IWEA
Irish Wind Energy Association

Building Offshore Wind

70 by 30 Implementation Plan

December 2020

Delivering the
Climate Action Plan

Executive Summary

Ireland's abundant offshore wind energy resource is more than sufficient to meet all of our future electricity needs. To date, this resource has not been utilised with only a single demonstration offshore wind farm off the Irish coast, Arklow Bank, which has seven turbines and a total capacity of 25 MW.

At the time it was completed, in 2004, Arklow Bank had the largest wind turbines in the world but, since then, while other countries and particularly Great Britain have accelerated the development of offshore wind, Ireland has stood still.

But over the last two years we have seen a new urgency from the Irish Government, a greater determination to ensure that our energy systems are decarbonised and a growing understanding of the role that offshore wind energy can play.

In 2019, the Government released the first Climate Action Plan (CAP) which set an ambition of at least 3.5 GW of offshore wind by 2030, which was increased to 5 GW in the Programme for Government (PfG) agreed in June 2020.

Ambition is no longer the challenge.

But delivering 5 GW of offshore wind farms within ten years – from a standing start – requires urgent, rapid and coordinated policy development across a wide range of Government departments, State agencies and other key stakeholders, particularly coastal and fishing communities.

The aim of this study is to set out the specific – and essential – policy changes that must be made to enable what is, in essence, the development of an entirely new industry in Ireland, employing thousands of people, attracting billions in investment and dramatically cutting our carbon emissions.

We have a sufficient pipeline of projects to meet our ambition

The most recent six-monthly IWEA developer survey shows that there are currently more than 16 GW of offshore wind projects at some stage of active development off the East, South and West coasts of Ireland (see Figure 1).

While this may sound like far more than we might need, it is important to understand that not all of these projects will be built. Not all of them will get planning permission or a grid connection. They will not all succeed in an auction under the Renewable Electricity Support Scheme (RESS). We need a substantial, and growing, pipeline to account for attrition but even so we clearly have enough projects in development to deliver our 2030 targets.

But we are dangerously short of time.

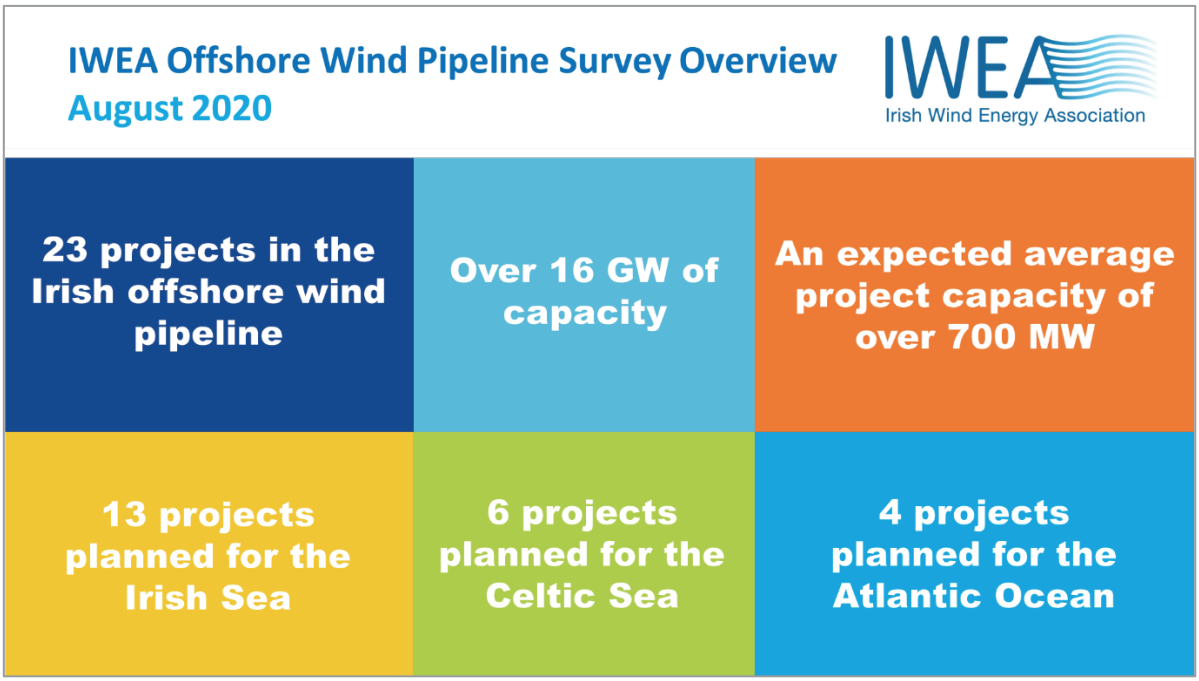

Figure 1: Overview of the current offshore wind pipeline in development in Ireland.[1]

Currently, we are destined to fail

In preparing this study we brought together experts from across the industry with substantial experience in the development of offshore renewable energy.

They analysed the current pipeline and produced a detailed model for how projects will progress through the various stages of the development process using a tool called the *Offshore IWEA Pipeline Analysis Tool (Offshore i-PAT)*.

The results of this exercise are deeply concerning. Under what we refer to as the '*Baseline scenario',* which applies our experience of Irish onshore development timelines and the global expertise of our members in offshore wind energy development, Ireland will only deliver 670 MW of offshore wind by 2030, which is a long way short of our 2030 targets (see Figure 2).

Without urgent action from the Government it simply will not be possible to achieve the 2030 targets. We will not simply fall short, we will fall well short, and under the current policy framework we are, in fact, destined to fail.

[1] https://iwea.com/images/IWEA-Onshore-and-Offshore-Wind-Pipeline-Report-August-2020-BLANK.pdf

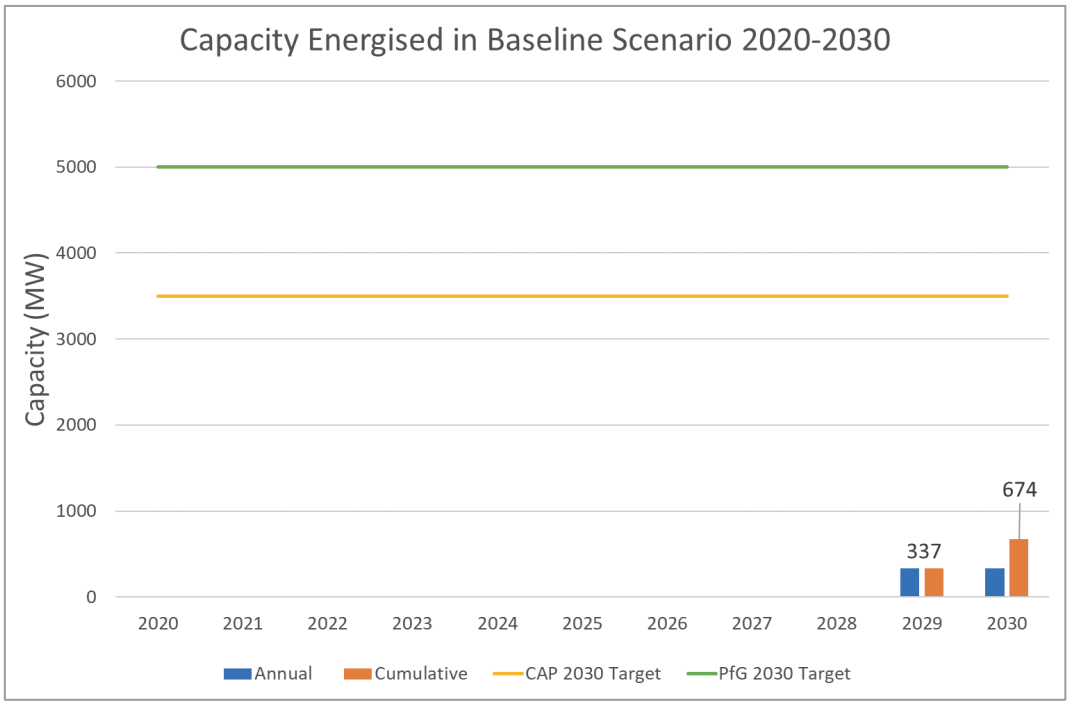

Figure 2: Offshore wind capacity energised in the *Baseline* scenario from 2020 to 2030.

Eight Critical Policy Improvements to Deliver 5 GW by 2030

After modelling the Baseline scenario, we identified eight critical Policy Improvements (PIs) which could be made to speed up the offshore development process and modelled their impact in the Offshore i-PAT tool. The eight Policy Improvements are:

- PI1: Issue Foreshore Licences and exclusivity for the seabed to all 2030 projects by Q4 2021;
- PI2: Complete the National Marine Planning Framework (NMPF) by Q4 2020;
- PI3: Enact the Marine Planning and Development Management (MPDM) Bill by Q1 2021;
- PI4: An Bord Pleanála will need sufficient resources so they can make decisions on offshore wind planning applications in 1.5 years on average;
- PI5: EirGrid and ABP need to engage with projects from the outset so projects can get a final grid offer and consent for a grid connection within 1.5 years on average after a RESS auction;
- PI6: Financial close and construction of the wind farm and grid connection should take 3 years or less (including energisation);
- PI7: Three RESS auctions need to occur by 2025 with sufficient volumes and competition;
- PI8: Work must commence immediately on strengthening the capacity and flexibility of the grid to accommodate 5 GW of offshore wind by 2030.

If these eight Policy Improvements are put in place to achieve our *'CAP/PFG Delivered scenario'*, then it is possible to hit the 5 GW target by 2030, as the pipeline becomes energised in the years outlined in Figure 3.

The cumulative capacity in 2030 is just over the 5 GW target (5,085 MW) but it is important to highlight that all of the projects are delivered in the second half of the decade so any slippage in the timelines could mean large volumes of renewables are unable to contribute to the 2030 targets. It is also

important to note that the modelling here assumes typical project timelines so project specific conditions may mean that a project is slightly faster or slower than the timelines used here.

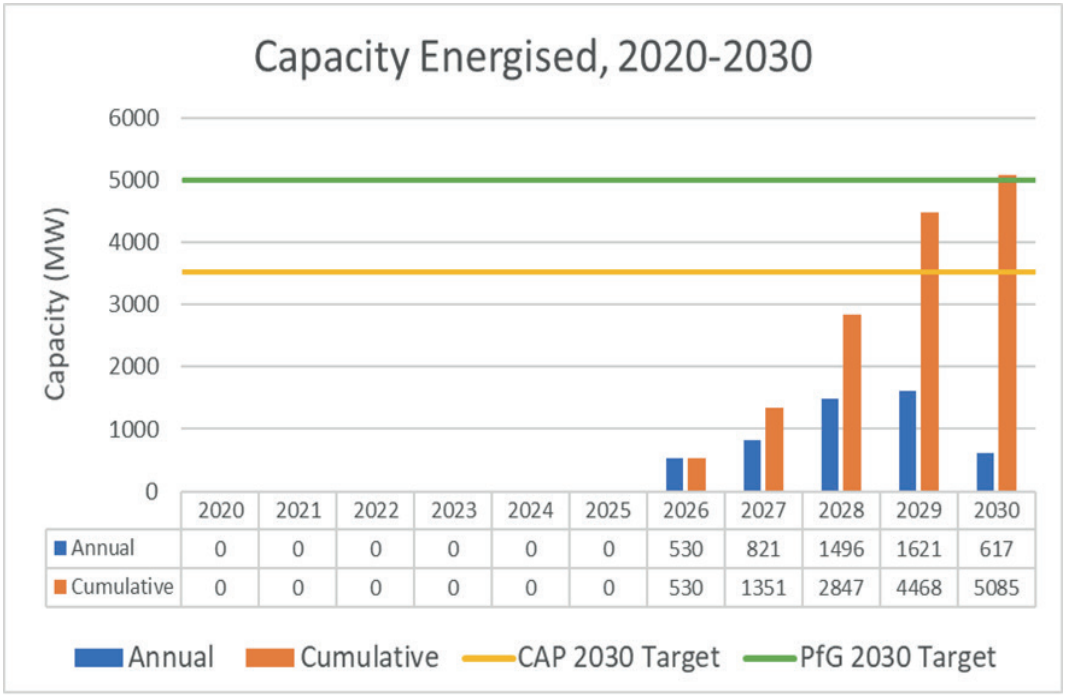

Figure 3: Offshore wind energised each year between 2020 and 2030 under the *CAP/PfG Delivered* scenario.

It will be a significant challenge to deliver the Policy Improvements outlined in this study, but if successful offshore wind energy will be doing more than any other technology to reduce our carbon emissions by the end of the decade. To help accelerate immediate action in each area, Table 1 outlines the lead stakeholder responsible for each Policy Improvement and the next step required for each one.

Importantly, Policy Improvements 1-6 are all required regardless of whether the ambition set for 2030 is 3.5 GW from the Climate Action Plan or the 5 GW from the Programme for Government. The increased ambition of the Programme for Government would require the larger offshore wind auctions and greater grid development set out in Policy Improvements 7 and 8.

Parallel Development of the Grid is the Single Biggest Challenge

Policy Improvement 8 is potentially the most challenging and has not been modelled explicitly in the Offshore i-PAT, which is to build sufficient grid capacity and flexibility to accommodate 5 GW in parallel to the deployment of the offshore wind farms.

EirGrid's East Coast Generation Opportunity Assessment[2] study suggests that there is 1.5-2 GW of capacity available on the east coast for offshore wind, which means that without major upgrades it will not be possible to meet the 5 GW ambition in the Programme for Government. Effectively, if no improvements are made here, there is an upper limit of 1.5-2 GW of offshore capacity that could be developed by 2030.

[2] http://www.eirgridgroup.com/site-files/library/EirGrid/East-Coast-Generation-Opportunity-Assessment.pdf

Work is currently underway as part of EirGrid's 'Power System Vision 2030' to establish how the grid can evolve in terms of capacity, operations and market design between now and 2030. The results of this work are needed urgently, followed by a rapid transition to implementation.

EirGrid typically goes through six steps to build transmission grid, so it can take years to build new infrastructure.[3] These steps need to be completed as soon as possible to have any chance of meeting the 2030 targets. To ensure the necessary focus and resourcing to deliver the grid capacity required there must be a dedicated Delivery Management Board established for the east and south coasts. Representation would be required from offshore developers, the Department of the Environment, Climate and Communications (DECC), the CRU and EirGrid.

The challenge ahead for the grid is the single biggest barrier at present for Ireland's 2030 targets and therefore, a separate report in the 70by30 Implementation Plan is dedicated to this which is called *Saving Power*.[4]

Realising the full economic potential of Ireland's offshore wind

Delivering just the 3.5 GW of offshore wind energy required under the Climate Action Plan will require an initial investment worth €8.6 billion, create thousands of jobs in planning, development and construction and hundreds of long-term jobs in operations and maintenance. However, currently Ireland has neither the infrastructure nor the capacity to capture these potential jobs when delivering the 5 GW it needs by 2030 in the Programme for Government. Ireland must move swiftly to ensure the supply chain evolves alongside the offshore wind market in the coming years. This was the focus of an earlier report by IWEA, *Harnessing Our Potential*, which identified four areas which need urgent attention: investment in port infrastructure; the development of offshore enterprise hubs and wind clusters; and addressing the upcoming skills shortage for the sector.

Although the 5 GW offshore wind target for 2030 will be crucial to meet Ireland's renewable energy targets, the true economic potential of offshore wind to Ireland is in our potential to export our vast offshore wind resource to other parts of Europe, which will need it to decarbonise their own energy systems. This is recognised in the Programme for Government which sets a target of 30 GW to export to Europe, which is a huge opportunity for Ireland. The analysis in this report focuses exclusively on the domestic 5 GW target so further work will be needed to establish how offshore wind will not only be fundamental to Ireland's climate action ambitions, but to our future economy and export potential also.

Conclusion

Ireland is on the cusp of finally unlocking our vast offshore wind resource which has the potential to lead the decarbonisation of Ireland's energy system.

There are big challenges ahead – we do not underestimate them – but there are also clear solutions, which this report has identified. With sufficient resources, determination and political will Ireland will finally unlock our country's single most significant energy resource to the benefit of generations of Irish people. With sufficient resourcing and implementation in these eight critical areas, Ireland will finally unlock what is likely to be the most significant energy resource ever created on the island of Ireland.

[3] https://www.eirgridgroup.com/__uuid/7d658280-91a2-4dbb-b438-ef005a857761/EirGrid-Have-Your-Say_May-2017.pdf

[4] https://iwea.com/latest-news/4453-lost-renewable-energy-enough-to-power-galway-for-a-year

Table 1: Summary of Policy Improvements required to delivery 3.5-5 GW of offshore wind by 2030 along with those responsible and the next step.

Policy Improvement (PI)	Brief Description of What's Needed	Lead	Supporting Role	Next Step	Target Date	Additional Capacity in 2030 vs *Baseline* scenario of 674 MW*
PI1: Obtain Foreshore Licences by Q4 2021	A planning application typically requires at least two years of environmental surveys, but these can only be completed once a project has a foreshore licence, so any project that has to be delivered before 2030 must have a licence by 2021.	DHLGH	DECC, DPER	Ensure sufficient resources are available to issue foreshore licences for all projects that can deliver pre-2030.	Q4 2021	Not Modelled
PI2: Complete National Marine Planning Framework by Q4 2020	The National Marine Planning Framework should be finalised and in place by Q4 2020 so projects can apply for consent through the MPDM in 2021	DHLGH	DECC	Conclude National Marine Planning Framework consultation by updating based on feedback received.	Q4 2020	+330 MW
PI3: Enact MPDM Bill by Q1 2021	The MPDM and all secondary legislation must be enacted by Q1 2021 to allow Phase 1 Projects to progress and Phase 2 Projects to enter the consent process	DHLGH	DECC	Complete pre-legislative scrutiny of the General Scheme before the end of the year and prioritise the final Bill for passage in early 2021. Progress Secondary Legislation and Offshore Guidelines.	Q1 2021	
PI4: ABP Planning Resources and Decision Timelines	An Bord Pleanála must be sufficiently resourced to process the significant number of projects that will apply for planning consent over the next number of years in a timely manner	ABP, DHLGH	DPER	Add at least 10 new people to ABP with appropriate skillsets for offshore wind & begin engaging with offshore projects. ABP should have statutory timelines for planning decisions.	Q4 2020	+562 MW

Policy Improvement (PI)	Brief Description of What's Needed	Lead	Supporting Role	Next Step	Target Date	Additional Capacity in 2030 vs *Baseline* scenario of 674 MW*
PI5: Grid Offers & Consenting	A decentralised, developer-led grid delivery model involving early engagement with An Bord Pleanála and EirGrid must be put in place to facilitate parallel wind farm and grid consenting. Phase 1 & 2 Projects need clarity on how their offers will be progressed.	Decentralise Grid: DECC Offers: CRU/ EirGrid	ABP	DECC to use a developer-Led Option 1/2 Offshore Grid Delivery Model. CRU to put in place grid offer process for Phase 1 & 2 Projects. EirGrid to process offers.	Q4 2020	+906 MW
PI6: Grid Delivery	Sufficient resourcing must be in place so that non-contestable grid delivery does not delay projects from commissioning. Appropriate cable functional specifications are also vital.	CRU	ESBN, EirGrid	Sufficient resources and incentives in PR5 to deliver project grid connections in a timely and cost-effective manner.	Q1 2021	+500 MW
PI7: RESS	An efficient RESS scheme must be put in place for offshore wind to maximise the capacity that can be achieved by 2030.	DECC	CRU, EirGrid	First Offshore RESS (O-RESS) auction as soon as possible with sufficient volumes auctioned by 2025 to meet the 2030 targets.	Q4 2021	+2,112 MW
PI8: Grid Capacity (note: IWEA's *Saving Power* report is dedicated to this issue)	The design, consent and construction of the appropriate network reinforcement for the east coast must be carried out as quickly as possible and on the south and west coasts to facilitate post-2030 projects.	EirGrid, CRU	ESBN	EirGrid to publish Power Systems Vision 2030 indicating what is required for 2030. CRU to ensure EirGrid and ESBN have the resources necessary in PR5 to deliver the grid required. EirGrid & industry to engage on the development of an 'All-Island Grid Capacity Forum'	Q4 2020	Modelled in *Saving Power* report and not this study. Offshore wind limited to ~2000 MW without this PI.[5]

*While some earlier PIs appear to have a relatively small impact on their own on capacity energised by 2030, they ensure the impact of implementing later PIs is maximised (the PIs are added to the model one-by-one, starting from the *Baseline* scenario). Also, for some, the impact is small as the difference between the *Baseline* and *CAP/PfG Delivered* scenario is a delay in the PI being implemented. These PIs are necessary for offshore wind projects to be developed and if they were to never materialise, it would result in no offshore wind rather than just the impact identified here due to a delay.

[5] https://iwea.com/latest-news/4453-lost-renewable-energy-enough-to-power-galway-for-a-year

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1 Introduction

The Irish Wind Energy Association (IWEA) is the representative body for the Irish wind industry, working to promote wind energy as an essential, economical and environmentally friendly part of the country's low-carbon energy future. We are Ireland's largest renewable energy organisation with more than 180 members who have come together to plan, build, operate and support the development of the country's chief renewable energy resource.

In 2018 IWEA commissioned Baringa Partners LLP to undertake a fully costed study of a 70 per cent renewable electricity system in Ireland. While it shows this target was possible it did not identify the policy changes needed to achieve it. Following the publication of Ireland's Climate Action Plan (CAP) in June 2019, where Government endorsed the 70 per cent target, IWEA has undertaken a body of work to set out in detail how the target can be achieved.

This body of work, which we refer to as the 70by30 Implementation Plan, consists of four separate reports:

- *Saving Money;*
- *Saving Power;*
- *Building Onshore Wind;*
- *Building Offshore Wind.*

This report, *Building Offshore Wind*, sets out how to ensure we can reach the CAP target of at least 3.5 GW of installed offshore wind by 2030, as well as how to meet the more ambitious 5 GW of offshore wind by 2030 set out in the subsequent Programme for Government (PfG), which was published in June 2020.

1.1 Legacy, Relevant and Enduring to Phase 1, 2 and 3 Projects

The development programme for offshore wind energy is a complex and lengthy process. Generally, this process will cover project feasibility and inception, surveying, planning and consenting (including associated impact assessments and associated public and statutory consultation) up until financial close of the project.

From the outset, it is important to be clear about the different types of projects and terminology used to refer to these in the Irish offer sector, which are **Legacy**, **Relevant** and **Enduring**.

Before May 2020, all projects which had planning or were in the consenting process under the Foreshore Act were referred to as **Legacy Projects**. However, there have been plans for many years to update Ireland's maritime consenting regime via new legislation called the Marine Planning and Development Management (MPDM) Bill.[6] However, the MPDM Bill is still a work in progress, so while it is being developed, the Irish government released a 'Transition Protocol', which outlined how all but one of the Legacy Projects could transition from the Foreshore consenting regime to the new MPDM consenting regime, once it is in place.[7]

[6] https://www.housing.gov.ie/planning/marine-spatial-planning/foreshore/marine-planning-and-development-management-bill

[7] https://www.gov.ie/en/press-release/07331-transition-of-offshore-renewable-projects-announced/

The one legacy project which was not covered under the Transition Protocol is Arklow Bank Phase 2, which has an existing foreshore lease.[8] The other projects which were included under the Transition Protocol are referred to as **Relevant Projects** and include:

- Oriel Wind Park
- Dublin Bay Array, (2 projects, Bray and Kish Banks)
- Codling Wind Park, (2 projects, Codling I and Codling II)
- Fuinneamh Sceirde Teoranta, (Skerd Rocks)
- North Irish Sea Array Ltd, (North Irish Sea Array)

However, there are other projects in development also beyond the one remaining Legacy project (i.e. Arklow Bank Phase 2) and the five Relevant Projects, which are called **Enduring Projects**. These groupings of projects have recently been renamed Phase 1 and Phase 2 respectively.[9] Enduring projects are at an earlier stage of development. They have not received planning permission, but they have identified potential sites, started seabed and bird surveys, and may have begun to engage with the local community.

It was particularly important to distinguish between Relevant and Enduring projects since the development pathway is different for each of these at present. An overview of the various projects in each category is presented later in Chapter 2 and Figure 4 below gives a high-level overview of the development steps expected for each for these when the first CAP was published in June 2019. However, since then, there have been a number of changes to these steps, and the latest development timelines assumed for both types of projects are presented in more detail later in the report.

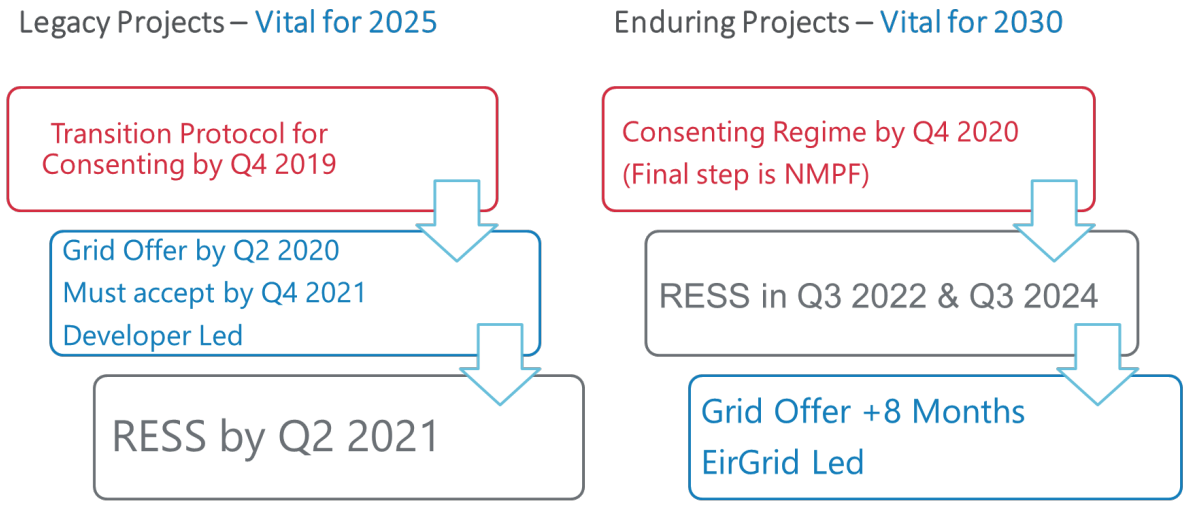

Figure 4: Legacy and enduring project milestones from the Climate Action Plan from June 2019. The order of these milestones has changed since this was published so these changes are discussed later in the report and accounted for in the analysis.

[8] https://www.sserenewables.com/offshore-wind/projects/arklow-bank/

[9] Sometimes it is stated that there are seven relevant (i.e. Phase 1) projects since two of these projects have two parts.

Most recently, in November 2020, the terminology was changed to new groupings under different 'phases'.

- Phase 1: includes all Relevant Projects and Arklow Bank Phase 2.
- Phase 2: includes all Enduring Projects which can deliver by 2030 to fill the capacity gap between the Phase 1 Projects and the 2030 target of 5 GW.
- Phase 3: includes all Enduring Projects which will deliver post-2030.

This terminology is therefore used in the remainder of this report. As the aim of this study is to establish how to deliver the 2030 targets, the focus is on Phase 1 and Phase 2 only, but if there is time slippage of course some of the projects which miss the 2030 deadline could then contribute to Phase 3.

There has been widespread political support for offshore wind since the first CAP was published in 2019, but unfortunately, even with this support, none of the target deadlines for offshore wind energy development set out in the plan have been met (see Figure 4). This is raising concerns – both in Ireland and in the wider global supply chain – about future deadlines and the commitment of the Irish political system to offshore renewable energy, and has also resulted in adjustments to the development sequence, which are discussed and modelled in detail later in this report. The aim of this report is to outline how the current policy and regulatory framework for offshore wind can change based on a series of Policy Improvements (PIs) so that enough offshore wind can be delivered by 2030 to meet the targets in the CAP and PfG.

1.2 Ireland's Offshore Wind Ambition

There has been a policy revolution in the marine space in Ireland over the past 2 years. The CAP outlines a target of at least 3,500 MW of offshore wind by 2030, with an interim target of 1 GW by 2025 (Figure 5).[10] The plan contains detailed, timebound actions regarding offshore wind covering consents, grid connection, route to market, and addresses the needs of Legacy and Enduring projects (now referred to as Phase 1 and Phase 2 Projects respectively) with an aim to secure Government approval for an offshore specific Renewable Energy Support Scheme (RESS) auction by Q3 2020. The plan committed to a 70% RES-E target by 2030 – the biggest saver of carbon in this being wind with at least 3.5 GW of offshore wind by 2030 – from an almost standing start. The ambitions in the CAP were also included in Ireland's National Energy & Climate Plan (NECP) which solidified this target to 2030.[11]

More recently, a new PfG was agreed in June 2020. This increased the ambition for offshore wind to 5 GW by 2030 and for the first time indicated the State's ambition for 30 GW of floating offshore wind energy to enable Ireland to export its abundant clean electricity potential in the longer term.[12] This would suggest that the next versions of Ireland's CAP and NECP are likely to include an increased ambition of 5 GW for 2030.

As the new ambition of 5 GW has not been yet been transposed into the latest CAP or NECP for Ireland, in this report the analysis shows how both the 3.5 GW and 5 GW ambitions in the CAP and PfG can be met by 2030.

[10] https://www.gov.ie/pdf/?file=https://assets.gov.ie/25419/c97cdecddf8c49ab976e773d4e11e515.pdf
[11] https://ec.europa.eu/energy/sites/ener/files/documents/ie_final_necp_main_en.pdf
[12] https://www.greenparty.ie/wp-content/uploads/2020/06/ProgrammeforGovernment_June2020_Final.pdf

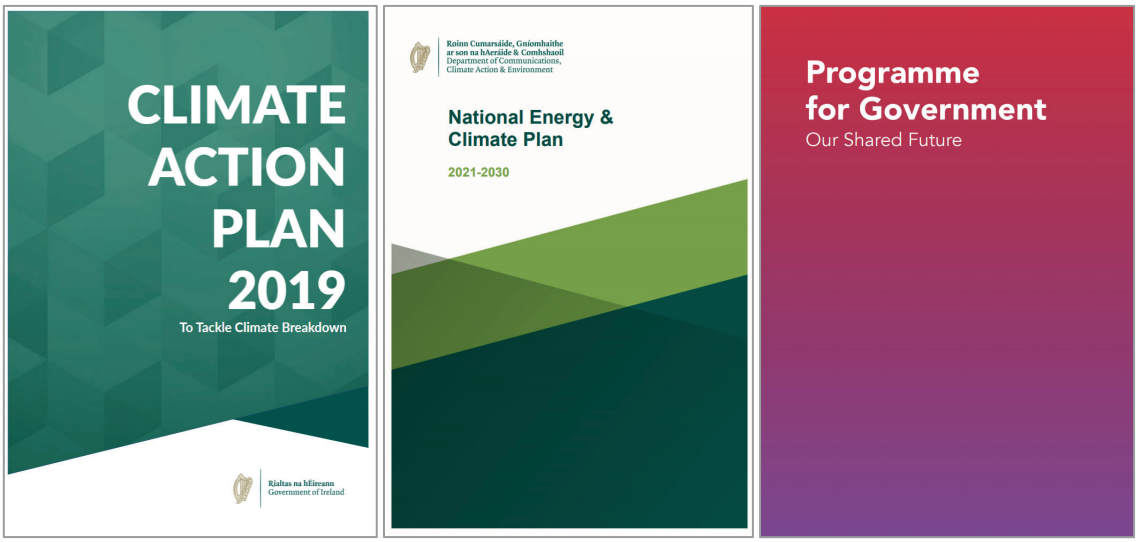

Figure 5: Ireland's Climate Action Plan, National Energy and Climate Plan and Programme for Government.

1.3 Typical Timeline to Develop an Offshore Wind Farm

Every renewable electricity project, whether offshore wind, onshore wind or solar, typically goes through four main steps: planning, grid offer, route-to-market and construction/delivery. This process is easier to define for onshore wind due to the large number of projects that have already been built in Ireland and is explained in detail in IWEA's *Life-cycle of an Onshore Wind Farm*[13] report. However, using the experience from onshore wind and the current policy direction for offshore wind, we have set out a more granular list of steps that an offshore wind project will need to follow which are modelled using the *Offshore IWEA Pipeline Analysis Tool (Offshore i-PAT)*:

1. **Early-Stage Assessment:** typically used to identify a site based on feasibility studies and desktop analysis.
2. **Obtain Planning:** the first major step for any project is to obtain planning and below are **indicative steps we expect for this, but these may change** as the consenting process is finalised.
    a. At present, an offshore project needs to **obtain a foreshore licence to start survey work**. Obtaining the licence itself currently takes more than a year, on average, and then at least 2 years for surveys.
    b. Once the MPDM Act is in place, our expectation is that an offshore wind energy project will then look to enter the **planning system through applying for a conditional Maritime Area Consent (MAC)** to the Minister for Environment, Climate and Communications under the new MPDM process. The foreshore licence may also be applied for as part of the conditional MAC application rather than as a separate step, but further clarity is required here.
    c. A conditional MAC ensures exclusivity for a project in that particular area of the seabed. This should be in place for projects to **start surveying** and to make an application to An Bord Pleanála (ABP) for planning consent. On award of conditional MAC, projects will begin a pre-planning application consultation with ABP, inclusive

[13] https://iwea.com/images/files/iwea-onshore-wind-farm-report.pdf

of the scoping of Environmental Impact Assessment Reports (EIAR), in preparation for their planning applications proper.

d. **Submit a Planning Application for development consent** (via MPDM for all projects except one) to ABP. ABP is the statutory body responsible for both the onshore and offshore elements of an offshore wind energy development. But an application to the local planning authority is required in respect of certain development types within the nearshore area such as operation and maintenance bases. ABP aims to make a decision within 18 weeks but based on our experience of that deadline for onshore wind, we expect delays of more than a year.

3. **Front End Engineering & Design (FEED):** once planning is secured, much more detailed engineering and design work takes place to prepare the project for a RESS auction and bid for a contract to provide a route-to-market for the wind farm.
4. **Apply for a Grid Offer:** a grid offer allows a project to connect to the electricity grid at a particular location. The steps to obtain one typically include:
    a. Apply for a grid offer from EirGrid to be allowed to connect to the electricity grid.
    b. Accept a grid offer from EirGrid, which is likely to be conditional in some way before RESS and confirmed once successful in RESS.
    c. Get planning for the grid connection – ideally at the same time as getting planning for the wind farm. The grid delivery model (i.e. central or decentralised) is fundamental to the overall project and a change to this methodology or late designation of this methodology will stall projects.
    d. **Important**: this comes before the 'Route to Market' step for Relevant (Phase 1) projects in the CAP, but after it for Enduring (Phase 2) projects (see Figure 4). However, the critical path for both is assumed to be after RESS due to changes since the CAP was published. This is explained in more detail later.
5. **Find a Route-to-Market:** the offshore wind farm will need to secure a revenue stream so that it can be financed.
    a. The most likely option for an offshore wind farm in Ireland for 2030 is the Irish Government's RESS. Some offshore wind farms in other parts of the world have also found a route to market using Corporate PPAs, but this is typically in more mature markets.
    b. The current intention is to finalise a MAC for a project once it is successful in a RESS auction, which outlines the relevant financial and contractual arrangements for the developer to build the project
6. **Financial Investment Decision (FID) and construction of the wind farm and the developer's share of the grid connection:** the project developer constructs the wind farm, but the grid connection is partly constructed by the developer and the System Operators (SOs).
    a. Construction of the wind farm itself including foundations, internal cables, and wind turbines: For the wind turbines, preferred practice currently involves the preassembly of the tower sections onshore (inclusive of internal components) and transport vertically to the wind farm site for installation using a specialist jack-up barge. The installation of a turbine from positioning the vessel at the site to departure takes about 24 hours, depending on location and weather conditions.
    b. Construction of the developer's share of the grid connection: To hit Ireland's 2030 target, the developer will also need to build the offshore substation and grid connection to the onshore substation, although this decision is still to be finalised

(Grid Options Delivery Model) and could also be different for projects that need to deliver beyond 2030.

7. **Construction of the SOs' share of the grid connection in parallel to the wind farm (i.e. Grid Delivery):** part of the connection works will need to be delivered by the SOs (i.e. EirGrid and ESB), such as the onshore substation (depending on which grid model is chosen).
8. **Energisation / Commissioning:** once the wind turbines are in place and there is a grid connection to export electricity, it can take some time to energise (also referred to as commission) the wind farm. This typically involves rigorous testing to ensure all systems are working as they were designed to, addressing any issues identified ahead of the operational phase.

This list of steps is very high-level but based on the typical time required for each one, which is available in Table 2, it suggests that, without the kinds of changes proposed in this report, it will take at least 10 years to build an offshore wind farm in Ireland . As the majority of the projects off our coast are currently in the early stages there is no time to be lost if they are to be completed by 2030.

Parallel Grid Development: In addition to the grid connection to the wind farm itself, it is vital that the SOs reinforce the wider grid in parallel. There must be sufficient grid capacity on the network at the point of connection to bring the electricity from the offshore wind farm to where it is needed in Ireland. This is currently the single biggest challenge facing Ireland's 2030 targets for both offshore and onshore wind.

Below is a list of the high-level steps to progressing a grid reinforcement project, as indicated by EirGrid, along with typical timelines we would expect each one to take:[14]

1. Step 1 - Identifying the future needs of the electricity grid (up to 12 months)
2. Step 2 – Assessing the technologies that can meet these needs (up to 6 months)
3. Step 3 – Deciding on the best option and location (up to 12 months)
4. Step 4 – Deciding exactly where to build the project including detailed route or site (up to 12 months)
5. Step 5 – The planning process (up to 18 months)
6. Step 6 – Construction and energisation (6 to 36 months depending on the type of project)

Assuming EirGrid is given the resources that allow it to adhere to the timetable set out above, it will take up to eight years to deliver a single grid reinforcement project. The need to start developing the transmission grid as soon as possible is imperative and IWEA has previously published a dedicated report, *Saving Power*, on this topic.[15]

[14] https://www.eirgridgroup.com/the-grid/have-your-say/
[15] https://www.iwea.com/images/files/iwea-saving-power-report.pdf

Table 2: Generic timelines for an offshore wind farm to pass through the various steps to development (Grid development must also happen in parallel which as mentioned in the text is up to eight years for a single grid project).

Step	Work package	Elements	Timelines
1.	**Early-Stage Assessment**	Desktop studies and application for foreshore licence and/or Planning Interest	1 to 1.5 years.
2.	**Site Characterisation**	High resolution geophysical and geotechnical drilling campaigns, offshore met ocean and wind resource data collection and modelling.	1 to 2 years, post completion of work package 1.
3.	**Environmental Assessments**	Baseline data collection including a minimum of 2 years offshore bird and mammal surveying, seasonal onshore ecological surveys, basic design and EIA preparation and consultation.	2 to 3 years, can run in parallel to work package 2.
4.	**Grid connection**	Connection method from TSO confirming specifications and costs, cable route planning, substation design and negotiation of associated landowner agreements.	2 years, can run in parallel with work packages 2 and 3.
5.	**Consents**	Planning application, further consultation and decision process including likely oral hearing.	1 to 1.5 years, post completion of work packages 2, 3 and 4.
6.	**Auction preparation**	Front end engineering design and supply chain pricing.	1 year, can run in parallel to work package 5.
7.	**Engineering and procurement**	Detailed design for supply chain tendering and contracting.	1 to 2 years, post success in RESS auction.
8.	**Financing (Financial Investment Decision or FID)**	Debt and equity package negotiation including due diligence.	1 to 2 years, post success in RESS auction, in parallel with work package 7.
9.	**Fabrication**	Main components fabrication, turbines, foundations, HV equipment, cables.	1 to 2 years post FID, depending on supply chain availability.
10.	**Construction and commissioning**	Offshore foundation, turbine and OHVS installation, onshore cable and HVS construction.	1 to 3 years, depending on construction methodologies and complexity of grid connection.

1.4 Report Outline

As mentioned previously, the aim of this report is to outline how the current policy and regulatory framework for offshore wind must change based on a series of PIs so that enough offshore wind can be delivered by 2030 to meet the targets in the CAP and PfG.

The next chapter of this report, chapter 2, outlines the methodology used to analyse the current situation and to establish what improvements are required. Chapter 3 presents the 'Baseline' scenario which shows that the current framework will not deliver sufficient capacity to meet our 2030 targets.

In chapter 4, we present in detail a series of PIs which can be made to improve how offshore wind is developed in Ireland and, in chapter 5, the results of these improvements are quantified by modelling how much additional offshore wind can be delivered by 2030. Chapter 6 outlines how these PIs could be implemented by identifying the specific next steps required and stakeholders responsible.

Finally, chapters 7 and 8 reflect on other important considerations for the offshore sector over the next decade which are indirectly related to Ireland's 2030 targets. Chapter 7 gives a brief overview of how we can build an offshore supply chain to maximise the economic benefits for Ireland, and chapter 8 briefly considers the other offshore wind target in Ireland's PfG, which is to export 30 GW of capacity to support the decarbonisation of other countries in Europe and create new export potential for Ireland.

2 Methodology

Two key pieces of information are required to forecast when Ireland's offshore wind farms can come online: a) the status of projects right now and b) an overview of the steps which projects must pass through to be delivered.

IWEA carries out a survey of our members every six months to establish the former, which is referred to as the IWEA Offshore Wind Pipeline survey, and some data from this is presented here in section 2.1. Section 2.2 then presents an overview of the modelling tool used in this report to simulate how fast the pipeline can be delivered under various assumptions, the Offshore i-PAT.

2.1 Current Offshore Wind Pipeline of Projects

In August 2020, IWEA carried out a survey to determine the scale and status of the current offshore wind energy development pipeline in Ireland, and to provide the input data for the modelling work carried out for this report.

The full survey uncovered details on many aspects of the offshore pipeline, including:

- Project capacity;
- Project location;
- The year a planning application will likely be submitted for the project;
- The consenting route the project will take (e.g. Foreshore Act, Transitional Protocol, Final enacted MPDM);
- The expected average water depth at project location and the distance from shore;
- The project foundation type (fixed or floating); and
- The capacity of turbines expected to be deployed at site.

The information supplied for this survey was based on members' most accurate estimations at the time, and the development of this pipeline will ultimately depend on the policies put in place by the Government and how well they facilitate the establishment of an offshore industry in Ireland over the coming years. Nonetheless, this survey represents the most up-to-date Irish offshore pipeline available today.

The survey revealed that 23 projects are in the pipeline, at various stages of development, accounting for a total capacity of over 16 GW (see Figure 6). More information on this pipeline can be made available to key stakeholders if it is required to support the development of enabling policy measures.

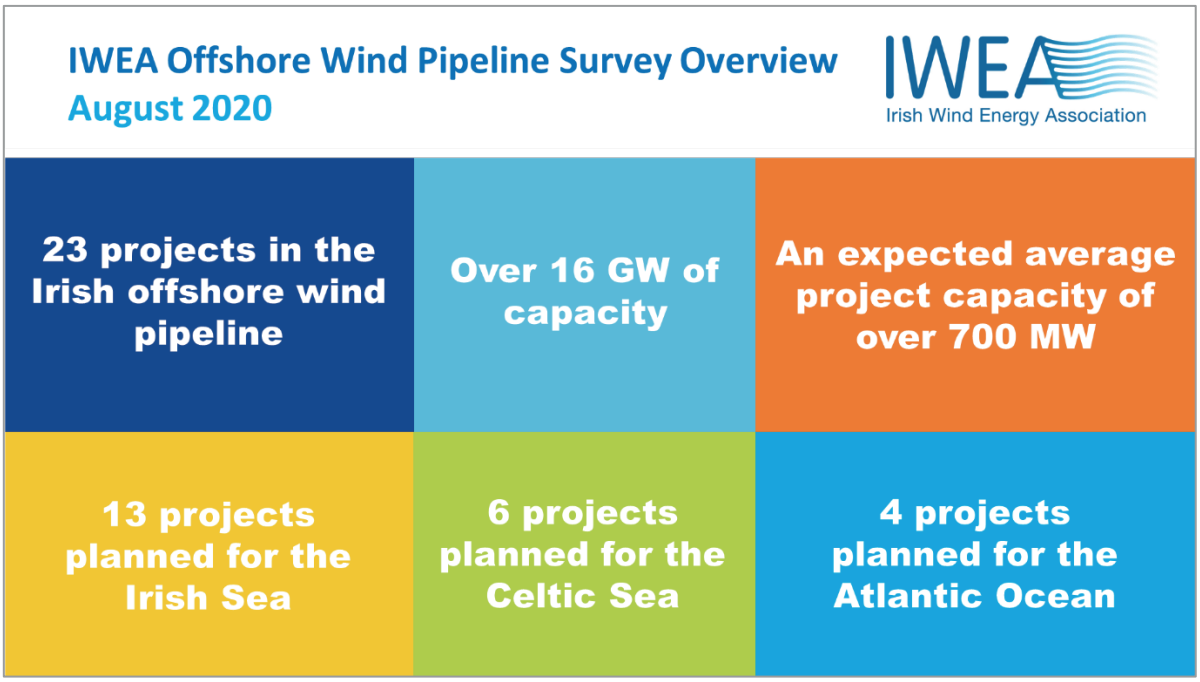

Figure 6: Overview of the current offshore wind pipeline in development in Ireland.[16]

The most relevant information for the purposes of this report are the project capacity, the year the project is expected to apply for planning consent and whether the project is a Phase 1 or Phase 2 project, as discussed in section 1.1.

The project capacity and expected year to enter the planning system allows the correct project capacity to be entered into the model at the appropriate date. Details on the approximate number of projects expected to enter the planning system and the associated capacity can be found in Table 3 and Figure 7 below. These show that multiple projects are expected to enter the system each year over the next 5 years, with more than 10 projects expected to apply for planning consent in 2023.

Table 3: Number of projects and associated capacity expected to enter the planning system over the next 5 years, using data from IWEA's Offshore Pipeline Survey.

	Number of Projects Entering the Planning System		Approximate Capacity (MW)
	Low Estimate	High Estimate	
2021	2	4	1,500
2022	1	3	2,000
2023	10	14	10,500
2024	2	4	1,000
2025	1	2	1,000

[16] https://iwea.com/images/IWEA-Onshore-and-Offshore-Wind-Pipeline-Report-August-2020-BLANK.pdf

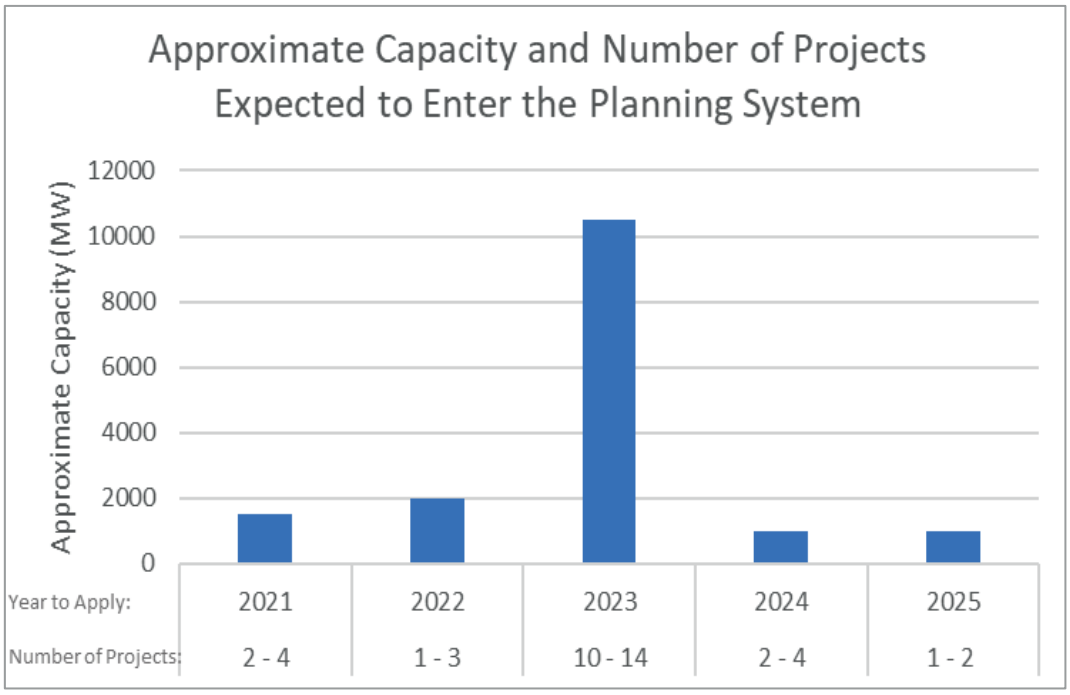

Figure 7: Number of projects and associated capacity expected to enter the planning system over the next 5 years, using data from IWEA's Offshore Pipeline Survey.[17]

The other crucial factor for modelling purposes is whether the project is a Phase 1 or Phase 2 Project. As discussed in section 1.1, this dictates the route by which the project will progress.

The identity of the Phase 1 Projects was already publicly available information, but the survey allowed us to get a better idea of the capacity of the projects in each category. The survey revealed a total capacity of over 3 GW spread over the six Phase 1 Projects and 17 additional projects, accounting for approximately 13 GW, giving a total pipeline of over 16 GW (Figure 8).

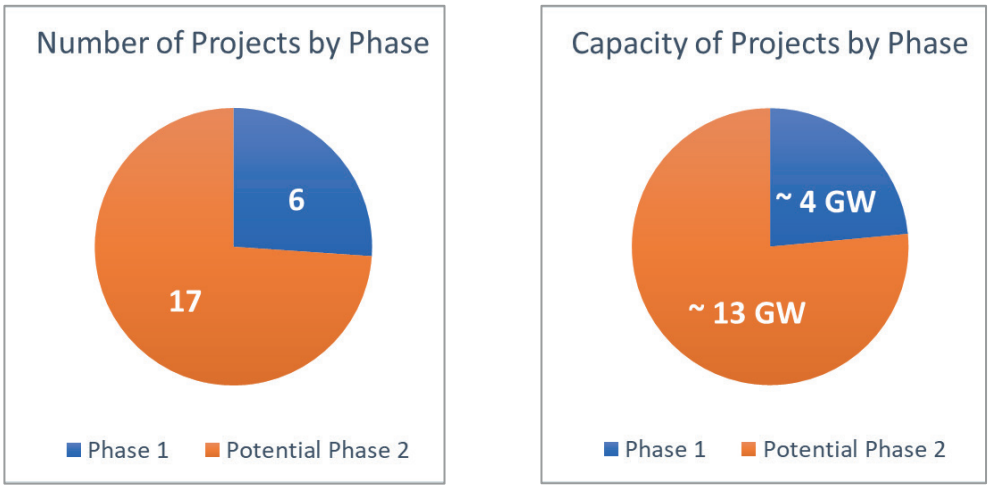

Figure 8: Breakdown of Number of Projects (Left) and Capacity (Right) in Phase 1 and Phase 2.

[17] https://iwea.com/images/IWEA-Onshore-and-Offshore-Wind-Pipeline-Report-August-2020-BLANK.pdf

From reviewing this pipeline, it is clear that industry is doing its part. We are ready and waiting to deliver upon the Government's 2030 targets and establish a strong, indigenous offshore industry in Ireland. As this report will show, however, delivering these targets will require more than a strong pipeline. The correct policies must be urgently put in place to ensure targets can be delivered.

2.2 Offshore IWEA Pipeline Analysis Tool (Offshore i-PAT)

IWEA developed a pipeline analysis tool to examine the pipeline discussed in section 2.1 and to model the potential capacity that could be energised by 2030 under differing timeline assumptions. The results of this modelling were used to investigate how our CAP/PfG targets can be reached, what PIs are needed to reach them and the impact each PI could have in terms of capacity energised by 2030.

Given the urgency needed to reach our 2030 targets and the tight timelines that industry and the Government are together up against, the starting point for this modelling is Q4 2020, with changes needed immediately to ensure we are on track to reach 2030 targets.

2.2.1 Attrition and Model Assumptions

It is not realistic to assume that all projects in the Irish offshore pipeline today will be delivered. There will be various forms of project attrition such as pre-planning attrition, failure to obtain planning consent, failure in a RESS auction etc. All of these are accounted for in the model to ensure a realistic and reliable output is generated.

Attrition rates used historical onshore wind attrition rates as a guide[18] and, where these sources were not relevant to offshore development in Ireland, attrition rates were chosen based on discussions with a range of experts in on and offshore wind energy development, both in Ireland and more mature markets.

In general, in the *Baseline* timeline, the attrition rates applied are in the higher range of plausible rates, reflecting a failure of policy to provide certainty for developers or adequate resourcing for projects to be progressed efficiently.

When a PI is implemented, which will be presented in detail later in chapter 4, the attrition rates associated with the particular project stage are generally improved, to reflect the impact of the PI.

Other assumptions are also made around things such as planning success rates, the number of projects ABP can process in one year, RESS auction capacity limits, competition ratios, and other factors.

Table 4 illustrates the various attrition rates and other assumptions applied to project stages for the *Baseline* timeline. The timeline itself is discussed in more detail in the next chapter.

[18] https://www.iwea.com/images/files/iwea-building-onshore-wind-report-lr.pdf

Table 4: Model Assumptions for the *Baseline* scenario.

	Baseline	
	Phase 1	Phase 2
Planning		
Pre-Planning Attrition	20%	30%
Planning Success Rate	60%	60%
Maximum Projects ABP can process per year	5	
Tier 1 duration[19]	2 years	
Tier 2 duration	3 years	
Route to Market		
Pre-Auction Attrition	15%	15%
Percentage of losing capacity in each RESS auction	50%	50%
RESS Auctions	2024, 2027	
Auction Capacity Limit	2 GW	
RESS Competition Ratio	1.7	
Grid Offer and Consenting		
Tier 1 duration	2 years	
Tier 2 duration	3 years	
FID, Wind Farm and Grid Delivery		
Phase 1 of construction before energisation begins	3 Years	
Phase 2 of construction (with energisation in parallel)	1 Year	

2.2.2 How the Model Works

The starting point for the model is the current offshore pipeline, as discussed in section 2.1.

Projects are also designated Phase 1 or Phase 2, so they can progress along the appropriate timeline. As there is not yet clarity on which projects will be classified as Phase 2, it is assumed for the purposes of the modelling work that all projects in the pipeline which are not included in the Phase 1 designation will potentially be Phase 2 Projects.

To avoid having to choose which projects are progressed and which are not, the pipeline works based on capacity rather than projects. For example, if multiple projects accounting for 2 GW of capacity enter the planning system with a 75% success rate, 1500 MW will receive planning consent, with the duration taken based on the timeline assumption.

The timeline assumptions made are explained in sections 3.1 and 5.1.

[19] To account for likely differences in the timelines for the progression of projects due to unforeseen delays, it is assumed that projects pass through the consenting and grid stages in a tiered approach, with 50% of capacity passing through the relevant stage in the quicker 'tier 1 duration' and the remining capacity progressing in the delayed 'tier 2 duration'.

Development Consent

Modelling begins from the development consent phase, but the date at which this process begins is dependent on assumptions made around the enactment of the NMPF and MPDM and the granting of foreshore licences and conditional MAC.

Before beginning the development consent process, pre-planning attrition is applied. Projects then enter the planning system, taking account of the year the developers expect they will apply and when this stage will be accessible based on the timeline assumption. For example, if a project expects to apply for planning in 2021 but the timeline assumes the MPDM is not enacted until 2022, the project will begin the development consent process in 2022.

When projects are being processed for development consent, a planning success rate is applied. It is also assumed a certain capacity is successful in a specified 'tier 1 duration' and the remaining capacity is successful but delayed to the 'tier 2 duration'.

RESS Auction

Projects that successfully receive development consent prior to the assumed RESS auction date are then entered into the RESS auction, after pre-auction attrition is applied. The RESS auction then proceeds based on a chosen competition ratio, with an upper limit placed on the capacity that can be successful. Assumptions are also made on the percentage of losing projects that proceed to the next RESS auction, and the number of auctions that are held, as shown in Table 4.

Grid-offer and consenting

Upon success in a RESS auction, it is assumed that projects then receive a final grid offer and consent is obtained for the developer-built portion of the grid connection and substation assets. Similar to the development consent stage, this stage is divided into tiers, with a percentage of capacity receiving an offer and consent in a 'tier 1 duration' and the remaining capacity delayed to the 'tier 2 duration'.

Final MAC

After receiving a grid offer and consent, projects then have to obtain final maritime area consent under the MPDM. It is assumed that all projects are granted this in the first quarter after the relevant auction.

FID, wind farm, and grid delivery

The final stage of project delivery modelled is final investment decision (FID), wind farm construction and grid delivery. This stage covers the progress of projects from FID to energisation. It is assumed that projects are energised in phases, with construction continuing in parallel.

For this report, the *Baseline* scenario was first modelled, to see the capacity that could be delivered for 2030 under these assumptions. This will be outlined in section 3. The PIs, which will be discussed section 4, were then implemented one-by-one, with the capacity delivered under each scenario modelled. Finally, the *CAP/PfG Delivered* scenario was modelled with all the PIs implemented, which will be discussed in section 5.

2.2.3 Specific Timelines for Phase 1 and Phase 2 Projects

The assumptions in Table 4 are indicative only and represent what happens at the individual steps, under baseline assumptions. They also assume a developer-led grid model as a centralised grid delivery model would delay offshore wind energy development by at least 3-4 years. As discussed in section 1.1, there will be a different chronology to these steps for Phase 1 and Phase 2 Projects towards 2030.

How these steps are put together is effectively the focus of the analysis in this report. The model uses separate timelines for Phase 1 and Phase 2 Projects, which are also different depending on the scenario being considered, so these are elaborated in more detail later. To begin, the next chapter presents the Baseline timeline in more detail along with the resulting capacity that can be delivered by 2030 if this timeline is applied.

3 *Baseline* Analysis

In practice, there is no such thing as business-as-usual for offshore wind in Ireland since we are yet to deliver a large-scale offshore wind project. The *Baseline* context here assumes that offshore wind projects progress based on the timelines experienced for onshore wind projects in the past. Where a step was unique to offshore, then the time forecasted was based on estimates from experts in offshore wind development. Most of these relate to tasks which are the responsibility of various Government agencies.

3.1 *Baseline* Scenario Timeline

It is important to note that **this timeline is not specific to individual projects** and instead is an indicative timeline that a Phase 1 or Phase 2 Project is likely to experience. Individual projects will very likely have unique circumstances which may accelerate or delay the steps presented in the timelines below.

In the *Baseline* timeline, a typical Phase 1 Project is delivered in 2030 (see Figure 9) but a Phase 2 Project cannot be delivered until after 2030, likely to be approximately 2034 (see Figure 10). The assumptions for the *Baseline* timeline are outlined in Table 7 but a detailed description of each PI is presented later in chapter 4.

One major issue which is clear from both timelines is that the consenting process, or the enactment of the MPDM in particular, has a major influence on the critical path for Phase 1 and Phase 2 Projects. Obtaining planning via this new consenting regime could delay a Phase 1 Project until 2023 and a Phase 2 Project until 2025, so putting this consenting regime in place as soon as possible and making it as efficient as possible really could accelerate the timelines considerably.

Another major issue which emerges from these timelines is that all steps are sequential, which significantly adds to the delivery date which is possible. In particular, the consenting process for the grid connection cannot take place at the same time as the consenting of the wind farm which adds two years to the critical path. At present, consenting for a grid connection primarily takes place separately due to a lack of certainty on a project's grid connection route. This is a function of the existing sequential nature of the grid connection offer process but also relates to the lack certainty or information available to the developer on what additional grid capacity is being planned by EirGrid.

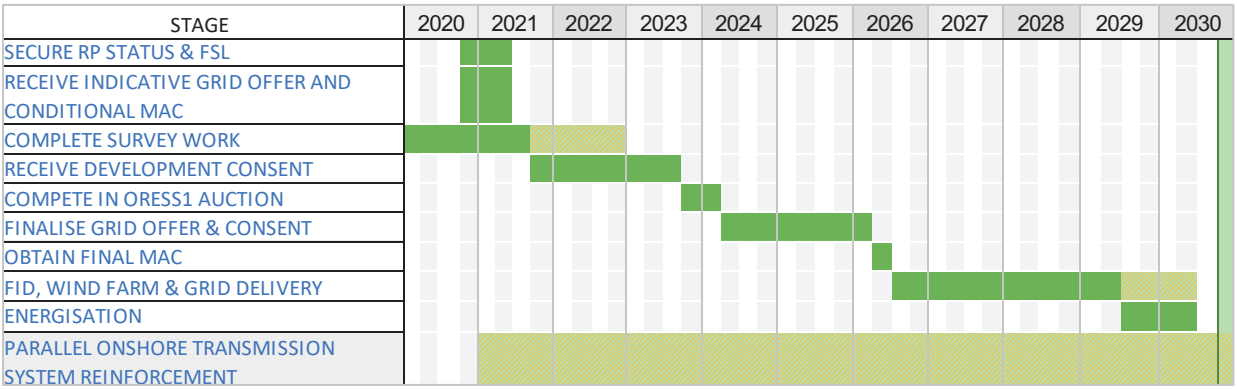

Figure 9: *Baseline* timeline assumed for Phase 1 Projects.

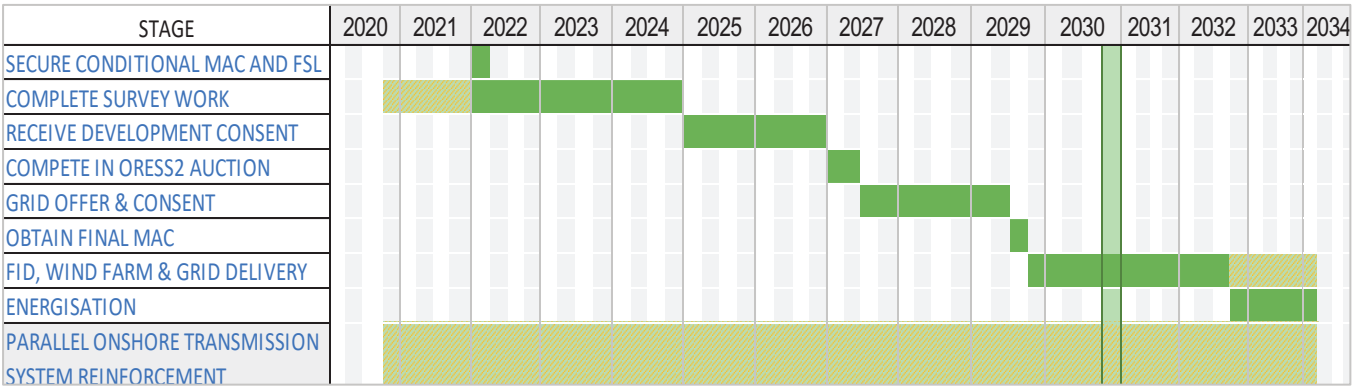

Figure 10: *Baseline* timeline assumed for Phase 2 Projects.

3.2 *Baseline* Scenario Results

The results from the *Baseline* scenario analysis, displayed in Figure 11, show that only 670 MW are energised by the end of the decade, with the first batch of capacity not coming online until 2029.

These results show that, despite the strong offshore pipeline in place in Ireland today, delays in action on the policy side will leave us well short of targets. The next section will outline the policy measures that are needed to ensure a scenario like the one modelled here does not come to pass.

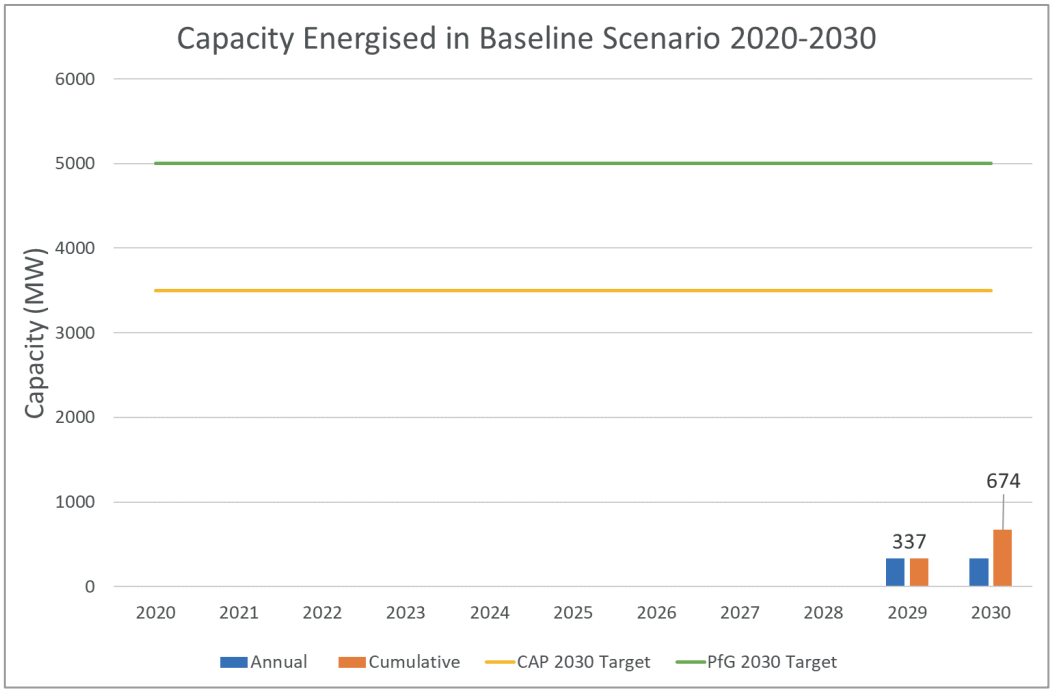

Figure 11: Offshore wind capacity energised, 2020-2030 in the *Baseline* scenario.

4 Policy Improvements to Deliver the CAP/PfG

As the *Baseline* scenario cannot meet the 2030 targets in either the CAP or the PfG, this chapter presents a series of PIs which are required to do so. In brief, the eight PIs identified in the analysis relate to:

- PI1: Issue Foreshore Licences and exclusivity for the seabed to all 2030 projects by Q4 2021;
- PI2: Complete the National Marine Planning Framework (NMPF) by Q4 2020;
- PI3: Enact the Marine Planning and Development Management (MPDM) Bill by Q1 2021;
- PI4: An Bord Pleanála will need sufficient resources so they can make decisions on offshore wind planning applications in 1.5 years on average;
- PI5: EirGrid and ABP need to engage with projects from the outset so projects can get a final grid offer and consent for a grid connection within 1.5 years on average after a RESS auction;
- PI6: Financial close and construction of the wind farm and grid connection should take 3 years or less (including energisation);
- PI7: Three RESS auctions need to occur by 2025 with sufficient volumes and competition;
- PI8: Work must commence immediately on strengthening the capacity and flexibility of the grid to accommodate 5 GW of offshore wind by 2030.

Each one of these is presented in more detail in an individual section of this chapter.

4.1 PI1: Foreshore Licenses & Exclusivity (e.g. via Conditional MAC) by Q4 2021

The foreshore is an area owned by the State and classified as the land and seabed between the high-water mark (HWM) and the twelve-mile limit (12 nautical miles equals approximately 22.24 kilometres) alongside of tidal areas of rivers and estuaries.

The Foreshore Unit in the Department of Housing, Local Government and Heritage (DHLGH) has recently applied a new prioritisation on offshore renewable energy (ORE) site investigation cases due to a static level of resources within the unit and an increase in ORE applications. The new system of assigning priority, outlined in Table 5 below, was proposed as the best approach for reaching Ireland's 2030 targets. However, the proposed new system represents a clear and very substantial risk to the commitment contained in the PfG to deliver "*5 GW capacity in offshore wind by 2030 off Ireland's Eastern and Southern coasts*" and will make it almost impossible to deliver upon this commitment.

Table 5: Foreshore Unit Prioritisation of ORE site investigation cases.

Priority Level	Type of Project
1.	Relevant Projects (Phase 1), projects with an existing ORE lease, Interconnectors
2.	National test site or other strategic infrastructure
3.	Projects on the East Coast (Louth to Wexford)
4.	Celtic Sea Inc. Cork & Kerry
5.	West Coast

4.1.1 Current Issues

A foreshore licence is needed to allow developers to investigate the suitability of foreshore locations for the development of offshore renewable energy. Without a licence, a developer cannot carry out these investigations, which are an essential the first step towards a subsequent planning application.

These investigations can typically only take place during a summer window from April to September. This means delays of months can cost a project more than an entire year of development, which could be fatal to delivering for 2030.

If projects do not receive a foreshore site investigation licence by 2021 – bearing in mind there are at least five current applications which have been waiting more than a year – there is very little chance of these projects being completed by 2030.

This contradicts the stated ambition in the PfG for projects to be developed off the south coast before the end of 2030. It also suggests the entire 5 GW envisaged in that document must now be developed off the east coast. While there is a strong pipeline in the Irish Sea, this needs to allow for any attrition due to delays in the planning system or grid capacity issues and consider any unexpected delays that may affect individual projects.

The south coast projects include plans for fixed bottom and early floating offshore wind projects which will be critical to realising the 5 GW by 2030 and the 30 GW export ambition in the PfG. Failure to progress these projects has grave implications for attracting investment into floating offshore wind in Ireland.

If the prioritisation process proposed by DHLGH is implemented, planned investment and recruitment for southern projects will be stalled at a time when offshore wind could be stimulating an economy seriously damaged by the Covid-19 crisis. Initial floating wind projects – despite the transformative potential this technology has for Ireland – would also not go ahead before 2030.

A similar foreshore licence can be obtained in approximately 14 weeks in the UK for example, and, while the system for processing applications there is more streamlined than ours, the speed and predictability of this process is key to attracting the supply chain to these UK projects.

A robust pipeline of Phase 1 Projects off the east coast ensures that the first offshore RESS auction will deliver wind energy at a competitive price for Irish consumers. However, without licences projects will be unable to advance, resulting in a period of stagnation in new projects coming on stream. This risks the creation of a widening time-gap between the Phase 1 Projects and the next batch of projects being ready for auction. To ensure there is competition in later RESS auctions, which is necessary to deliver renewable energy at the best price for consumers, there is a need for multiple licence holders actively progressing development around the coast. To have 5 GW of operating wind farms by 2030 will require significantly more than 5 GW of projects competing in auctions. Policy decisions taken now will have a significant impact on the auctions that are due to take place later in the decade. There is concern that a lack of competing projects would result in inefficient auction outcomes as fewer projects would be available to compete thus driving up the price of electricity for consumers.

4.1.2 Proposed Solution

Phase 1 projects should continue to receive the fastest possible processing of foreshore licences in line with the Transitional Protocol. This will enable new projects to come through the system. Even with this priority put forward there are three outstanding applications for Relevant Projects and at least one Relevant Project has been waiting more than a year for a decision. Any further prioritisation needs to facilitate all projects which could help meet our 2030 targets. If additional resources are required, then they should be identified and made available. It may be helpful to note that in the UK, when similar challenges arose during the early stages of offshore development, external support – including from industry – was deployed to great effect.

Considering that the development of offshore wind energy is a strategic priority for the Government, an issue of resources should not be allowed to hold up developments utterly critical to decarbonising our energy supply.

The solution to this is additional resources, either directly in the foreshore unit of DHLGH or by using external resources and DECC to issue foreshore licences.

The recent EirWind[20] report, Blueprint for Offshore Wind in Ireland 2020-2050, estimated that up to 30 new personnel need to be recruited to various Government departments and State agencies over the next 18-24 months to support the development of offshore renewables.[21]

For example, additional resources will be required imminently for the offshore consenting process within ABP and DECC, so the news that a shortage of resources at the very first step (i.e. the granting of foreshore licences) is bringing the majority of projects to a standstill is very concerning for our members.

[20] https://www.marei.ie/project/eirwind/
[21] https://www.marei.ie/wp-content/uploads/2020/07/EirWind-Blueprint-July-2020.pdf

Surveying should come with exclusivity. An offshore wind energy project will enter the planning system by applying for a conditional MAC to the Minister for Environment, Climate and Communications under the new MPDM process. If a conditional MAC is granted by the Minister then this ensures exclusivity for a project in that particular area of the seabed, formerly referred to as Planning Interest.

If a project is going to make a significant investment to survey the seabed, then it is important that the developer knows they have exclusive development rights to that seabed, or otherwise there will be significant risk for the project in developing. To avoid this, exclusivity should be awarded as part of a foreshore licence which could be achieved by offering both under a conditional MAC. If this approach is used, then the project will require both of these by 2021 to meet the timelines for 2030.

4.2 PI2: Complete NMPF by Q4 2020

The European Maritime Spatial Planning Directive (Directive 2014/89/EU) has directed that all EU Member States must have a Marine Spatial Plan (MSP) for their territorial seas in place by 31 March 2021. Ireland's MSP is called the National Marine Planning Framework (NMPF) and it will be finalised by December 2020 and submitted to the European Commission by March 2021. This strategy for managing marine activities in Irish territorial water will set out the direction for maritime development and protection over the next 20 years through the provision of spatial and policy context. The NMPF is an essential component for facilitating the deployment of offshore wind energy in Irish waters and in managing its co-existence with other marine users, in keeping with the objectives of CAP.

4.3 PI3: Enact MPDM Bill by Q1 2021

The General Scheme of the Marine Planning and Development Management Bill 2020 has introduced the concept of a new streamlined consenting process for Ireland and will be the legislative underpinning for the NMPF. The Bill will look to designate the maritime area in which the regime will operate, create a new single State consent regime for the entire maritime area, and provide for a single development consent for all projects including a single Environmental Impact Assessment (EIA) and Appropriate Assessment (AA).

The MPDM Bill incorporates a forward planning model, with decisions to be taken in a manner that secures the objectives of the NMPF (providing the spatial and policy context for decisions about the maritime area) and will introduce two new forms of State consent, the awarding of Planning Interest (a gateway into the planning system – this may be replaced by/amalgamated with a conditional MAC) and Maritime Area Consent (the leasing of the seabed from the State).

The implementation of a legislative framework which is consistent, transparent, and practical will provide a firm foundation for the offshore renewable energy industry for years to come. Therefore, it is essential that the MPDM Bill and all associated secondary legislation is enacted in line with the commitment in the PfG to "*Give cross-government priority to the drafting of the Marine Planning and Development Management Bill*" and ensure it is enacted by the end of March 2021.

4.3.1 Current Issues & Proposed Solutions

However, there are challenges relating to Heads of Bill within the General Scheme of the MPDM Bill that need to be addressed within the final version to ensure this new consenting legislation supports the delivery of the required amount of offshore wind to achieve 2030 targets.

- Planning Interest and Marine Area Consent should be amalgamated and front-ended similar to an agreement for lease used by the Crown Estate in the UK. This would allow for a more streamlined consenting process.
- An agreement for lease should be bound by specific milestones such as commencement of development work and the application for planning permission. These will be timebound, will require specific evidence and will be subject to extensions in certain instances.
- A seabed lease should be awarded for a minimum term of 60 years for offshore wind energy projects.
- Developers should be entitled to submit a further planning application if refused permission and to participate in a subsequent RESS auction (or equivalent route to market) if unsuccessful in an earlier auction.
- For survey works, clarification is required on who will make determinations and, so that the new system is more streamlined, certain survey activity should be permitted under a combined state consent (PI and MAC) / agreement for lease.
- A form of design envelope flexibility is required within the consenting process for offshore wind in Ireland to keep pace with a rapidly evolving technology.
- A 'one-stop-shop' for project consenting, similar to that available through Marine Scotland with the Marine Scotland Act (2010), should, in time, be considered for Ireland. This should not be at the expense of the delivery of earlier projects and would require adequate funding for a transitionary period.
- A planning application for all elements of an offshore wind farm project, whether located in the Maritime Area, Nearshore and/or on land, should be made to ABP in order to avoid duplication and multiple environmental assessments by different development consenting bodies. These should be dealt with in a timely fashion and be subject to defined statutory obligations, inclusive of pre-application scoping consultations.
- Engaging with communities regarding proposed wind energy developments should start as early as possible and the most efficient way to support the public participation process is to focus public participation on the planning consent phase of the process, subject to compliance with the Aarhus Convention.

In summary, there is more that can be done to streamline the consent process as outlined in the General Scheme of the Bill which will serve to improve project timelines to ensure 2030 targets can be fulfilled. More details are available in IWEA's MPDM Bill Position Paper[22], which is listed in the Appendix.

[22] https://www.iwea.com/images/files/20201014-iwea-mpdm-bill-position-paper-.pdf

4.4 PI4: ABP Resources for Average Decisions in 1.5 Years

With a new sector and a new consenting regime comes new demands for resources, particularly for the supporting agencies such as ABP and the National Parks and Wildlife Service (NPWS). These agencies will need additional budget to increase their capability to deal with offshore wind and ensure Ireland can remain on track to reach our 2030 target.

4.4.1 Current Issues

As part of the new MPDM Bill, the process will include projects applying to ABP for the onshore and offshore elements of the project alongside of a MAC, or leasing of the seabed, from the department responsible (DECC for offshore wind). This is a new process for Ireland and there will be a need to recruit and upskill across the relevant bodies at all levels of responsibility. Offshore wind is larger, more complex and in a unique environment compared to onshore renewable energy development. There is currently a shortage of resources specifically related to offshore wind energy development in the DECC, DHLGH and in ABP to process these applications and substantial investment in new personnel and skills is urgently required.

It is important that the DECC, DHLGH and ABP are aware of the volume and scale of offshore wind energy projects on the horizon. On average the capacity size of projects in the 16 GW pipeline is 700 MW with Figure 12 below indicating when this capacity expects to apply for consent.

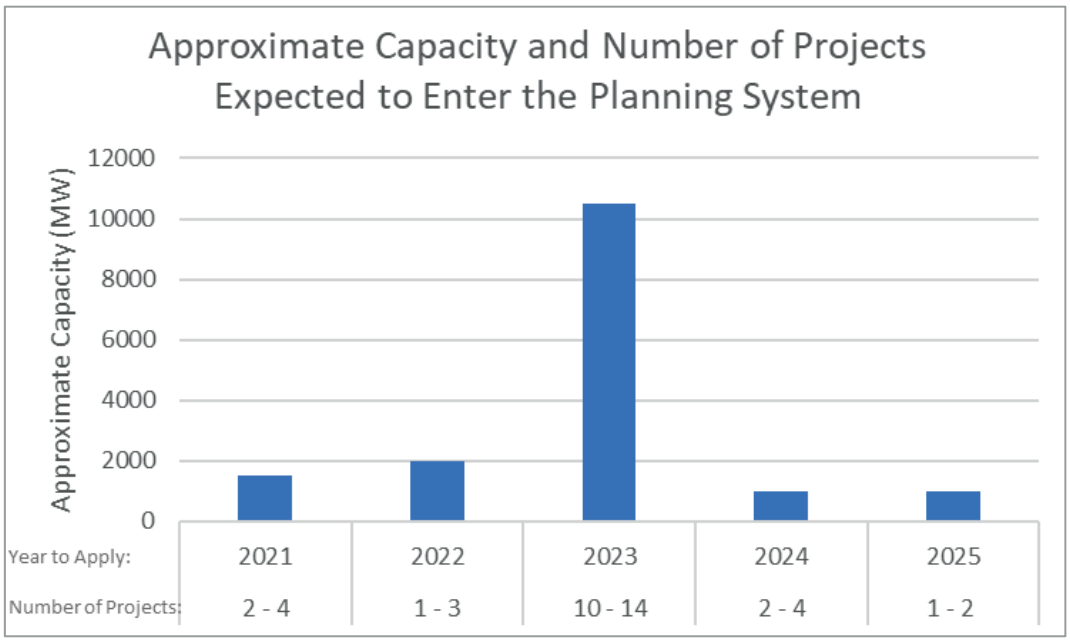

Figure 12: Approximate Offshore Wind Capacity Applying for Consent.[23]

Due to the scale of these offshore wind energy projects it is anticipated that Strategic Infrastructure Development (SID) provisions will be made to process the pipeline of applications. It is anticipated that each project application will be the equivalent of a large-scale SID with the need to deal with multiple applications in parallel. SID cases are already on the increase as outlined in Figure 13 so there is already a demand for additional resources before offshore wind even starts to add to this workload.

[23] https://iwea.com/images/IWEA-Onshore-and-Offshore-Wind-Pipeline-Report-August-2020-BLANK.pdf

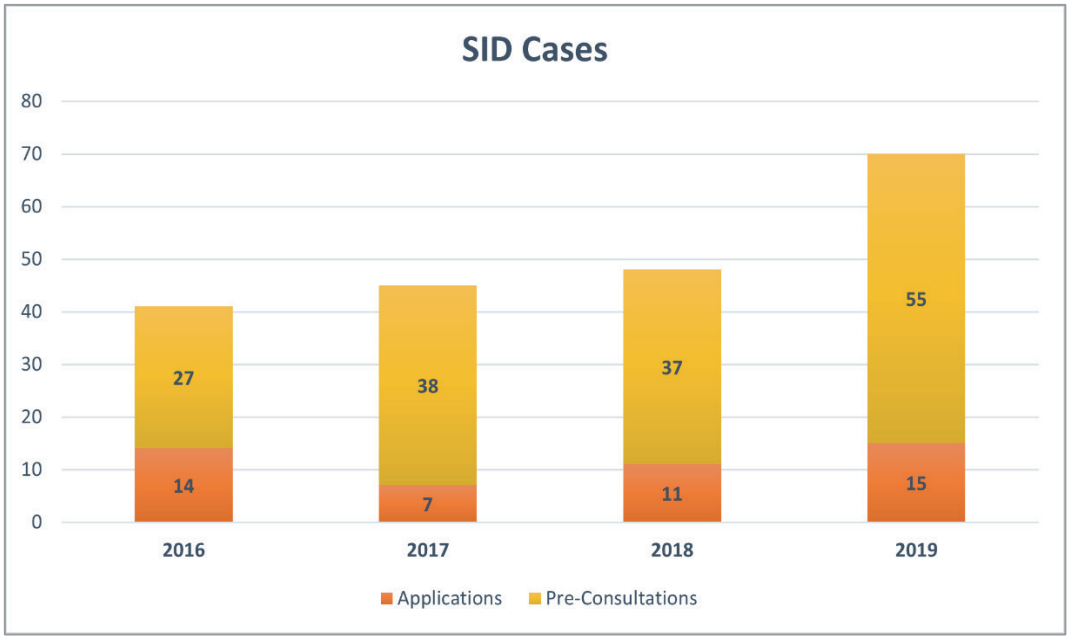

Figure 13: SID Cases from 2016-2019.

Furthermore, Figure 14 highlights the anticipated number of SID pre-planning engagements for both onshore and offshore wind out to 2025 with meaningful and formal engagements required to commence as soon as possible.

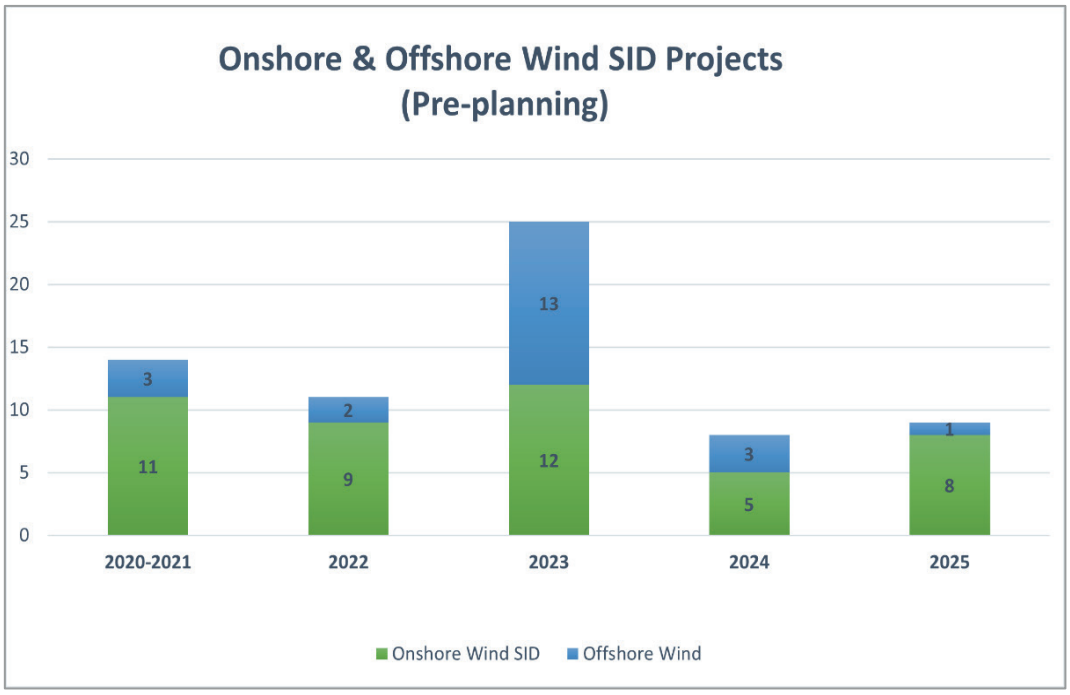

Figure 14: Anticipated number of SID pre-planning engagements for onshore and offshore wind to 2025.

4.4.2 Proposed Solution

Resourcing is key if the Government's future offshore wind energy ambitions are to be realised. There is an urgent need to recruit new planning inspectors, board members and an external panel of experts to ensure applications can be processed rapidly enough to enable Ireland to reach our 2030 targets.

EirWind's recent report[24] estimated that up to 30 new personnel need to be recruited to various Government departments and State agencies over the next 18-24 months to support the development of offshore renewables. The EirWind study recommends that a minimum of 10 staff within ABP should be dedicated to processing these applications. Both the DHLGH and DECC will need additional resourcing to ensure sufficient expertise and efficient marine planning and consenting processes going forward. It is also recommended that resources are provided to the statutory consultees to ensure proper consultation and to prevent challenges on nature conservation grounds creating lengthy delays. For this reason, the establishment of a coordinated scientific research and data collection programme is recommended to support the marine spatial planning and consenting processes. Figure 15 provides an overview of the various consenting steps.

It is recommended that a resource roadmap be developed for offshore wind immediately, with significant marine experience a primary focus, in advance of key legislation being enacted, so that the average planning decision for an offshore wind project can be made by ABP in 1.5 years.

IWEA's Consultation Response to the Department of Housing, Local Government and Heritage's Statement of Strategy 2021 – 2025 includes further reading in relation to the importance of adequate resourcing. A link to this is available in the Appendix.

[24] https://www.marei.ie/wp-content/uploads/2020/07/EirWind-Blueprint-July-2020.pdf

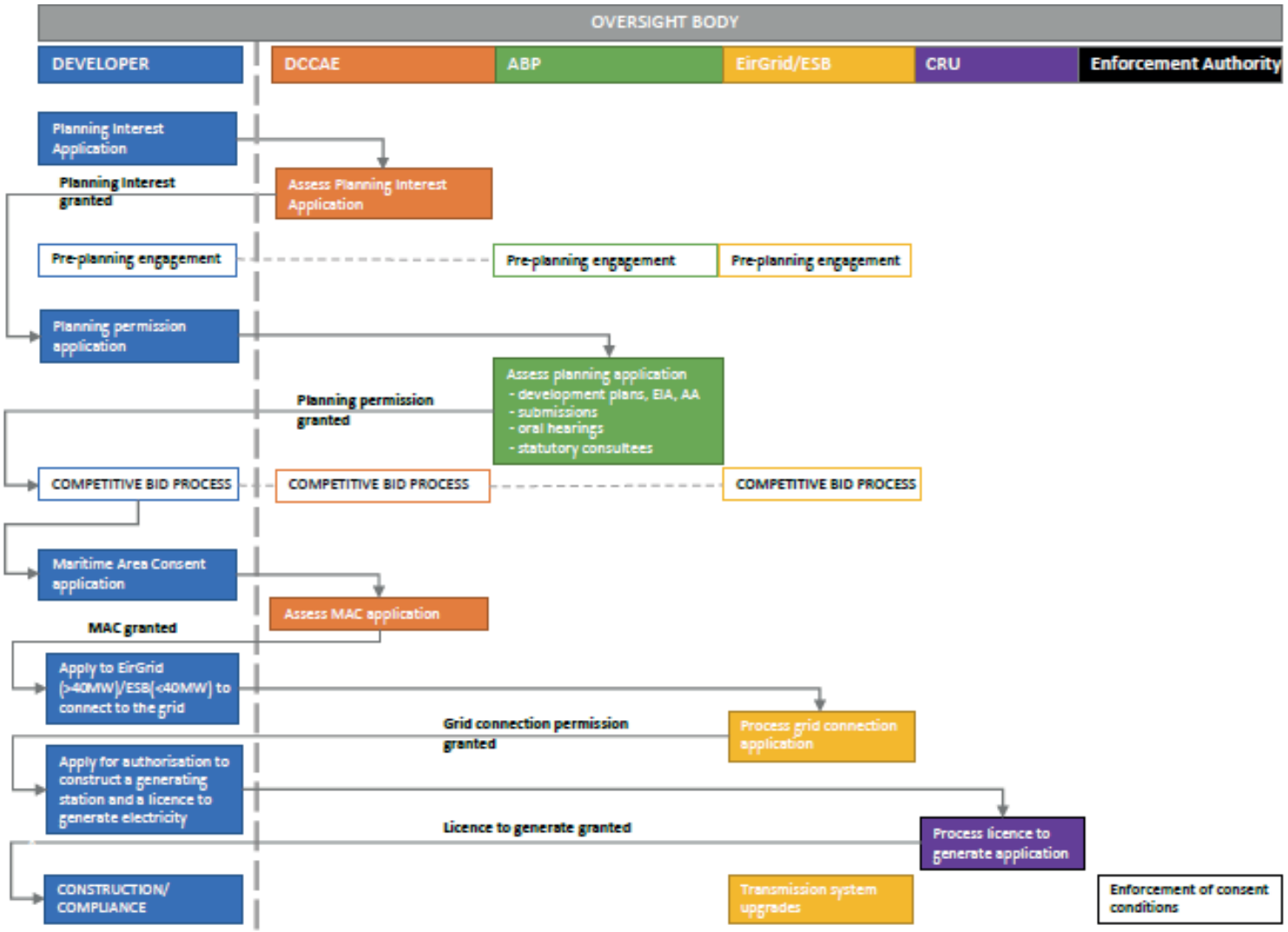

Figure 15: Process flow chart for the proposed consenting process under MPDM (EirWind, 2020)

4.5 PI5: Grid Offers and Consenting on Average is 1.5 Years

When developing an offshore wind farm, the grid connection from the wind farm to the electricity grid (which occurs at a substation) is another critical piece of infrastructure which needs to be constructed in parallel with the wind farm itself.

The project developer needs to work very closely with the SOs, EirGrid and ESB Networks, from a very early stage right up to the end of the development process to make sure that the grid connection progresses in parallel to the wind farm. Responsibilities for various parts of the grid connection development are shared across the developer and SOs, so if there is not a close collaboration here then long delays can occur. The first part of this interaction does not involve physical infrastructure but instead obtaining a 'grid offer' from the SOs outlining where the project will be allowed to connect to the electricity grid, how this will happen and how long this will take. A developer will also need to obtain consent or planning permission to build this connection once the connection offer has been issued.

4.5.1 Current Issues & Proposed Solutions

At present, since offshore wind is a new sector, there is a high risk that insufficient time and resources will be available to ensure that enough offshore wind generators obtain a grid offer and get consent for their grid connection in time to deliver for 2030. In this section, we highlight four key improvements that will need to occur to ensure that grid offers, and grid consenting, can be minimised on the critical path. These improvements are:

1. In June 2020, DECC published a consultation on four grid model options for offshore wind. A 'Developer-Led' hybrid of Option 1, with strategic components of Option 2, must be progressed as the grid delivery model in Ireland for all 2030 projects. A project must be classified as 'developer-led' at the commencement of EIA studies (e.g. in 2021) so this status is tied to the project (e.g. rather than the auction that the project enters) since such a fundamental change cannot be incorporated in the middle of the project development process (e.g. if a RESS auction is missed).
2. Enhanced collaboration between stakeholders is critical for grid offers.
3. There must be optimisation of onshore and offshore grid development for connection offers.
4. It must be possible to obtain consent for the grid connection at the same time as obtaining consent for the wind farm.

A short summary of each of these is provided in this section along with references to more extensive papers on each one. By implementing these improvements, the aim is to reduce the estimated time it will take to get a grid offer and the related consent for the grid connection to an average of 1.5 years in the *CAP/PfG Delivered* scenario, compared to 2.5 years in the *Baseline* scenario.

4.5.2 Grid must be implemented using a 'developer-led' approach

Offshore wind will play a crucial role in enabling Ireland to meet its 2030 renewable energy and decarbonisation targets, but only with a considered grid model which can facilitate the timely delivery of offshore wind by 2030. Close collaboration across all parties including the DECC, EirGrid, CRU, ESB Networks and industry will be vital to delivering progress in the coming decade.

A developer-led approach with close and continuous engagement with EirGrid and ESB Networks is required for all projects needed to contribute to 2030 targets. This approach would require a focus on the proactive development of the transmission system. For the existing pipeline of projects, offshore developers, already carrying out the necessary marine surveys, have significant experience in successfully delivering projects elsewhere and are best placed to consent and build the wind farms.

IWEA believes it would not be prudent to undo the positive momentum which has been created over recent years by signalling a pause in project development while a new, fully plan-led model for offshore grid is implemented, and EirGrid, along with a planning State Body, try to assess how best to conceive and attempt to deliver a fully plan-led approach by 2030.

IWEA's recent response to DECC's offshore grid models consultation[25] details how IWEA believes a hybrid solution which uses Option 1 and the strategic infrastructure development components of Option 2 is the correct model for delivering Ireland's 2030 targets for the following reasons:

- **Timelines for 2030:** Offshore wind must form a considerable percentage of the electricity system generation mix if Ireland is to achieve its 2030 renewable electricity targets. Options 1 and 2 are best suited to delivering this outcome. They would leverage the existing experience in project development and maximise the value of the work done to date to progress those projects which can deliver pre-2030. Progressing Option 3 or 4 in a pre-2030 timeframe would require significant changes to planning and grid connection legislation, the setting up of a State Body responsible for offshore site development and consenting and building up new teams of resources with very specialised skillsets within EirGrid, ESB Networks and the CRU. This would, in effect, be a decision to abandon the 2030 target for offshore wind energy given the current lead times for environmental analysis, consenting and construction of projects which would then subsequently follow.
- **Leveraging progress to date:** Allowing the developer to retain responsibility for the site selection, pre-development, consenting and construction of the wind farm and the offshore and onshore transmission connections, as outlined in Option 1, will ensure the quickest method of connecting offshore wind to the Irish grid. It leverages the progress which Phase 1 Projects and Phase 2 projects have made in their site selection, environmental analysis, and site optimisation work. It also does not require a fundamental shift in the regulatory landscape for Ireland's existing consenting or grid connection regimes, which would be necessary in the plan-led models suggested by Option 3 and 4.
- **Delivering value:** To improve project financeability and deliver the best value to the consumer it is important that the developer owns and operates the offshore connection assets for projects energising pre-2030. Uncertainty surrounding the contractual framework for guaranteed availability and operation & maintenance (O&M) of the cable asset, combined with the lack of a resource skillset or demonstrated track-record from the SOs of managing offshore generation infrastructure, mean that an owner/operator model for the offshore wind cable connections is the best model to de-risk project development, improve project financeability and deliver the best value to consumers in RESS auctions.
- **Future-proofing:** IWEA is supportive of future-proofing onshore substations built to connect both Phase 1 and Phase 2 Projects; however, IWEA does not see the requirement or need for blanket future-proofing of offshore connection assets which adds to project risks, costs and timelines for

[25] https://www.iwea.com/images/files/iwea-response-to-dccae-consultation-to-inform-a-grid-development-policy-for-offshore-wind-in-ireland.pdf

delivery, in the absence of a clear use for the assets. For example, additional offshore connection points do not need to be provided at the offshore wind platform if the capacity of the new offshore grid connection is already full due to the wind farm itself. Introducing such measures would introduce consenting risk and possibly lead to a requirement to update environmental assessments previously carried out. Continued engagement between the Government, SOs and industry will be essential to optimise the offshore grid connections, co-ordinate on offshore specifications, and develop both the onshore connection points and transmission system reinforcements required by EirGrid. This will ensure the transmission system can utilise the generation from offshore wind farms in the most optimal manner possible.

- **Developing onshore grid in parallel:** It will be critical to have parallel planning of onshore transmission system reinforcements alongside the development of the Phase 1 and Phase 2 Projects in order to ensure electricity generated from offshore wind can be exported as soon as the offshore projects connect to the transmission system. Grid capacity is a primary concern for the realisation of the Government's ambition for 5 GW of offshore wind by 2030, and it is only by allowing EirGrid and ESB Networks to progress the development of the grid as outlined in Option 2 that offshore wind can be delivered at minimum cost to the consumer and maximum efficiency. IWEA recommends that an updated version of EirGrid's East Coast Study is carried out immediately and expanded to the south and west coasts to include all projects that can deliver for 2030 and identify optimal connection points. Further details on the need for sufficient grid capacity and flexibility is set out in PI 8 in section 4.8.
- **Price Review 5:** Alongside the strategic planning of the transmission system, it is crucial that EirGrid and ESB Networks are provided with the budget and resources in the upcoming Price Review 5 decision to:
    - Deliver connection offers to the offshore projects in a timely manner;
    - Proactively plan the transmission system to allow for 5GW of offshore capacity by 2030;
    - Build and deliver the onshore reinforcements required by 2030 to facilitate 5GW of offshore capacity; and
    - Progress the development of the next phase of EirGrid's DS3 Programme to minimise constraint and curtailment for offshore projects and allow them to develop at the lowest cost to the consumer.
- **Remove minimum distance to shore:** IWEA strongly opposes the suggested inclusion of any 'minimum distance to shore' being introduced for offshore wind energy development in Ireland, as suggested in Option 2. The minimum distance to shore should be assessed locally, on a project-by-project basis through the EIA process and should take advantage of the best advances in seascape character assessment and visualisation tools. We believe such a proposition is the remit of the DHLGH, using vehicles such as the MPDM Bill, the NMPF and the MSP. None of these critical pieces of offshore consenting legislation referred to a minimum distance to shore during recent consultations.
- **Positive local relationships:** Community engagement and ensuring social acceptance is a critical part of infrastructure development. While there are advantages and disadvantages for each Option, we believe that Option 1 offers the best way forward for projects along the east and south coasts. It is the collective experience of our members from working on offshore wind energy projects in Europe and elsewhere that it is essential that project communications be tailored to the characteristics of the specific project and concerns that may exist in the community. There is no one-size-fits-all approach to community engagement and attempts to impose one will serve only to undermine social acceptance and to create tensions. We believe there may, instead, be a value in the appropriate State body or agency working with industry to produce a set of best

practice principles to ensure effective community engagement and to assist in securing social acceptance. This would have the important advantage of combining the experience of industry with the State's wider policy perspective in a practical manner. Secondly, we believe the State can play a crucial role in designing, coordinating, and delivering a sustained national awareness-raising campaign on the positive climate and economic contributions that will be made by offshore wind energy.

Should, for any reason, a centralised model be adopted as the long-term approach, a suitably long-term transitionary pathway must be considered which recognises the effect on the current development pipeline and future renewable energy targets. We would recommend a phased transition approach is taken to implement this, with substantial levels of industry consultation throughout this process. Work must begin immediately to provide enough certainty that this model could be introduced to support projects in the early 2030s onwards. IWEA does not envisage a centrally planned grid model being able to facilitate projects for the 2030 targets.

In summary, a developer-led model, leveraging the experience and expertise of international developers, with critical strategic onshore reinforcements the responsibility of EirGrid, is the only suitable option for the timely delivery of these 2030 targets. It allows parallel effort in ensuring timelines can be met, reflects each parties' inherent strengths, and makes the best use of available resources and expertise.

Note that for the purposes of this report, the assumption taken by IWEA is that a developer-led model such as Option 1, Option 2, or a combination of both, is the progressed pathway forward for offshore grid in Ireland to meet our 2030 target of 5GW installed capacity. Progressing with Option 3 or Option 4 would require a fundamental re-think to all of the remaining proposed PIs, and a re-examination of the maximum capacity of offshore wind capable of connecting to the grid before 2030, with this figure undoubtedly being substantially less than 5 GW.

4.5.3 Collaboration is critical for grid offers

Offshore connection policy should be developed in a collaborative manner with the CRU, EirGrid, ESB Networks and DECC. Continued engagement between the Government, industry and key stakeholders will be essential to the optimisation of offshore grid connections and the development of both onshore connection points and deep reinforcements required by EirGrid.

IWEA recommends that a stakeholder group is organised to hold regular group and bilateral meetings on the development of offshore connection policy (similar to the development of ECP-2 policy). Representatives from EirGrid, ESB Networks, DECC and the offshore industry should be included in the group meetings. These meetings may need to continue after the initial connection policy is agreed, possibly on a less regular basis, to address any ongoing or new issues on connection policy and to ensure the optimisation of connections with the continued development of the wider grid.

Similarly, once the projects enter into a delivery phase, there needs to be collaboration between the stakeholders on the delivery of grid connection works required for the connection and operation of the Phase 1 and Phase 2 Projects. To oversee and ensure the successful delivery of the grid connections and reinforcements for offshore projects it is proposed that a Delivery Management Board is established. This would be similar to the board established between EirGrid and ESB Networks for the delivery of the South West 220kV projects. There should also be representatives from CRU, DECC and the Phase 1 Projects on this board in the first instance, with the remit of the board expanded

to include Phase 2 Projects when appropriate. This board should report its progress under Action 25 of the Government's CAP. The Offshore Wind Industry Council (OWIC) in the UK is an example of such a successful model for the delivery of offshore wind in Great Britain.

IWEA's preferred option of Option 1, assumes that the offshore connections will be radial in nature in the near to medium term. The Phase 1 and Phase 2 Project developers acknowledge the need to be mindful of future offshore connections and transmission grid reinforcements when progressing connection design and all attempts will be made to minimise any possible sterilisation of routes for future grid. This will require close collaboration with the SOs and the CRU.

The connection offer process should allow collaboration between EirGrid and developers to ensure the optimum design of grid connections. The application process should allow developers and SOs to interact to jointly decide the optimum connection capacity/Maximum Export Capacity having regard to the capacity of the network to receive the power in the short, medium and long-term. EirGrid may be able to support this process with updated system studies additional to the East Coast Generation Opportunity Assessment that was published in February 2019. Existing connection policies such as phasing and temporary connections may need to be used to maximise the capacity of offshore projects that can connect at an early stage and also allow the full capacity of the project to be connected on a phased basis, if necessary. We would strongly recommend that EirGrid initiate similar analyses around the South and West coasts of Ireland to that carried out on the East Coast in order to better identify suitable onshore connection points where capacity is available.

4.5.4 Optimisation of onshore and offshore grid development for connection offers

IWEA members appreciate that there is the need for the efficient use of system capacity for the development of offshore renewables. The connection offer process and agreements need to strike a balance between:

a) the need to have legal certainty on the grid connection method, costs and timelines when bidding and securing a RESS contract;
b) the need to ensure grid capacity for offshore renewable projects is used efficiently; and
c) the need for commitments to execute connection offers including first-stage payment and bonds.

The form of the connection offer and agreement needs to appropriately address these competing requirements.

In relation to the development of hubs, this may be appropriate in the long-term where certain groups of projects are clustered, or where strong onshore nodes on the transmission system can be identified early and strengthened to facilitate these hubs. In particular, these hubs may be appropriate in 'space constrained' areas such as Dublin - potentially by strengthening stations such as Shellybanks, Poolbeg, North Wall, Carrickmines and Belcamp. On the south coast similar development and strengthening of suitable points such as Aghada, Great Island and Longpoint may be appropriate. While on the west coast, Moneypoint is a very strong node to utilise as part of the initial expansion of west coast offshore wind projects. The direct connection onto the 400 kV grid will allow for direct power injection from the west coast to load centres in north and south Dublin.

One of the primary benefits of optimising the onshore and offshore connection design lies in the supporting DS3 system services which offshore wind projects could provide to nodes in Ireland. By locating reactive power devices, possibly supplemented by synchronous condenser technology also, at the onshore connection point, the offshore project can provide much needed voltage support to many regions along Ireland's coast, along with inertia and synchronising torque through the

synchronous condensers. In particular, this could be a vital component of long-term system operation at times of 100 per cent renewable electricity on Ireland's power grid, and provide much needed system support for major towns and cities along Ireland's coasts which may otherwise require investment from fossil fuel generation.

We firmly believe that EirGrid needs to prioritise the development of onshore transmission assets and the associated transmission upgrades required for the connection and operation of both the Phase 1 Projects and the early-stage Phase 2 Projects. EirGrid must start the permitting process for the necessary onshore grid reinforcements in 2021 to facilitate the Phase 1 Projects. A similar exercise should be completed in 2021 and 2022 for the Phase 2 Project capacity which can be connected by 2030.

Given the lengthy delays in grid development in Ireland, the current model of only starting to proceed with a deep grid reinforcement for a project once the project's connection offer is signed and stage gate payments are made by the developer is no longer tenable. EirGrid and ESB Networks need to be supported with funding and resources from the Price Review 5 process to progress early with the consenting and development of these works. Experience from large clusters of onshore windfarms in regions such as the South-West has shown that the development by EirGrid of the grid connection assets, including reinforcements that impact on the shallow connection of the wind farms, was often the critical path for the delivery of the wind farms. Improvements and lessons learned from the development and delivery of other major transmission projects in recent years should be applied to these works. Positive examples of how EirGrid are improving the development process in projects, such as Intel's new 220kV substation, are included in the EirGrid Stakeholder Engagement Report 2019[26].

Further details on the criticality of sufficient onshore grid infrastructure are set out in PI8 in section 4.8.

4.5.5 Obtaining consent for the grid connection at the same time as obtaining consent for the wind farm

Under existing policy, only projects that have grid connection points relatively close to the wind farm and have relatively clear connection methods can include their grid connection in their planning application for the wind farm. Projects with longer connections along public roads cannot reasonably get the required private landowner consents (where the folio boundary extends to the centre of the road). This could be a particular challenge for offshore wind generators if they need to consent the offshore section of their connection through the MPDM process and separately need to progress the onshore section of their connection under the terrestrial planning regime. To overcome this, two specific changes to current policy are urgently required.

The first relates to the current requirements for lodging a planning application for a linear development along a public road, such as a wind farm grid connection, which falls under DHLGH. This submission process needs to allow a planning application to be lodged for both the wind farm and the grid connection even in a scenario where the grid connection is along a public road. This can be

[26] http://www.eirgridgroup.com/site-files/library/EirGrid/EirGrid-Stakeholder-Engagement-Report-2019-Final.pdf

facilitated by making specific changes to the Planning Regulations, which are outlined in the *Building Onshore Wind* report[27], or alternatively this could also be accounted for in the MPDM Bill discussed in section 4.3.

The second issue relates to the right to install utility services, such as wind farm grid connections, in or under a public road corridor, which is the responsibility of the CRU. It is important that a wind farm developer is granted the appropriate licences to install electricity cables along a public road where required by the CRU, in the same way that ESB Networks can do so. Again, the specific changes required to facilitate this are outlined in more detail in the *Building Onshore Wind* report.

In all of these circumstances it will also be important that EirGrid provide early certainty on the grid connection route to the project so that they can achieve consent for the grid connection route in parallel with the wind farm itself.

[27] https://www.iwea.com/images/files/iwea-building-onshore-wind-report-lr.pdf

4.6 PI6: Construct the Wind Farm and Grid Connection in 3 Years (including energisation)

Once projects have secured planning, a grid connection offer and a route-to-market (covered under PI 7 in section 4.7) the construction of the wind farm and delivery of the grid connection is typically the critical path to project energisation.

4.6.1 Current Issues & Proposed Solutions

In the following sections we highlight three key improvements that will need to occur to ensure that grid delivery timeframes can be minimised on the critical path. These are:

1. As outlined in section 4.5.2 of PI 5, it is vital that the grid delivery model chosen for Phase 1 and Phase 2 projects is a developer-led model. Under this scenario, the grid connections will be developed through a contestable build where the developer designs, constructs and manages the grid connection.
2. It will be important to the critical path for project energisation that connection works at the onshore substation are progressed by EirGrid and ESB Networks and ready for the offshore connection. Several improvements can be made to the existing process for delivering connections to streamline this.
3. Lastly, the appropriate application of new offshore specifications will be important to de-risking projects and delivering them at the lowest possible cost to the consumer.

4.6.2 Grid must be implemented using a 'developer-led' approach

In order to achieve the 5 GW PfG target by 2030, it is essential that a hybrid solution which uses Option 1 and the strategic infrastructure development components of Option 2 is the chosen grid model for delivering Ireland's 2030 targets. The detailed reasoning for why this is required is set out in section 4.5.2.

4.6.3 Grid Delivery

Traditionally for onshore renewables, once a project has secured planning, a grid connection offer and a route-to-market, non-contestable grid delivery is typically the critical path to project energisation. However, for offshore wind generation the delivery model is very likely to be through contestable connection works which will require parallel works by EirGrid and ESB Networks at the point of connection at the onshore substation.

The timeframe to finance, build and energise a wind farm after securing a route-to-market is assumed to take between 4-5 years in the *Baseline* scenario but this is reduced to 3 years in the *CAP/PfG Delivered* scenario.

If a developer-led grid delivery model is chosen, as IWEA recommends, then the majority of the grid delivery for the wind farm is likely to be the responsibility of the developer of the project up to the connection point at the onshore substation. The SOs will need to ensure that any required works at the connection point substation are completed in time for the wind farm connection. It is vital that there is close collaboration between the project developer and SOs to ensure this alignment takes places.

In this scenario, a 3-year grid delivery is unlikely to require major policy or regulatory change; however, there are several areas where policy improvements can ensure a 3-year timeline can be reliably met including:

- A more efficient ESBN and EirGrid Infrastructure Agreement mechanism could be introduced as IWEA recommends this could be improved upon through a review of the overall process and the inclusion of industry input.
- Reliable Delivery Programmes which provide sufficient detail and a contractual obligation to adhere to should be implemented. IWEA recommends that EirGrid and ESBN create a Project Development Support and Tracking Office to manage the delivery of these programmes.

More details on these are provided in in the *Building Onshore Wind* report.

4.6.4 Appropriate Cable Specifications where relevant must be in place

IWEA support a plan-led approach to onshore transmission reinforcement and future proofing of onshore substations built to connect both Phase 1 and Phase 2 Projects. However, IWEA does not see the requirement or need for blanket future-proofing of offshore transmission export cables and offshore substations. It is essential that projects which can deliver pre-2030 have control of the specification and timelines of offshore infrastructure if Ireland is to deliver 5 GW of offshore wind by 2030 as outlined in the PfG. Under a grid model with radial offshore connections, there is no benefit to EirGrid or ESBN setting specification requirements for the offshore cable and platform. This adds unnecessary costs onto project development and increases consenting risk for the projects. Blanket future proofing also creates a risk of developing stranded offshore assets which are over specified for the capacity which the project requires.

Regardless of the grid delivery model, appropriate connection design specifications will need to be in place for the onshore substation elements. This should be consulted upon in detail with industry and any future changes should also be subject to consultation. There are specific proposals for how this engagement and consultation should occur in section 4.8.2 of the *Building Onshore* report[28].

[28] https://www.iwea.com/images/files/iwea-building-onshore-wind-report-lr.pdf#page=78

4.7 PI7: Three RESS Auctions by 2025 with Sufficient Volume & Competition

The Renewable Electricity Support Scheme (RESS) has been introduced in Ireland to deliver renewable energy through a contract-for-difference auction system. The first RESS auction occurred in 2020, with successful projects for both onshore wind and solar, but it is anticipated that standalone auctions for offshore wind will be delivered from 2021 as per the CAP with Terms and Conditions (T&Cs) under development by the DECC at present. The timeline in Figure 16 outlines the department's target timeline for the delivery of these auctions. It should be recognised, however, that 6 months is not enough time to prepare bids for an offshore auction once T&Cs are published.

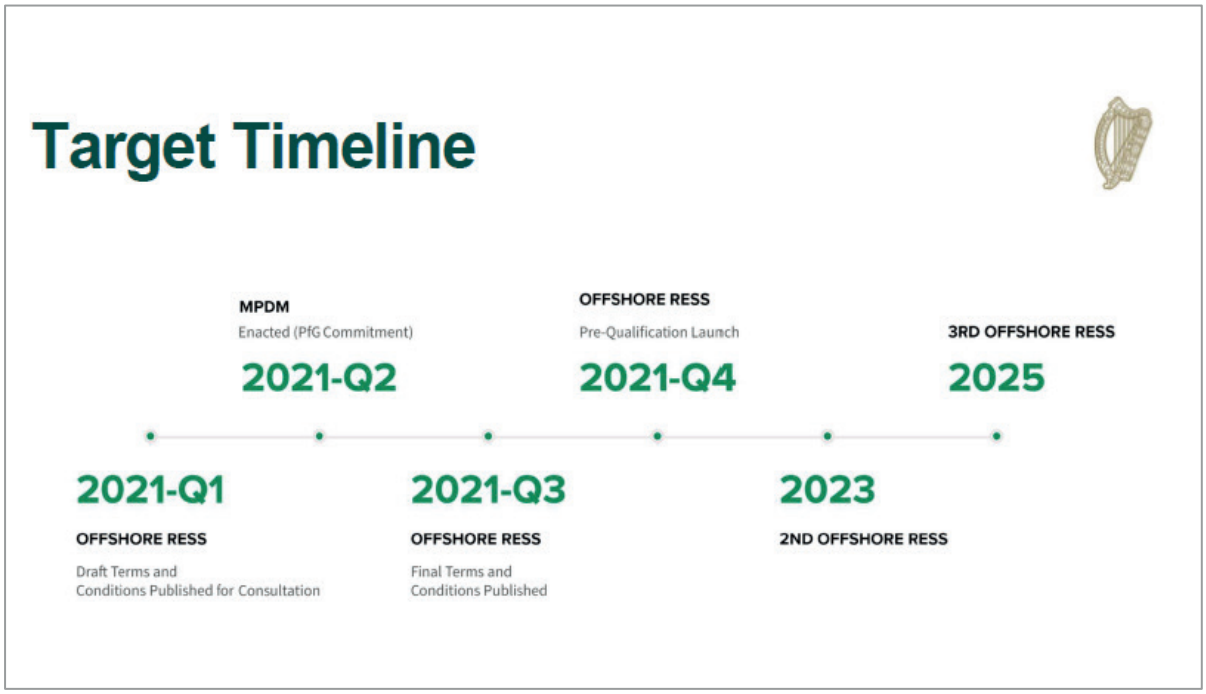

Figure 16: DECC target timeline for delivery of Offshore RESS auctions.

A well-designed RESS scheme should be aligned to the nature of larger-scale offshore projects alongside their associated consenting, grid and financing timelines, and the varying stages of development of Ireland's offshore pipeline.

While there are many similarities between onshore and offshore wind projects, there are also many differences, which means that some elements of a RESS auction design that are suitable for an onshore auction may be less suitable for an offshore auction. The increased scale and the resultant investment levels and development timelines, coupled with the nascent nature of the industry at present in Ireland and the developing regulatory framework, add to the uncertainty and risk involved with offshore projects in Ireland. These differences should be considered by the DECC when forming the design of an effective offshore RESS scheme.

4.7.1 Current Issues & Proposed Solutions

To facilitate a successful auction regime, the following items are key items that need to be addressed within the final Terms and Conditions which are due to be published in Q3 2021:

- **Offshore RESS auctions should be indexed**, which would allow projects to access a lower cost of capital, allocate inflation risk more appropriately and lead to lower RESS auction bids. This will benefit consumers and increase public support for offshore wind. Indexation is particularly pertinent for offshore projects, given the significant scale and investment involved in projects, and the vast outlays spent on operations and maintenance over the lifetime of projects. The first RESS auction which included onshore wind and solar power was not indexed, but IWEA recommends that going forward all RESS auctions are indexed for both onshore and offshore renewables.
- **Late delivery penalties should be limited to erosion of project value,** as erosion of support is sufficient incentive to ensure project delivery. IWEA does not believe performance bonds, as implemented in RESS 1, are appropriate for offshore auctions given the scale of projects. We would also welcome the opportunity to assist the department in setting reasonable and achievable interim milestones, aligned to the development timelines of offshore projects and taking account of the regulatory landscape in Ireland, that will ensure the timely delivery of offshore projects.
- **Constraint and curtailment compensation need to be provided for in the structure of the offshore RESS,** as set out in Article 13 of the Electricity Regulation of the Clean Energy Package (EU Regulation 2019/943). Where a RESS Project has achieved a market position, any subsequent re-dispatch for curtailment or constraint should be compensated accordingly up to the value of the 'financial support', i.e. the RESS strike price achieved by the generator.
- **The design of an offshore auction regime should make use of a Pay-as-Clear (uniform price) auction mechanism.** By making project developers' remuneration independent from their price bid, bidders are encouraged to disclose their actual costs, which should result in more efficient auctions and an optimal mix of RES-E capacity.
- **Finally, a greater level of interaction should take place between DECC and industry** on the most appropriate methods of progressing offshore RESS auctions to facilitate competitive auctions, to reach the 5 GW target outlined in the PfG, and to deliver value for the consumer overall, given the varying stages of development of the Phase 1 and Phase 2 Projects and the staggered way in which they may be expected to be ready for standalone offshore RESS auctions.

Outside of the design itself, **the timing of the auctions will be a particularly critical factor to ensure sufficient competition. The results in this study indicate that if all other PIs are implemented (i.e. PI1-6), then the timing and volume of the RESS auctions along with the grid capacity put in place (i.e. PI8) will then determine if it is 3.5 GW or 5 GW of offshore wind that is successful by 2030.** This is discussed in more detail when the results are presented in section 5.

Looking at the European experience with offshore wind projects, the lead-times from auction announcement to the assignment of contracts is normally two years, with another three to four years to energisation of the project. If offshore wind is to contribute to Ireland's 2030 targets for

renewable energy, it will be necessary for the initial roll out of offshore wind to allow more advanced projects to progress.

The Phase 1 and Phase 2 Projects are at various stages of development and this will need to be considered by DECC when considering the timing of RESS auctions. Uncertainties surrounding the timelines for the MPDM Bill, environmental analysis, grid connection certainty and timing, and the implementation of the MPDM offshore planning process in general, will mean that projects may have different planning durations depending on the particulars of a project.

Therefore, it is likely that both Phase 1 Projects, in the near term, and Phase 2 Projects, in the medium term, will be ready to enter auctions and move towards construction in a staggered way over the coming years.

As the market matures, and more projects complete the development process, it can be expected that there will be enough capacity ready at similar times to ensure adequate competition in regular offshore specific auctions.

In the meantime, there will be a need for DECC to make decisions over how to progress the RESS process to enable a critical mass of projects to compete in the first and subsequent offshore RESS Auctions and to facilitate competitive auctions.

There are a number of mechanisms available to DECC to ensure that competitive auctions can take place amongst a relatively small number of bidders. These include, amongst others, careful timing of auctions, choosing qualification criteria to allow the participation of a greater number of offshore projects, the use of preference categories in a technology neutral auction similar to those identified in the RESS1 T&Cs for solar and community projects, applying an evaluation correction factor (ECF) to offshore wind projects and adjusting the competition ratios for the auction.

IWEA notes the department's recent announcement that they are considering allowing projects without full planning permission to participate in early RESS auctions. Whilst IWEA sees the benefits in a mechanism like this being implemented to help improve project timelines through the paralleling of consent and RESS hurdles, there are inherent risks associated with this for projects. IWEA would welcome further engagement on this with DECC before a final set of criteria is put in place.

More details are available in IWEA's Position Paper on an Offshore Wind RESS Scheme Design which is listed in the Appendix.

4.8 PI8: Sufficient Grid Capacity & Flexibility

As mentioned in the previous section, the results in this study indicate that if all other PIs are implemented (i.e. PI1-6), then the timing and volume of the RESS auctions (PI7) along with this PI related to grid capacity will determine if it is 3.5 GW or 5 GW of offshore wind that is successful by 2030.

IWEA has developed a comprehensive report as part of the 70by30 Implementation Plan titled *Saving Power* (Figure 17) which sets out how we can minimise dispatch down and maximise the use of renewable electricity on our grid by 2030.

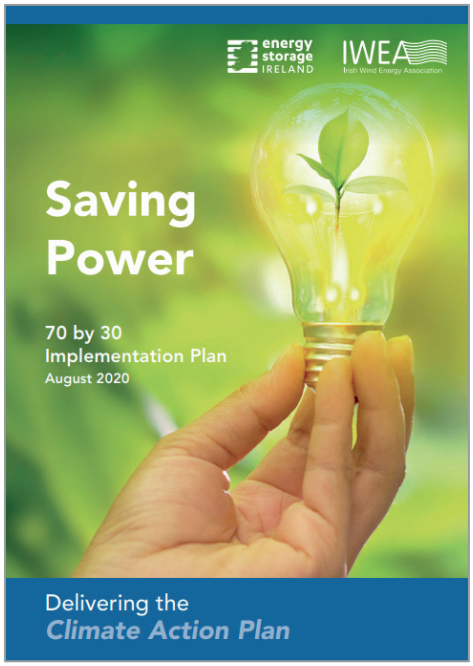

Figure 17: IWEA's Saving Power Report, released as part of the 70by30 Implementation Plan

The report outlines PIs to minimise constraints and curtailment of renewable generation in areas such as grid capacity and system flexibility. A summary of the PIs is outlined in the next two sub-sections but we would recommend reading the full Saving Power report for a full description of the issues and potential solutions.

4.8.1 Grid Capacity

This is discussed in more detail when the results are presented in Chapter 5, but briefly, EirGrid's East Coast Study indicates there is ~1.5GW of offshore wind capacity on the East coast of Ireland without any significant transmission capacity expansion. This highlights the need for significant grid reinforcements. Moreover, as highlighted above, the PfG's target of 5 GW will put even more pressure on EirGrid to facilitate the reinforcements required in a timely and reliable manner.

Considering the pipeline of offshore wind projects under development and the recent timelines needed to deliver grid infrastructure, e.g. at least 10-15 years for a new transmission line, it is clear that the current method of delivering large-scale network reinforcements will need to be improved and mechanisms introduced to ensure the most efficient use of existing grid capacity. If the System Operators take the traditional approach of only beginning to examine grid reinforcement options once a generator project has been consented or a new generation customer has signed a connection offer,

this will mean the new generator is likely to be operational for several years before any grid reinforcement materialises.

This is likely to result in high constraints being incurred by the generator which will mean significant volumes of renewable energy cannot be used. This will also affect the commercial viability of projects entering the development pipeline, as some projects may not be able to connect to the system until the relevant grid reinforcements are in place, which could take several years. This will lead to higher costs to the consumer as developers will price anticipated constraint levels into their RESS bids, or simply choose not to enter auctions until such time as they can make competitive bids.

Therefore, it is imperative that EirGrid begins to design and consent grid reinforcement projects at an early stage based on the volumes and locations of the future offshore pipeline and progress these projects in parallel with renewable project development. ESBN and EirGrid should also, where possible, introduce measures to ensure the most efficient use of existing grid capacity such as dynamic line ratings, Smart Wires and network solutions such as energy storage and demand side response. The aim here is to minimise constraint levels for existing and new renewable generation, and maximise the number of renewable projects able to connect to the grid without delay by ensuring sufficient grid capacity is in place.

Grid capacity is a primary concern for the realisation of the Government's ambition for 5 GW of offshore wind by 2030, and it is only by allowing EirGrid and ESB Networks to progress the development of the grid as outlined in Option 2 that offshore wind can be delivered at minimum cost and maximum efficiency for the consumer.

IWEA therefore recommend that an updated version of EirGrid's East Coast Study is carried out immediately and expanded to the south and west coasts to include all projects that can deliver for 2030 and identify optimal connection points.

To deliver the required grid reinforcements, the SOs will need adequate resources, in terms of the development and operating spend required for the design and consenting of grid reinforcement solutions, and the capital spend required for new network build to deliver the required grid reinforcements. Incentives must also be placed on the SOs to ensure they are progressing the required grid solutions in a timeframe that will allow the delivery of our offshore targets. If these resources or incentives are not provided for by the CRU in the SOs' cost recovery mechanisms and regulatory framework, then the SOs will not be able to deliver the necessary grid infrastructure. It is therefore important that the CRU supports the approach of developing grid reinforcements based on the strength of the renewable pipeline via adequate funding and incentivisation of the SOs in frameworks such as PR5.

4.8.2 System Flexibility

As well as delivering sufficient grid capacity it is also essential that the electricity system has the necessary flexibility and capability to manage increasing volumes of renewable generation and minimise renewable curtailment. The *Saving Power* report has identified three measures that will help minimise the level of curtailment out to 2030 and beyond. These can be summarised as follows:

1. Develop the DS3+ programme to relieve existing operational constraints in line with EirGrid's strategic objectives to run the system with up to 95% non-synchronous generation.
2. Deliver the Greenlink Interconnector by 2023 and Celtic Interconnector by 2026 to allow an export market for increased renewable generation and develop an enduring interconnection policy regime by Q4 2020.
3. Enhance interconnector operation by introducing market changes such as continuous intraday coupling with other European markets so that the interconnectors are more flexible and able to export approximately 90% of their capacity during curtailment events.

5 *CAP/PfG Delivered* Analysis

Each of the PIs in the previous chapter will speed up the development process for offshore wind in Ireland. In this chapter, this PIs are added to the *Baseline* scenario to create new timelines for offshore wind development under a scenario called the ***Climate Action Plan / Programme for Government (CAP/PfG) Delivered* scenario**.

5.1 *CAP/PfG Delivered* Scenario Timelines after all PIs are Included

Table 6Table 6, below, outlines the main assumptions made for the *CAP/PfG Delivered* scenario around attrition, success rates etc. compared to the Baseline scenario. It can be seen that in general attrition rates are lower, success rates are higher, and timelines are shortened which reflects more facilitative policy and processes, improved resourcing or increased certainty for developers.

Table 7Table 7 outlines how the PIs are modelled in the Offshore i-PAT for the *CAP/PfG Delivered* scenario compared to the *Baseline*. The overall resulting timelines for Phase 1 and Phase 2 Projects are presented in Figure 188 and Figure 19 respectively.

It is important to note that **the timelines below are not specific to individual projects** and instead are indicative timelines that a Phase 1 or Phase 2 Project is likely to experience. Individual projects will very likely have unique circumstances which may accelerate or delay the steps presented in the timelines below.

With these PIs, the *CAP/PfG Delivered* scenario enables a typical Phase 1 Project to potentially deliver in 2026 (see Figure 18) and a Phase 2 Project to deliver in 2027 (see Figure 19). Importantly, this means that both Phase 1 and Phase 2 Projects can contribute to Ireland's 2030 targets which is critical, since this is the only way that the CAP/PfG ambitions can be met. Also, it is important to note that the modelling here assumes typical project timelines so project specific conditions may mean that a project is slightly faster or slower than the timelines used here.

Table 6: Model Assumptions in the *Baseline* and *CAP/PfG Delivered* scenarios.

	Baseline		CAP/PfG Delivered	
	Phase 1	Phase 2	Phase 1	Phase 2
Planning				
Pre-Planning Attrition	20%	30%	0%	25%
Planning Success Rate	60%	60%	75%	75%
Maximum Projects ABP can process per Year	5		7	
Tier 1 duration[29]	2 years		1 year	
Tier 2 duration	3 years		2 years	
Route to Market				
Pre-Auction Attrition	15%	15%	0%	15%
Percentage of losing capacity going to next RESS	50%	50%	100%	66%
RESS Auctions	2024, 2027		2022, 2024, 2025	
Auction Capacity Limit	2 GW		No limit	2 GW
RESS Competition Ratio	1.7		1.25	1.5
Grid Offer and Consenting				
Tier 1 duration	2 years		1 year	
Tier 2 duration	3 years		2 years	
FID, Wind Farm and Grid Delivery				
Phase 1 of construction before energisation begins	3 Years		2 Years	
Phase 2 of construction (with energisation in parallel)	1 Year		1 Year	

[29] To account for likely differences in the timelines for the progression of projects due to unforeseen delays, it is assumed that projects pass through the consenting and grid stages in a tiered approach, with 50% of capacity passing through the relevant stage in the quicker 'tier 1 duration' and the remining capacity progressing in the delayed 'tier 2 duration'.

Table 7: Modelling Assumptions in the *Baseline* and *CAP/PfG Delivered* Scenarios.

Area	Key Areas on the Critical Path	Modelling assumption in *Baseline* Scenario	Modelling Assumption in *CAP/PfG Delivered* Scenario
Planning	PI1: Foreshore Licences & Exclusivity	All Phase 1 Projects obtain foreshore licences & exclusivity before Q1 2021 and all Phase 2 Projects before Q1 2022.	All Phase 1 and Phase 2 Projects which can deliver before 2030 obtain foreshore licenses & exclusivity before Q1 2021.
	PI2: NMPF	Phase 1 Projects can apply for development consent and Phase 2 Projects can receive planning interest from Q4 2021	Phase 1 Projects can apply for development consent and Phase 2 Projects can receive planning interest from Q1 2021
	PI3: MPDM		
	PI4: ABP Planning Resources	Decisions on planning consent by ABP take 2 Years for 50% of projects & 3 years for the remaining 50%	Decisions on planning consent by ABP take 1 Year for 50% of projects & 2 years for the remaining 50%
Grid for the Project	PI5: Grid Offers & Consenting	This process takes 2 years for 50% of projects and 3 years for the remaining 50%	This process takes 1 year for 50% of projects and 2 years for 50%
	PI6: Grid (and wind farm) Delivery	Finance and build period of 4 to 5 years for the grid and wind farm	Finance and build period of 3 years for the grid and wind farm
Route to Market	PI7: RESS	Only 2 Offshore RESS auctions occur in 2024 and 2027 due to delays, with a 2 GW limit on each	3 offshore auctions of ambitious volume take place by 2025 to facilitate reaching the 2030 targets
Grid Capacity	PI8: Grid Capacity	Not modelled in the report but discussed in section and elaborated upon in detail in a dedicated report called *Saving Power*, which is listed in the Appendix.	

Phase 1 Project Timeline to Deliver the CAP/PfG Targets:

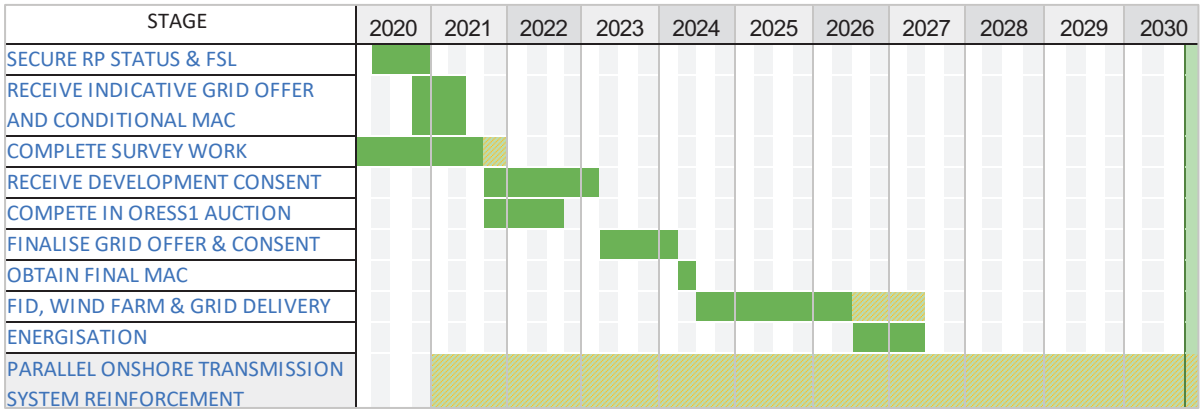

Figure 18: *CAP/PfG Delivered* timeline assumed for Phase 1 Projects. Important note: This is a generic timeline and does not reflect an individual project which can be very different. The timeline begins in 2020 but not all projects will start at this point so Offshore i-PAT accounts for this based on the status of the pipeline that was presented earlier in Figure 7. As the policy and regulatory framework for offshore wind is still in development these steps and timelines are very likely to change.

Phase 2 Project Timeline to Deliver the CAP/PfG Targets:

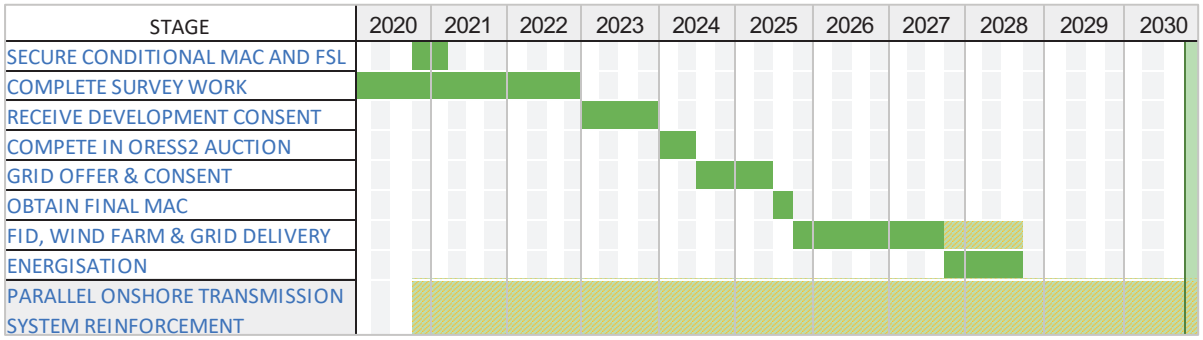

Figure 19: *CAP/PfG Delivered* timeline assumed for Phase 2 Projects. This is a generic timeline and does not reflect an individual project which can be very different. The timeline begins in 2020 but not all projects will start at this point so Offshore i-PAT accounts for this based on the status of the pipeline that was presented earlier in Figure 7. As the policy and regulatory framework for offshore wind is still in development these steps and timelines are very likely to change.

5.2 *CAP/PfG Delivered* Scenario Results

When the improved timelines are added to the Offshore i-PAT tool, then it is possible to deliver just over 5,000 MW of offshore wind by 2030 with the current pipeline that is in development.

As presented in Figure 20 and Table 8, the first six steps will all be required regardless of which ambition is required, either the 3.5 GW ambition in the CAP or the 5 GW ambition in the PfG. As a reminder, these are:

- PI1: Issue Foreshore Licences and exclusivity for the seabed to all 2030 projects by Q4 2021;
- PI2: Complete the National Marine Planning Framework by Q4 2020;
- PI3: Enact the Marine Planning and Development Management Bill by Q1 2021;
- PI4: An Bord Pleanála will need sufficient resources so they can make decisions on offshore wind planning applications in 1.5 years on average;
- PI5: EirGrid and An Bord Pleanála need to engage with projects from the outset so projects can get a final grid offer and consent for a grid connection within 1.5 years on average after a RESS auction;
- PI6: Financial close and construction of the wind farm and grid connection should take 3 years or less (including energisation)

Even with these in place, the current pipeline will be just short of 3,000 MW by 2030 as there is not enough capacity available in the two RESS auctions that are assumed to take place by 2025. Hence a third auction will be necessary, which combined with a sufficient volume of projects coming through due to all other PIs being delivered, also means that the PfG ambition can be met. This leads us to PI7, below:

- PI7: Three RESS auctions need to occur by 2025 with sufficient volumes and competition

However, it is important to emphasise that to meet our PfG 5 GW target, all eight PIs proposed here must be delivered, all of which have very challenging timelines. The majority of the capacity is also coming online in the second half of the decade (Figure 21), so time slippages could result in hundreds and even thousands of megawatts being lost. The last improvement, PI8, is potentially the most challenging and has not been modelled explicitly in Offshore i-PAT, which is:

- PI8: Work must commence immediately on strengthening the capacity and flexibility of the grid to accommodate 5 GW of offshore wind by 2030.

EirGrid's East Coast Generation Opportunity Assessment[30] study suggests that there is 1.5-2 GW of capacity available on the east coast for offshore wind, which means that without major upgrades it will not be possible to meet the 5 GW ambition in the PfG. Effectively, if no improvements are made here there would be a cut off upper limit of 1.5-2 GW of offshore capacity that could be developed by 2030.

Work is currently underway by EirGrid as part of their 'Power System Vision 2030' to establish how the grid can evolve in terms of capacity, operations and market design between now and 2030 so the results of this work are required urgently, followed by a rapid transition to implementation.

[30] http://www.eirgridgroup.com/site-files/library/EirGrid/East-Coast-Generation-Opportunity-Assessment.pdf

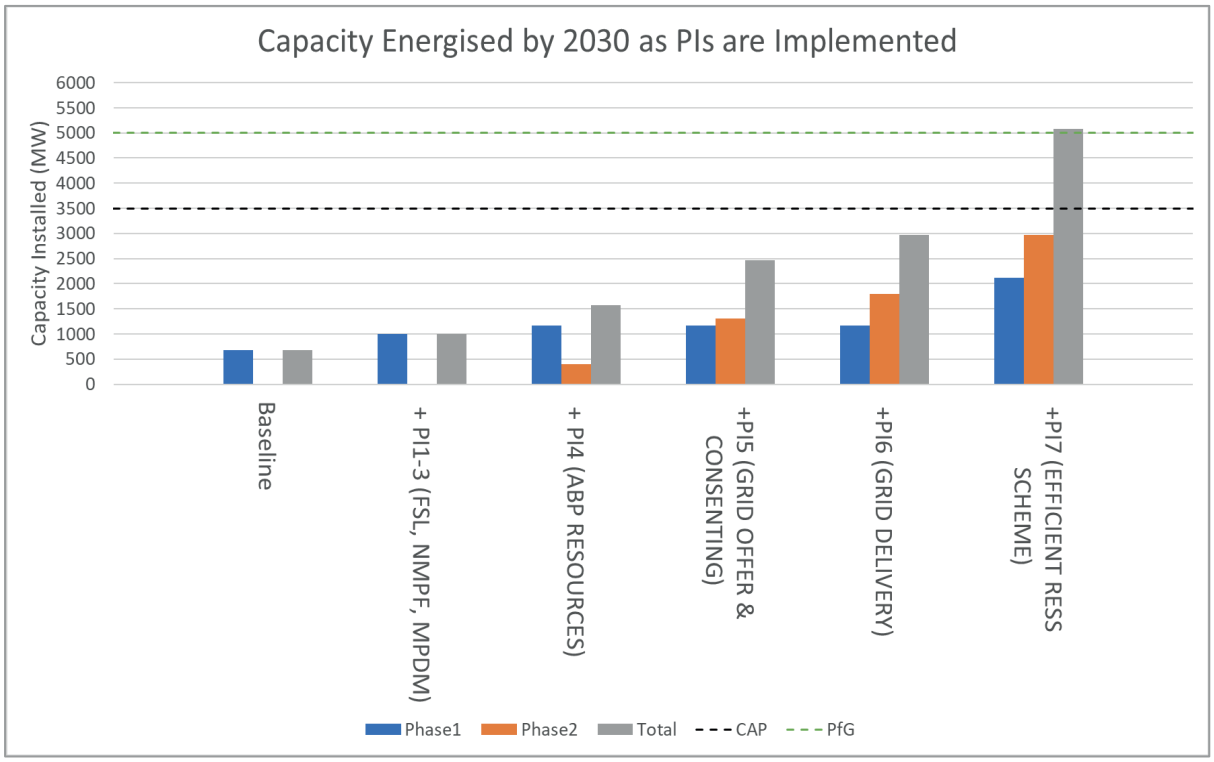

Figure 20: Offshore wind energised by 2030 under the *Baseline* scenario along with the additional capacity as each Policy Improvement is implemented. It is important to note that PI8 in relation to Grid Capacity is not modelled explicitly here but instead is discussed in section 4.8 and since it is the most challenging PI to deliver before 2030, a separate volume of the 70by30 Implementation Plan, *Saving Power*, is dedicated soley to PI8.[31]

Table 8: Capacity energised by 2030 as PIs are implemented and impact of each Policy Improvement. These results should not be mistaken as a prediction of what will appear in individual Phases or RESS auctions as the model is based on a specific set of assumptions which are very likely to change. However, the results do signify the urgency required and the important contribution of both Phase 1 and Phase 2 Projects to deliver the target of 5 GW by 2030.

Policy Improvement	Capacity for 2030 (MW)			
	Phase 1	Phase 2	Total	Addition
Baseline	674	0	674	-
+ PI1-3 (FSL, NMPF, MPDM)	1004	0	1004	330
+ PI4 (ABP RESOURCES)	1172	394	1566	562
+PI5 (GRID OFFER & CONSENTING)	1172	1300	2472	906
+PI6 (GRID DELIVERY)	1172	1800	2972	500
+PI7 (EFFICIENT RESS SCHEME)	2118	2966	5085	2112

[31] https://iwea.com/latest-news/4453-lost-renewable-energy-enough-to-power-galway-for-a-year

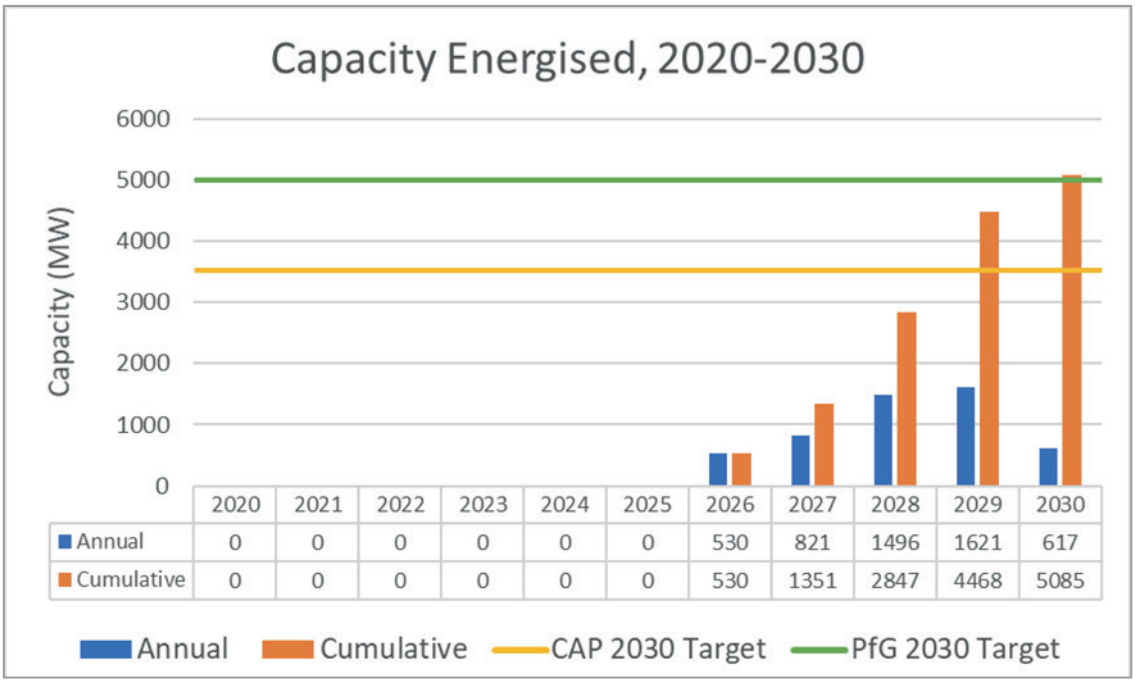

Figure 21: Offshore wind energised each year between 2020 and 2030 under the *CAP/PfG Delivered* scenario.

6 Implementing the Policy Improvements

There is currently huge momentum building for offshore wind in Ireland, which is very welcome, but the scale of the challenge means that we will need more. To help progress the critical PIs identified in this study as soon as possible, Table 9 gives an overview of the lead stakeholder and next step required for each one, with the aim to aid as much progress as possible across all key areas as soon as possible to ensure that offshore wind start making a major contribution to climate action in Ireland.

Table 9: Summary of Policy Improvements required to delivery 3.5-5 GW of offshore wind by 2030 along with those responsible and the next step (each PI is described in detail in separate sections of chapter 4).

Policy Improvement (PI)	Brief Description of What's Needed	Lead	Supporting Role	Next Step	Target Date	Additional Capacity in 2030 vs *Baseline* scenario of 674 MW*
PI1: Obtain Foreshore Licences by Q4 2021	A planning application typically requires at least two years of environmental surveys, but these can only be completed once a project has a foreshore licence, so any project that has to be delivered before 2030 must have a licence by 2021.	DHLGH	DECC, DPER	Ensure sufficient resources are available to issue foreshore licences for all projects that can deliver pre-2030.	Q4 2021	Not Modelled
PI2: Complete National Marine Planning Framework by Q4 2020	The National Marine Planning Framework should be finalised and in place by Q4 2020 so projects can apply for consent through the MPDM in 2021	DHLGH	DECC	Conclude National Marine Planning Framework consultation by updating based on feedback received.	Q4 2020	+330 MW
PI3: Enact MPDM Bill by Q1 2021	The MPDM and all secondary legislation must be enacted by Q1 2021 to allow Phase 1 Projects to progress and Phase 2 Projects to enter the consent process	DHLGH	DECC	Complete pre-legislative scrutiny of the General Scheme before the end of the year and prioritise the final Bill for passage in early 2021. Progress Secondary Legislation and Offshore Guidelines.	Q1 2021	
PI4: ABP Planning Resources and Decision Timelines	An Bord Pleanála must be sufficiently resourced to process the significant number of projects that will apply for planning consent over the next number of years in a timely manner	ABP, DHLGH	DPER	Add at least 10 new people to ABP with appropriate skillsets for offshore wind & begin engaging with offshore projects. ABP should have statutory timelines for planning decisions.	Q4 2020	+562 MW

IMPLEMENTING THE POLICY IMPROVEMENTS

Policy Improvement (PI)	Brief Description of What's Needed	Lead	Supporting Role	Next Step	Target Date	Additional Capacity in 2030 vs BASE scenario of 674 MW*
PI5: Grid Offers & Consenting	A decentralised, developer-led grid delivery model involving early engagement with An Bord Pleanála and EirGrid must be put in place to facilitate parallel wind farm and grid consenting. Phase 1 & 2 Projects need clarity on how their offers will be progressed.	Decentralise Grid: DECC Offers: CRU/ EirGrid	ABP	DECC to use a developer-Led Option 1/2 Offshore Grid Delivery Model. CRU to put in place grid offer process for Phase 1 & 2 Projects. EirGrid to process offers.	Q4 2020	+906 MW
PI6: Grid Delivery	Sufficient resourcing must be in place so that non-contestable grid delivery does not delay projects from commissioning. Appropriate cable functional specifications are also vital.	CRU	ESBN, EirGrid	Sufficient resources and incentives in PR5 to deliver project grid connections in a timely and cost-effective manner.	Q1 2021	+500 MW
PI7: RESS	An efficient RESS scheme must be put in place for offshore wind to maximise the capacity that can be achieved by 2030.	DECC	CRU, EirGrid	First Offshore RESS (O-RESS) auction as soon as possible with sufficient volumes auctioned by 2025 to meet the 2030 targets.	Q4 2021	+2,112 MW
PI8: Grid Capacity (note: IWEA's *Saving Power* report is dedicated to this issue)	The design, consent and construction of the appropriate network reinforcement for the east coast must be carried out as quickly as possible and on the south and west coasts to facilitate post-2030 projects.	EirGrid, CRU	ESBN	EirGrid to publish Power Systems Vision 2030 indicating what is required for 2030. CRU to ensure EirGrid and ESBN have the resources necessary in PR5 to deliver the grid required. EirGrid & industry to engage on the development of an 'All-Island Grid Capacity Forum'	Q4 2020	Modelled in *Saving Power* report and not this study. Offshore wind limited to ~2000 MW without this PI.[32]

*While some earlier PIs appear to have a relatively small impact on their own on capacity energised by 2030, they ensure the impact of implementing later PIs is maximised (the PIs are added to the model one-by-one, starting from the *Baseline* scenario). Also, for some, the impact is small as the difference between the *Baseline* and *CAP/PfG Delivered* scenario is a delay in the PI being implemented. These PIs are necessary for offshore wind projects to be developed and if they were to never materialise, it would result in no offshore wind rather than just the impact identified here due to a delay.

[32] https://iwea.com/latest-news/4453-lost-renewable-energy-enough-to-power-galway-for-a-year

7 Building an Offshore Wind Supply Chain in Ireland

Over the next ten years Ireland will connect a new generation of offshore wind farms, providing enormous amounts of clean energy to power homes, farms and businesses. This will accelerate the ongoing decline in CO2 emissions from the electricity sector and drastically cut Ireland's bill for foreign fossil fuel imports.

Offshore wind energy is at the heart of the CAP's ambition to cut CO2 emissions in the electricity sector by two-thirds and increase the renewable energy share of electricity demand to 70 per cent by 2030 from its current 35 per cent. Already Ireland has an offshore wind energy pipeline of approximately 16 GW (see Figure 6) at various stages of development, enough to supply more than Ireland's electricity needs. Beyond 2030, as the costs of developing and connecting floating offshore wind energy continue to fall, progress towards a net-zero electricity system will become unstoppable. With the necessary levels of interconnection there is no reason why Ireland's offshore wind industry cannot provide increasing amounts of power to its neighbours, turning Ireland into a consistent net energy exporter for the first time in line with the PfG ambition to export 30 GW.

The technology, the resources, the skills and the commitment from industry and policymakers to achieve all of this is – finally – beginning to fall into place. The momentum provided by the CAP is driving planning and investment from industry alongside the necessary policy development and strategic thinking required from Government.

However, as the path to a new indigenous Irish energy industry becomes clearer, so do unanswered questions prompting concerns that Ireland may – again – miss an opportunity. Delivering just the 3.5 GW of offshore wind energy required under the CAP will require an initial investment worth €8.6 billion, create thousands of jobs in planning, development and construction and hundreds of long-term jobs in operations and maintenance.

For the Beatrice offshore wind farm in Scotland, approximately 1,500 people were employed during construction with the creation of approximately 90 full time and local roles for the duration of its 25-year lifespan.

But where will that money go? At best, Irish firms would be able to attract only 22 per cent of the lifetime multi-billion-euro investment. From where will wind farm developers find the workers needed to see these projects through to the end when there are substantial skills shortages in engineering, financial services, logistics and technical expertise?

Unless investment is provided – either from the Government or the private sector – not a single port in the Republic of Ireland will be capable of servicing the requirements to install an offshore wind farm. In the short-term Belfast port can service some projects on the East coast but due to the scale of offshore development required in Ireland, additional port infrastructure will also be needed.

Ireland has neither the infrastructure nor the resource capacity to capture the benefits of the coming energy revolution and this creates a question-mark over Ireland's ability to develop the 5 GW it needs by 2030 to deliver in the PfG. Ireland is also competing against both larger and/or more mature global markets (UK, Europe, USA, Taiwan) for turbines, vessels, contractors and other parts of the supply chain. The market in Ireland needs to move swiftly in line with commitments in CAP, to reinforce this confidence and to ensure that developers can secure access to the global supply chain.

Unless the very few years available - before construction starts on our first offshore wind farms since 2004 - are used to develop and support a strong Irish supply chain, many of the social and economic benefits created by this new industry will go outside of Ireland.

There is still time to act, but none to lose.

IWEA commissioned the Carbon Trust to carry out a supply chain study for offshore wind in Ireland, *Harnessing our potential*. This report is a detailed analysis of the opportunities Ireland faces in building an offshore wind energy supply chain.

And while it identifies many of the difficulties faced, it also comes with solutions and ideas that are clear, practical and achievable. It identifies the tools with which to build an infrastructure and an industry that can thrive and grow domestically; and compete internationally. Among the dozens of recommendations made in the report to increase readiness for the development of offshore wind energy, there are four that are particularly urgent.

- First, strategic investment driven by the Government or the private sector must be directed into one or more Irish ports to take advantage of the commercial opportunity of delivering 3.5 GW of offshore wind by 2030. This report includes a detailed analysis of the suitability of 16 ports around Ireland to support the development of offshore wind farms and to provide operations and maintenance services.
- Then, Government must bring together industry, ports and local communities to develop offshore wind enterprise zones. These should be located around those ports identified as suitable to support offshore wind energy projects and must serve as hubs to attract international investment and create links to Irish businesses and suppliers.
- Next, Enterprise Ireland should be supported to continue its excellent work to date on developing offshore wind clusters for Irish companies. This would enable those businesses to develop their resources and capacity to a point where they can not only support the development of offshore wind domestically but also compete effectively in the European and even global markets.
- Finally, Ireland must address the skills shortage faced in trying to maximise local employment opportunities. The Government must coordinate the work of schools and universities, existing training bodies and skills development programmes, to identify the most cost-effective ways to eliminate the skills gap. Central to this must be the development of specialist marine apprenticeship schemes and working with academic institutions to develop a skills development plan for offshore wind.

There is limited amount of time to act. As momentum grows behind offshore wind energy, the window of opportunity shrinks. If Irish ports and businesses are not able to take advantage of this opportunity, there is no doubt others will step in and the money invested will flow out of Ireland. The chance to develop a skills base and an industry that can compete internationally in a rapidly growing global renewable energy industry will be lost.

This is the time for Ireland to seize the opportunity, to bring together industry, policymakers and communities to ensure the benefits are maximised from multi-billion-euro investments in zero carbon generation that creates thousands of skilled jobs at home and regenerates coastal communities right around the island.

More details are available in the Harnessing our Potential report which is listed in the Appendix.

8 Exporting our Abundant Offshore Wind Resource

At the end of June 2020, the new Irish Government adopted a PfG that, for the first time, set out a commitment to a long-term vision for floating wind energy off Ireland's coast by setting an ambition of at least 30 GW.

The European Commission estimates that Europe will need up to 450 GW of offshore wind energy by 2050[33] to decarbonise our energy systems compared to a current offshore capacity of 22 GW. Wind Europe has forecast that 85 GW of this will be required in the Atlantic Ocean[34] so Ireland will need to play its part in delivering upon this ambition.

Due to bathymetric conditions around the Irish coastline it is anticipated that a significant amount of this capacity will be needed to be delivered through floating offshore wind energy technology. Additionally, due to forecasted electricity demand for the island of Ireland, it is envisioned that a significant amount of this capacity will need to be connected to the European grid directly alongside of being used to facilitate new and innovative routes to market such as the production of green hydrogen.

Based on the EU's energy demands today for electricity, heat and transport, it will need 5,200 TWh of electricity to support the current electricity demand and the areas which can be directly electrified (see Table 10). Assuming wind energy provides 70 per cent of this, then over 800 GW of wind power would be needed in Europe for direct electrification alone.

Table 10: Electricity required for direct electrification of the EU28's energy system and the equivalent wind energy that could be required to support it.

	2020 Demand (TWh)	Efficiency Assumed	Electricity (TWh)
Electricity Demand	3400	100%	3400
Heat Pumps in Rural Areas (50% Building Heat Demand)	1,532	300%	511
Heat Pumps in Industry (Demand <200C)	659	300%	220
Total Cooling: Buildings & Industry	612	200%	306
EVs	663	85%	780
Total			**5216**
Wind Energy Share of Electricity		**% of Demand**	**70%**
		Volume (TWh)	**3651**
Wind Capacity assuming a 50% Capacity Factor		**GW**	**834**

[33] https://ec.europa.eu/energy/topics/renewable-energy/onshore-and-offshore-wind_en

[34] https://windeurope.org/wp-content/uploads/files/about-wind/reports/WindEurope-Our-Energy-Our-Future.pdf

In addition, the EU will need to find approximately 2,000 TWh of 'green fuels' for the areas which cannot be directly electrified (see Table 11). If indirect electrification is used for these such as electrofuels, power-to-fuels, synthetic fuels, hydrogen or ammonia, and again assuming wind accounts for 70 per cent of electricity supply, then this would require up to an additional 800 GW of wind power. Bioenergy is likely to provide some of this where it can be obtained sustainably, but between direct and indirect electrification it is clear that the demand for wind power across Europe will be enormous so Ireland has a huge opportunity to play a key role in providing this.

Table 11: Electricity required for indirect electrification of the EU28's energy system and the equivalent wind energy that could be required to support it.

EU Aviation Fuel	700	TWh
EU Ships	590	TWh
Process Heat >200C	845	TWh
Total Fuel	2135	TWh
Electrofuel Efficiency	60%	
Elec Demand	3558	TWh
Wind Energy Share of Electricity	**70%**	**% of Demand**
	2491	**Volume (TWh)**
Wind Capacity assuming a 50% Capacity Factor	**812**	**GW**

Floating wind energy technology is evolving rapidly and is now being discussed as a commercially viable technology option. Given the rate of technological advancements, innovations and supply chain developments, it is anticipated that costs for floating offshore wind will decrease rapidly over the decade and beyond following similar trajectories to that of onshore wind and fixed bottom offshore wind. Huge experience has been built up within Ireland and the EU in fixed bottom offshore wind energy and there are opportunities for the transfer of knowledge and to gain efficiencies key for accelerating the deployment of floating offshore wind.

To facilitate the offshore wind ambitions for the European Commission, floating wind will be required and will allow for the deployment of offshore wind at scale and in more challenging environments.

The south coast projects in the current development pipeline include plans for early floating offshore wind projects which are aiming for pre-2030 delivery and will be critical to realising the 5 GW by 2030. Failure to progress these projects has grave implications for attracting investment into floating offshore wind in Ireland.

9 Conclusion

Over the last two years we have seen a new urgency from the Irish Government, a greater determination to ensure that our energy systems are decarbonised and a growing understanding of the role that offshore wind energy can play.

The release of the CAP in 2019 and the PfG in 2020, and the setting of ambitious 3.5 GW and 5 GW targets for offshore wind by 2030, have brought a renewed sense of optimism and determination to the industry.

We have a strong pipeline of more than 20 offshore wind projects, totalling over 16 GW, in various stages of development off our east, south and west coasts. This pipeline is more than sufficient to achieve the targets set by Government, and indeed, to surpass them.

But as this report illustrates, it will take more than a strong pipeline of projects to deliver upon these targets. The correct policies must be urgently implemented across planning, grid and route-to-market to ensure targets can be delivered.

While these policies are implemented, it is also crucial that work goes on in parallel to reinforce our transmission system throughout the country. Otherwise, this could be the single biggest limiting factor to what we can achieve by 2030.

If the changes suggested in this report are not made, and made quickly, we could fall well short of our targets for 2030, delivering just under 700 MW.

But if these changes are made, the ambitious 5 GW target set by Government is achievable, and with it, the associated economic, climate and energy security benefits.

Delivering the 5 GW target set out in the PfG would transform Ireland from a country with grand ambitions and unrealised potential in offshore wind, to a serious player in the European industry.

It would also help us to develop our supply chain, maximising the project investment that can be captured by Irish firms, and leave us well placed to achieve future targets, including the 30 GW of floating offshore wind outlined in the PfG.

Ireland is on the cusp of finally unlocking our vast offshore wind resource, which has the potential to lead the decarbonisation of Ireland's energy system.

There are big challenges ahead – we do not underestimate them – but there are also clear solutions, which this report has identified. With sufficient resources, determination and political will Ireland will finally unlock our country's single most significant energy resource to the benefit of generations of Irish people.

10 Appendix – List of Relevant IWEA Reports

List of IWEA relevant papers on offshore wind:

1. 70by30 Implementation Plan:
    a. 70by30 Building Offshore Wind: launching 26th Nov: https://iwea.com/events/3035-offshore-conference
    b. 70by30 Saving Power: https://iwea.com/latest-news/4453-lost-renewable-energy-enough-to-power-galway-for-a-year
    c. 70by30 Saving Money: https://iwea.com/latest-news/3554-wind-industry-urges-government-to-cut-power-prices

2. Consenting:
    a. IWEA MPDM Bill Position Paper: https://iwea.com/images/files/20201014-iwea-mpdm-bill-position-paper-.pdf
    b. IWEA National Marine Planning Framework Draft Consultation Submission: https://iwea.com/images/files/20200430-iweanmpfdraftconsultationsubmission.pdf
    c. IWEA Paper on Offshore Wind Development Guidelines coming soon.
    d. IWEA Consultation Response to the Department of Housing, Local Government and Heritage's Statement of Strategy 2021 – 2025: https://iwea.com/images/files/20201027-iwea-submission-on-dhlgh-statement-of-strategy-2021-2025.pdf

3. Grid:
    a. IWEA Position Paper on Grid Offers for Relevant (Phase 1) Projects: https://iwea.com/images/files/20200630iwearelevantprojectsoffshoreconnectionpolicypositionpaperfinal.pdf
    b. IWEA Response to the Consultation to Inform a Grid Development Policy for Offshore Wind in Ireland: https://iwea.com/images/files/iwea-response-to-dccae-consultation-to-inform-a-grid-development-policy-for-offshore-wind-in-ireland.pdf

4. RESS:
    a. IWEA Position Paper on an Offshore Wind RESS Scheme Design: https://iwea.com/images/files/iweaoffshore-ress-position-paper.pdf

5. Supply Chain:
    a. Harnessing our Potential: https://iwea.com/latest-news/3479-new-report-reveals-multi-billion-euro-offshore-wind-energy-potential