to prevent the economic risks associated with oversupply.

To prevent delays in establishing effective trading frameworks, export-focused policy direction should be guided by EU regulation as a starting point to facilitate emergent collaboration for projects in uncertain or previously unexplored jurisdictions. Crucially, Ireland needs to continue to play an active role in EU ORE policy, particularly engaging with requisite market reform to support ORE development and deployment both in Ireland and other member states. Social and political opposition should be mitigated through robust engagement practices both domestically and with partner countries.

Cost reduction is critical to overcoming the challenges associated with both domestic build-out of ORE and export potential within broader EU energy price spreads, particularly to mitigate costs to energy consumers. There are several existing EU export mechanisms which could see ORE deployment cost reductions, that are not dependent on ongoing market reform, such as Joint Projects or Joint Support Schemes. Government will continue to explore ORE cost reduction opportunities through various methods including attracting investment opportunities, appropriate design of energy auctions, market support, and other State and EU funding opportunities. Given that certain technologies, namely floating wind, are associated with lower commercial readiness levels and therefore higher development costs, there is a risk that development at the scale needed to meet ORE targets will be costly if the levelized cost of electricity (LCOE) and associated support gap does not reduce. Risks to technology readiness may be mitigated through RD&I programmes, with the potential to pursue alternative technologies, albeit at higher cost.

Delays to ORE target delivery consequent of insufficient development of additional infrastructure must be managed through alignment with port construction, manufacturing facilities, and securing other supply chain components and services. Crucially, government must ensure that planning and decision-making timelines are reduced to the extent possible to promote investor confidence to attract and secure sufficient investment in Ireland's ORE future.

7 Domestic Opportunities

7.1 Return to the State and Community Benefits

A final component of the economic analysis assessed how best to maximise the economic benefit to the State and local communities to ensure that Ireland's net zero transition delivers for Irish people. Considering wider socio-economic and environmental priorities and benefits to local communities will help facilitate a stable political consensus and drive investment.

The economic analysis considered financial measures including community ownership, revenue sharing, community benefit funds and seabed levies of which only the latter two options are being pursued in Irish ORE policy. Seabed levies are a condition of MACs as required by MARA to establish a levy framework for seabed use under the *MAP Act*. In Phase One, the levy will be applied in two stages. An initial development stage levy rate of €20,000 per km^2 per year applies during the project development stage. Subsequently, as the project reaches the operational stage the levy payable become 2% of the project's gross annual revenue.

In addition to seabed levies, another mechanism for distributing economic and financial benefits to local communities is the Community Benefit Fund (CBF) as described under ORESS 1. The developer must contribute at least €2 per MWh of electricity generated by the project to the CBF during the operational life of the project. The CBF is assisted in the allocation of the funding by a dedicated Fund Administrator (FA). The anticipated benefits, and the potential economic multiplier impacts of these funds may be very significant.

Community Benefit Funding may be distributed to a variety of uses including improving local infrastructure, skills and training within the community, or other community support programmes. Future iterations may review the level of mandated contribution, conduct social impact assessments, establish robust measurement and reporting mechanisms, and ensure a fair distribution of funds especially across overlapping projects and affected communities. Government will navigate any discrepancies across different stages of project development and spatial regions across the country.

Aside from financial measures, it is important to consider non-financial measures to promote social acceptance of ORE deployment, including the potential for environmental and social impact assessments as already described in the *MAP Act*.

There must also be a strong emphasis on meaningful community consultation and engagement beginning early in the planning process.

Actions		Owners	Timeline
29	Include Community Benefit Fund provisions in MACs, applicable regardless of route to market.	DECC MARA	Q3 2024 – Q1 2025

7.2 Jobs and Skills[43]

The OWDT is taking action to address the skills required for the development of ORE in Ireland and the delivery of our 2030 targets. The Department of Further and Higher Education, Research, Innovation and Science (DFHERIS) is leading, in collaboration with DECC, on a dedicated Skills and Workforce workstream. This workstream supports planning for training and upskilling in the offshore wind energy sector. There is close collaboration with industry, through Wind Energy Ireland. The main goal of the workstream is to identify the skills and workforce requirements for the development of offshore wind, and to establish a sustainable workforce and skills pipeline.

To ensure that our long-term ambitions for offshore wind are met, however, continuous planning and skills interventions are required to support the creation of a sustainable skills and workforce pipeline. As well as seeking to increase skills provision in relevant disciplines, the workstream will work with stakeholders to identify how best to raise awareness of career and educational opportunities across the board – including new entrants to the workforce, and upskilling and reskilling of existing Irish workers from competent backgrounds such as energy or maritime sectors. It will also support policy interventions to ensure that difficult to fill roles can be filled through international recruitment.

7.3 Technology

The SEAI is developing an *ORE Technology Roadmap to 2050*, due for publication early 2024, which is complementary to the market analysis and addresses the current prominent ORE generation technologies and the anticipated impact on the offshore energy mix from 2030 to 2050. It examines 37GW and 50GW development scenarios, used to identify the necessary technological advancement to realise similarly large-

[43] See Appendix C for further information.

scale deployment, and the pathways to commercialisation considering the technological and economic maturity of fixed and floating offshore wind and emerging technologies, especially wave energy, which are the next generation technologies likely to impact in Ireland. Priority is placed on the highest potential technologies and building industrial supports for commercialisation and deployment at scale, as well as localised opportunities to generate value across Irish supply chains, O&M and adjacent services (surveying, LiDAR, remote technologies).

One potential area for elucidation is the development of multi-purpose sites through the co-location of ORE generation technologies. Multipurpose sites optimise site efficiency by improving energy security through increased generation, streamlining the regulatory and consenting processes compared to individual projects, and limiting adverse effects on the environment by optimising spatial usage of a geographic area. Ireland is particularly well-suited for co-located sites given its temporal offset between peak wind and wave generation periods, which enhances energy efficiency of the site. Government will continue to collaborate interdepartmentally to ensure an efficient approach to ORE deployment with consideration to new technologies and site configurations.

Future directions on technology implementation will place a weighty emphasis on technological innovation, stakeholder consultation, and environmental and social impact assessments.

8 Next Steps

The ORE landscape is ever-changing given technological innovation, new policy alignment, partnership with industry and developers, consultation with public and local communities, and shifting maritime usages. Consequently, there is a need to maintain extensive collaboration across government departments, agencies and stakeholders, as facilitated by the OWDT. Further research must prioritise study into future technological feasibility including cost-competitiveness, as well as environmental concerns which will inform spatial designations, and adaptive maritime space utilisation. Meeting Ireland's energy and climate commitments as well as providing and delivering on a robust pathway to ORE deployment will require an adaptive and evolutionary approach across multidisciplinary facets.

New policy will be guided by the principles set forth in this Future Framework Policy Statement, informed by lessons learned from existing ORE policy such as DMAP designation, and directed based on the identified future actions proposed throughout the Future Framework and subsequent policy. Streamlining the planning and development process will be prioritised, with reference to alignment of infrastructural efficiencies for timely ORE delivery, consenting through MACs, and facilitating optimal routes to market.

The Future Framework Policy Statement is a high-level, national document which sets forth the final stage in Ireland's plan-led approach to ORE delivery. This policy exists within a larger domestic and international energy context, which is constantly adapting to the reality of global ORE efforts. To reflect the innovative and multifaceted nature of Irish ORE policy, the Future Framework is intended to be a dynamic document with annually scheduled progress reviews. While the main policy of the Future Framework will remain constant to secure industry confidence, the actions and broader policy context must be regularly updated.

The key actions of the Future Framework will be updated and revised for completion, adjustment, or addition along with updates on other ORE progress to ensure alignment with upcoming domestic policy and EU legislative compliance. This will be a review of all spatial, economic, skills and jobs, interconnection, and renewable hydrogen for ORE policy to ensure delivery of targets. Subsequent Future Framework progress reviews will allow coordination with existing and upcoming ORE policy such as the *CAP23*, the *National Hydrogen Strategy*, the upcoming *Offshore Transmission Strategy*, *Ireland's Offshore Wind Industrial Strategy*, and any DMAP announcements. The review

procedure will take place on an annual basis with updates to be published as appropriate. Any published progress reviews will be subject to legislative requirements including SEA and AA legislation and may be subject to public consultation periods. The dedicated Future Framework workstream of the OWDT is already primed to undertake the actions set forth in this document and it is through this workstream that a review of the Future Framework Policy Statement will be coordinated.

Appendices

Appendix A – Table of Actions *77*
Appendix B – Export Potential Market Analysis *83*
Appendix C – Jobs and Skills Analysis *88*
Appendix D – Glossary of Terms *90*

Appendix A – Table of Actions

The actions set forth in the Future Framework are intended to support the future policy development under the remit of DECC needed to deliver Ireland's long-term ORE targets. Government recognises that certain actions are more critical to immediately advancing the policy and planning process. Resourcing will be allocated appropriately to focus on delivery of the following priority actions.

Priority Actions

7	Provide the structures and supports necessary to establish a future DMAP roadmap.
10	Explore the feasibility of implementing a competitive MAC framework.
1	Explore the possibility of a roadmap for future ORE development.
12	Design and develop a successor support scheme to ORESS.
13	Maximise capacity from alternative routes to market.
16	Align infrastructure efficiencies to consider generation, grid, and route to market.
2	Assess the potential to deploy floating offshore wind at scale in Irish waters.

	Actions	Owners	Timeline
1	Explore the possibility of developing a more detailed roadmap for future ORE development, including the potential for interim ORE capacity targets and sub targets for innovative technologies.	DECC	Q1 2025
2	Conduct a study to assess the potential to deploy floating offshore wind in Irish waters at scale, assessing capacity at key strategic locations in Ireland and taking account of the upcoming global auctions dedicated to floating wind, including in France, in 2024.	DECC DETE	Q2 2024
3	Investigate the feasibility of a floating offshore wind demonstrator site including optimal capacity.	DECC DETE	Q3 2024
4	Maintain State support for our existing or planned test sites and explore the feasibility of supporting additional test sites.	DECC SEAI	ongoing
5	Conduct an analysis to determine the economic and practical viability of various innovative ORE technologies.	DECC SEAI	Q3 2024 – Q4 2025
6	Establish a dedicated ORE technology innovations research and development advisory group including research, industry and government representatives, chaired by SEAI.	SEAI	Q2 2024
7	Provide the structures and supports necessary to establish a future DMAP roadmap including criteria and timelines for deployment. This roadmap should be produced in accordance with all relevant legislative and regulatory processes and in alignment with technology maturity and offtake availability.	DECC	Q4 2024
8	Assess the potential for accelerating the development of a West Coast DMAP and examine the cost and viability of initiating floating offshore wind projects in this DMAP as	DECC	Q4 2024

	Actions	Owners	Timeline
	Ireland seeks to support the development of this sector in line with Action 7.		
9	Continue to support the consenting process for ORE projects including support of necessary environmental procedures.	DECC MARA	ongoing
10	Explore the feasibility of implementing a competitive MAC framework with consideration to requirements under the *MAP Act* including appropriate criteria and indicative timelines for implementation.	DECC MARA	Q2 2024 – Q4 2024
11	Maintain a single schedule for all upcoming State tenders for ORE, including non-grid limited ORE, in alignment with Action 7.	DECC	ongoing
12	Design and develop a successor support scheme to ORESS, and obtain State Aid clearance, to be in operation from 2026-2030. This successor support scheme will be subject to domestic and international demand assessment.	DECC	2024 – 2025
13	Identify and assess the enabling supports and/or frameworks that may be required to maximise capacity from alternative routes to market.	DECC	Q1 2024 – Q4 2025
14	Design a competitive process to facilitate sea-bed access designated for 2GW of non-grid limited capacity in 2025, to be in development by 2030 in alignment with Action 10.	DECC MARA	Q1 2024 – Q2 2025
15	Explore and develop routes to markets as required for the 2GW non-grid limited generation capacity in alignment with Action 4 of the *National Hydrogen Strategy*.	DECC	2025 – 2028
16	Rollout of EirGrid's *Grid Implementation Plan* and future iterations to aid in the alignment of infrastructure efficiencies in a manner which	EirGrid DECC	Q2 2024 – Q2 2025

	Actions	Owners	Timeline
	considers offshore generation, grid, and routes to market.		
17	CRU to consider provision for anticipatory investment for the development of offshore and onshore grid through the regulatory framework following publication of EU guidance scheduled for Q1 2025.	DECC CRU DPENDR	Q1 2025 – Q4 2025
18	Identify the resourcing needs both, current and capital, across government departments and agencies to ensure all government bodies in relevant marine, ecology, planning, relevant industrial development and ORE disciplines are properly resourced to discharge the expanded responsibilities to attract the economic value as set out under the Future Framework. DECC to facilitate inter-departmental analysis to identified needs and report to government in Q3 2024 with a business case for strategic investment in the future framework. This should include the identification of specific leadership roles to deliver the scale and pace of regulatory and policy functions to deliver on the opportunity laid out in the future framework. Alignment of these resources should be completed via the annual budgetary process and the NDP allocations for capital investment and overseen by the Climate Action Delivery Board and Cabinet Committee on the Environment as required.	DECC [44] D/Taoiseach	Q3 2024
19	Develop an Alignment Strategy action plan by end 2024, to support the delivery of 2040 and 2050 ORE targets, with a built-in review structure to assist implementation. This strategy, to be place by end 2025, intends to ensure that ORE generation, transmission, and demand – both traditional and non-traditional – are in alignment both from a geographic and temporal perspective. It will apply to current and future DMAP areas. As per Action 18, develop	DECC	Q4 2024

[44] An all-government approach facilitated by the OWDT

	Actions	Owners	Timeline
	appropriate resourcing and leadership in DECC that can work with government and industry stakeholders, including with the Project Ireland 2040 Board.		
20	Establish a joint government and industry working group as facilitated under the OWDT industry forum to discuss the prioritisation, delivery and implementation of the actions set forth under the Future Framework.	DECC	Q2 2024
21	Consider the establishment of additional working groups to provide opportunities for policy input regarding the Future Framework between government and other stakeholders, which may include environmental groups or community representatives.	DECC	Q2 2024
22	Procure, consolidate and publish all relevant data to support the open sourcing of ocean data available for the protection of the marine environment and biodiversity during development of ORE.	DECC Marine Institute	Q3 2023 – ongoing
23	Establish a priority process to incorporate cumulative impact studies into the DMAP process as required by the *MAP Act*.	DECC	2024
24	Conduct additional studies and data modelling to inform future ORE DMAP delineation given increasing frequency of weather extremes and future climate and environmental conditions.	DECC	Q3 2024 – Q1 2025
25	Develop an overarching ORE data policy and governance statement.	DECC	Q4 2024
26	Explore potential investment incentives which could be developed to encourage both domestic investment opportunities and foreign direct investment in domestic supply chain facilities.	DECC DETE	Q3 2024 – Q1 2025

Actions		Owners	Timeline
27	Establish Offshore Bidding Zone Frameworks necessary to maximise the efficient use of offshore renewable energy and interconnector capacity, in order to meet the objectives of the EU Green Deal.	DECC	TBC in Offshore Transmission Strategy
28	Further assess the feasibility of hydrogen export markets and routes, including the costs and viability of transport options, including export pipeline routes.	DECC DETE	Q3 2024 – Q2 2025
29	Include Community Benefit Fund provisions in MACs, applicable regardless of route to market.	DECC MARA	Q3 2024 – Q1 2025

Appendix B – Export Potential Market Analysis

Given Ireland's maritime endowment, there is potential to capture significantly more offshore wind energy than would be needed to satisfy domestic energy requirements indicating an opportunity to develop an export-focused energy industry. An economic analysis was conducted to establish the rationale for developing an export market for surplus ORE. Further analysis should examine whether ORE surplus ought to be exported as electricity, renewable hydrogen (or hydrogen derivative) or used to produce new value-added products and services domestically such as data centres, green ammonia or sustainable aviation fuels.

i) Economic market analysis

A study conducted by external consultants, AFRY Managing Consultants Ltd and sub-consultants BVG Associates, has provided an evidence-base for the proposed ORE targets and export ambitions in Ireland as set out in this Future Framework Policy Statement. A market analysis based on wholesale price differentials was conducted for Ireland and neighbouring jurisdictions in the EU and UK to forecast ORE demand into 2030, 2040 and 2050. This economic analysis assessed the market conditions for ORE development, the potential for interconnection and development of a renewable hydrogen industry as well as Ireland's export viability in terms of policy, trade, and investment. Additionally, an analysis was conducted to assess the optimised financial and economic return to the State and local communities.

To assess the economic viability of Ireland's ORE future, several scenarios were considered. Each scenario was categorised by the quantity of ORE capacity (16GW, 37GW and 50GW) and the quantity of interconnection capacity (10GW, 12.2GW, and 16.7GW), which were analysed in various combinations to assess economic viability. Based on initial market analysis results coupled with expert feedback, four focus scenarios were selected to investigate subsequent aspects of this economic analysis.

1. Domestic Net Zero (DNZ): This scenario is based on EirGrid's Tomorrow's Energy Scenarios Self-Sustaining world outlining the quantity of ORE capacity needed to reach a net zero economy by 2050 assuming a rapid decarbonisation approach. The modelled scenario considers 16GW of ORE with 10GW of

electricity interconnection in alignment with the EU 2030 15% electricity interconnection target.

2. 37GW and Well-Connected Interconnection: This pathway sees offshore capacity reach the government target of 20GW by 2040 and 37GW by 2050. Well-connected interconnection assumes the 15% of total installed generation capacity, in addition to increased on-grid capacity resulting from higher ORE development. In the 37GW scenario, this equates to 12.2GW of interconnection by 2050.
3. 37GW and Stretch Interconnection: As above, this scenario sees ORE capacity reaching 37GW by 2050. The Stretch interconnection capacity is a theoretical capacity intended to account for a highly export-focused ORE landscape at 20% interconnection. In our 37GW model, this equates to 16.7GW of electricity interconnection by 2050.
4. 50GW and Stretch Interconnection: This pathway represents a more ambitious target that sees capacity reach 25GW in 2040 and 50GW by 2050. The 50GW scenario was taken as an upper modelling limit to stress test the 37GW scenario. Given the high levels of ORE capacity associated with this scenario, Stretch interconnection (16.7GW) was taken as the minimum economically plausible capacity of electricity interconnection.

In contrasting the above scenarios using counterfactual analysis, the study established an economic rationale for the implementation of ORE targets, and the resultant economic return to the State and local communities. Some of the key conclusions resulting from the economic analysis are outlined below:

- 37GW of offshore renewable energy generation by 2050 was identified as an ambitious but feasible target so long as it is coupled with large interconnection capacity, a growing hydrogen industry, and extensive domestic demand including high electrification and increasing data centre infrastructure.
- Despite energy demand growth potentially tripling compared to 2022, there remains extensive ORE surplus in Ireland in 2050 in the 37GW generation scenario. This introduces challenges including mitigating a large support gap and costs to consumers but presents opportunities including strengthening the business case for export and domestic demand opportunities. Future domestic demand opportunities were further explored by DETE as part of *Ireland's Offshore Wind Industrial Strategy*.

- Large increases in interconnector capacity is needed to reach Ireland's ambitious ORE targets. Ireland will see a net export of ORE to the UK and EU (mainly through France and possibly Spain, Belgium or the Netherlands). In the 37GW generation scenario, models suggest a minimum of 12GW of interconnector capacity by 2050 with higher interconnection required if targets are more ambitious.
- While there is currently no commercial renewable hydrogen industry in Ireland this economic analysis indicates that Ireland will be globally competitive with growing industry elsewhere in Europe. Models suggest that the hydrogen industry is more economically attractive through pipeline exports compared to shipping. Currently the key opportunity looking to the future in Ireland is in ammonia production for fertiliser use.

ii) Interconnection

Electricity interconnection allows for the transfer of surplus energy to external consumers and is currently the primary means by which ORE is exported to international markets. Given the variability of renewable energy generation, electricity interconnection is key to ensuring the security of Ireland energy supply and to export surplus ORE to external markets. As proposed in this policy statement, the Future Framework sets out a pathway to achieving 20GW of ORE by 2040, ramping up to 37GW by 2050. In concert with creating high domestic demand (outlined in Section 5), this quantity of ORE generation capacity will require extensive electricity interconnection. The *2023 National Policy Statement on Electricity Interconnection* commits Ireland to exploring more interconnection with more countries. Government is examining the potential for additional interconnection to the UK, France, Spain and other northern EU member States.

Point-to-point interconnection has been the traditional mechanism for electricity transmission. Multi-purpose interconnectors enabling electricity export from OBZs have the potential to offer significant benefits to the energy system including operational synergies, lower capital costs by sharing infrastructure, integrated planning processes, improved energy security, and reduced environmental impacts. These are new departures in energy infrastructure and regulation with few established models to follow. We will be exploring this potential further and setting out the necessary steps to establish OBZs in an Irish context in the upcoming *Offshore Transmission Strategy*.

Optimising the level of electricity interconnection in Ireland requires balancing technical and practical complexities with economic returns and cost competitiveness. Technical and practical constraints include cable distance, seabed characteristics and international coordination through offshore jurisdictional arrangements. Interconnection projects must be appropriately managed to address practical challenges in the context of marine traffic intensity, the frequency of maintenance required, and the potential for cable damage.

The economic analysis examined the trade-offs between these implementation challenges and potential benefits to the state. A cost-benefit analysis accounted for congestion rent revenues, internal rates of return and socio-economic welfare benefits. The model incorporates the full generation capacity mix of relevant jurisdictions including natural gas, oil, renewables and nuclear. Furthermore, the analysis considers on a qualitative basis, issues relating to the regulatory and commercial models for progressing further interconnection. This includes looking at the economic rationale for multi-purpose interconnection, regulatory funding models for economic rationale for interconnection, and other revenues than the congestion rent.

Along with the requirement to manage ORE generation surplus there is a robust economic rationale for increasing interconnection capacity. Increasing ORE generation will substantially decrease the price of energy in Ireland. As a result of price dynamics, Ireland has a competitive advantage for interconnection exports, especially to the UK and France. Interconnection with France and Spain results in some imports to Ireland being linked to extra solar generation in these countries and associated price spread dynamics. Interconnection projects to the UK followed by France have the highest internal rate of return given that capital expenditure is significantly lower relative to interconnection to other jurisdictions, attributed to shorter cable distances and associated resourcing constraints. Increasing interconnection capacity, with all other factors being equal, substantially decreases the internal rate of return due to the cannibalisation effect. In a 37GW scenario congestion rent doubles compared to a net zero (16GW) economy, which can be attributed to additional flows.

A socio-economic welfare impact analysis identifies an overall net positive benefit for Ireland from 2030 to 2055, which is generally a requirement for regulatory approvals. The analysis considers a combination of different indicators such as the consumer surplus, producer surplus, congestion rent and interconnector cost. Each new

interconnector shall be subject to a socioeconomic and environmental cost-benefit analysis and implemented only if the potential benefits outweigh the costs. In acknowledgement of the international nature of interconnection projects, efforts are ongoing to facilitate and secure the support of Ireland international energy partners including relevant government jurisdictions.

Appendix C – Jobs and Skills Analysis

The same economic analysis conducted by consultants AFRY Managing Consultants and BVG Associates as described in Section 6 and Appendix B further assessed the economic impacts of the various ORE export scenarios measured using GVA, employment measured in FTE, and tax take. Naturally, larger capacity of ORE deployment sees an increasing trend in GVA and both direct and indirect employment. The analysis shows that the greatest proportion of local content in offshore wind projects is in the development and project management and O&M stages.

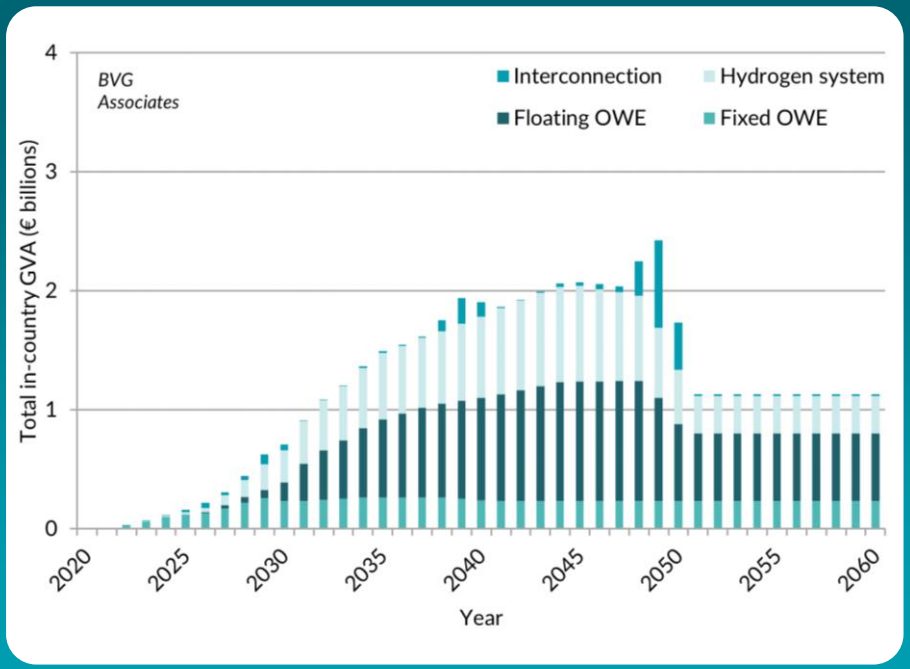


Figure 1.
Irish annual FTE years employment for the 37GW well connected scenario as produced from the economic market analysis and associated model assumptions. Employment modelled out to 2060, split by technology.

In general, both fixed and floating offshore wind are characterised by a high share of overall value in the O&M stage. Floating offshore wind has comparably higher domestic economic benefits relative to fixed projects which is largely attributed to greater supply in balance of plant and installation and commissioning, due to floating foundation assembly, synthetic line manufacture and floating offshore wind construction port provision. On the other hand, interconnection projects have markedly lower local value than other technologies related to the high cost associated with cable manufacturing and offshore installation. Hydrogen electrolyser projects deliver the most domestic value as a result of the onshore nature of the works, which require civil engineering skills.

To meet ORE jobs and skills goals, a workstream under the OWDT has established an Expert Advisory Group with members from further and higher education, government departments, agencies and industry, to consider skills and workforce requirements. In collaboration with Greentech Skillnet, a detailed skills assessment report has also been conducted. It outlines the roles and skills most likely to be required in Ireland, as well as the opportunities for roles and skills that could be developed, dependent upon supply chain and market conditions.

The identification of skills requirements for offshore wind has been progressing alongside important developments in the delivery of skills training for renewable energy. This includes Kerry Education and Training Board's Wind Turbine Maintenance Technician apprenticeship, which was launched in March 2022. Greentech Skillnet, sponsored by Wind Energy Ireland and co-funded by DFHERIS through Skillnet Ireland, provides industry-focused training in areas relevant to renewable energy and offshore wind. These subsidised, industry-led programmes are aimed at people in employment and not in employment and include upskilling and reskilling courses in areas such as offshore development and regulation, managing safely for wind power, and energy storage systems. In Higher Education, the 2023 Human Capital Initiative Pillar 1 call is funding 152 places across three courses at Level 9 in areas relevant to offshore wind for the 2023-2024 academic year. This includes a Certificate in Leadership in Offshore Renewable Energy at Technological University of the Shannon and a Postgraduate Certificate in Offshore Renewable Energy and an Offshore Wind and Ocean Energy Conversion Course, both at University College Cork. Funding of €200,000 was secured by DFHERIS in Budget 2024 to enable expansion of training provision on offshore wind energy skills requirements in the Further Education and Training sector.

Appendix D – Glossary of Terms

AA	Appropriate Assessment
ABP	An Bórd Pleanála
CBF	Community Benefit Fund
CPPA	Corporate Power Purchase Agreement
CRU	Commission for Regulation of Utilities
DECC	Department of the Environment, Climate and Communications
DETE	Department of Enterprise, Trade and Employment
DFHERIS	Department of Further and Higher Education, Research, Innovation and Science
DMAP	Designated Maritime Area Plans
DNZ	Domestic Net Zero
ENTSO-E	European Network of Transmission Systems Operators for Electricity
FA	Fund Administrator
FTE	Full-time Equivalent
GCA	Grid Connection Assessments
GVA	Gross Value Added
GW	Gigawatt
HVAC	High voltage Alternating Current

HVDC	High-voltage Direct Current
IMDO	Irish Maritime Development Office
LCOE	Levelized Cost of Electricity
LiDAR	Light Detection and Ranging
M&A	Marshalling and Assembly
MAC	Maritime Area Consents
MAP Act	Maritime Area Planning (MAP) Act
MARA	Maritime Area Regulatory Authority
MSP Directive	Marine Spatial Planning Directive
Mt	Metric Ton
MWh	Megawatt-hour
NDP	National Development Plan
NMPF	National Marine Planning Framework
NSEC	North Seas Energy Cooperation
O&M	Ongoing Operations and Maintenance
OBZ	Offshore Bidding Zones
ORE	Offshore Renewable Energy
OREDP	Offshore Renewable Energy Development Plan
ORESS	Offshore Renewable Electricity Support Scheme
OWDT	Offshore Wind Delivery Taskforce
OWE	Offshore Wind Energy

R&D	Research & Development
RD&I	Research, Development & Innovation
SEAI	Sustainable Energy Authority of Ireland
SEM	Single Electricity Market
SME	Small and medium-sized enterprises
TSO	Transmission System Operator
TWh	Terawatt Hour
TYNDP	Ten-Year Network Development Plan

Prepared by the Department of Environment,
Climate and Communications
gov.ie/DECC