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Irish Wind Energy Association

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IWEA Response to the Consultation to Inform a Grid Development Policy for Offshore Wind in Ireland

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Overview and Main Positions

IWEA would like to thank the Department of Communications, Climate Action and Environment (DCCAE) for the opportunity to respond to the consultation to inform a grid development policy for offshore wind in Ireland.

IWEA believes that 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 DCCAE, EirGrid, CRU, ESB Networks and industry will be vital to delivering progress in the coming decade.

IWEA's response to the consultation has been structured to provide background policy context and a 'state-of-play' of the industry in Ireland before subsequently responding to the questions set by DCCAE. However, IWEA's key positions can be summarised as follows for offshore projects which can deliver pre-2030 and offshore projects which can deliver post-2030:

- Pre-2030: IWEA strongly advocates for a basis of Option 1 with strategic components of Option 2, focused on the proactive development of the transmission system, being progressed as a hybrid solution as the appropriate grid option to take Ireland to our 2030 targets. This should be applied to the Relevant Projects and the Enduring Projects which can deliver pre-2030. Together they can deliver Ireland's ambition of 5 GW of offshore wind by 2030 as outlined in the Programme for Government.
- Post-2030: IWEA believes a plan-led approach that is zoned appropriately is likely to be needed post-2030 to unlock investment beyond 5GW and to allow Ireland to tap into the 30GW of potential for export as outlined in the Programme for Government. IWEA believes that further consultation would be required on what this transition to a plan-led approach would look like for Ireland, especially in light of the Programme for Government's increased ambitions to 5GW for 2030 and 30GW of export potential, which is a very different policy context to that in which the Navigant options were initially prepared. Once the model for pre-2030 is decided upon and understood, we will be in a much stronger position to understand how the transition to a plan-led approach would work and for what longer-term ambitions it should be designed. Planning for the transition from the pre-2030 model to the post-2030 more plan-led approach must begin as soon as a pre-2030 model is defined to provide a clear, transparent roadmap for offshore wind development into the future. IWEA recommends this model and roadmap are consulted upon

once policy decisions to support the Programme for Government export ambitions have been developed.

IWEA believe that leveraging a hybrid model of Options 1 and 2 will deliver the right framework for Ireland to deliver on its 2030 targets. We simply cannot see the alternatives delivering the offshore wind required for 2030. Using the hybrid of Option 1 and 2 proposed here will also allow the development of a strong, indigenous offshore supply chain and build up industry experience which can be harnessed in a post-2030 plan-led delivery model. This can place Ireland at the heart of decarbonising Europe's electricity grid using our offshore generation export potential along the west and south coasts in particular.

Pre-2030 - Option 1 with components of Option 2 in a hybrid grid model

IWEA believes that 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, in particular those projects in development on the east coast. 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 Commission for Regulation of Utilities (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, construction of the wind farm and the offshore and onshore transmission connections will ensure the quickest method of connecting offshore wind to the Irish grid as outlined in Option 1. It leverages the progress which Relevant Projects and pre-2030 Enduring 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 System Operators 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 Relevant and Enduring 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 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 from the windfarm 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, System Operators 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 to 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 to progress alongside the development of the Relevant Projects and pre-2030 Enduring 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 5GW 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 to the consumer. IWEA 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.
- 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 consultation 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 oppose the suggested inclusion of any 'minimum distance to shore' being introduced for offshore wind energy development in Ireland as suggested in Option 2. IWEA believes that there are much more appropriate consultations currently underway in relation to offshore wind in Ireland in relation to this. IWEA strongly believes that the minimum distance to shore should be assessed locally and on a project by project basis through the Environmental Impact Assessment (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 Department of Housing, Planning and Local Government (DHPLG), using vehicles such as the MPDM Bill, the National Marine Planning Framework and the Marine Spatial Plan. 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 has been proven to be 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.

Post 2030 - Transition towards a plan-led delivery model

IWEA believe that a plan-led model, which is appropriately consulted upon once we have a clearer post-2030 policy framework, would be the best model post-2030 and we would like to highlight the following key points in relation to this:

- As we look beyond the next decade, towards unlocking our 30 GW of offshore potential on the west coast, increased coordination will be needed which builds upon an already established industry. IWEA believe a plan-led approach that is zoned appropriately is likely to be needed to unlock such investment, facilitating Ireland in going above and beyond its own energy needs and enabling offshore wind to contribute significantly on our journey to net zero emissions.
- IWEA believes that further consultation would be required on what this transition to a plan-led approach would look like for Ireland, especially in light of the Programme for Government's increased ambitions to 5GW for 2030 and 30GW of export potential, which is a very different policy context to that which the Navigant options were initially prepared against. Once the model for pre-2030 is decided upon and understood, we will be in a much stronger position to understand how the transition to a plan-led approach would work and for what longer-term ambitions it should be designed for. Therefore, it should be consulted upon then.
- Planning for the transitionary step towards a plan-led approach in the 2030s must begin immediately once a pre-2030 option is defined to provide a clear, transparent roadmap for offshore wind development into the future. Evidence from other jurisdictions has highlighted that the transition must be clearly signalled with a long lead time to allow developers to transition projects and to allow the State to progress required legislative and co-ordination body changes. For the State, these substantive changes include but are not limited to the suitable development of planning and grid connection legislation and frameworks, 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.
- The transition from a pre-2030 Option 1 and 2 hybrid model towards a plan-led model should also take account of development work already completed or underway for post-2030 Enduring Projects, in particular floating projects off the South and West coasts, to ensure progression of these projects can be facilitated through the plan-led model.
- Lastly, IWEA believe EirGrid should carry out a techno-economic assessment as soon as possible on the offshore generation export potential of Ireland's West and South coasts, with a focus on the grid capabilities and requirements for reinforcements in these areas to facilitate this. Any such study should be cognisant and complementary to additional interconnection to other jurisdictions

and the emerging developments of large-scale complementary decarbonisation technologies such as electrolysers for Green Hydrogen.

1 Introduction

Offshore wind will play a central role in meeting Ireland's 70% renewable electricity target by 2030. The government's Climate Action Plan (CAP) set a target of at least 3,500 MW of offshore wind to be energised in Ireland by 2030 and set out several detailed actions for how that will be achieved. This has been recently followed by Ireland's new Programme for Government agreeing to increase this ambition further and deliver 5,000 MW of offshore wind by 2030.

As part of the CAP published in June 2019, EirGrid were tasked with developing an Offshore Grid Options paper as a deliverable under by Q1 of 2020. As a part of this process, EirGrid commissioned Navigant as consultants to aid in the development of this paper. IWEA were engaged by Navigant to consult on industry opinion, preference and expertise of offshore grid models. As part of this engagement process, IWEA developed an Offshore Grid Models position paper[1] to ensure continued dialogue with EirGrid on this issue going forward. IWEA now welcome the opportunity to provide a response to the Department of Communications, Climate Action and Environment (DCCAE) on this *Consultation to Inform a Grid Development Policy for Offshore Wind in Ireland.*

IWEA also welcome the grid options paper that has been prepared by Navigant on behalf of EirGrid and delivered in support of this consultation. The intent is to inform a suitable grid model adoption for Ireland to support and ensure timely delivery of the ambitious targets of at least 3.5GW of offshore wind by 2030 highlighted in the CAP and more recently 5GW of offshore wind being tabled within the new programme for Government. The paper outlines four enduring grid model scenarios ranging from a fully developer led model similar to the UK, through hybrid approaches, to a fully state centralised model (or fully plan led model), similar to that which is used in the Netherlands. IWEA welcome the comprehensive review of international approaches carried out by Navigant assessed against key drivers and acknowledge that no weightings have been applied to the models as part of this process.

It is understood that the set of model options that have been provided by Navigant have been tailored for the Irish context but that the individual elements of each model presented could be combined and/or used to inform additional models as required providing flexibility in deciding upon a suitable enduring model for Ireland. It is also noted that more than one model may be suitable in the Irish context It should also be noted that detailed planning and environmental implications on existing project pipelines were beyond the scope of the Navigant study. IWEA acknowledges the advantages and disadvantages put forward in the Navigant report and welcomes the opportunity to put forward industry's position in relation to these and in response to the questions posed within the consultation.

[1] https://www.iwea.com/images/files/20191204iweaoffshoregridoptionspositionpaper.pdf

INTRODUCTION

As was highlighted within IWEA's Offshore Grid Models position paper, it takes approximately 10 years to develop, survey, consent, design, finance, construct and commission a typically sized offshore wind farm. With the additional time required to put all the policy measures for a centralised model in place needed in Ireland (including a centralised leasing, planning interest and consenting regime), it is industry's position that were such a blanket approach applied now it would effectively rule out offshore wind energy generation prior to 2030.

Industry's position is that a developer-led approach with close and continuous engagement with EirGrid and ESB Networks is preferred, at least for all projects needed to contribute to 2030 targets. For existing pipeline projects, the offshore grid developers that are already carrying out all the marine surveys necessary for the consenting process have considered all options relating to both grid connection cables and the generation asset. The majority of these developers already have significant experience in successfully delivering offshore projects elsewhere and are currently best placed to consent and build the assets required. IWEA believe it would not be prudent to undo the positive momentum which has been created over the recent years by signalling a pause to project development as a new fully plan-led model is implemented, and EirGrid, along with a planning State Body, assesses how best to conceive and try to deliver a fully plan led approach by 2030.

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 impact to the current development pipeline and future renewable energy targets. We would recommend a phased transition approach to implement this is taken, 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 RES-E target.

IWEA would particularly welcome the opportunity for continued engagement with DCCAE, EirGrid, ESB Networks, and DHPLG in relation to the design and delivery of a suitable grid model given the critical path nature of grid delivery and connection for offshore wind in Ireland to help support policy objectives under the CAP.

IWEA has structured our response to this consultation in line with the individual consultation questions as stated below:

1) With respect to key driver **(i), cost levels**, which of models 1,2,3,4, or variant of these, delivers the most satisfactory results? Which features of the model, or variant, are the most influential for your given choice?

2) With respect to key driver **(ii), environmental impact**, which of models 1,2,3,4, or variant of these, delivers the most satisfactory results? Which features of the model, or variant, are the most influential for your given choice?

3) With respect to key driver **(iii), future proofing and technologies**, which of models 1,2,3,4, or variant of these, delivers the most satisfactory results? Which features of the model, or variant, are the most influential for your given choice?

4) With respect to key driver **(iv), required infrastructure**, which of models 1,2,3,4, or variant of these, delivers the most satisfactory results? Which features of the model, or variant, are the most influential for your given choice?

5) With respect to key driver **(v), compatibility with *Relevant Projects***, which of models 1,2,3,4, or variant of these, delivers the most satisfactory results? Which features of the model, or variant, are the most influential for your given choice?

6) With respect to key driver **(vi), social acceptance**, which of models 1,2,3,4, or variant of these, delivers the most satisfactory results? Which features of the model, or variant, are the most influential for your given choice?

7) With respect to key driver **(vii), facilitating the timely development of offshore wind capacity to achieve the 2030 target**, which of models 1,2,3,4, or variant of these, delivers the most satisfactory results? Which features of the model, or variant, are the most influential for your given choice?

8) **Rank the key drivers** in order of importance 1-7, which have the greatest impact on the choice of model.

9) How important is it for Ireland to develop an **indigenous offshore wind energy industry**? How best can an indigenous industry be developed?

10) How should **onshore and offshore grid connections be optimised**? For example, should consideration be given to common hubs for adjacent projects?

11) Are there any further considerations which might **reduce the cost to the consumer**?

12) Currently, developer compensation is not provided for delayed delivery of grid connections to renewable generators connecting to the network. Should **developer compensation arrangements** be provided for delivery of offshore grid connections to renewable projects? Similarly, who is best placed to bear the **outage risks** under the various options?

13) Are there any **further drivers** which should be considered when assessing a grid delivery model suitable for offshore wind development in Ireland?

14) **Overall**, which model, or model variant, is most appropriate as an enduring grid delivery model for offshore wind in the Irish context?

15) It is accepted that a transition towards the chosen enduring grid delivery model will be required to leverage the development of the Relevant Projects in the short term. Taking into account the high-level roadmaps set out at Figures 5 and 6 above, **what should this transition look like?**

2 Policy Context

IWEA is committed to engaging with policy makers and other stakeholders to tackle challenges associated with establishing a viable offshore industry in Ireland. Renewable energy will require a clear, robust and efficient policy framework to deliver in a timely and low-cost manner by 2030 – not simply via support mechanisms, but also through planning and grid policy and their effective and efficient interaction. Industry input into forming these measures, and the importing of international learnings from other jurisdictions, will be key to the success of Ireland achieving its climate targets. Policy formation needs to be set, implemented and managed across traditional government body boundaries. Considering the scale of ambition expressed in the CAP, these governance and accountability structures will be key to its success over the next decade.

The CAP outlines the delivery of at least 3.5GW of offshore wind by 2030. Industry will play a pivotal role in delivering the renewables generation required to meet Ireland's climate targets and reaching 70% renewable electricity by 2030. The increase in electricity demand from the heating and transport sectors, coupled with an increase in large energy users, primarily from increased development of data centres, will mean offshore wind is needed to decarbonise the Irish energy system, achieve emission reduction targets, meet increasing electricity demand, increase the security of electricity supply and contribute to the "green economy".

Offshore wind is central to Europe delivering upon the Green Deal and sustainably growing the green economy and green recovery in the aftermath of the Covid-19 pandemic. The European Commission has highlighted that Europe will need between 230-450GW of offshore wind by 2050 to achieve carbon neutrality[2]. The EU Commission's goals for offshore wind are achievable, provided the right investments in electricity grids and Governments take the right approach to maritime spatial planning[3]. Ireland has been earmarked and has the potential to contribute to this revolution as can be seen in Figure 1. The EU Recovery Plan has the potential to accelerate the offshore wind sector in Europe. Through its plans and investment via grants and loans, aimed at recovering from the damage of Covid-19, the plan aims to modernise the EU economy and transition from fossil fuels in a just manner. The delivery at scale of the offshore wind sector and supporting infrastructure in Europe will be economically transformative.

[2]European Commission, 2018. A Clean Planet for All
[3]https://windeurope.org/wp-content/uploads/files/about-wind/reports/WindEurope-Our-Energy-Our-Future.pdf

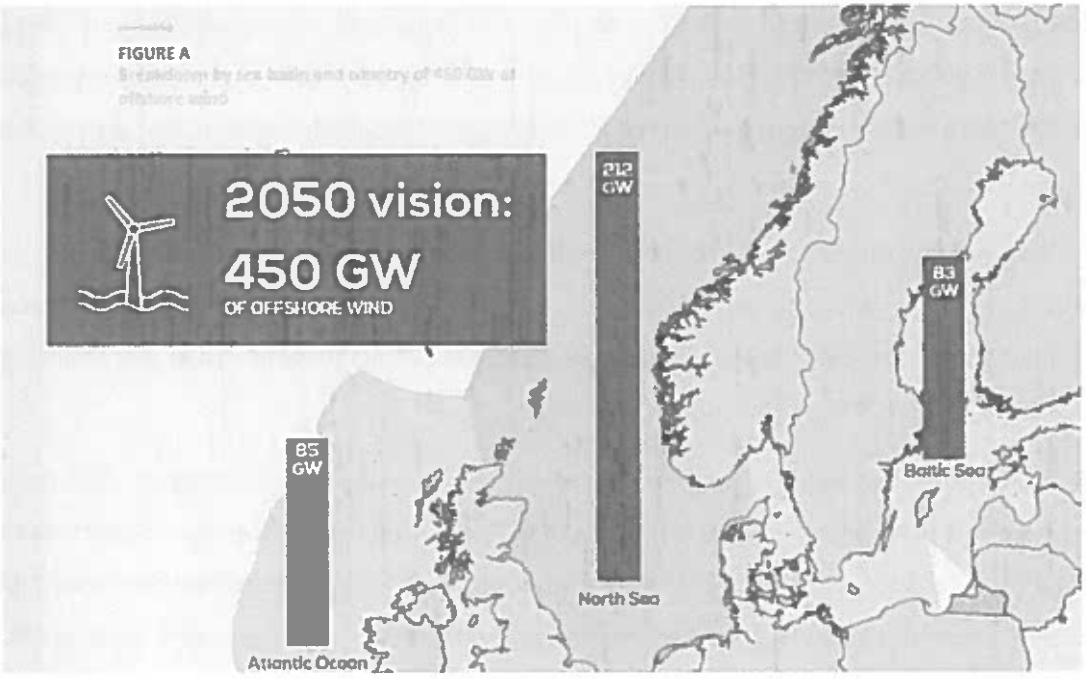


Figure 1: Breakdown of sea basin and country of 450 GW of offshore wind by 2050

More recently in Ireland, details of the draft Programme for Government have committed to a new offshore target of 5 GW by 2030, the enactment of the MPDM Bill within 9 months, floating offshore wind marked as key for R&D alongside plans for Ireland to contribute to a pan-European renewable energy generation and transmission system; taking advantage of a potential of at least 30GW of offshore floating wind power in our deeper waters in the Atlantic Ocean. The Programme for Government is committed to an average 7% per annum reduction in overall greenhouse gas emissions from 2021 to 2030 (a 51% reduction over the decade) and to achieving net zero emissions by 2050; and will be set in law by the Climate Action Bill, which will be introduced in the Dáil within the first 100 days of government alongside a newly established Climate Action Council. The Bill will define how five-year carbon budgets will be set. Every sector will contribute to meeting this target by implementing policy changes as outlined throughout the Programme for Government.

Offshore wind energy will be the flagship technology in delivering this decarbonisation to Ireland and critical to the delivery of offshore wind will be the timely delivery of a suitable grid model. The recent publication of the EU Hydrogen Strategy[4] also gives ability for Ireland to create an offshore wind / hydrogen export economy while overcoming limitations on offshore installed capacity beyond 2030.

IWEA welcomes Government putting in place a cohesive policy framework for the delivery model for offshore grid and acknowledge the alignment with the National Marine Planning Framework (NMPF)

[4] https://ec.europa.eu/energy/sites/ener/files/hydrogen_strategy.pdf

and its underpinning legislation, the MPDM Bill. However, there are concerns relating to the delay of both the MPDM Bill and NMPF due to the interregnum over the past number of months alongside of Covid-19; which has been flagged within IWEA's NMPF Draft Consultation Submission[5] in April of this year.

IWEA recommends therefore that DCCAE, DHPLG and relevant agencies interact regularly with industry to flag any issues or bottlenecks that arise with the delivery of a new policy framework (across consenting, grid and route to market) for offshore wind; and address these to ensure that projects can be delivered and the 2030 targets can be achieved.

IWEA acknowledge and welcome recent policy developments to support the roll out of offshore wind energy projects in Ireland. The progression of the Relevant Projects is a key step towards meeting 2030 targets and IWEA welcome this under the transitional protocol; and the direction from CRU to EirGrid to commence processing grid connection applications. EirGrid's East Coast Study points to ~1.5GW of offshore wind capacity on the East coast of Ireland without any significant transmission capacity expansion; but highlights the need for significant grid reinforcements and associated lead times for the integration of the at least 3.5GW of offshore wind put forward in the CAP (inclusive of Enduring Projects). Moreover, as highlighted above, the Programme for Government's target of 5GW will put even further importance on EirGrid's role to facilitate the reinforcements required in a timely and reliable manner. IWEA believes a developer led model, leveraging experiences and expertise of international developers, with critical strategic onshore reinforcements being the focus 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.

As such IWEA strongly advocate for a basis of Option 1 with strategic components of Option 2, focused on the proactive development of the transmission system, being progressed as a hybrid solution for the appropriate grid option to take Ireland to our 2030 targets.

IWEA have outlined our reasoning to this in response to DCCAE's consultation questions in the following chapters.

[5] https://www.iwea.com/images/files/20200430-iweanmpfdraftconsultationsubmission.pdf

3 Navigant Options Paper

In June 2019 the CAP directed EirGrid to develop an options paper for offshore grid models and EirGrid commissioned Navigant to prepare a report to help inform on a suitable grid model for Ireland. IWEA welcomed the opportunity to engage with Navigant and EirGrid in advance of this report being drafted and as a part of the engagement followed up with a voluntary Offshore Grid Options Position Paper.[6]

The Navigant report gives a comprehensive review of international approaches and has developed four standard grid model options which could be tailored to the Irish context. These range from a fully developer led option similar to the UK, to a fully state led or plan led approach similar to the Netherlands. The report assesses the pros and cons of each of the grid models put forward.

In mapping the advantages and disadvantages of each model, Navigant has acknowledged the compatibility of a developer led model in Option 1 with the timely development of the Relevant Projects. With increased ambition of 5GW to 2030 since the publication of this report, this should also include the more progressed Enduring Projects which can deliver pre-2030. As part of this they have acknowledged the existing expertise of the offshore developers involved from other jurisdictions. IWEA would be supportive of this approach in principle for delivery of both Relevant and Enduring projects out to 2030. It should be noted however that there is still risk involved in the reactive manner of onshore grid reinforcements undertaken by EirGrid and ESBN (i.e. after auction success for projects), which could impact project delivery and reaching 2030 targets and is addressed in more detail later.

In Option 2, Navigant outline a plan defined approach where the State define a minimum distance to shore or buffer zone for wind farm development. Applying a blanket buffer zone around the coast in Ireland will hinder the progression of both Relevant Projects and the more advanced Enduring Projects as highlighted in IWEA's response to the draft NMPF[7]. Due to the existing geological and bathymetric conditions around Ireland, fixed bottom offshore wind infrastructure will be located closer to the shoreline. This is in keeping with the development of offshore wind infrastructure across the globe with projects located at varying distances from the coastline in both nearshore and offshore environments. Proximity to shore will be particularly important when considering impacts associated with seascape and landscape. Wind farm design should always be cognisant of this element and the impact of any potential development on the coastal environment will be thoroughly assessed in any Environmental Impact Assessment (EIA) processes. The developer must balance this within their

[6] https://iwea.com/images/files/20191204iweaoffshoregridoptionspositionpaper.pdf
[7] https://iwea.com/images/files/20200430-iweanmpfdraftconsultationsubmission.pdf

project development and consultation and apply proper consideration and mitigation measures where necessary.

Commercial scale offshore wind farms will be new for coastal communities in Ireland. Their potential impact on existing landscape will therefore need to be handled carefully. Any distance from shore should be decided upon locally and on a project by project basis taking advantage of the best advances in seascape character assessment and visualisation tools. It is understood that the DHPLG are progressing these workstreams in parallel and as part of the delivery of the final NMPF. We do not consider a nominal set-back distance appropriate to be introduced into a grid model given this set-back has no technical or functional impact on the selection of a grid options approach and it would seem out of place with the other workstreams currently ongoing.

Furthermore, in Option 2 we welcome the possibility of EirGrid pro-actively planning and coordinating onshore grid reinforcements in a strategic manner which allows for the efficient use of offshore wind generation once connected to the network. We would welcome the inclusion of this proposal to also be incorporated into Option 1 in a hybrid option approach. However, we would have concerns as to the appropriateness of EirGrid effectively acting as gate-keepers for which projects can and cannot progress through RESS auctions. Through the development of the offshore grid regulatory framework and/or the RESS design there will need to be a balanced achieved between the legal certainty on the grid connection method, costs and timelines and the need to ensure grid capacity for offshore renewable projects is used efficiently.

Options 3 and 4 put forward centrally planned approaches to grid development. Although this could be considered an optimal approach when looking beyond 2030 in developing the West coast for export, it should be noted that although it has had success in jurisdictions such as the Netherlands in driving down LCOE (See Figure 2), significant investment in resourcing would be required to develop a similar one stop shop in Ireland. Additionally, it should be noted that the developer led model within the UK delivered strike prices of £39.12 / MWh (@2012 prices)[8] in their 2019 CfD auction.

[8] Indexed to 2019 prices that would be approximately £46.54/MWh or €51.66/MWh at the time of the auction.

Offshore auction results in 2019

COUNTRY	WIND FARM	CAPACITY	STRIKE PRICE (€/MWh)	TYPE OF SUPPORT	WINNER[12]	EXPECTED COMMISSIONING DATE
Netherlands	Hollande Kust Zuid 3 & 4	760	-	Zero-subsidy bid	Vattenfall	2023
France	Dunkirk	600	44	Feed-in-Premium	EDF, Innogy and Enbridge	2026
UK	Sofia	1400	44.99	Contract for Difference	Innogy	2024
	Seagreen Phase 1 - Alpha	454	47.21	Contract for Difference	SSE Renewables	2025
	Forthwind	12	44.99	Contract for Difference	2-B Energy	2024
	Doggerbank Teeside A	1200	47.21	Contract for Difference	SSE Renewables and Equinor	2025
	Doggerbank Creyke Beck A	1200	44.99	Contract for Difference	SSE Renewables and Equinor	2024
	Doggerbank Creyke Beck B	1200	47.21	Contract for Difference	SSE Renewables and Equinor	2025

Source: WindEurope

Figure 2: Offshore auction results in 2019. Source: Wind Europe[9]

Dutch and German auctions were awarded to build subsidy free / zero-subsidy projects. Within Germany and the Netherlands, subsidy free means that no government incentive is given to support building of offshore wind. However, it should be highlighted that these zero-subsidy bids are possible only for some developers in some markets, and when governments take on and manage a share of the project risk. It is worth highlighting here that the TSO (TenneT) consents, finances, builds and operates the grid so there are no costs associated with this included in a competitive auction and have budgeted approximately €5.7bn for the next 6.3GW to be delivered. This additional cost would be reflected in consumer bills through increased network charges.

Additionally, the projects which delivered the initial subsidy free auctions also had favourable site conditions (Shallow waters (10-40m) and sandy ground conditions ideal for monopiles), strong energy resource and are within an established market with considerable local content. There are also concerns amongst investors regarding how subsidy free projects will be funded as they must rely on electricity market prices alone. Where a plan led or centralised approach has been successful (for example the Netherlands), the process requires (i) significant lead time for development of the offshore grid so that the developers have full visibility of grid delivery timetables before making

[9] https://windeurope.org/data-and-analysis/product/?id=61

investment decisions; and (ii) full financial compensation for any late delivery which provides important incentives for TSOs and a manageable level of risk for developers and lenders. To the extent that these factors are not present, TSO delivery models have failed to work - i.e. Germany.

If centralised approaches are to be considered for Ireland, planning needs to start now in parallel to a developer led approach to at least 2030, which we believe should be an Option 1 and Option 2 hybrid outlined above, to facilitate a lead time of approximately 10-15 years. IWEA believe there is risk of delay to project delivery and a risk in failing to meet targets if centrally planned models were to be introduced earlier than 2030.

Additionally, clarity on how this would be resourced and funded would be needed. For example, EirGrid and ESB Network's submissions to the Commission for Regulation of Utilities (CRU) for the Price Review 5 process, which covers the System Operators budgets from 2021 - 2025, do not include resources or expertise to design and develop a centrally planned offshore grid model. EirGrid's track record in delivering large scale infrastructure such as EWIC and the Celtic integrated is noted within the Navigant report. However, it should also be highlighted that platform design, construction and most importantly operation is beyond their current experience. Furthermore, delays to infrastructure development such as the North-South interconnector alongside of the cancellation of works such as Grid Link and Grid West is evidence of inefficient delivery. Recent equipment failures and lack of foresight in housing spare parts for same, both at Moneypoint and more recently on the Arklow - Carrickmines 220 kV circuit, point to a decentralised option being best to ensure minimal downtime is experienced. Both of these outages have led to extraordinary levels of dispatch down being experienced for wind farms in the south of Ireland, leading to enormous losses for the owners and operators of these projects.

IWEA are generally supportive of the common set of assumptions underpinning all four options as presented in the Navigant paper. However, there are significant concerns regarding how the subsequent transfer of ownership back to EirGrid / ESBN will work if it is required and it is not well defined at the outset. Specifically, how the developer will get paid in this instance and who will value the asset for the transaction. How will the meter location be considered/modified if the Point of Connection is changed (i.e. the tariff meter would be in the wrong place)? Will minimum availability levels of the infrastructure be warranted by EirGrid to protect developers if they cannot control or manage the operation of the assets? Notwithstanding this, the consenting and associated timelines associated with a centrally plan led approach as per Options 3 and 4 would effectively end Ireland's ability to reach 2030 targets.

Offshore wind project development and installation timelines are circa 7-10 years in developed markets such as the UK[10] and IWEA would like to highlight that any departure from the current approach should take account of the lengthy timelines associated with offshore developments, especially with regard centrally planned approaches. We would also specifically wish to highlight that planning and environmental implications were noted to be beyond the scope of the Navigant report, yet it is fundamental to the achievement of our 2030 targets. If site development works are to be undertaken centrally by Government departments and agencies, they would struggle to be prepared in time for the delivery of enduring projects before the end of the decade. Details on the criticality of getting the offshore planning regime moving have been outlined in Section 2.

It should be noted that a developer-led model is fully compatible with RESS auction design. The consultation correctly notes specific future offshore wind auction(s) as per the CAP and that policy levers can be adopted and fine-tuned for each auction. A set of RESS Terms and Conditions suitable for offshore wind (i.e. these include, without limitation, areas such as appropriate milestones for project delivery, reasonable and proportionate force majeure provisions, community benefits specific to offshore wind) and tailored for policy needs can be readily adopted to support a developer-led grid model. Industry will require grid connection infrastructure and capacity circa 18-24 months post RESS auction results to avoid construction and commissioning delays, and ongoing engagement between industry, EirGrid and ESB Networks will be crucial to this.

Furthermore, it will be important to set out the expected standards clearly and adequately for offshore wind connections well in advance to allow for consenting of both the offshore wind farms and connection cables to progress efficiently through the MPDM. IWEA look forward to engaging with the System Operators on these specifications in an upcoming consultation in Q3 2020.

IWEA recognise the benefits of an optimised plan-led grid model beyond 2030 to facilitate offshore wind energy at scale, inclusive of floating offshore wind, hydrogen production, and the export opportunity. However, in the interests of time, resource, expertise and 2030 targets being achieved, IWEA strongly advocate for a basis of Option 1 with strategic components of Option 2, focused on the proactive development of the transmission system, being progressed as a hybrid solution for the appropriate grid option to take Ireland to our 2030 targets. No buffer zone should be included within any chosen solution for the detailed reasons outlined above.

[10] https://iwea.com/images/files/final-harnessing-our-potential-report-may-2020.pdf

It is understood that DCCAE will decide on the offshore grid framework to be used in Q3 2020 and IWEA ask that they seriously consider the evidence provided and recommendations put forward in this response.

4 With respect to key driver (i), cost levels, which of models 1,2,3,4, or variant of these, delivers the most satisfactory results? Which features of the model, or variant, are the most influential for your given choice?

In assessing the impact on cost of the various options we note that Navigant's accompanying report concludes that "*it is not possible to provide a total quantitative societal cost comparison*", an assessment we would agree with given the range of complex and interdependent areas impacted under either model. These factors include, but are not limited to, the impact of competitive pressure on prices, investor/supply chain confidence, delivery against national and EU targets, deployment of onshore grid reinforcements, impacts on system operation, cost of redispatch/system services, and project financeability.

Recognising this myriad of factors, IWEA does not propose to present one option as overall "least cost". However, a range of factors and consideration with respect to cost are outlined below, linked to the establishment of an offshore industry in Ireland and delivery against our targets.

Parameter	Likely to Result in Lowest Cost for Consumer	
	Developer-Led	Plan-Led
Help with Economic Recovery	X	
Most Competition	X	
Avoid Sunk Costs	X	
Onshore Co-ordination		X
Avoid Excessive Largest In-Feed	X	
Avoid Buffer Zones	X	
Financeable	X	
Confidence to Supply Chain	X	

Table 1: Qualitative Cost Comparison

4.1 COVID-19 recovery

We note Navigant's conclusion that "*Ireland, as an emerging market, might benefit from a developer-led grid delivery model where experienced developers could deploy offshore wind transmission assets at more optimal cost levels right away*". This comment should be viewed with particular significance as we look towards Ireland's post-COVID-19 economic recovery.

Offshore wind developers in Ireland have undertaken significant investment so far in the assessment and early development of offshore windfarm sites and are poised to invest billions of euros in the

establishment of Ireland's offshore wind sector, creating thousands of jobs (both direct and indirect) in the process.

Our COVID-19 recovery must be twinned with the existential issue of our time – the fight against climate breakdown. Leveraging the available capital investment in Ireland's offshore wind industry should therefore be viewed as a priority, providing national investment, stimulus into towns and communities along the east coast, whilst also further decarbonising Ireland's energy supply.

Of course, with respect to climate action in Ireland, investment is needed well beyond the offshore wind industry, in areas such as energy efficiency and decarbonisation of heat and transport. These other areas may require significant investment by the State to implement at scale. Ireland should be mindful to leverage available private capital where it exists, such as for offshore wind, recognising that exchequer funding is likely to be needed in other areas as a priority.

4.2 Competitive Pressures

The consultation document outlines the positive impact on cost levels that can be attained via competitive pressure in the delivery of transmission infrastructure, via Options 1 and 2. We would note that said competitive pressures go beyond only delivery of the transmission assets in Options 1 and 2, and equally apply to site selection and development and assessment of the same. The consultation notes as a negative consequence of Options 1 and 2 that there will be "*sunken costs for pre-development of sites unsuccessful at auction*". It should be highlighted that these sunken costs, for sites which do not go on to be developed, will sit with the taxpayer in Options 3 and 4.

We note the proposed model in Option 2, where the TSO can predetermine parameters within the auction such as grid location. It is important that the regulator has responsibility for delivering as effective and efficient auction as possible. Whilst an auction could be set up to minimise work needed on the onshore transmission grid this may not, overall, be the most cost-effective solution given the distortion this could bring to the auction price stack, which could result in significant additional RESS costs being paid for years afterwards.

As a general comment, IWEA supports the competitive development of energy infrastructure. Competition can safeguard costs for consumers, whilst driving the innovation we will undoubtably need to decarbonise our electricity system. A State-led build will not inherently deliver efficient build-out or the delivery of cost reductions.

WITH RESPECT TO KEY DRIVER (I), COST LEVELS, WHICH OF MODELS 1,2,3,4, OR VARIANT OF THESE, DELIVERS THE MOST SATISFACTORY RESULTS? WHICH FEATURES OF THE MODEL, OR VARIANT, ARE THE MOST INFLUENTIAL FOR YOUR GIVEN CHOICE?

4.3 Cost recoupment

As Navigant's report highlights, for Options 1 and 2, spend by the developer in the development and delivery of the project will be factored into RESS prices, with CfD contracts providing support during periods of low market prices, funded by the PSO levy.

For Options 3 and 4, the consultation indicates that spend on infrastructure, both onshore and offshore, would be recouped via network charges. An important point of clarification is that spend on the development of generation sites themselves in such a model (i.e. assessment of site suitability, environmental impact assessments etc.) should not be recouped via network charges. Payment of increased network charges in support of the development of generation sites, rather than network infrastructure, would represent unacceptable distortion of the market (i.e. costs borne by generators/demand network users in direct support of investigatory works into other non-network infrastructure). Experience from EirGrid's Grid 25 strategy, and Grid West in particular, highlight the need for coordinating grid development, to show that these models may be suitable in the 2030s, with a well signalled transition approach required, but that there are strong parts of the existing network in East and South East to take advantage of in short to medium which has the potential to reduce costs in the long run.

Whilst impact on PSO levy and/or network charges should be carefully considered, we would note the competitive pressures under Option 1 and 2 can assist in ensuring the PSO levy is used as effectively and efficiently as possible.

4.4 Coordination of onshore grid

IWEA recognise the additional opportunity that would come with Options 3 and 4, in particular, to coordinate onshore grid with offshore grid. Such coordination could drive as efficient solutions as possible, though this should be considered against loss of competition and the potential significant delays that could result in the pursuit of an "optimum" solution.

As we look beyond 2030 towards unlocking our west coast potential, onshore grid development will have to be coordinated between offshore projects given limited transmission infrastructure in the west. Infrastructure investment is likely to be needed for the network to export renewable power from the west of the country to the east and potentially beyond, even when considering the potential role of hydrogen as an export vehicle. A coordinated approach in this circumstance will be particularly important to drive cost efficiency and is likely to be critical in exploiting the potential 30 GW of offshore wind as outlined in the new Programme for Government.

WITH RESPECT TO KEY DRIVER (I), COST LEVELS, WHICH OF MODELS 1,2,3,4, OR VARIANT OF THESE, DELIVERS THE MOST SATISFACTORY RESULTS? WHICH FEATURES OF THE MODEL, OR VARIANT, ARE THE MOST INFLUENTIAL FOR YOUR GIVEN CHOICE?

4.5 Largest infeed/single point of failure

The documents also highlight the opportunity for "shared infrastructure" or "hubs", which it is suggested may be more cost-effective given avoided multiple landfalls by utilising a single connection point. Whilst recognising the potential savings opportunity with such hubs, shared infrastructure is likely to require longer offshore transmission networks, putting upwards pressure on projects costs. Importantly, large single infeeds could represent a significant challenge to the TSO and may result in significant ongoing cost to the consumer. The TSO must procure the System Services needed to stabilise the system in case the largest infeed is lost. Currently, this would be EWIC interconnector at 500 MW, though this will increase to 700 MW for the Celtic Interconnector. Offshore wind farms are likely to be of a similar magnitude and, therefore, it is questionable as to whether concentrating multiple large offshore wind farms to the same point on the network is desirable from a system stability perspective. The potential system costs of such an approach should be carefully considered.

4.6 Minimum Distance

We note that Option 2 proposes that the State could set minimum distance from shore for windfarms. IWEA believe that this is not the right consultation for buffer zones or minimum distance to shore to be discussed.

This has been discussed at length with DHPLG and responded to in IWEA's response to the Draft NMPF[11] which states, *"It should be noted that the location of potential offshore wind projects in Ireland may vary in terms of proximity to the Irish shoreline. Due to the existing geological and bathymetric conditions around Ireland fixed bottom offshore wind infrastructure will be located closer to the shoreline. This is in keeping with the development of marine wind infrastructure across the globe with projects located at varying distances from the coastline in both nearshore and offshore environments. Proximity to shore will be particularly important when considering impacts associated with seascape and landscape. Wind farm design will be cognisant of this element and the impact of any potential development on the coastal environment will be thoroughly assessed in an EIA with appropriate mitigation measures applied where necessary. Commercial scale offshore wind farms will be new for coastal communities in Ireland. Their potential impact on existing landscape will therefore need to be handled carefully."*

[11] https://iwea.com/images/files/20200430-iweanmpfdraftconsultationsubmission.pdf

WITH RESPECT TO KEY DRIVER (I), COST LEVELS, WHICH OF MODELS 1,2,3,4, OR VARIANT OF THESE, DELIVERS THE MOST SATISFACTORY RESULTS? WHICH FEATURES OF THE MODEL, OR VARIANT, ARE THE MOST INFLUENTIAL FOR YOUR GIVEN CHOICE?

Similarly the MRIA recommended in a major paper[12] previously that "MRIA believes that the application of a blanket national 'buffer zone' (e.g., no renewables development within the buffer zone boundaries) out to, for example, 12nm would freeze and paralyse development of renewable offshore energy. The industry could drop anchor for perhaps 10 years to await the emergence of wave and deep-sea floating wind technology which would enable renewable energy to be exploited well out in the Atlantic." If such limits were set such that seabed suitable for offshore wind farm development was severely restricted, or that early offshore projects were no longer viable, Ireland's offshore industry could be set back significantly. A reduced amount of seabed available, potentially in deeper waters, is likely to put upward pressure on costs.

4.7 Financeability

From a project financing perspective a developer led approach would be most suitable. The concerns with respect to delivery of a centralised approach outlined elsewhere in this paper, and the potential delays resulting from extra up-front government/network company, should be considered within the context of project financeability. A connection build which was in control of the developer itself, as much as possible, would increase control over the ability to deliver to schedule, and thus increase certainty. A model which left projects vulnerable to non-delivery by the TSO could be a significant challenge to finance, increasing risk and putting upward pressure on costs.

As noted in Navigant's report, a developer-led approach will require higher spends by the developers themselves, given that the offshore developer will need to finance the de-centralised grid. However, commercial parties could potentially deliver cheaper solutions (e.g. higher debt shares which could result in lower Weighted Average Cost of Capital) for such builds. Regarding allocation of risk, it should be noted here that grid delays under the current RESS design are not considered to be a force majeure event which would add substantial risk to an offshore project in the absence of a developer-led approach to de-risk potential delays.

In relation to ownership, operation and maintenance of offshore grid assets IWEA believes that this responsibility should remain with the developers to ensure any risks with the potential to impact upon the success of financial close can be managed. The specific risks relating to ownership alongside of the thresholds and standards expected in other jurisdictions have been detailed within the further drivers section of this paper.

[12] http://www.mria.ie/site/assets/files/1016/marine_spatial_planning_needs_of_marine_renewables_emerging_technologies.pdf

WITH RESPECT TO KEY DRIVER (I), COST LEVELS, WHICH OF MODELS 1,2,3,4, OR VARIANT OF THESE, DELIVERS THE MOST SATISFACTORY RESULTS? WHICH FEATURES OF THE MODEL, OR VARIANT, ARE THE MOST INFLUENTIAL FOR YOUR GIVEN CHOICE?

4.8 Supply chain confidence

As noted in relation to delivery of Relevant Projects and delivery against 2030 targets, Ireland's offshore industry stands at a juncture. Significant targets have been set for 2030. Delivering on them will be critical in attracting the supply chain that the development of such projects will need. On a global scale, there is intense competition for vessels, expertise and other key supply chain elements, with an ever-increasing number of countries setting ambitious targets for the next decade.

If Ireland does not stick to its targets, it will lose attractiveness to the global supply chain. Fewer companies with active interest in Ireland's offshore sector will likely put upward pressure on costs due to reduced supply chain competition. It is therefore critical from a cost perspective that Ireland maintains and builds confidence in the deliverability of its offshore plans.

4.9 Summary of costs

As already stated, given the myriad of complex and interlocking factors impacting on costs, it is not possible to determine with certainty a least cost offshore model. However, over the next decade, maintaining confidence in Ireland's offshore sector (by delivering on targets) will be critical in driving investment certainty, attracting international supply chain, and developing an offshore industry here in Ireland. Particularly as we look towards the post Covid-19 period, unlocking billions of euros of private investment in a green recovery becomes of particular importance. A developer-led model will therefore be required to deliver this investment in the immediate future. We note that the consultation paper proposes additional parameters could be established (i.e. minimum distance from shore) or input into any auction process (i.e. grid availability). Whilst recognising the potential rationale for such parameters, due consideration must be given to the cost effectiveness of such measures given potential knock-on effects such as skewing of auction price stacks, increased system operation costs and in particular the substantial risk of enormous amounts of stranded investment in the case of the establishment of a minimum distance to shore.

As we look beyond the next decade, towards unlocking our 30 GW of offshore potential on the West Coast, increased coordination will be needed, building on an already established industry. A plan-led approach that is zoned appropriately is likely to be needed to unlock such investment, facilitating Ireland in going above and beyond its own energy needs and enabling offshore wind to contribute significantly on our road to net zero emissions. Planning for this transitionary step towards a plan-led approach in the 2030s must begin immediately to provide a clear, transparent roadmap for offshore wind development into the future.

5 With respect to key driver (ii), environmental impact, which of models 1,2,3,4, or variant of these, delivers the most satisfactory results? Which features of the model, or variant, are the most influential for your given choice?

In respect of EIA, the industry is in favour of Options 1 or 2 or a combination of aspects from both. Some advantages may exist from Options 3 or 4 such as the State taking the risk on site investigation and consenting which would allow for de-risking of this phase of development, for more efficient use of resources for developers and less sunken costs if unsuccessful in progressing project. However, in Ireland's case these would be outweighed by benefits pertaining to Options 1 and 2. Considerations in relation to this have been outlined below:

1. **The offshore wind market is not fully established yet but is an emerging market on a steep trajectory in Ireland. Until the market is fully established, there would be benefit in having a developer-led grid delivery model where experienced developers are primed to deploy offshore wind transmission assets and associated EIAs at more optimal cost levels. The state is currently unprepared and lacking the required resources to deliver the initial wave of offshore wind EIAs. As stated in IWEA's 2019 Grid Model Position Paper[13], any changes will require allowances for training and adjustment periods. It is imperative that the needs of each Government department and agency are defined accurately and resourced sufficiently. The timelines and the volumes involved in meeting our energy targets are very tight and insufficient resourcing along any of the steps of the process will cause delays and impact projects being built and targets being achieved. Therefore, from an EIA delivery perspective Options 1 and 2 are more favourable.**

2. **The benefits of Options 1 and 2 are that offshore developers will be considering the cumulative impact assessment of the offshore windfarm, the offshore grid works and the onshore shallow connection works. Several of the onshore deep reinforcements that will help facilitate the offshore windfarms will also be required for general system development, for example demand growth and as part of asset replacement programmes. These onshore deep reinforcements should be part of a wider EIA process being led by the TSO and TAO so it is not clear there will be efficiencies as suggested in Options 3 & 4.**

[13] https://iwea.com/images/files/20191204iweaoffshoregridoptionspositionpaper.pdf

WITH RESPECT TO KEY DRIVER (II), ENVIRONMENTAL IMPACT, WHICH OF MODELS 1,2,3,4, OR VARIANT OF THESE, DELIVERS THE MOST SATISFACTORY RESULTS? WHICH FEATURES OF THE MODEL, OR VARIANT, ARE THE MOST INFLUENTIAL FOR YOUR GIVEN CHOICE?

3. The State currently lacks demonstrable experience in the delivery of offshore wind projects. Offshore wind developers have built up considerable experience in the development of onshore wind farms in Ireland alongside of experience garnered from the delivery of offshore wind projects in other jurisdictions. IWEA members have previously demonstrated this in the appendix of IWEA's Grid Model Position Paper 2019[14]. Developers have already undertaken significant investment in the assessment and early development of offshore windfarm sites and are primed for further investment in the sector here. This experience and expertise in developing EIAs for offshore wind, the understanding of potential impacts to the marine environment, and how these can be mitigated against means developers are better prepared for the delivery of prepared sites. If a transition to a plan-led model (Option 3 or 4) post-2030 were to happen, we would recommend that jurisdictions of best practice such as the Netherlands (RVO) should be followed. The Netherlands compensated developers, who were in the planning system at the time, for all of their development costs to that date and purchased all data collected during this time. If this were to happen in Ireland it would be costly to the State and taxpayer and inevitably impact timelines for delivering upon 2030 targets.

4. From a programme and delivery perspective, developer led will be more favourable, due to the challenging timelines involved. Experience has shown in Ireland for example, that TAO and TSO project delivery will take longer which has been highlighted in earlier sections of this paper. Infrastructure agreements between the System Operators may be functional but timelines to get capital approval and project delivery timelines are potentially longer. The EIA process could therefore take longer to complete, and overall consenting timeframes could take longer.

5. EIAs require an extremely wide range of expertise spanning across multiple facets of both the marine and onshore areas. There are potential limitations with State consenting due to limited offshore expertise within State bodies. If Ireland were to progress Options 3 or 4 post-2030, experiences from other jurisdictions such as the Netherlands should be taken on board where consultants are contracted to work alongside the RVO which ensures the level of resource, expertise and state of the art required to deliver offshore wind energy sites.

[14] https://iwea.com/images/files/20191204iweaoffshoregridoptionspositionpaper.pdf

WITH RESPECT TO KEY DRIVER (II), ENVIRONMENTAL IMPACT, WHICH OF MODELS 1,2,3,4, OR VARIANT OF THESE, DELIVERS THE MOST SATISFACTORY RESULTS? WHICH FEATURES OF THE MODEL, OR VARIANT, ARE THE MOST INFLUENTIAL FOR YOUR GIVEN CHOICE?

6. There is a likelihood that developers will prioritise timelines for EIA delivery more than in a plan-led model as they will be subject to significant financial risk.

7. The plan-led model may have greater potential optimising onshore-offshore transmission asset coordination due to the long-term planning horizon for the coordinated roll-out of offshore wind developments. This may result in the State Body and TSO minimising environmental impacts. For example, a plan-led model could potentially realise synergies between individual projects, minimise cable routes and landfalls, thereby minimising the cumulative environmental impact of Irish offshore wind developments. However, it should also be noted that through proactive engagement between the developers and TSO under Options 1 & 2, that consideration could also be given to issues like minimising cable routes and landfalls, thereby also minimising the cumulative environmental impact of Irish offshore wind developments under these options.

6 With respect to key driver (iii), future proofing and technologies, which of models 1,2,3,4, or variant of these, delivers the most satisfactory results? Which features of the model, or variant, are the most influential for your given choice?

IWEA support a plan-led approach to onshore transmission reinforcement and future proofing of onshore substations built to connect both Relevant and Enduring 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 5GW of offshore wind by 2030 as outlined in the Programme for Government. A plan-led delivery model may be appropriate to an offshore transmission network for the South and West Coasts post-2030 where floating offshore may be some distance from shore and where there may not be a suitable onshore node to connect these projects, but this is not the case in the Irish Sea for pre-2030 projects. The offshore projects in the Irish Sea are nearshore and there is an existing 220kV onshore network running up the East coast.

The East Coast Generation Opportunity Assessment study shows that there is a certain amount of capacity available on the east coast without any reinforcement and further capacity can be released with some additional onshore reinforcement[15]. The argument for reinforcing the network via offshore infrastructure only really materialises once this capacity is used. Where there is a need for significant additional grid reinforcement, which would be difficult to implement onshore, consideration could then be given to reinforcing the network offshore. The cost of reinforcing offshore will be significantly more expensive than any onshore solution so it makes sense to reinforce onshore where possible. The Navigant report states that in the UK Ofgem announced that it will explore whether a more coordinated offshore transmission system could reduce both financial and environmental costs. National Grid Electricity Transmission have subsequently communicated that they intend to do this by developing a string of coastal nodes to a allow developer-led projects to connect efficiently. This will facilitate the connection of future offshore projects to strong nodes on the coast and will facilitate future bootstraps along the coast. This is a model that could also be adopted in Ireland.

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

WITH RESPECT TO KEY DRIVER (III), FUTURE PROOFING AND TECHNOLOGIES, WHICH OF MODELS 1,2,3,4, OR VARIANT OF THESE, DELIVERS THE MOST SATISFACTORY RESULTS? WHICH FEATURES OF THE MODEL, OR VARIANT, ARE THE MOST INFLUENTIAL FOR YOUR GIVEN CHOICE?

In Navigant's comparison between existing developer led models they provide the examples of Germany and the Netherlands where the TSO has built large offshore DC nodes and used these to connect multiple offshore projects, using a DC interconnector to bulk transfer large volumes of MWs to large demand centres far from the coast. From a technical point of view this model may not be appropriate for the Irish system. The Irish grid is a much smaller/ weaker grid than mainland Europe, with a largest infeed of 500MW (which will increase to 700MW once the Celtic Interconnector is connected). The Celtic Interconnector will cause grid stability issues that will need to be addressed by EirGrid's DS3 programme but it is likely that bulk transfer beyond 700MW may not be technically possible on the Irish System and has not been assessed by the TSO. Relevant Projects on the East coast of Ireland are already close to the main demand centre and therefore do not need to transfer power over significant distances. Similarly, there are several progressed Enduring Projects which can deliver pre-2030 on the east and south coasts near strong connection nodes. An AC offshore network would pose a different set of technical issues.

The maximum rating you will get on a 220kV offshore export cable is around 400MW per circuit. The Relevant Projects are likely to use the full capacity of their export cables so there is no added value inter-connecting their offshore substations unless it was to provide a bootstrap up the coast. It is likely that this solution would require further switchgear and reactors on the offshore platforms. The trend is for offshore platforms to get lighter and smaller. EirGrid future proofing of offshore substation requirements, to facilitate an offshore bootstrap, would reverse this trend and totally change the foundation type, substructure and topside design adding considerably to the cost of the offshore platform and substation. This is unlikely to be the most cost-effective way to create a bootstrap. An offshore bootstrap between two onshore nodes may be a more cost-effective solution. This could be facilitated in early years by Relevant Projects future proofing the onshore substations. It was disappointing that the Navigant analysis did not explore this as an option and did not acknowledge the unique nature of the Irish grid and the proximity of Relevant Projects to the main demand centre.

There is a concern that future proofing requirements from the TSO would add cost and delays to Relevant Projects. It is unclear who would fund the future proofing and how to quantify the cost of the TSO's functional and oversight requirements. The Relevant Projects are further advanced in their designs and planning requirements. Future proofing requirements, where not known, could significantly impact on Relevant Project timescales and costs. Projects would no longer have control over their consenting and construction timelines. There could be a conflict between the TSO's offshore functional requirements and a technically feasible design which could lead to protracted discussions

and delays in the consenting process. An example of this would be if EirGrid insisted upon maintaining 220kV onshore circuit ratings offshore.

There is a concern about the level of oversight required by the TSO/TAO if future proofing of offshore infrastructure is required and how this could affect construction timelines. Onshore wind experience is that the TSO/TAO would want to review the design, witness construction activities and attend FATs and SATs. This is likely to add programme delay risk and exposure to large delay claims from contractors. Works package interfaces for offshore wind projects are incredibly complex and programme delays in one package can result in knock on delays in other packages. The developer TSO/TAO interface for onshore contestable projects is not a smooth process and has introduced significant costs and time delays to projects. For an offshore project the stakes are so much higher and significant delays during the construction phase could cost hundreds of millions.

IWEA can also see issues around future asset transfer and change of ownership/ operational boundaries. To date onshore asset transfer has not been very smooth and has been a protracted and costly affair in many situations. Developers have concerns about this process and the demands that may be put upon them by the TAO for an offshore asset transfer. There is also the issue of a change in ownership boundary part way through the life of a wind farm. The grid code compliance requirements for the wind farm would have to fundamentally change if the ownership boundary was to move to the offshore substation. The fibre optic link to an onshore SCADA system is a crucial piece of infrastructure for the wind farm. How will the asset transfer affect the ownership and control of these assets and will the FO cable be shared, and will the developer have to relocate their onshore SCADA infrastructure?

From a financial perspective, there is also the question of how asset transfer would affect long term service agreements that may be in place and insurance premiums. Insurance premiums are linked to availability and compensation for non-availability. There is a concern over the level of availability commitment and compensation that would be provided for outages associated with faults or connecting in other projects (see Section 16 for more details). If the TSO's liabilities or penalties where capped it would lead to major hikes in insurance premiums as this would remove the incentive to minimise the outage period. This is currently the case in the UK with OFTO. It should be noted that the OFTO model is not best model for Ireland to follow due to ownership of asset debates, control of the build, functional spec compliance and no third party sign off being required.

WITH RESPECT TO KEY DRIVER (III), FUTURE PROOFING AND TECHNOLOGIES, WHICH OF MODELS 1,2,3,4, OR VARIANT OF THESE, DELIVERS THE MOST SATISFACTORY RESULTS? WHICH FEATURES OF THE MODEL, OR VARIANT, ARE THE MOST INFLUENTIAL FOR YOUR GIVEN CHOICE?

There is also the question around how DS3 System Services revenue would work for offshore projects who had designed their reactive compensation onshore to meet grid code compliance. If ownership of the connection offshore is taken over by the TAO, will the developer retain control, ownership and operation of the reactive compensation onshore which has now been separated from the offshore wind farm? How will those assets be maintained if the compound has been taken over by the TAO? How will System Services revenue be paid to the developer for their operation? The revenue stream from System Services for reactive compensation and possibly other services is not an insignificant revenue source for offshore projects and this needs to be factored in.

In summary, IWEA is not opposed to future proofing of onshore substations associated with offshore wind farms if deemed beneficial, but IWEA does not see the requirement or need for blanket future proofing of offshore assets associated with offshore projects prior to 2030.

7 With respect to key driver (iv), required infrastructure, which of models 1,2,3,4, or variant of these, delivers the most satisfactory results? Which features of the model, or variant, are the most influential for your given choice?

In relation to required grid "infrastructure", the Navigant report (e.g. Figure 4 Advantages and Disadvantages of grid delivery model options for key drivers in Ireland) suggests that Option 1 would provide '*no coordination and optimisation on- and off-shore grid across ORE projects*' and that Option 2 would provide '*less coordination potential*' compared to option 3 and 4.

We do not necessarily agree that Option 1 would not allow for coordination and optimisation across projects. This model has been applied to onshore historically, for example through the successful implementation of several aspects of the DS3 programme which has led to facilitating a 65% SNSP penetration on our electricity system and will deliver further benefits in the coming years. We accept that offshore has a greater scale but the lower number of projects should mean less complexity in the power system analysis needed to future plan the onshore grid developments for the offshore projects.

In an auction environment it will not be known, until post-auction results and bonding, which projects will be progressing when, or if at all. Yet, forward planning of onshore nodes to accommodate the necessary capacities at strategic locations, irrespective of which individual project, can still be coordinated through the development of strategic nodes. Indeed, it is the capacity enablement at the point of connection to the onshore grid that is the critical enabler of offshore wind and is needed to allow connection of projects in the mid-2020's to achieve 2030 CAP targets.

Given the ambitious targets and potential for grid capacity creation to be on or near the critical path for offshore development and connection, we consider that the limited resources available to EirGrid and ESB Networks should be focused on the onshore grid development works necessary to facilitate this 5GW of capacity out to 2030. While there is a place for other models, including centralised, post our 2030 ambition and/or in or around certain geographical locations, for example with little pipeline or where market attractiveness is low without intervention, achieving our 2030 ambitions will require the parallel focus of industry to consent, finance and build projects offshore and EirGrid and ESB Networks to enable the connection of this capacity (in line with interim objectives throughout the 2020s) and the operation of the system ensuring minimum constraint and curtailment. Attempting to move immediately to Options 3 or 4 for Relevant Projects and pre-2030 Enduring Projects will take

focus and limited resources away from the onshore system developments – which are urgently needed and create a very real threat that we will fail to deliver projects for 2030 and impede financeability and investability in offshore in the short to medium term.

Plans for a more centralised model on the west coast to unlock the Atlantic Ocean floating offshore wind potential could be progressed in the coming years, with a view to continuing our decarbonisation pathway beyond 2030. However, as previously summarised this should be in parallel, well signalled, not put at risk the 2030 development pipeline, and consulted upon further once the post-2030 ambition and policy landscape is clearer over the next two years.

We would highlight that 2030 projects will require capacity to be available circa 18-24 months post auction. This signals that the onshore planning and reinforcements to connect east coast projects needs to begin immediately. Indeed, we believe certain upgrades are likely to be behind where they need to be to support the Relevant Project connections already. To create an environment where pro-active actions can be taken in respect of grid capacity planning and development, aspects of Option 2 should, in our view, be incorporated into the Option 1 model in a hybrid grid delivery model. In particular, we would argue for the pro-active planning and coordination of onshore grid reinforcements to support the delivery of capacity for each offshore RESS auction, with early engagement with developers to identify the location, capacity and timelines developers can expect this capacity to be in place.

The most economic projects will be awarded through the auction and progress to a grid connection, but there are many locations where onshore capacity can be developed through a 'no regrets' model by identifying strategic nodes (substantially in line with the East Coast model). The focus of onshore development will also provide Ireland with an opportunity to overcome other capacity constraints influencing other sectors such as large customer demand hubs in the Dublin area.

In responding to this consultation, we could not find any example of any other market which tried to move to a new grid development model so close to the first planned auction and with such financial investment and project pipeline clarity in early stage projects. To consider this step change when also simultaneously trying to ensure project delivery within circa 5 years and 5GW within 10 years comes with significant risks. We would raise serious concern in Ireland's ability to deliver offshore projects consistently and at scale without having a long, well signalled and clearly mapped out approach in transitioning to Options 3 or 4 (or any combination of these aspects) which we believe should be

WITH RESPECT TO KEY DRIVER (IV), REQUIRED INFRASTRUCTURE, WHICH OF MODELS 1,2,3,4, OR VARIANT OF THESE, DELIVERS THE MOST SATISFACTORY RESULTS? WHICH FEATURES OF THE MODEL, OR VARIANT, ARE THE MOST INFLUENTIAL FOR YOUR GIVEN CHOICE?

further consulted upon once our post-2030 policy landscape is clearer, and should contain a focus towards Ireland's long-term offshore generation export potential ambitions.

The approach of signalling a move to Option 3 or 4 in Q3 2020, which includes being applicable for all projects needed to deliver for 2030 would also create an immediate incompatibility with planning and environmental requirements, relative to how developers are currently progressing, as has been detailed in separate sections of this response.

8 With respect to key driver (v), compatibility with Relevant Projects, which of models 1,2,3,4, or variant of these, delivers the most satisfactory results? Which features of the model, or variant, are the most influential for your given choice?

IWEA welcome that the Navigant report strongly agrees that only the developer led approach is compatible with Relevant Projects. We would agree that the plan-led Options 3 and 4 are not in any way compatible with developing the Relevant Projects.

For Relevant Projects, the next steps need to recognise the existing contractual position and the urgent timeline needed to ensure the offshore development pipeline is not stalled and there is not an unnecessary long gap between the first phase of Relevant Projects and the following phase needing reinforcements.

What is required is a bespoke approach to developing the Relevant Projects through a combination of aspects of Option 1 and 2. Many of the aspects of Option 1 are also appropriate for Relevant projects. The grid connection point should be onshore. The developers are responsible for consenting, and following successful participation in an auction, are responsible for financing and construction of the windfarm and offshore transmission assets. The offshore transmission assets are operated and maintained by the windfarm.

EirGrid is also starting to proactively develop the sensible and realistic reinforcements for the Relevant Projects now. Following the direction by the CRU in January 2020 for EirGrid to progress with the processing of connection applications for the Relevant Projects, EirGrid have engaged with the Relevant Projects and now know the locations of the projects and their approximate size. They have held a workshop to set out the studies they will be undertaking to facilitate the connection of these projects, and these studies should include identification of sensible and realistic reinforcements.

The critical feature of Option 2 that is required for Relevant Projects is for the proactive development of the onshore grid reinforcements. To accommodate all the capacity of the Relevant Projects it is evident that onshore reinforcements are required. However, we believe that the necessary reinforcements, with appropriate priority and focus, can be delivered in a timeline to ensure the Relevant Projects can connect and contribute to our interim renewable targets and 2030 renewable electricity targets. The development of 220 kV transmission infrastructure in the South West, critical

to the delivery of the onshore wind required to meet the 2020 renewable electricity targets, demonstrates how substantial transmission infrastructure can be delivered in similar timelines.

There needs to be collaboration between the stakeholders on the delivery of grid connection works required for the connection and operation of the Relevant Projects. To oversee and ensure the successful delivery of the grid connections and reinforcements for the Relevant Projects, it is proposed that a Project Office and 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 220 kV projects. There should also be representatives from CRU, DCCAE and the Relevant Projects on this board. This board should report its progress under Action 25 of the Government's Climate Action Plan.

Other aspects of Option 2, for example minimum distance from shore and the TSO determination of the projects that are ready for RESS auctions, are not necessary or appropriate for the Relevant Projects considering the existing progress that has been made on development of the sites. However, through the development of the offshore grid regulatory framework and/or the RESS design there will need to be a balanced achieved between the legal certainty on the grid connection method, costs and timelines and the need to ensure grid capacity for offshore renewable projects is used efficiently.

9 With respect to key driver (vi), social acceptance, which of models 1,2,3,4, or variant of these, delivers the most satisfactory results? Which features of the model, or variant, are the most influential for your given choice?

9.1 Introduction

Community engagement and ensuring social acceptance has been proven to be a critical part of infrastructure development. The approach taken by project promoters is a key factor in the success of a wind energy development.

In Options 1 and 2, developers consent projects and carry out community consultation. In Options 3 and 4, a State ORE Body leads on this and is the key interface with the community during the consent phase.

While there are advantages and disadvantages for each, we believe that Option 1 offers the best way forward for projects along the east and south coast. It appears to us that the conclusions drawn in relation to the merits of the centralised approach are not borne out by the evidence provided in the report nor by the experience of infrastructure project development in Ireland.

An extensive literature has developed in regard to social acceptance and infrastructure development. While there has been less research on offshore wind as it is a newer technology, some clear themes have emerged as acknowledged in Navigant's report:

- **Meaningful consultation at an early stage can help to refine the design approach to a project, explain the potential benefits of a project and establish an open relationship at the outset.**
- **Research also shows that ensuring communities have the opportunity to share in the socio-economic benefits of offshore wind farm projects is key.**

In the sections below we will respond to some of the statements contained in the Navigant report and set out the arguments in favour of a community engagement process that is bottom-up and designed to the unique needs and preferences of the local community rather than a standardised, one-size-fits-all approach that is imposed onto local people.

WITH RESPECT TO KEY DRIVER (VI), SOCIAL ACCEPTANCE, WHICH OF MODELS 1,2,3,4, OR VARIANT OF THESE, DELIVERS THE MOST SATISFACTORY RESULTS? WHICH FEATURES OF THE MODEL, OR VARIANT, ARE THE MOST INFLUENTIAL FOR YOUR GIVEN CHOICE?

9.2 A unique approach for each community

While there are merits in seeking to coordinate community engagement strategies across projects as much as possible, the conclusion that a plan-led approach "might improve social acceptance due to an overarching coordinated planning strategy across individual wind developments" does not appear to be supported by the evidence provided in the Navigant report.

While there may be some benefits, the clustering of projects and combining of social acceptance processes could lead to confusion and have unintended consequences. While all wind farms share some characteristics, projects can differ when it comes to key criteria. For example, the make-up of the communities along the coast may vary, projects tend to be situated at varying distances from shore and can also vary significantly in size. Grouping wind farms together could have a negative impact on an individual project's chance of getting consented.

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.

The Navigant report also states that because a social acceptance process would need to be established for each individual project in the developer-led model, this process would be "less standardised across developments and does not take into account future projects".

As highlighted above, community consultation and engagement tailored to the needs of an individual project should not be viewed negatively. Every wind farm and community is different and establishing bespoke engagement campaigns will be necessary to ensure projects win social acceptance. Opportunities to share good practice are promoted at an industry level. IWEA is a forum where developers share engagement plans, good practice and seek to find synergies where beneficial. This activity is already underway and later this month, for example, a webinar will take place to share best practice experience in the Irish market of introducing an offshore wind project to the local community.

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.

WITH RESPECT TO KEY DRIVER (VI), SOCIAL ACCEPTANCE, WHICH OF MODELS 1,2,3,4, OR VARIANT OF THESE, DELIVERS THE MOST SATISFACTORY RESULTS? WHICH FEATURES OF THE MODEL, OR VARIANT, ARE THE MOST INFLUENTIAL FOR YOUR GIVEN CHOICE?

Our members approach to consultation and engagement is to engage meaningfully and early with communities. While we acknowledge that the industry's approach to community consultation must always evolve in light of new research and feedback from communities, we believe that Navigant's report underestimates the extent to which developers have an interest in ensuring this is approached effectively. Our members know that engaging in a meaningful and participative manner with individuals and communities who will be affected by offshore wind energy development is the optimal approach to gaining acceptance for a project. It can also lay the foundation for successful engagement with other communities in the future. Successful examples of community engagement in wind energy development are already collected, shared and studied by IWEA members through regular meetings, working groups and policy forums to ensure lessons learned can be applied to future projects.

For a developer, successful community engagement and the building of social acceptance is not only the right thing to do, it also ultimately delivers time and cost savings in the project development process by eliminating avoidable delays, particularly during the planning and construction phases of the project life cycle.

9.3 The role of the State in social acceptance

We believe there is a role for coordination in this space but that it would be more effective for this to be kept at a high-level rather than be focused on project specifics. A coordinated awareness campaign focused on the east and south coast could be beneficial. This could be led by the State, industry or jointly. Research shows that general attitudes have a substantial influence on responses to individual projects. It is therefore recommended that the public be engaged in discussions of both specific project characteristics and larger issues regarding renewable energy[16]. Research recently carried out by UCC suggest that there is merit in pursuing a national campaign to strengthen the understanding of the direct link between offshore wind and climate change[17].

We will face an enormous national challenge in this decade. The difficulties in developing and connecting 3.5 GW of offshore wind – potentially 5 GW as suggested by the new Programme for Government – cannot be understated. These targets are achievable, but only in the context of a

[16] D. Bidwell and M. Affairs, "Public acceptance of offshore wind energy: Relationships among general and specific attitudes," *OCEANS 2015 - MTS/IEEE Washington*, Washington, DC, 2015, pp. 1-6

[17] V. Cummins and Y. Cronin "Co-designing opportunities towards the development of Irish offshore wind: Public Perceptions report", EirWind

determined effort by the State, industry and the business community to explain, empower and mobilise people and communities to help drive the energy transition forward.

An awareness raising campaign should be incorporated into Option 1 focused on influencing general attitudes to renewable energies to make clear the link between carbon emissions reduction and the installation of wind energy. We need to set the offshore industry up to succeed. A clear narrative can help set the tone and clearly communicate the benefits of offshore wind and its key role in tackling climate change.

Over the last 20 years it has largely fallen to industry to communicate and advocate for renewable energy and ensure Ireland is in a position to meet its EU renewable electricity targets. As we develop offshore wind energy there is the opportunity at this early stage for a narrative to be created, shaped and then communicated right across Ireland that offshore wind energy is the key to cutting our CO_2 emissions, stimulating a green economic recovery and, in the long-term, turning Ireland into an energy exporter.

We would strongly argue that the role of the State in ensuring social acceptance for offshore wind energy development is not in taking responsibility for community engagement for individual projects. It is in taking a national perspective, using its reach and resources to design and deliver positive messaging around wind energy which will shape the context in which community engagement for individual projects takes place.

In addition to awareness raising, State coordination would also be beneficial in other areas such as community benefit guidelines and industry engagement particularly in the area of fisheries. The industry is already actively seeking to establish a formal mechanism for engagement modelled on the Fishing Liaison with Offshore Wind and Wet Renewables Group (FLOWW) which was set up in 2002 in the UK to foster good relations between the fishing and offshore renewable energy sectors and to encourage co-existence between both industries.

Facilitated by the Crown Estate, FLOWW's objectives are to enable and facilitate discussion on matters arising from the interaction of the fishing and offshore renewable energy industries, to promote and share best practice, and to encourage liaison with other sectors in the marine environment. A key output of this Group has been the FLOWW Guidelines[18] which cover planning and consenting

[18] FLOWW Best Practice Guidelines for Offshore Renewables Developments: https://www.thecrownestate.co.uk/media/1776/floww-best-practice-guidance-disruption-settlements-and-community-funds.pdf

processes, liaison practices, mitigations and coexistence practices and safety zones. The incorporation of this model into Option 1 will also help improve stakeholder relationships and social acceptance.

9.4 Harnessing experience

Developers have extensive experience in offshore wind development from the work they have carried out in other European countries. These developers are already applying their experience to the Irish market, combining their experience of onshore wind energy development in this country with best practice globally. A number of projects are at advanced stages of development off the east and south coasts.

Community engagement is already underway for all of these projects which are generally categorised as legacy or relevant projects. To provide continuity, maintain trust and avoid information vacuums, it will be imperative for these projects to progress through the grid development process in an Option 1 type model with the strategic forward planning elements for the transmission system in Option 2 as discussed in other sections of this response.

Most of them are at a critical point in the stakeholder and community engagement process. Detailed discussions have already taken place with local stakeholders and positive relationships established with key figures in the community. This is a process that will be ongoing throughout the life cycle of the project. The list of community engagement activity that has been carried out – and is still underway – includes:

- Public launches of the projects;
- Briefings and face-to-face meetings with people working in the Irish fishing industry with a particular emphasis on fishermen whose activity may face disruption;
- Briefings for key local stakeholders including the relevant local authorities, the business community, ports and harbours, and media;
- Briefings for elected representatives including members of the relevant local authorities and the Oireachtas;
- Printing and distribution of material explaining the project to members of the public; and
- Launches of individual websites for each project providing information to members of the public.

Developers are already delivering community engagement for offshore wind projects in an Irish context. A number of these developers have plans to develop other projects along the east and south coast. A move to a more a centralised approach would lead to the loss of this knowledge and expertise and an inability for developers to build on these relationships.

WITH RESPECT TO KEY DRIVER (VI), SOCIAL ACCEPTANCE, WHICH OF MODELS 1,2,3,4, OR VARIANT OF THESE, DELIVERS THE MOST SATISFACTORY RESULTS? WHICH FEATURES OF THE MODEL, OR VARIANT, ARE THE MOST INFLUENTIAL FOR YOUR GIVEN CHOICE?

It should also be noted that community engagement has already commenced for projects which fall outside of the Relevant Project category. The move to a State-led approach once Relevant Projects are dealt with would undermine the progress made here to date. It would also mean the loss of the relationships built up with the local community – both individually and collectively – by project staff. Having discussed the proposed wind farm with project staff, in many cases to some detail, local people would be told that they must now engage with a new State agency that, at time of writing, does not exist.

Disrupting an ongoing community engagement process needs to be avoided as it will create confusion and erode trust built up with stakeholders in the local community in gaining social acceptance for the projects. It could risk seriously undermining efforts to develop, with the support of local communities, 5 GW of offshore wind energy by 2030 and to meet our international obligations for cutting carbon emissions.

We would also note that it cannot necessarily be inferred from the evidence provided that a State body can carry out community consultation better than developers based on the evidence provided. Recent experience shows that infrastructure projects can meet challenges regardless of whether the project promoter is the state or a private developer.

It also appears to us that insufficient attention has been given to the question of how a State body would carry out community engagement on this scale nor on the risk created by giving all of this responsibility to a single body.

Each developer will have their own team of dedicated specialists in the fields of environmental surveying, community engagement, stakeholder management, communications and fishing liaison. This entails very substantial allocation of financial and personnel resources. It is difficult to imagine a State body being able to provide the same level of resources to properly manage community engagement for every stage of development for every Irish offshore wind farm as the developers who would be responsible for this work under Option 1 and 2. As we outline above, we would caution against the clustering of social acceptance processes across projects as communications should be tailored to the characteristics of individual development.

There is also a significant risk to allocating this responsibility to a single entity. Successfully delivering infrastructure projects in Ireland is extremely challenging. Mistakes can be made and this can have a negative impact on the reputation of the company or body involved, damaging their brand identity.

WITH RESPECT TO KEY DRIVER (VI), SOCIAL ACCEPTANCE, WHICH OF MODELS 1,2,3,4, OR VARIANT OF THESE, DELIVERS THE MOST SATISFACTORY RESULTS? WHICH FEATURES OF THE MODEL, OR VARIANT, ARE THE MOST INFLUENTIAL FOR YOUR GIVEN CHOICE?

If a State body responsible for offshore wind farm development was to find itself in a difficult or controversial situation with one project there would be a real risk, since the same State body would be responsible for every other project, of cross contamination which would undermine other existing or future projects.

Finally, we believe it is worth highlighting that most of the developers looking to build offshore wind farms have already been involved in successfully developing wind farms onshore and have learned a great deal from that experience. In recent years we have seen increased social acceptance and support for the development of onshore wind energy as developers have applied the lessons learned from project development and improved how they engage with and work with communities to build new projects.

Evidence for this can be seen from three important measures:

- Opposition to wind energy as recorded in opinion polls has fallen steadily from a height of 13 per cent in 2014[19] to 4 per cent in 2019[20];
- Record levels of wind energy have been connected to the transmission system with 2018 and 2019 being the first and second best years respectively for adding new capacity as levels of social acceptance have increased;
- In 2014, when the Wind Energy Development Guidelines were out to consultation, almost 7,500 submissions were received[21] while during the consultation in 2020 fewer than 500 submissions were received[22].

All of these indicators show an industry that is increasingly successful in winning support for the development of onshore wind energy, in ensuring social acceptance and can now transfer those learnings to the offshore space.

9.5 Making offshore wind energy more expensive

Ensuring proposals for development take proper account of the impact on landscape and seascape is a critical part of sustainable development. All offshore wind projects are required to demonstrate how

[19] Ipsos MRBI opinion poll. October 2015.
[20] Interaction opinion poll. December 2019.
[21] https://www.housing.gov.ie/planning/guidelines/wind-energy/public-consultation-wind-energy-guidelines-focused-review-draft
[22] Parliamentary question 1027, Dáil Éireann, 27 May 2020.

they can avoid, minimise or mitigate significant adverse seascape and landscape impacts through an EIA during development.

We understand that the Marine Institute is undertaking work on the methodology and identification of preliminary/draft Seascape Character Types and Seascape Character Areas at a national and regional level to inform Ireland's approach to marine spatial planning and contribute to Ireland's National Landscape Strategy 2015-2020. We welcome this piece of work as a consistent approach to the classification of landscape and seascape is required to ensure projects can be progressed with certainty.

We do not believe that minimum distances from shore should be a feature of offshore wind energy development or be in scope for this grid development consultation. This did not emerge as a feature or recommendation in the draft National Marine Planning Framework, a document which has been subject to a lengthy and extensive consultation process. Minimum distances from shore on the east and south coast would rule out viable areas and put Ireland's ability to meet 2030 targets at risk.

As noted throughout multiple sections of this document, a minimum distance from shore requirement would have an impact on costs to the consumer. If such limits were set such that seabed suitable for offshore wind farm development was severely restricted, or that early offshore projects were no longer viable, Ireland's offshore industry could be set back significantly. A reduced amount of seabed available, potentially in deeper waters, is likely to put upward pressure on costs.

In short, imposing a minimum distance means more expensive electricity for consumers and more carbon emissions, which we believe would serve to undermine social acceptance for offshore wind energy development.

9.6 Making landfall

The Navigant report states that "As a developer-led model will not typically lead to offshore hub connections, it could generally result in more individual connections to shore that could negatively impact public acceptance".

However, the Navigant report goes on to acknowledge that the pipeline of projects on the east coast are relatively close to each other and close to the shore. Therefore, the opportunities to leverage the advantages of combining projects on a single hub are likely limited. It does not appear as if this is a relevant consideration in this context.

In any event, onshore landing points can be managed with a proactive approach from the TSO. The TSO should work with developers to find synergies between projects when it comes to grid connection. An approach such as this could help mitigate any potential issues and we would like to acknowledge the substantial improvements delivered by the TSO in recent years in coordinating onshore grid connection.

It also should not necessarily be assumed that large onshore landing points will lead to greater public acceptance than smaller landing points for individual wind farms.

9.7 Conclusion

As set out above we believe that Option 1, in tandem with strategic elements of onshore infrastructure development in Option 2, represents the best hybrid approach to ensuring social acceptance for offshore wind energy development. It puts responsibility for community engagement with those who have the greatest experience in the area.

But this should not be seen as industry suggesting there is no role for the State in ensuring social acceptance for offshore wind energy. Rather, we believe that the State's primary responsibility should not be taking over individual projects and attempting to engage with every single community affected by offshore wind energy development. It should instead be to shape at a national level the approaches taken to working with communities and the context in which that work takes place.

The State can do this by:

- Working with industry to produce a set of best practice principles to ensure effective community engagement and to assist in securing social acceptance;
- 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;
- Establishing and resourcing a formal engagement mechanism to bring together industry and the fishing community modelled on the Fishing Liaison with Offshore Wind and Wet Renewables Group (FLOWW);
- Clarifying how community benefit requirements for offshore wind energy projects will be set out in RESS 2.

We believe that the resources available to the State should, therefore, be focused on ensuring the national policy framework and context is in place to help secure social acceptance and that the developer should take responsibility for working with individual communities for each project.

10 With respect to key driver (vii), facilitating the timely development of offshore wind capacity to achieve the 2030 target, which of models 1,2,3,4, or variant of these, delivers the most satisfactory results? Which features of the model, or variant, are the most influential for your given choice?

10.1 Background

In assessing the impact of the grid delivery model on the ability to achieve the 2030 target it is important to set out the wider context of how the 2030 target of 5GW of offshore wind energy in Ireland as per the recent Programme for Government will be achieved and an applicable project development timeline.

As set out in the accompanying Navigant Report, Figure 3 below demonstrates project attrition through both the planning and competitive auction processes.

Figure 3: Pipeline attrition through project development phases

This highlights the need to progress projects representing a capacity significantly larger than the target capacity of 5GW through the development phase and further, to compete in a RESS auction. As a result, both the Relevant Projects and Enduring Projects which are currently in development will be required to meet the 2030 targets.

In relation to the development timeline for an offshore wind project, the below Figure 4 sets out the timing, on a non-project specific basis, from site selection through to commercial operation.

WITH RESPECT TO KEY DRIVER (VII), FACILITATING THE TIMELY DEVELOPMENT OF OFFSHORE WIND CAPACITY TO ACHIEVE THE 2030 TARGET, WHICH OF MODELS 1,2,3,4, OR VARIANT OF THESE, DELIVERS THE MOST SATISFACTORY RESULTS? WHICH FEATURES OF THE MODEL, OR VARIANT, ARE T

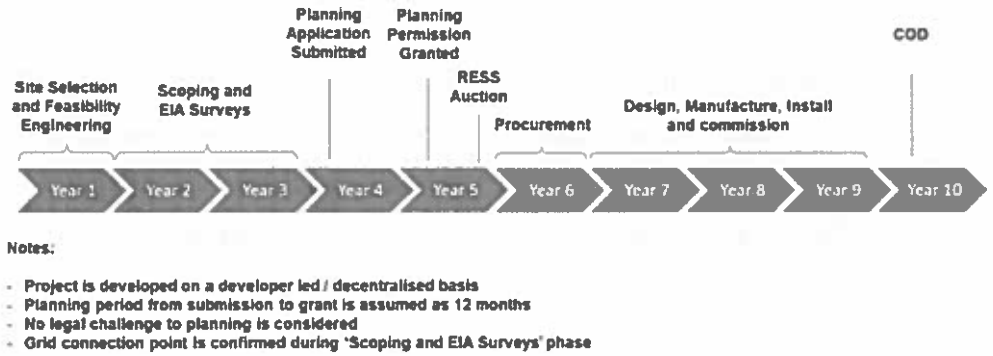


Figure 4: Offshore Wind Farm – typical development timeframe

Due to the project development timeframe, any project(s) which intends to connect in advance of 2030 will be required to commence detailed site-specific development comprising EIA scoping and environmental surveys in 2020. External factors, such as delays to the enactment of legislation, nature of grid delivery model or legal challenges, which either delay the commencement of development or prolong this phase will have a detrimental effect on the industry's ability to achieve the 2030 targets.

10.2 Model Assessment – Developer or Plan Led

The four options set out in the consultation document can be broadly grouped into developer-led (Option 1 and 2) and plan-led (Option 3 and 4) delivery models with several differing aspects in their implementation within these groupings.

Throughout the report, Navigant determine that a key advantage of a developer-led model is the ability for projects to be developed quickly and to commence offshore wind developments in the short-term. This timing advantage is driven by the development inputs being predominantly under the control of a single entity (the project developer) allowing the technical design of the project to be assessed from the outset of the consenting phase. In terms of the 2030 targets, the ability of the developer-led model to allow projects to progress in the near term is key in terms of its selection as the model for the coming decade.

In contrast to this, the plan-led approach is highlighted as a model which takes considerably longer to implement than the developer-led model. This is driven by the time required at the outset to develop new governmental capabilities and to adapt policy, regulatory, licence and legislative frameworks. The establishment of a State development body including the associated upskilling and sourcing of funding to undertake site development would lead to a multi-year delay to site consenting and as such is not a suitable model to deliver capacity pre-2030.

WITH RESPECT TO KEY DRIVER (VII), FACILITATING THE TIMELY DEVELOPMENT OF OFFSHORE WIND CAPACITY TO ACHIEVE THE 2030 TARGET, WHICH OF MODELS 1,2,3,4, OR VARIANT OF THESE, DELIVERS THE MOST SATISFACTORY RESULTS? WHICH FEATURES OF THE MODEL, OR VARIANT, ARE T

10.3 Specifics of a Developer-Led model

It is clear, given the above development timelines and the relatively limited time to achieve the 2030 targets, that a developer-led grid model is most appropriate to deliver the necessary capacity in the coming decade. Within the general context of the developer led model the interaction with the TSO, to ensure a common understanding of available system capacity, is a critical feature for successful project delivery.

10.3.1 Pro-active onshore grid reinforcement

Given the scale of the challenge to connect 5GW of offshore wind by 2030 it is essential that onshore grid reinforcements are planned and progressed as soon as possible to ensure sufficient capacity is made available throughout the east and south coasts. The assessment and planning of onshore reinforcements in a reactive manner will not be sufficient to deliver the capacity required and as such the planning and consenting of these reinforcements should commence as soon as possible.

The East Coast Generation Opportunity Assessment report was a seminal study in terms of identifying and setting out available capacity on the east coast. It is recommended that the scope of this study is extended to include the south coast to set out the reinforcements that will be required to facilitate the connection of 5GW of offshore wind by 2030. Furthermore, IWEA believe EirGrid should carry out a techno-economic assessment as soon as possible on the offshore generation export potential of Ireland's west and south coasts, with a focus on the grid capabilities and requirements for reinforcements in these areas to facilitate this for our post-2030 ambitions.

The identification of suitable connection points in the near term will ensure developers can continue to progress their project through the consenting phase ensuring a sufficient number of projects for the 2030 targets. Further to the ongoing engagement between the TSO and the Relevant Projects, the Enduring Projects will require similar interaction in the near term and as such, the resourcing of the TSO should be reflective of this requirement.

10.3.2 Design of offshore transmission assets

In Option 2, the proposed approach of combined delivery of technical specifications for the offshore transmission assets has the potential to delay the early development and consenting stage of a project due to the multiple inputs to the overall project design. This point should be applicable to any assets which are handed over to the TSO; however, stipulating the requirement for technical input into

infrastructure consented, built and operated by the project developer will lead to delays in consent and potentially result in higher overall project costs as set out further within this paper.

10.4 Learnings from other jurisdictions in achieving targets

Within the consultation document the timing of project deployment is cited as a key driver of the grid model evaluation, but critically does not weight this against other determining factors – "*It should be noted that the Options Paper on Offshore Grid Models report does not apply any weighting to the various driver*" (page 5). The document goes on to demonstrate the importance of timelines in mapping out prospective grid models and reiterates that "*overall suitability of each model option in the Irish context highly depends on the emphasis and relative weighting of certain criteria to reflect key stakeholder perspectives.*" (page 10). It is key then, given the 2030 target of 5GW, that those factors which have an ability to negatively impact the delivery of this capacity are thoroughly scrutinised.

Whilst recognising the need for timelines to be considered in the choice of grid connection model, the consultation document does not jointly consider the projects required to achieve the 2030 targets and overall timelines. The suitability of developer-led grid options (models 1 and 2) for existing projects is recognised; however, the importance of this relative to achieving the Government's offshore wind target of 5 GW by 2030 is discounted. This is highlighted through the following observations:

- The Irish offshore wind portfolio of projects in a scoping, development, or consented phase is approximately 12.3 GW. Projects at more advanced stages of development (in planning or consented) comprise approximately 5 - 6 GW.
- Required timelines to establish plan-led offshore transmission systems delivering 5 GW historically exceed 10 years from the point of enactment of enabling infrastructure:
    - Germany – 11 years. TenneT TSO mandated in 2006 to provide transmission for offshore wind farms. Germany had commissioned 5 GW cumulative capacity in 2017. The delivery of this capacity was only achieved by government intervention to increase the Feed in Tariff rate which incentivised developers to proceed while risk around the plan-led grid delivery remained.
    - Netherlands – 12 years (anticipated). TenneT TSO was mandated in 2014 to provide transmission on future projects still under construction as part of the Offshore Wind Energy Act. Projects developed under the new centrally planned offshore wind framework

are expected to reach 5 GW capacity in 2026. However, it should be noted that the remaining projects required to reach the 5GW capacity are part of existing multiphase developments.

- Denmark – Not projected to reach 5 GW with projects following a plan-led grid model. The next offshore wind farms leased in Denmark as part of the Thor lease auction will have developer-led transmission systems. The Danish government has reverted to a developer-led model after public criticism of the socialised costs of the plan-led model which yielded additional delays and costs to the Kreigers Flak project.
- Belgium – Not projected to reach 5 GW with projects following a plan-led grid model before 2030. Belgium is currently transitioning to a centralised site auction model resulting in a four-year gap of offshore buildout. Future wind development in Belgium is likely to retain a plan-led model with MOGs.

The Netherlands is one of the most established offshore wind markets in the world, and one of only six countries with an operational capacity of over 1 GW. The timeline below in Figure 5 highlights the significant level of forward planning undertaken by both the TSO and the central development agency, RVO, to achieve an installed capacity equal to Ireland's overall ambition of 5GW in a 12 year period.

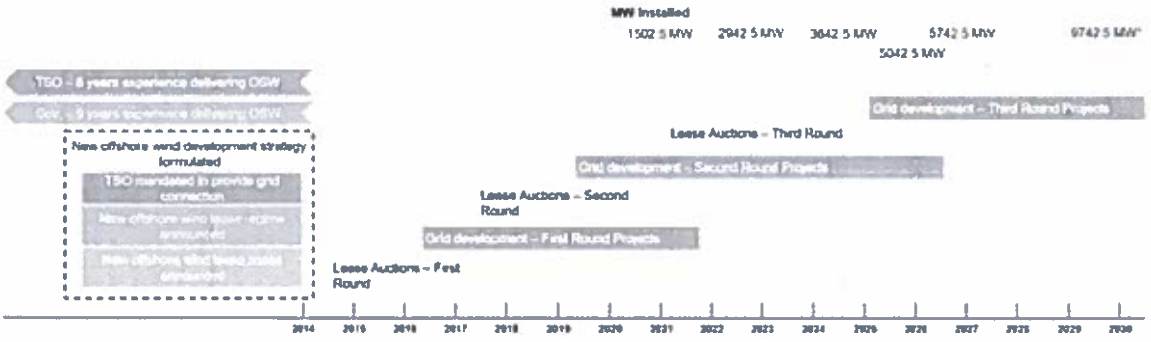


Figure 5: Netherlands TSO operations timeline

Moreover, at the time TSO TenneT was mandated to provide grid connection for future offshore wind projects in 2014, the TSO had amassed six years of experience in developing suitable offtake systems and procedures for the German offshore wind market.

Despite the existing experience in providing a transmission network, and the existing infrastructure present for offshore wind in the Netherlands, a plan-led transmission system in the country is forecast

to deliver the government target of approximately 3.5 GW of installed capacity 10 years after mandated to do so by the government. This is 1.5 GW less than the Irish development target over a 9-year period to 2030.

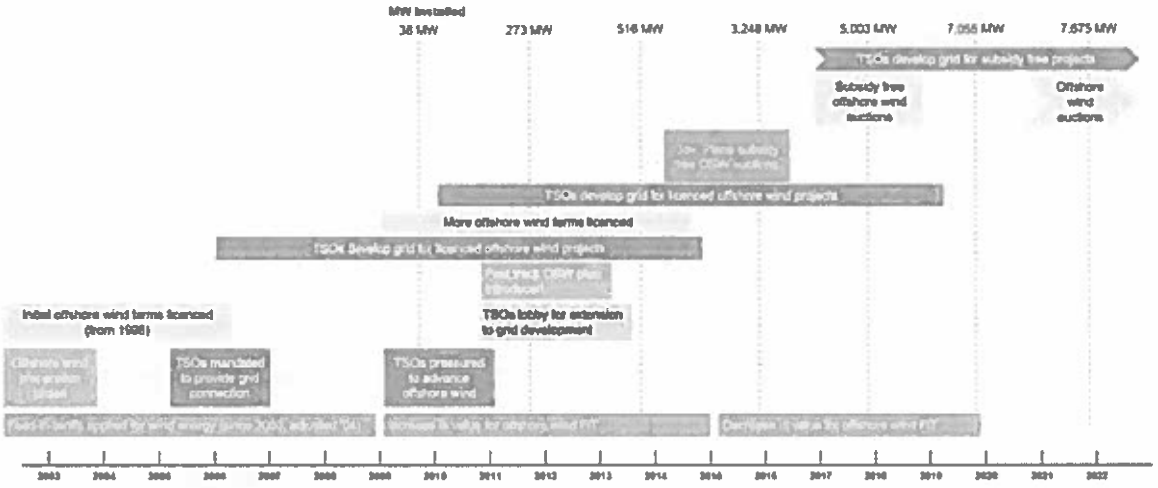


Figure 6: German TSO operations timeline

10.5 Conclusion and recommendations

Given the timing to achieve the 2030 targets and the overall timeline for project development, it is clear that a developer-led grid delivery model is the appropriate choice to deliver capacity in the near term and medium term.

As part of the developer-led grid delivery model, there are two aspects which are critical in relation to timelines:

- Pro-active onshore reinforcement planning and consenting by TSO as proposed in Option 2; and
- Ensuring design and ownership of developer consented assets as proposed in Option 1.

IWEA recommend that an updated version of EirGrid's East Coast Generation Opportunity Assessment 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.

WITH RESPECT TO KEY DRIVER (VII), FACILITATING THE TIMELY DEVELOPMENT OF OFFSHORE WIND CAPACITY TO ACHIEVE THE 2030 TARGET, WHICH OF MODELS 1,2,3,4, OR VARIANT OF THESE, DELIVERS THE MOST SATISFACTORY RESULTS? WHICH FEATURES OF THE MODEL, OR VARIANT, ARE T

10.6 Note in relation to 'Zone Identification' and 'Minimum distance from shore':

It is critical that the 'zone identification' activity envisaged under each of the grid delivery models maintains the hybrid approach set out within the National Marine Planning Framework ("NMPF") and the discretionary process envisaged by Head 21 of the Marine Planning and Development Management Bill ("MPDM"). A formal zoning process should be forward looking only and not look to retrospectively apply to projects currently under various stages of development. Given the minimum two-year period associated with zone identification, introducing this step now as a precursor to the progression of current developments will detrimentally impact project developments and will not allow projects to progress in such time to achieve the 2030 targets.

As IWEA submitted in relation to the NMPF consultation, spatial designations and the zone identification set out in Figure 3 of the consultation document should reflect the areas already identified in the Offshore Renewable Energy Development Plan 2014 (OREDP) as being suitable for offshore wind development. This includes the large areas anticipated in the Navigant report such as the East Coast (North), East Coast (South) and South Coast. Developers have already identified and are actively developing sites on the basis of the signal provided in the OREDP.

In relation to defining the 'Minimum distance from shore' as set out in Options 2, 3 and 4, for reasons that are set out throughout this consultation it is not appropriate for a blanket setback to be applied in relation to offshore wind development. The impact of applying this aspect to the developer-led delivery models will delay projects from commencing development and as such will not allow the 2030 targets to be achieved. Each project will, through the project specific EIA process, undergo a rigorous assessment of the landscape and seascape associated with the particulars of both the individual project and the applicable coastline. This process, and the subsequent assessment undertaken by the consenting authority who has significant experience in this field from onshore projects, sets an extremely high bar in terms of acceptable impact on the coastline. A site-specific assessment on an individual project basis is the most appropriate methodology for assessing this impact.

10.7 Note in relation to 'unbundling' EU legislation relating to Options 3 and 4

Grid models must be compatible with existing policy and regulatory requirements. Currently, the "onshore" grid delivery model provides the framework for offshore wind projects and offshore wind transmission asset development in Ireland. Grid development policy for offshore wind will require to be informed by compliance with European law requirements – in particular, the unbundling arrangements and certification of EirGrid as transmission system operator.

WITH RESPECT TO KEY DRIVER (VII), FACILITATING THE TIMELY DEVELOPMENT OF OFFSHORE WIND CAPACITY TO ACHIEVE THE 2030 TARGET, WHICH OF MODELS 1,2,3,4, OR VARIANT OF THESE, DELIVERS THE MOST SATISFACTORY RESULTS? WHICH FEATURES OF THE MODEL, OR VARIANT, ARE T

Under Directive 2009/72/EC (the Directive), transposed in Ireland by S.I. No. 570/2011 - European Communities (Internal Market in Electricity) (Certification and Designation of the Transmission System Operator) Regulations 2011, National Regulatory Authorities (NRAs) were required to certify the unbundling arrangements of Transmission System Operators (TSOs) in each Member State in a form consistent with the Directive. Unbundling refers to effective separation of networks from activities of generation and supply.

There are three available models described in the Directive: full ownership unbundling (FOU); independent system operator (ISO); and independent transmission operator (ITO). Article 9(9) of the Directive allows for a derogation from these models provided that the existing transmission arrangements can be shown to guarantee more effective independence for the TSO than would be possible under the ITO model (9(9) certification).

The Recast Electricity Directive (2019/944) setting out the rules on TSO unbundling as developed in the 3rd Package remains unchanged when it comes to the main substantive rules on the unbundling regimes for TSOs, as well as the TSO designation and certification process (the latter is also set out in Article 51 of the Recast Electricity Regulation (2019/943)).

On 2 April 2012, ESB made an application to CRU (then the CER) for certification under Article 9(9) of the Directive.

This application argued that the current transmission arrangements in Ireland, EirGrid as TSO and ESB as transmission system owner (TAO) operating under a contractually defined relationship through the Infrastructure Agreement, guarantee more effective independence for EirGrid as TSO than the ITO model would. ESB's application applied for EirGrid to be the certified TSO in Ireland.

CRU's assessment was that the system of legislation, licence obligations, enforcement powers and the involvement of EirGrid in transmission system operation arrangements applying in Ireland brings benefits compared to the independent transmission operator model. The structural separation of the TSO and the TAO, the legislative and contractual relationship between them and the regulatory oversight of their respective duties and interactions, provide greater transparency and compliance with the regulatory and legislative requirements than would be possible under an ITO within a vertically integrated undertaking.

On 12 February 2013, the SEM Committee (on behalf of CRU) issued its Preliminary Decision on ESB's application, in addition to all of the supporting documentation, to the European Commission. The

WITH RESPECT TO KEY DRIVER (VII), FACILITATING THE TIMELY DEVELOPMENT OF OFFSHORE WIND CAPACITY TO ACHIEVE THE 2030 TARGET, WHICH OF MODELS 1,2,3,4, OR VARIANT OF THESE, DELIVERS THE MOST SATISFACTORY RESULTS? WHICH FEATURES OF THE MODEL, OR VARIANT, ARE T

Directive (and Regulation referenced above) stipulate that where an application is made for a 9(9) certification the European Commission shall make the decision as to whether the arrangements guarantee more effective independence than the ITO model. The European Commission subsequently issued its decision on 12 April 2013. EirGrid were then certified by CRU as the transmission system operator for Ireland on 22 May 2013.

Grid development policy for offshore wind will therefore require to be informed by such requirements. The enduring Irish grid delivery models as assessed in the Navigant Report are noted as deviating to a certain extent from the current "onshore" grid delivery model. Options 3 and 4 are likely to require a significant restructuring of roles and responsibilities in the roll-out and development of offshore wind projects and transmission infrastructure. This will raise "unbundling" issues with the existing arrangements that have been certified.

Indeed, the issue of ownership, operation and maintenance of plant equipment and apparatus (including transmission assets) from the proposed wind farm to point of connection is not adequately identified or discussed in the consultation or the Navigant Report in relation to any of the options. There are some significant aspects around future asset transfer (including valuation methodology and process) and change of ownership/ operational boundaries that still need to be properly consulted upon as the policy/regulatory framework is progressed for offshore wind. Developers will require early clarity on such matters and the demands that may be put upon them by the TAO for an offshore asset transfer.

Any grid model that materially departs from the current "onshore" grid delivery model (i.e. requires material licence modifications, material adjustments to the Infrastructure Agreement or material alterations to codes and other industry documents that sit under either the licences or statute which are within the power of the CRU to approve, upon a request or on its own initiative), may be considered to reside outside the current certified arrangements.

11 Rank the key drivers in order of importance 1-7, which have the greatest impact on the choice of model.

11.1 Relevant Project Developer Perspective

Table 2 ranks the key drivers from the perspective of Relevant Project developers. Evidently, each driver is important. Furthermore, there are difficulties in ranking them effectively given that some drivers are interdependent, and the full implications of each driver under the different grid delivery frameworks are unknown. That said, an effort has been made to rank these drivers in a manner that is in the best interest of facilitating Relevant Projects to play a vital role in meeting our renewable energy targets, and optimising and leveraging the growth of the offshore supply chain.

The drivers are separated into two categories:

- **Very high** impact on grid delivery model; and
- **High** impact on grid delivery model.

The key drivers are subsequently ranked as follows:

1. Compatibility with Relevant Projects
2. Facilitating offshore wind capacity to achieve the 2030 targets
3. Required infrastructure
4. Environmental Impact

5, 6, 7. Social acceptance, cost, and future proofing and technologies.

The reasoning behind these rankings is outlined in Table 2 below. It must be noted that these rankings solely reflect the impact of the driver on the choice of grid delivery model. All these drivers are essential, and this ranking does not reflect their importance in the overall development of an offshore wind project.

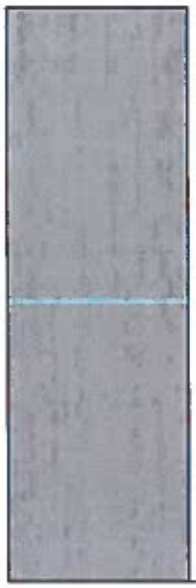
RANK THE KEY DRIVERS IN ORDER OF IMPORTANCE 1-7, WHICH HAVE THE GREATEST IMPACT ON THE CHOICE OF MODEL.

Table 2: Key drivers ranked for Relevant Project Development

Group 1 - Very high impact on grid delivery model			
Impact	Rank	Drivers	Reasoning
Very High	1	Compatibility with Relevant Projects	It will be essential that the momentum achieved by the Relevant Projects is maintained. Any delays introduced by a marked change in policy will introduce uncertainty and a multi-year gap in development, stalling the offshore wind industry. This could result in negative knock-on effects on supply chain confidence and project financeability. Key lessons can be learned from the development of the Relevant Projects. Crucial improvements in policy and process (such as timely and proactive onshore grid infrastructure development) should also be introduced to enable more effective and efficient integration of future offshore projects.
	2	Facilitating offshore wind capacity to achieve the 2030 targets	Delivery of the Relevant Projects will be essential to kick-start Ireland's development of offshore wind and make meaningful early contributions to Ireland's 2030 targets. The Relevant Projects can not only deliver for 2030 but also for Ireland's interim renewable energy targets as set out in the Clean Energy Package. In order to contribute to these targets, it is critical that a hybrid solution based on Option 1 and Option 2 is chosen, as moving to a fully plan-led model would ensure Ireland cannot meet 2030 targets.
	3	Required Infrastructure	It is essential that onshore infrastructure is built to enable the connection of offshore wind and facilitate its full export capability. Additionally, the offshore connections require a reasonable level of firmness. If high levels of constraints are anticipated, auction bids are likely to be higher as developers factor these constraints into their bids. IWEA are fully supportive of proactive onshore grid reinforcements as proposed within Option 2 and believe complementary development of the onshore grid will be crucial to facilitating the full potential of the Relevant Projects.
Group 2 - High impact on grid delivery model			
High	4	Environmental Impact	Regardless of the grid delivery model chosen, offshore developments will be subjected to full Appropriate Assessment and Environmental Impact Assessment under the MPMD legislation, and all environmental impact issues will be systematically assessed under this

			process. However, the Relevant Projects are at advanced stages of development and have already invested in site selection, pre-development works and substantial environmental analysis. Deviating to a plan-led process where the responsibility of site selection and consenting is instead transferred to a State body would halt the development of Relevant Projects and mean Ireland's 2030 targets will be missed. Navigant have viewed a plan-led option for Relevant Project as incompatible for these reasons.
	Grouping 5, 6, 7	Social Acceptance	As outlined in Section 9 of this response, 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. We believe there may 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, co-ordinating and delivering a sustained national awareness-raising campaign on the positive climate and economic contributions that will be made by offshore wind energy.
		Cost levels	Cost is obviously a key factor to consider. However, the cost implications of the model selection are complex. Considering the uncertainty involved in carrying out a total societal cost comparison of the models, this driver has been given a lower rank than would normally be expected. The Navigant report has also highlighted that developer-led delivery models allow for more innovation and increased competitive pressure. Given that national funding will have many competing priorities under the new Programme for Government, developer-led private capital should be leveraged where possible. Our detailed breakdown of cost can be found in Section 4 of this response.
		Future proofing and technologies	IWEA support a plan-led approach to onshore transmission reinforcement and future proofing of onshore substations built to connect both Relevant and Enduring projects. However, IWEA does not see the

RANK THE KEY DRIVERS IN ORDER OF IMPORTANCE 1-7, WHICH HAVE THE GREATEST IMPACT ON THE CHOICE OF MODEL.



requirement or need for blanket future proofing of offshore transmission export cables and offshore substations. There is a concern that future proofing requirements from the TSO would add cost and delays to Relevant Projects. It is unclear who would fund the future proofing and how to quantify the cost of the TSO's functional and oversight requirements. The Relevant Projects are further advanced in their designs and planning requirements. Future proofing requirements, where not known, could significantly impact on Relevant Project timescales and costs. Projects would no longer have control over their consenting and construction timelines leading to increased possibilities of delayed delivery and missed opportunities for Ireland in terms of contributing to interim 2030 targets.

RANK THE KEY DRIVERS IN ORDER OF IMPORTANCE 1-7, WHICH HAVE THE GREATEST IMPACT ON THE CHOICE OF MODEL.

11.2 Enduring Project Developer Perspective

Table 3 ranks the key drivers from the perspective of Enduring Project developers. Evidently, each driver is important. Furthermore, there are difficulties in ranking them effectively given that some drivers are interdependent, and the full implications of each driver under the different grid delivery frameworks are unknown. That said, an effort has been made to rank these drivers in a manner that is in the best interest of facilitating Enduring projects to play a vital role in meeting our renewable energy targets, and optimising and leveraging the growth of the offshore supply chain initiated by the Relevant projects.

The drivers are separated into two categories:

- **Very high** impact on grid delivery model; and
- **High** impact on grid delivery model

The key drivers are subsequently ranked as follows:

1. Facilitating offshore wind capacity to achieve the 2030 targets
2. Compatibility with Relevant Projects
3. Required infrastructure
4. Environmental Impact

5, 6, 7. Social acceptance, cost, and future proofing and technologies.

The reasoning behind these rankings is outlined in Table 3. It must be noted that these rankings solely reflect the impact of the driver on the choice of grid delivery model. All these drivers are essential, and this ranking does not reflect their importance in the overall development of an offshore wind project.

RANK THE KEY DRIVERS IN ORDER OF IMPORTANCE 1-7, WHICH HAVE THE GREATEST IMPACT ON THE CHOICE OF MODEL.

Table 3: Key drivers ranked for Enduring Project Development

Group 1 - Very high impact on grid delivery model			
Impact	**Rank**	**Drivers**	**Reasoning**
Very High	1	Facilitating offshore wind capacity to achieve the 2030 targets	Enduring Projects which can deliver pre-2030 will be required to contribute to meet the Programme for Government's 5 GW offshore wind target for 2030. Many Enduring Projects which can deliver for 2030 are already in various stages of development off the East and South Coast, and the time delay introduced by a change in policy towards a plan-led process would hinder their development dramatically. Developing an enduring grid delivery process, which leverages upon the learnings from the Relevant Projects, and looks to the near future in terms of aligning the construction of onshore infrastructure will be key. We believe a continuation of a hybrid solution of Option 1 and key components of Option 2 will be required to deliver the pre-2030 Enduring Projects.
	2	Compatibility with Relevant Projects	It will be essential that the momentum achieved by the Relevant Projects is leveraged to swiftly progress the Enduring Projects. Any delays introduced by a marked change in policy will introduce uncertainty and a multi-year gap in development, stalling the offshore wind industry. This could result in negative knock-on effects on supply chain confidence and project financeability. Key lessons can be learned from the development of the Relevant Projects. Crucial improvements in policy and process (such as timely and proactive onshore grid infrastructure development) should also be introduced to enable more effective and efficient integration of future offshore projects.
Group 2 - High impact on grid delivery model			
High	3	Required infrastructure	It is essential that onshore infrastructure is built to enable the connection of offshore wind and facilitate its full export capability. Additionally, the offshore connections require a reasonable level of firmness. If high levels of constraints are anticipated, auction bids are likely to be higher as developers factor these constraints into their bids. IWEA are fully supportive of proactive onshore grid reinforcements as proposed within Option 2 and believe complementary development of the onshore grid will be crucial to

RANK THE KEY DRIVERS IN ORDER OF IMPORTANCE 1-7, WHICH HAVE THE GREATEST IMPACT ON THE CHOICE OF MODEL.			
			facilitating the full potential of the Enduring Projects which can be delivered in a pre-2030 timeframe. IWEA 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. IWEA also believe EirGrid should carry out a techno-economic assessment as soon as possible on the offshore generation export potential of Ireland's West and South coasts, with a focus on the grid capabilities and requirements for reinforcements in these areas to facilitate this post-2030. Any such study should be cognisant and complementary to additional interconnection to other jurisdictions and the emerging developments of large-scale complementary decarbonisation technologies such as electrolysers for Green Hydrogen.
	4	Environmental Impact	Regardless of the grid delivery model chosen, the offshore developments will be subjected to full Appropriate Assessment and Environmental Impact Assessment under the MPMD legislation, and all environmental impact issues will be systematically assessed under this process. However, the pre-2030 Enduring Projects are at various stages of development and have already invested in site selection and pre-development works. Deviating to a plan-led process where the responsibility of site selection and consenting is instead transferred to a State body would stall the development of Enduring Projects and lead to a significant gap in project delivery until the model is in place.
	Grouping 5, 6, 7	Social acceptance	As outlined in Section 9 of this response, 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. We believe there may 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,

RANK THE KEY DRIVERS IN ORDER OF IMPORTANCE 1-7, WHICH HAVE THE GREATEST IMPACT ON THE CHOICE OF MODEL.

			coordinating and delivering a sustained national awareness-raising campaign on the positive climate and economic contributions that will be made by offshore wind energy.
		Cost levels	Cost is obviously a key factor to consider. However, the cost implications of the model selection are complex. Considering the uncertainty involved in carrying out a total societal cost comparison of the models, this driver has been given a lower rank than would normally be expected. The Navigant report has also highlighted that developer-led delivery models allow for more innovation and increased competitive pressure. Given that national funding will have many competing priorities under the new Programme for Government, developer-led private capital should be leveraged where possible. Our detailed breakdown of cost can be found in Section 4 of this response.
		Future proofing and technologies	IWEA support a plan-led approach to onshore transmission reinforcement and future proofing of onshore substations built to connect both Relevant and Enduring projects. However, IWEA does not see the requirement or need for blanket future proofing of offshore transmission export cables and offshore substations. Enduring Projects will be required to contribute to the 5 GW offshore wind target capacity by 2030, and therefore, there are concerns that any future proofing requirements introduced by the System Operators without a demonstrable need which would benefit 2030 targets would add additional costs, and potential delays for Enduring Projects. Further analysis is welcome on the most optimum long-term solution (which may include onshore or offshore nodes) which considers the nuances of the power system in Ireland. A full cost benefit analysis and clear plan for the purpose of any future proofing is needed before these options can be developed further.

12 How important is it for Ireland to develop an indigenous offshore wind energy industry? How best can an indigenous industry be developed?

If Ireland wishes to realise the huge potential of offshore wind here - and in doing so capture all the associated benefits - it is crucial that we develop and establish an indigenous offshore wind energy industry sooner rather than later.

Ireland is well placed to develop a thriving offshore industry, with many of the key pieces needed to do so available: a large sea territory; access to excellent wind resources; a strong pipeline of offshore projects; appetite for investment in renewables; and strong political and social demand for action on climate change.

But while we may be well placed to establish an offshore wind energy industry, much work is still needed to do so. Several countries in Europe have well established offshore industries and others have ambitious plans for offshore wind over the coming decade and beyond. If Ireland does not seize its opportunity to establish an offshore wind industry now, many of the potential benefits may be lost to these countries.

12.1 Opportunity

Offshore wind represents a significant opportunity for Ireland, with the country well placed to capitalise on some of the associated benefits, for several reasons.

12.1.1 Excellent Wind resource

Ireland has access to one of the best offshore wind resources in Europe, with high wind speeds off our coasts over the Irish Sea, the Celtic Sea and the Atlantic Ocean. A good wind resource is a crucial factor to the success of any wind project, and access to one allows installed turbines to operate near their maximum capacity factor and maximise their production of renewable electricity.

12.1.2 Large Sea Territory

Ireland's marine territory covers an area of 880,000 km^2, more than 10 times its 85,000 km^2 land mass area[23]. Taking our seabed into account, Ireland is one of the largest EU states. This demonstrates that not only does Ireland have access to a geat quality wind resource, but also a great area to expolit.

[23] https://www.ouroceanwealth.ie/sites/default/files/sites/default/files/Publications/2012/HarnessingOurOceanWealthReport.pdf

12.1.3 Pipeline and Established Onshore Industry

Ireland has a healthy offshore pipeline of over 12 GW in various stages of development. Many of IWEA's members are already operating successfully at a global scale within international jurisdictions. Ireland also has a well-established onshore wind industry. In 2019, Ireland was number one in the world for onshore wind penetration[24]. Many of the industry players needed for the offshore sector are already established in Ireland, and a strong skills base is already in existence, some of which can be transferred from the onshore to the offshore sector. Renewable UK have published rankings of the offshore pipelines around the world and for the first time the first time Ireland appears in the top 10, overtaking Poland and Denmark to give it the 4th largest pipeline in Europe [25]

12.1.4 Public Support

The results of the first nationally representative survey of public perception of offshore wind farms in Ireland were released by EirWind earlier this year. 93 per cent of respondents said they would not object to the development of an offshore wind farm anywhere in Irish waters[26]. A recent nationally representative opinion poll carried out by Interactions and commissioned by IWEA also found 79 per cent of respondents in favour of wind energy, with only 4 per cent opposing it[27].

12.1.5 Political Support and Ambition

The EU Green deal has set Europe a goal of at least 32 per cent renewable energy by 2030 and climate neutrality by 2050. Offshore wind will be central to reaching these targets, with WindEurope estimating that as much as 450 GW will be needed for 2050, up from 22 GW today[28].

The CAP set ambitious targets of 70 per cent renewable electricity and at least 3.5 GW offshore renewable energy for 2030, with analysis showing increasing wind energy among the most economical measures to decarbonise our electricity supply[29].

The new Programme for Government[30] has upped this ambition by committing to an average 7 per cent per annum reduction in greenhouse gas emissions from 2021 to 2030 and setting plans to achieve

[24] https://www.ren21.net/wp-content/uploads/2019/05/gsr_2020_full_report_en.pdf
[25] https://www.renewableuk.com/news/518217/30-annual-growth-in-global-pipeline-of-offshore-wind-energy-projects.htm
[26] https://www.marei.ie/eirwind-offshore-wind-study/
[27] https://www.iwea.com/latest-news/2948-new-poll-confirms-overwhelming-majority-back-wind-energy
[28] https://windeurope.org/wp-content/uploads/files/about-wind/reports/WindEurope-Our-Energy-Our-Future.pdf
[29] https://www.dccae.gov.ie/en-ie/climate-action/publications/Documents/16/Climate_Action_Plan_2019.pdf
[30] https://www.greenparty.ie/wp-content/uploads/2020/06/2020-06-15-ProgrammeforGovernment_Corrected-Final-Version.pdf

5 GW capacity in offshore wind by 2030 and to take advantage of a potential of at least 30 GW of floating offshore wind (FLOW) in our deeper waters in the Atlantic.

The above factors demonstrate that Ireland has a golden opportunity to finally establish an indigenous offshore wind energy industry. Many of the key pieces needed are in place but if this excellent opportunity is not capitalised on now, many of the potential benefits will be lost or inefficiently captured. Some of these potential benefits are discussed below.

12.2 Benefits

If Ireland can capitalise on the excellent opportunity outlined, the potential benefits of an established offshore industry are significant.

12.2.1 High Levels of Investment Required

In 2019, investments in new wind farms in Europe totalled €19 billion, with €6 billion invested in offshore projects. 1.4 GW of offshore wind reached final investment decision[31]. This gives an investment level of €4.3 billion per GW of offshore wind. Delivering the 3.5 GW of offshore wind energy required under the CAP would require an initial investment worth €8.6 billion and a €17.9 billion lifetime spend[32].

Offshore wind projects also contribute massively to local economies. To give a recent example, it is expected that the 588 MW Beatrice wind farm in Scotland will generate over £1 billion to the Scottish economy. Much of this added value will also be focused in the local areas impacted by the development.

12.2.2 Jobs and Supply Chain

Delivering the 3.5 GW required under the CAP would create 2,500 local development and construction jobs, 700 local and permanent operations and maintenance jobs, and a further 1,312 jobs during the decommissioning stage of these projects[36].

The importance of these jobs grows as Ireland looks to move away from fossil fuel use, with 2.1 GW of fossil fuel generators set to come offline before 2030. Offshore wind can add to the employment provided by renewables in Ireland, grow the green economy and help towards a just transition.

The number of jobs created here, and the investment captured, highly depends on how well a local supply chain can be established. A crucial factor in developing Ireland's supply chain is investing in our

[31] https://windeurope.org/wp-content/uploads/files/about-wind/statistics/WindEurope-Annual-Statistics-2019.pdf

[32] https://www.iwea.com/images/files/final-harnessing-our-potential-report-may-2020.pdf

port infrastructure. Having strong port infrastructure in place would allow Irish ports to provide staging and manufacturing services, help a local supply chain to develop, lower the LCOE of projects and allow more of the total project investment to be captured by Irish firms. It is estimated that today, Irish firms could only capture 22 per cent of this investment but with the right support this could quickly grow to 31 – 36 per cent and eventually as much as half. If the required investment in Irish ports does not take place, much of the market could be served by British ports.

12.2.3 Helping to Achieve National Targets

Offshore wind can generate unprecedented amounts of clean, renewable, indigenous electricity due to the scale of projects, the capacity factors of the turbines used and the more consistent wind resource that can be accessed offshore. It will contribute enormously to Ireland's energy security and at the same time help to reach our emissions reduction and renewable energy targets discussed.

In Ireland in 2018, the use of renewable energy displaced fossil fuel use equivalent to 2 Mtoe and avoided 4.9 million tonnes of emissions, equivalent to 13 per cent of total energy-related CO_2 emissions. 3.1 $MtCO_2$, 64 per cent of the total, was avoided by onshore wind[33]. Onshore wind alone provided 44 per cent of our electricity demand in Q1 2020[34]. Offshore provides an excellent opportunity to build on the work that onshore has started.

Decarbonising our electricity system while increasing the electrification of heat and transport is an important part of the strategy for decarbonising the Irish energy system. With 500,000 deep retrofits and almost 1 million electric vehicles planned by 2030 under the CAP, offshore wind can also ensure that the electrification of heat and transport maximises CO_2 emissions reductions and helps to improve Ireland's performance in RES-H and RES-T, which has been poor to date.

12.2.4 Floating Offshore Wind, Renewable Hydrogen and Export Opportunities

While the fixed-bottom offshore wind sector is still growing, FLOW is a fast maturing technology that will enable Ireland to make the best use of its excellent wind resources in deeper waters off our south and west coasts. Commercial scale FLOW projects should start to become competitive before 2030 and the Programme for Government has committed to producing a plan to take advantage of the potential of at least 30 GW of FLOW in our deeper waters in the Atlantic.

Renewable hydrogen will be key to reaching the EU's commitment to carbon neutrality by 2050. It can be used to store and transport renewable energy, it can replace fossil fuels in some carbon intensive

[33] https://www.seai.ie/publications/2020-Renewable-Energy-in-Ireland-Report.pdf
[34] https://iwea.com/latest-news/3240-wind-energy-outperforms-gas-for-a-full-quarter-for-the-first-time

industrial processes, and it can help to decarbonise hard to abate parts of the transport system. The EU's hydrogen strategy outlines plans to install at least 40 GW of renewable hydrogen electrolysers and produce up to 10 million tonnes of renewable hydrogen up to 2030. There will be a major opportunity for green hydrogen production using the electricity generated from offshore wind.

There is also a great opportunity for Ireland to develop offshore wind at significant scale and become a net exporter of renewable electricity, once its targets for domestic renewable energy supply have been met. This will become much more achievable as the market evolves and interconnection improves between European countries.

While these opportunities seem more long term, it is important that Ireland establishes a strong offshore wind industry now so that it is best placed to capture the benefits from related technologies in the future.

12.3 How to Best Develop an Indigenous Industry

Offshore wind is needed to decarbonise the Irish energy system, achieve emission reduction targets, meet increasing electricity demand, and increase the security of supply. It can also bring a host of other benefits, such as employment and investment in the Irish economy.

Public and private stakeholders have an integral part to play in realising the projected growth in offshore wind in Ireland. The constructive relationships that need to be built and maintained for the mutual benefits of offshore wind industry growth to be maximised can be best described in Figure 7.

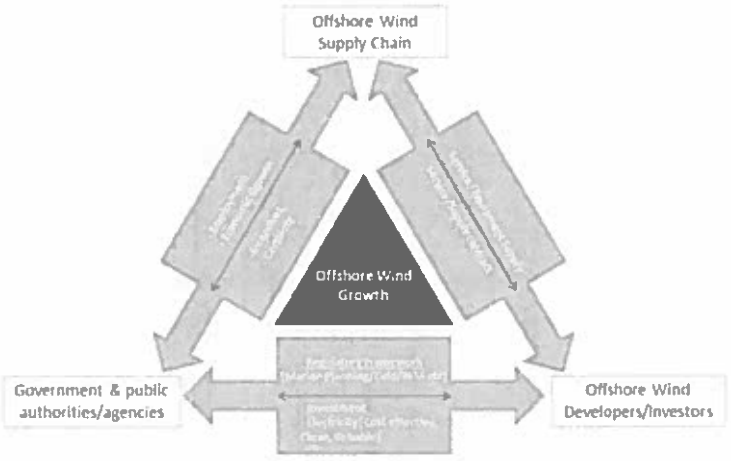


Figure 7: Offshore wind sector synergistic relationship[35]

[35] https://iwea.com/images/files/final-harnessing-our-potential-report-may-2020.pdf

While these relationships will be paramount, above all, a clear, robust policy framework will be needed for the successful development of an indigenous offshore industry. The timing and delivery of a range of policy areas e.g. consenting, grid, route to market and supply chain, will be crucial.

12.3.1 Planning

It is essential that Ireland's marine planning system effectively enables the development of offshore wind, in keeping with the objectives of the CAP. Consenting is the first step in delivering a wind project and a fit-for-purpose planning regime will be essential for the development of an offshore wind industry. The timely implementation of the NMPF and the MPDM Bill which underpins it will be crucial to this.

IWEA has concerns relating to the delay of both the MPDM Bill and the NMPF due to the interregnum over the past number of months alongside of Covid-19 restrictions. These concerns have been raised within IWEA's NMPF Draft Consultation Submission in April of this year[36].

12.3.2 Grid

As discussed in this consultation response, IWEA strongly advocates for a basis of Option 1, with strategic components of Option 2 focused on the proactive development of the transmission system, being progressed as a hybrid solution to take Ireland to our 2030 targets. This should be applied to the Relevant Projects and the Enduring Projects which can deliver pre-2030. The delivery of these targets will help massively towards the establishment of an offshore industry in Ireland.

IWEA has outlined its reasons for this belief in this response and is happy to engage further.

12.3.3 Route to Market

IWEA believes that a well-designed RESS scheme, aligned to the nature of larger-scale offshore projects and the associated consenting, grid and financing timelines, will be crucial to aiding the development of offshore wind projects in the coming years, as well as the industry as a whole in the longer term.

The commitment in the programme for government to hold the first offshore RESS auction in 2021, with auctions held each year thereafter, is also welcome. A reliable and well-designed RESS scheme will send a strong signal to industry and be crucial to the development of Ireland's offshore industry.

[36] https://www.iwea.com/images/files/20200430-iweanmpfdraftconsultationsubmission.pdf

12.3.4 Supply Chain

The development of a local supply chain will be another key factor which will help to establish an indigenous offshore wind industry in Ireland and ensure Ireland captures the greatest share of the benefits possible.

The Carbon Trust's Report, Harnessing our Potential[37], carries out a detailed analysis of the opportunities presented to Ireland and the challenges that will be faced in building an offshore wind energy supply chain. A number of recommendations are also made in the report to increase readiness for the development of offshore wind energy in Ireland.

12.3.5 Industry

Of course, industry will also have a major role to play in the development of an indigenous offshore wind industry. When the key policy pillars are in place, industry will have to deliver the projects in an efficient manner and engage with the relevant public and private stakeholders throughout. IWEA and its members are committed to doing this and playing its part in the establishment of a strong indigenous offshore industry.

[37] https://www.iwea.com/images/files/final-harnessing-our-potential-report-may-2020.pdf

13 How should onshore and offshore grid connections be optimised? For example, should consideration be given to common hubs for adjacent projects?

13.1 Collaboration is critical

Offshore connection policy should be developed in a collaborative manner with the CRU, EirGrid, ESB Networks and DCCAE. Continued engagement between Government, industry and key stakeholders will be essential to optimisation of offshore grid connections and the development of both onshore connection points and deep reinforcements required by EirGrid to ensure the transmission system can utilise the generation from offshore wind farms in the most optimal manner possible.

IWEA would recommend 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, DCCAE 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 continues 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 Relevant Projects and Enduring 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, DCCAE and the Relevant Projects on this board in the first instance, with the remit of the board expanded to include Enduring Projects when appropriate. This board should report its progress under Action 25 of the Government's Climate Action Plan. 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 Enduring and Relevant 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 System Operators and the CRU.

HOW SHOULD ONSHORE AND OFFSHORE GRID CONNECTIONS BE OPTIMISED? FOR EXAMPLE, SHOULD CONSIDERATION BE GIVEN TO COMMON HUBS FOR ADJACENT PROJECTS?

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 system operators to interact to jointly decide the optimum connection capacity/MEC 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 in a phased approach in the medium and long term, if necessary. We would strongly recommend that EirGrid initiate similar analysis around the South and West coasts of Ireland to that carried out on the East Coast in order to better inform developers of suitable onshore connection points where capacity is available.

13.2 Onshore grid reinforcement is critical

We firmly believe that EirGrid need to prioritise the development of onshore transmission assets and associated transmission upgrades required for the connection and operation of both the Relevant Projects and the early stage Enduring Projects. EirGrid need to have identified in 2020 and started permitting in 2021 all the onshore grid reinforcements required to facilitate the Relevant Projects. A similar exercise should be completed in 2021 and 2022 for the Enduring Projects capacity which can be connected by 2030.

The current model of progressing planning and design and making capital commitments on the required infrastructure only when backed off by contributions by developers 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 windfarms, were often the critical path for the delivery of the windfarms. 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[38].

13.3 Optimisation of onshore and offshore grid development including hubs

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 appropriates. 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 in Ireland 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% renewable electricity on Ireland's power grid, and provide much needed system

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

support for Ireland's major towns and cities along Ireland's coasts which may otherwise require investment from fossil fuel generation.

13.4 Consideration of Hybrid Connection Models

IWEA is also supportive of the development and progression of hybrid connection policy which we believe can provide benefits for the connection of offshore wind generation as well as onshore renewables.

IWEA has proactively worked with EirGrid and the other System Operators in Ireland and Northern Ireland to break down the barriers to progress hybrid connections. The key challenges our members have brought forward to be addressed include (i) separate legal entities permitted within a single connection agreement and (ii) dynamic sharing of MEC between units connected under the same connection agreement.

We believe that enabling hybrid connections will lead to increased utilisation of the existing network and lead to lower cost connections to the consumer. We welcome EirGrid's recent publication of the 'FlexTech Response to Consultation' which sets out how EirGrid intend to progress hybrid connections[39]. Finally, we note that the CAP included a series of steps in order to facilitate hybrid connections, which we have outlined in Figure 8. We request that the barriers noted in this section are progressed and addressed in the short-term in recognition of the steps outlined in this plan.

Action 18: Facilitate additional hybrid connections (e.g. solar/wind/batteries) operating in the electricity market to increase RES-E penetration			
Steps Necessary for Delivery	**Timeline by Quarter**	**Lead**	**Other Key Stakeholders**
Review of hybrid connection requirements and requirements of the market	Q4 2019	CRU	ESBN, EirGrid
Identify required changes to implement more hybrid connections in the market	Q2 2020	CRU	ESBN, EirGrid
Implement required changes	Q3 2020	CRU	ESBN, EirGrid, DCCAE
Review RESS eligibility and settlement rules for hybrid units	Q2 2021	DCCAE	EirGrid, CRU
Update RESS Terms and Conditions for hybrid units as appropriate	Q3 2021	DCCAE	EirGrid, CRU

Figure 8: Steps outlined in the Climate Action Plan to facilitate hybrid connections

[39] EirGrid - FlexTech Response to Consultation - July 2020 - http://www.eirgridgroup.com/site-files/library/EirGrid/FlexTech-Response-to-consultation.pdf

14 Are there any further considerations which might reduce the cost to the consumer?

14.1 Delivering 70by30 – Saving Money

Offshore wind farms in Ireland over the next decade will predominantly be looking to secure a route to market via RESS auctions. This means that each project will enter a bid and only those that offer the best value will receive a long-term price support. To develop their bids, projects will have to put forward a minimum price at which they can build, and this will mean taking a 25-30 year view on costs that may arise during the life-time of the project, in addition to any related development costs. While the competitive bidding environment does generally put downward price pressure on the costs of renewable deployment, as we have seen in numerous auctions in other countries, policy decisions by the Irish Government and by policy makers such as the CRU, EirGrid and ESBN have a huge impact on the costs that renewable projects must account for in their bids. Everoze, in association with IWEA, have recently published a report, Saving Money,[40] which looks at the cost of policy in relation to onshore wind development, as measured against the Levelised Cost of Energy (LCoE) of a typical wind farm, and puts forward recommendations to reduce these potential costs going forward.

For example, if just €1/MWh can be saved on the volume of energy to be procured over the entirety of the RESS scheme - 13.5 TWh according to the RESS High Level Design - the savings to the electricity consumer in Ireland, through a reduced PSO levy, over the entire 15 year contract duration for RESS projects is €202.5 million. To put this in context, Saving Money estimates the combined cost of these savings could reduce the LCoE by €35/MWh.

A summary of the recommendations and related cost impacts is highlighted in Table 5 below. It is worth noting that many of these policies are relevant to offshore wind as well and these are detailed further in the following paragraphs.

[40] https://www.iwea.com/images/files/final_iwea-70by30_saving-money_report_may_2020.pdf

ARE THERE ANY FURTHER CONSIDERATIONS WHICH MIGHT REDUCE THE COST TO THE CONSUMER?

Name	Description	Lead Stakeholders	Most Affected	Others Impacted^	Cost Impact
1. Tip Heights	Ensure that taller wind turbines can be accommodated in the revised Wind Energy Development Guidelines	DHPLG, DCCAE, Communities, Local Authorities, An Bord Pleanála	All Consumers receive savings via the PSO due to lower RESS bid prices.		-27% -€20.3/MWh
2. Noise Limits	Ensure the revised Wind Energy Development Guidelines do not include extreme noise limits	DHPLG, DCCAE, Communities, Local Authorities, An Bord Pleanála	All Consumers pay additional costs via the PSO due to higher RESS bid prices.		+11.4% +€8.6/MWh
3. Life Extension	Grant planning for wind farms for 30 years	Local Authorities, An Bord Pleanála, DHPLG	All Consumers.	Offshore Wind; Solar	-10% -€7.5/MWh
4. Simplified Planning	a) Enhanced community engagement; b) Implement regional planning for wind energy; c) Improve SID engagement and decision timelines in An Bord Pleanála; d) Facilitate grid consenting in parallel to wind farm consenting.	a) Wind farm developers; b) DHPLG& Regional Authorities (via REPDF); c) An Bord Pleanála & DHPLG; d) DHPLG & CRU to facilitate grid installations on public roads	All Consumers. Some savings should be allocated to additional resources in Regional Authorities & ABP.	Offshore Wind	-1.5% -€1.1/MWh
5a. Curtailment	Continuation of the DS3 program to ensure enough system services (reserve, inertia, reactive power, and ramping) can be provided, ideally by zero-carbon services, to increase SNSP to 95% and eliminate 'Min Gen'. Create more flexibility on the Irish grid via interconnection and Demand Side Management/storage.	CRU to provide enough resources via PR5 and EirGrid/ESBN to implement, particularly via continuation of DS3, more interconnection and flexible technologies.	All Consumers. Some savings should be allocated to EirGrid, ESBN & industry to invest in new solutions required.	Offshore Wind; Solar	+10% +€7.5/MWh
5b. Constraints	Progress grid reinforcements based on future development along with alternative network solutions using best-in-class community engagement. Streamline EirGrid's 'six-step' process and create a Grid Capacity Advisory Council.	CRU to provide enough resources via Price Review 5 and EirGrid to design/consent based on future outlook. ESBN to build the grid once a clear need is demonstrated.		Offshore Wind; Solar	+8% +€6/MWh
6. Grid Charges	Provide fixed grid charges (DLAF, TLAF, DuOS and TuOS) before financial close of a wind farm and allocate future cost changes to new connections and/or to be socialised.	CRU to review grid charges methodology.	All Consumers will benefit from lower capital costs. Reform of grid charges should otherwise be cost neutral.	Offshore Wind; Solar	-3% -€2.3/MWh

ARE THERE ANY FURTHER CONSIDERATIONS WHICH MIGHT REDUCE THE COST TO THE CONSUMER?					
7. Grid Connections*	More contestability for grid connections, sufficient grid offers and alignment of grid offer process with RESS auctions, facilitate hybrid connections by allowing separate legal entities and dynamic sharing of capacity at a single connection point.	CRU via review of Hybrid policy, ECP policy and PR5. EirGrid and ESBN to implement Hybrid and ECP policy with resources/incentives from PR5.	All Consumers. Some savings should be allocated to EirGrid & ESBN for additional resources to deliver.	Offshore Wind; Solar	**-1% -€0.8/MWh**
8. Balancing Costs	Create more flexibility on the Irish grid via interconnection and DSM/storage; couple I-SEM to Europe via SIDC (formerly XBID); improve liquidity in the continuous markets by allowing new products and GB access to all intraday markets; avoid excessive system margins.	EirGrid via SEMO and CRU to update the I-SEM design. EirGrid to facilitate more interconnection and flexible technologies.	All Consumers with some savings offset by investment in new solutions.	Offshore Wind; Solar	**-3% -€2.3/MWh**
9. Commercial Rates	Reverse recent increase in commercial rates for wind farms so they are maintained at similar levels to those payable by fossil fuel generators. For example, Ireland could decrease the rates payable by wind farms by updating the Valuations Act to exclude the moving parts of a wind turbine which is the case in Northern Ireland.	DHPLG to update the Valuation Act. Valuation Office to implement based on a more transparent and robust valuation scheme for wind farms.	All Consumers. Reduced commercial rates liability will enable wind farms to sell power more cheaply.	Solar	+5% +€3.8/MWh
10. Grid Capital Allowances	Allow the capital costs associated with grid connections to be included as capital expenditure like roads, turbines and electricity systems when reducing the amount of tax payable, as allowed in the UK.	Department of Finance and the Revenue Commissioners	Lower costs for wind, but tax reductions will need to be collected elsewhere or offset by future growth in wind.	Offshore Wind; Solar	**-1% -€0.8/MWh**
Total Savings					**-46.5% -€35/MWh**
Total Costs					+34.4% +€26/MWh

Table 4: Policy Choices to reduce the costs of offshore wind in Ireland

^The analysis was originally based on onshore wind, but there are a number of policies that will potentially benefit offshore wind and solar also, which are also central to the Irish government's plans for 2030.

*This does not account for the cost of uncertainty due to grid delivery. For example, if renewable electricity auctions include 'cliff edge' deadlines then this will create additional risk for a project, particularly in relation to the timelines for grid delivery. This will be an additional cost to consider and was beyond the scope of the analysis here.

14.2 Life Extension

The duration of a wind farms' operating life is constrained primarily by planning consent and technical considerations. Planning consents for onshore wind farms in Ireland will include conditions that limit the permitted operational life of the project. This consented period often commences on first export of electricity from the wind farm and usually permits an operating period of either 20 or 25 years. Decommissioning of the project is required after the end of this period. In the past, it was unusual in Ireland to see consent for operating periods longer than 25 years.

Wind turbines also have a designated design life that is influence by factors such as wind and site conditions such as wind speed, turbulence, air density and temperature. It is often the case that some climatic condition parameters are less onerous than the limits of the applicable design class and this presents a potential opportunity for the operating life of a project to be extended without compromising the structural integrity of the turbines. The impact of increasing operating life on the present value of a wind farm is already well known in the wind industry. Considering how best to extend the life of a wind farm through asset-sweating, refurbishment, re-planting or other means is of increasing commercial interest. This is particularly true in markets where energy price support mechanisms are being removed and projects are more exposed to merchant pricing risk.

By granting planning permission of at least 30 years, this allows the potential to extend the operating life of a wind farm, if feasible, which leads to cost savings over the longer-term. Saving Money estimates that these cost savings would be around €7.7/MWh in this 30 year scenario.

14.3 Simplified Planning

Obtaining planning consent for a wind farm is a time-consuming and costly exercise. A robust planning process is an important part of responsible development, but there is significant potential to streamline the current system. IWEA identified the following areas where simplification of the planning process could be achieved:

- Improved spatial planning to identify areas that are suitable for wind energy development on a regional level;
- A clearer and more interactive pre-application SID (Strategic Infrastructure Development) process that enables fatal flaws to be identified pre-planning;
- Reduced An Bord Pleanála decision timelines; and
- Enable grid connections to be designed and consented in parallel with the main wind farm consent.

While not all these are relevant to offshore wind as there are some different considerations and processes in relation to zoning and planning procedures, it is still relevant that reduced planning decision timelines and enabling grid connections to be designed and consented in parallel with the main project will improve project timelines overall and allow development costs to be reduced.

IWEA estimate that these planning improvements would reduce LCoE by €1.1/MWh.

14.4 Curtailment

Regardless of the grid model that is ultimately progressed, it is essential that onshore grid reinforcements are planned and progressed as soon as possible and system level measures are implemented to accommodate the volumes of renewable generation needed to reach our 2030 targets and minimise the levels of dispatch down (e.g. constraint and curtailment).

14.4.1 Clean Energy Package Regulation

Under the current market arrangements renewable generators are not compensated for curtailment, regardless of their level of firm access, and are only compensated for constraints relative to their firm access quantities, which is based on their ex-ante market revenues and not the level of the lost price support (e.g. REFIT tariff).

It is important to note that, going forward, the context for renewable deployment costs will be very different as we transition from the REFIT support scheme to RESS auctions. For instance, under REFIT the support rates are set by Government and the constraint and curtailment risk is with developers who have to absorb this cost within the available REFIT tariffs. However, under the forthcoming RESS auctions it is wind farm developers that will be determining the price of renewable development, and therefore the PSO support rates, via their auction bids. Developers will have to take a 25-30 year view of future constraint and curtailment levels to factor into their financial models and come up with a price under which they can build. Future constraint and curtailment levels are extremely difficult to project, and wind farms must factor in a certain amount of additional risk in their calculations to account for volatility. These costs will then be locked in for the term of the RESS support. Developers have almost no ability to manage these risks post RESS auction bid, whereas those who are ideally placed to reduce and even remove dispatch down are the Regulatory Authorities and System Operators, by either adjusting the electricity market rules to incentivise solutions, such as through the DS3 programme, or by building the solutions directly.

The Clean Energy Package Electricity Regulation (the Regulation) that came into effect on 1 January 2020 will have a material effect regarding the treatment of renewable generators in relation to

dispatch down and compensation for constraint and curtailment. The Regulation has yet to be implemented in the Irish market and there is still considerable uncertainty as to how the rules will be adopted with potentially significant repercussions for new renewable projects, which may see greatly elevated levels of dispatch down compared to existing wind farms, without being fully compensated.

Article 13 of the Regulation sets out that generators who are subject to non-market based redispatch should be compensated for redispatch up to their net revenues including any financial support (such as REFIT, RESS or Corporate PPAs) foregone as a result, unless they have accepted a connection offer with no guarantee of the firm delivery of power. However, the SEM Committee interpretation of the Regulation thus far, as reflected in their recent consultation paper on implementation of the articles in relation to dispatch and redispatch,[41] is that constraints do not constitute non-market based redispatch, that compensation for curtailment only be provided for firm generation and that this level of compensation will potentially be capped under a range of different measures.

IWEA responded to the SEM Committee consultation on this matter regarding the implementation of the Regulation's articles in relation to Dispatch and Redispatch.[42] It is IWEA's position that the SEM Committee's interpretation is not correct, that both constraint and curtailment constitute non-market based redispatch and in the case of curtailment, firmness of a grid connection has no relevance for the application of curtailment (as it is a system wide issue applied pro-rata to both firm and non-firm generators), and as a result, both firm and non-firm generation should be compensated under Article 13 for curtailment. Furthermore, there must be no cap on this compensation as this is not compliant with the Regulation.

The Regulation must be implemented as soon as possible to provide certainty to the renewable pipeline on the levels of dispatch down they are likely to see and the costs they must reflect in their auction bids. It is also essential that any generators that receive revenues for redispatch in Ireland and are in receipt of a PSO levy payment are not then penalised for the receipt of these revenues under R factor reconciliation calculation.

If full compensation for non-market based redispatch is not provided for, renewable generators will therefore be charging consumers for a cost, via their auction bids, which they are very poorly placed to find solutions for. These costs will then be locked in for up to 16.5 years under the term of the RESS

[41] https://www.semcommittee.com/sites/semc/files/media-files/SEM-20-028%20Consultation%20Paper%20on%20Implementation%20of%20Regulation%202019943%20in%20relation%20to%20Dispatch%20and%20Redispatch_.pdf

[42] https://iwea.com/images/files/20200619-iwea-and-nirig-response-to-semc-article-12-and-13-consultation-final.pdf

support. It is highly unlikely that the cost factored into a wind farm's bid to take account of this uncertainty will reflect the true cost of constraint and curtailment. In the future, consumers will be paying for this either directly (through compensation for non-market based redispatch) or indirectly (where onshore and offshore developers incorporate their assumptions into auction bids).

Saving Money shows that the combined costs of constraint and curtailment could add up to €13.50/MWh onto the bid price of onshore wind energy in the RESS auctions. If it is assumed the same price is attributable to offshore wind and solar generation, then the overall saving to the PSO Levy over the duration of RESS for compensating for curtailment and constraint is in excess of €2.7 billion of the duration of the RESS scheme. If that €2.7 billion is averaged out over 15 years, the saving to the consumer will be over €180 million per annum. These savings would be even more significant if analysed over the full 30+ year lifetime of the projects.

By allocating the management of constraint and curtailment risk to the System Operators, rather than renewable developers, this focuses the incentives on the parties who are best placed to manage these risks.

14.4.2 Minimising Curtailment

Critical to this will be funding for the "Delivering a Secure, Sustainable Electricity System" (DS3) programme and the implementation of system wide measures, such as the removal of current system operational constraints and the introduction of new low carbon technologies such as battery storage, that will minimise curtailment going forward. The DS3 programme is an extremely successful initiative that has enabled Ireland to become a world-leader in the integration of renewable electricity onto the grid. The DS3 programme has successfully delivered the tools, policies and system services needed to enable the current SNSP operational limit to be increased to 65 per cent, up from a 50 per cent limit when the programme began in 2011. Further trials to increase SNSP to 70 per cent, and then to 75 per cent, are expected in 2020 and 2021 respectively. The DS3 programme has so far maintained curtailment at manageable levels of less than 5 per cent. As the volume of renewables connecting to the system continues to grow it is certain that, without developing the DS3 programme and achieving further SNSP increases, curtailment levels will increase substantially. For instance, a report commissioned by the SEAI, Managing Curtailment in 2030, estimates that with current system constraints and no new mitigation measures, curtailment levels could increase to 44 per cent and we would need significant additional volumes of renewable generation to meet our 70% target.[43]

[43] https://www.seai.ie/documents/research-projects/RDD-000326.pdf

ARE THERE ANY FURTHER CONSIDERATIONS WHICH MIGHT REDUCE THE COST TO THE CONSUMER?

In Saving Money IWEA has outlined a number of high-level recommendations to minimise curtailment:

- Design of system services including; reserve, inertia, reactive power and ramping. The focus should be on provision of these services by distributed zero-carbon sources such as batteries, demand side management, synchronous condensers and STATCOMs. The recent report Store, Respond and Save - Cutting two million tonnes of CO2[44] highlights the benefits of this approach in terms of CO2 reductions from the Irish and Northern Irish power systems, reduced curtailment and reduced operational costs.
- Parallel progress towards higher levels of SNSP and removal of operational constraints.

Funding for the System Operators to advance the DS3 programme out to 2030, via the CRU's PR5 revenue allowance for ESBN and EirGrid, is essential to deliver these cost savings and funding in this area should be seen as an investment that will reduce the costs of renewable deployment by a substantial margin over the life-time of projects.

14.5 Minimising Constraints

Lack of transmission capacity is likely to be the biggest challenge in terms of meeting our renewable energy goals. As noted, the required onshore grid reinforcements must be pro-actively planned and progressed as soon as possible to ensure sufficient capacity is made available throughout the East and South coasts to accommodate the volumes of offshore renewable energy. The Clean Energy Package Regulation has also highlighted the importance of firm connections in relation to compensation for constraints and so timely grid reinforcements, and transparency on future network planning, are needed for projects to factor these considerations into their financial models.

Saving Money outlines a number of high-level recommendations to minimise constraints:

- EirGrid should progress the design and consent of grid reinforcements based on the strength and certainty of the future renewable energy project pipeline rather than waiting for projects to obtain planning consent and accept connection offers;
- EirGrid should signal solutions and timelines to address the needs of the grid at an early stage (e.g. via publications such as their System Needs Assessment, Transmission Development Plan and Transmission Forecast Statement) to provide more certainty to participants on future grid development;

[44] https://www.energystorageireland.com/wp-content/uploads/2020/02/Energy-Storage-Ireland-Baringa-Store-Respond-Save-Report.pdf

ARE THERE ANY FURTHER CONSIDERATIONS WHICH MIGHT REDUCE THE COST TO THE CONSUMER?

- EirGrid/ESBN to investigate alternative network solutions (e.g. smart wires, storage, congestion products) to identify situations where this may prove a cheaper and more efficient outcome than grid reinforcement;
- Streamlining of EirGrid's six-step development framework, to reduce timelines for capital approval of new projects and to give a more focussed delivery of reinforcement projects;
- Establish an all-island Grid Capacity Advisory Council to improve collaboration between EirGrid/SONI, CRU, UR, industry bodies, and other stakeholders, similar to the DS3 Advisory Council;
- Improved community engagement to promote the need for, and benefits of grid development, and how these are linked to renewable energy policies and climate action.

Again, funding to progress these reinforcements via mechanisms such as PR5 will be critical and IWEA stresses that these network costs should be seen as investments that will unlock greater savings for consumers over the longer-term via reduced RESS auction bids.

Finally, IWEA is currently finalising a report titled 'Saving Power' as part of a programme of work to identify the measures needed to deliver our 70% RES-E target in the most cost-effective and timely manner. The 'Saving Power' report will look at the measures needed to minimise constraint and curtailment in more detail and we will be happy to discuss this with you and take you through the recommendations when the report is ready.

14.6 Grid Charges

System charges such as Transmission Use of System (TUoS), Transmission Loss Adjustment Factor (TLAF) and Distribution Loss Adjustment Factor (DLAF) are currently updated annually, with the aim of providing a locational signal that incentivises installation of generation capacity where it is of most benefit to the overall electrical grid.

Once a project is built it cannot relocate and is therefore subjected to significant volatility of charges arising from the annual review process. This volatility of system charges creates uncertainty in the financial model, which further increases the weighted cost of capital (WACC). If charges could be locked in for a longer term at the time of financing (e.g. 15-20 years), with just normal indexation applied, this would result in a reduced risk premium i.e. a reduced WACC

IWEA believes the CRU should carry out an independent review of electricity transmission charging and associated connection agreements. This review should include the charging methodology and examine the requirement for a locational element to the charges. Reforming grid charging to bring it

into line with the changing requirements of a flexible energy system would reduce the cost burden currently placed on generators and ensure best value for the customer. Saving Money estimates that this would reduce the LCoE by €2.3/MWh.

14.7 Grid Connections

Grid connections for wind farms in Ireland are currently subject to significant costs with long delivery timelines that are frequently further delayed.

IWEA's recommendations in this area are to allow for more contestability for grid connections, better align the grid connection process with RESS auctions, allow for more hybrid connections and remove any grid delivery cliff-edges for price supports that increase risks for projects.

Saving Money estimates that this would reduce the LCoE by €0.8/MWh.

14.8 Balancing Costs

The cost of balancing wind generation can vary substantially, with IWEA members advising it ranges from around €1.5/MWh to €4/MWh depending on the design of the electricity market. A key factor that influences this cost is the provision of a deeply liquid continuous market in which changes to forecast generation can be traded out at prices that do not penalise generators. Such a market exists in Europe already in the form of Single Intraday Coupling (SIDC, formerly known as XBID). It is essential that participants on the island of Ireland can access and participate in this market to reduce balancing costs. It is also evident that there is a need for more flexibility on the Irish system to accommodate additional renewable generation such as increase interconnection, demand side response and energy storage,

The recommendation here is to create more flexibility on the Irish grid via interconnection and DSM/storage, couple I-SEM to Europe via SIDC (formerly XBID) and improve liquidity in the continuous markets by allowing new products and access to new markets. Saving Money estimates that this would reduce the LCoE by €2.3/MWh.

14.9 Grid Capital Allowances

A company in Ireland can claim certain costs and expenditure against its profits to reduce the amount of tax it pays. Specifically, in Ireland capital allowances can be claimed at a rate of 12.5 per cent over an eight year period for any capital expenditure. Most elements (roads, turbines, electrical system) of a wind farm are thus eligible for capital allowances. However, to date, the Irish Revenue has not permitted the grid connection cost to qualify although tax relief on grid connection costs incurred by developers is permitted in Britain. If the grid element of a wind farm was eligible for capital allowances,

then the tax cost to the project over the first 8 years would be reduced. Solar farms and offshore wind farms would also be entitled to this allowance, helping to lower the cost of these technologies.

Saving Money estimates that this would reduce the LCoE by €0.8/MWh.

CURRENTLY, DEVELOPER COMPENSATION IS NOT PROVIDED FOR DELAYED DELIVERY OF GRID CONNECTIONS TO RENEWABLE GENERATORS CONNECTING TO THE NETWORK. SHOULD DEVELOPER COMPENSATION ARRANGEMENTS BE PROVIDED FOR DELIVERY OF OFFSHORE GRID CONNECTIONS TO RENEWABLE PROJ

15 Currently, developer compensation is not provided for delayed delivery of grid connections to renewable generators connecting to the network. Should developer compensation arrangements be provided for delivery of offshore grid connections to renewable projects? Similarly, who is best placed to bear the outage risks under the various options?

The following provides context as to direct experience of the key grid delivery models implemented in the jurisdictions reviewed in the Navigant Report. This context highlights a number of points which will impact the practical implementation of a developer led or centrally plan led delivery model and the considerations around delivery risk and compensation.

Where a plan led approach has been successful (for example the Netherlands), the process requires (i) significant lead time for development of the offshore grid so that the developers have full visibility of grid delivery timetables before making investment decisions; and (ii) full financial compensation for any late delivery which provides important incentives for TSOs and a manageable level of risk for developers and lenders. To the extent that these factors are not present, TSO delivery models have failed to work.

15.1 Netherlands

In the Netherlands, the government instructs TenneT (the TSO) when and how to construct the offshore connection infrastructure (in consultation with offshore windfarms) and the Dutch tax payer pays for them. The offshore windfarms do not have to pay for or deliver the grid connection. The TSO also takes full delivery risk and compensates the developers for all loss of profits due to late delivery. The success of this model to date is only achieved through sufficient lead times for planning (15 years) and a policy decision that the TSO is fully financially accountable for grid delivery by being liable for full compensation, the cost of which is ultimately borne by the consumer.

It is also important to note that only one offshore wind farm has been constructed using this centrally planned model to date. Therefore, it is difficult to predict whether this plan-led approach will continue to deliver in future, particularly if large scale compensation payments are required. The Dutch TSO delivered the first project on time so no compensation was required. However, if an onerous level of

compensation is required to be paid by the TSO in future projects, a number of issues could arise with this plan led model.

15.2 Germany

In Germany, while the TSO is the same entity as in the Netherlands, TenneT and the same responsibilities lie with the TSO (consenting and grid delivery) the system has not been successful in terms of delivery. The TSO only partially compensates the developer for any loss of profits due to late delivery. The calculation of this partial compensation is highly complicated and parties are often not clear about the amount due, which in turn results in disputes.

Significant reservations have been expressed by developers and financiers as to whether this model delivers best value. Grid connections have frequently been late and the complicated compensation mechanism, which leaves the generator partially exposed to grid delivery risk, means generators are taking risks which they cannot control. The compensation mechanism has resulted in very significant compensation having been paid to developers (ultimately at the cost of the consumer) but not sufficient compensation to keep developers whole for the costs of the grid delay and the further cost and delay associated with inevitable disputes. The result being that developers can only manage those risks by including risk premiums in their project costs. This means that the ultimate cost for consumers is higher because they are paying not only for the compensation for which the TSO is liable, but also for the generators expectation of potential risk (both of grid delivery and disputes), rather than just the cost of the TSOs grid delivery performance.

15.3 United Kingdom

In the UK, offshore connection works form part of the transmission system and are owned by Offshore Transmission Owners ("OFTOs"). The assets, however, can be delivered in one of two ways. Either the generator can build the assets themselves and then sell them off to an OFTO within a prescribed period (a "Developer Build Model") or the OFTO can build the assets from the outset (a "TSO Build Model").

It is instructive that the TSO Build model has never been adopted for development of an offshore transmission connection in the UK. The principal reason for that is that developers cannot afford to lose control of timing and delivery of the works or run into interface issues. A single integrated project delivery structure needs to be in place from the outset that ensures that the grid infrastructure and

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the windfarm are delivered simultaneously. The market has therefore proven that, all other things being equal, the Developer Build Model delivers better outcomes for projects.

The UK experience is that this model has been very successful. Advantages include (i) developers retain control over the delivery and timing of the works and are able to access more cost efficient financing; (ii) it reduces the risk of the TSO setting grid delivery price and not improving / delivering cost reductions; (iii) financial and development risk for the offshore grid remains with the developer. In each case this ultimately saves costs for consumers.

15.4 Lessons for Ireland

There are strong parallels between the early UK and current Irish markets. In circumstances where offshore transmission planning has not had an opportunity to be led strategically and a policy decision has been made that customers will not bear the financial cost of transmission delivery risk, the only model that can deliver large scale offshore wind in the context of the 2030 targets is the Developer led model. The projects anticipated to contribute to the 2030 targets are relatively nearshore (and in many cases may be closer to shore than an offshore connection hub) and run broadly parallel to the coast and therefore few of the advantages of a plan led model are realised in relation to these projects. A plan led approach may be appropriate in Ireland in the same circumstances that it is recognised as being possibly appropriate in the UK – but this would only be post 2030 as we move to Atlantic offshore development, and with the planning process starting now.

The model adopted in the Netherlands is appropriate in that jurisdiction because the offshore grid is being developed to serve large multi-phase offshore wind development zones. It is also successful because (i) the process began sufficiently early; and (ii) the developer is kept whole for all grid delivery risk. This could be appropriate in Ireland, but not within the timeframes required to hit 2030 targets nor in the context of the locations of the projects which will have an ability to contribute to those targets on the East and South coast. In an Irish context, a plan led model would require significant development and design up front, which could significantly delay or risk the establishment of an offshore industry, preventing the achievement of 2030 targets. Also, in Ireland there is a current lack of expertise, experience and capability in centralised offshore grid planning. This model would also require the Government to make a decision that EirGrid (and ultimately the electricity consumer) would be fully liable for all costs associated with offshore grid delivery risk.

16 Are there any further drivers which should be considered when assessing a grid delivery model suitable for offshore wind development in Ireland?

Financeability is a further driver that should be considered when assessing a suitable grid delivery model for Ireland. Specifically, with regard compensation relating to asset ownership and operations and maintenance (O&M). IWEA are concerned that responsibilities for compensation resting with the TSO and TAO during down time could impact upon financial close or the financial investment decision for offshore wind projects and impact the successful delivery on Ireland's 2030 targets. This is mainly due to the uncertainty that currently exists in relation to the contractual framework for guaranteed availability alongside of the O&M of the cable asset. It should also be noted that there is no existing resource with the experience or expertise in situ in these organisations for managing offshore generation infrastructure.

Within a fully plan-led model where the offshore grid asset is being constructed and owned by ESBN and operated by EirGrid, the system operators will be liable for the associated risks and compensation relating to construction delays which has been discussed in the previous section but also responsible for compensating for dispatch down resulting from outages during operation. Moreover, they would be required to stock requisite spare parts to minimise down time and associated compensation.

Recent experience with large scale grid infrastructure in Ireland such as delays to the North-South interconnector alongside of the cancellation of works relating to Grid Link and Grid West does not provide industry with confidence of efficient delivery. Similarly, recent equipment failures and lack of foresight in housing spare parts for same, both at Moneypoint and more recently on the Arklow - Carrickmines 220 kV circuit, point to a decentralised option being best to ensure minimal downtime is experienced and compensations avoided where possible. Both of these outages have led to extraordinary levels of dispatch down being experienced for wind farms in the south of Ireland, leading to enormous losses for the owners and operators of these projects.

IWEA have benchmarked how these compensation requirements are addressed in other jurisdictions during outages for connection assets. An overview is given in the following sub-sections.

16.1 Netherlands

Within the centrally planned Dutch system, if the TSO TenneT are late in delivering the offshore grid connection, they are liable to pay the windfarm developer so long as the relevant construction has started. This is up to 90% of foregone revenue of both the subsidy support and the power price.

TenneT must also pay similar levels of compensation if there is an outage or the offshore grid is unavailable for any reason other than for only 5 days of maintenance per calendar year. The regulatory detail relating to this compensation are listed in chapters 6 and 7 within documentation for the most recent successful tender *Hollandse Kust (noord) Wind Farm Zone,* (March 2020)[45], inclusive of formulas to determine the compensation.

16.2 Germany

For the centrally planned German system, the generator is compensated to 90% of the lost income if there are delays to the construction / completion of the offshore grid system. Compensation would be payable from the 11th day and the compensation refers to the auction strike price or the monthly market value. The exact same regulation applies to connection outages during operation. Once the offshore grid has been built and is in operation, for any subsequent outages / loss of availability the generator would also be compensated up to 90% of the lost revenues after 10 days where the lost revenue would be both any subsidy support and power price.

There is no maximum compensation amount or period in the law associated with this. These compensations are largely socialised via grid charges, but the TSO share is dependent on the responsibility for delay. For example;

- If the TSO acts deliberately there is no socialisation of the compensation;
- If the TSO acts negligently, the TSO's share is capped to €17.5m per incident; and
- If the TSO is considered to have acted in a grossly negligent manner, the TSO's share is 20% up to €200m damage with decreasing shares for higher volumes.

In relation to the law, it is assumed that for grossly negligent behaviour, the burden will be on the TSO to prove otherwise.

16.3 United Kingdom

In the UK, which uses a decentralised model, the "Developer Build Model" (the de facto model for OFTO as detailed in the previous section) delivers the assets and they are subsequently sold through a competitive tender to an OFTO (Offshore Transmission Owners) for operation once the construction of the offshore transmission assets is completed.

If the TSO's liabilities or penalties were capped it would lead to major hikes in insurance premiums as this would remove the incentive to minimise the outage period. This is currently the case in the UK

[45] https://offshorewind.rvo.nl/file/download/55040433

with OFTO. Therefore, it should be noted that the OFTO model is not best model for Ireland to follow due to ownership of asset debates, control of the build, functional spec compliance and no third party sign off being required

16.4 Lessons for Ireland

As has been advocated for throughout this paper, IWEA strongly believe a developer-led approach similar to that used within the UK is the best fit for Ireland. Although there are many parallels between the UK and Ireland, it should be noted that the OFTO ownership / operations model is not the best fit for Ireland for the reasons set out above.

IWEA believe that to improve project financeability and deliver the best value to the consumer it is important that the developer designs, builds, 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 no existing resource skillset or demonstrated track-record from the System Operators 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.

17 Overall, which model, or model variant, is most appropriate as an enduring grid delivery model for offshore wind in the Irish context?

IWEA's key positions can be summarised as follows for offshore projects which can deliver pre-2030 and offshore projects which can deliver post-2030:

- Pre-2030: IWEA strongly advocates for a basis of Option 1 with strategic components of Option 2, focused on the proactive development of the transmission system, being progressed as a hybrid solution as the appropriate grid option to take Ireland to our 2030 targets. This should be applied to the Relevant Projects and the Enduring Projects which can deliver pre-2030. Together they can deliver Ireland's ambition of 5 GW of offshore wind by 2030 as outlined in the Programme for Government. No 'minimum distance to shore' should be included within any chosen solution for the detailed reasons outlined throughout the response.
- Post-2030: IWEA believes a plan-led approach that is zoned appropriately is likely to be needed post-2030 to unlock investment beyond 5GW and to allow Ireland to tap into the 30GW of potential for export as outlined in the Programme for Government. IWEA believes that further consultation would be required on what this transition to a plan-led approach would look like for Ireland, especially in light of the Programme for Government's increased ambitions to 5GW for 2030 and 30GW of export potential, which is a very different policy context to that in which the Navigant options were initially prepared. Once the model for pre-2030 is decided upon and understood, we will be in a much stronger position to understand how the transition to a plan-led approach would work and for what longer-term ambitions it should be designed. Planning for the transition from the pre-2030 model to the post-2030 more plan-led approach must begin as soon as a pre-2030 model is defined to provide a clear, transparent roadmap for offshore wind development into the future. IWEA recommends this model and roadmap are consulted upon once policy decisions to support the Programme for Government export ambitions have been developed.

IWEA believe that leveraging a hybrid model of Options 1 and 2 will deliver the right framework for Ireland to deliver on its 2030 targets. We simply cannot see the alternatives delivering the offshore wind required for 2030. Using the hybrid of Option 1 and 2 proposed here will also allow the development of a strong, indigenous offshore supply chain and build up industry experience which can be harnessed in a post-2030 plan-led delivery model. This can place Ireland at the heart of decarbonising Europe's electricity grid using our offshore generation export potential along the west and south coasts in particular.

18 It is accepted that a transition towards the chosen enduring grid delivery model will be required to leverage the development of the Relevant Projects in the short term. Taking into account the high level roadmaps set out at Figures 5 and 6 above, what should this transition look like?

At this stage there is a need for a strong focus on delivering the critical consenting, regulatory and grid workstreams to ensure the relevant projects and supporting infrastructure can be developed in time to contribute towards the 2030 targets.

Until there is more progress on the development of the Relevant Projects and the enduring approach it is not possible to comment meaningfully on the need and type of transitional arrangements that may be required.

However, as referenced previously, both in the Navigant report and in previous sections of this response, both Germany and the Netherlands have moved away from a developer led approach to a full, centrally planned offshore grid system (with centrally planned auctions).

Both jurisdictions can offer insights and learning. In the case of Germany, there was a long transitional period, incorporating a move from developer led projects (site selection and grid). In Germany, following the early developer led model (feed in tariff, not auctions), the number of connections and sites had become unmanageable and in 2012 a systemic grid planning for 8 clusters within the North Sea was introduced. This was further refined in 2017, with plans set out for a full centrally planned system (coordinating grid build out with auctions for volume and delivery). Sites which already had grid connection offers and could reach commercial operation by 2021 were allowed to continue under the old system. Furthermore, two transitional auctions were introduced for sites within the specified clusters, which had met the necessary permitting milestones. However, if they were not successful within those 2 transitional auctions, the developers lost their project rights; (termination of permitting process), but they could obtain a "last call option" in return for handing over their site information to the federal agency to be used if those sites were tendered again in a future centralised auction.

This transitional approach provided an opportunity for developers to derive some value from the previous DEVEX in exchange for handling over their project's site investigation / relevant information.

IT IS ACCEPTED THAT A TRANSITION TOWARDS THE CHOSEN ENDURING GRID DELIVERY MODEL WILL BE REQUIRED TO LEVERAGE THE DEVELOPMENT OF THE RELEVANT PROJECTS IN THE SHORT TERM. TAKING INTO ACCOUNT THE HIGH LEVEL ROADMAPS SET OUT AT FIGURES 5 AND 6 ABOVE, WHAT SHO

Whilst it may be considered a loss of value, it could be seen as a fairer approach than the one taken in the Netherlands.

In the Netherlands, the original developer led approach had also led to multiple site developments and an unmanageable level of grid connection offers, with a very small proportion of sites actually being developed, and in 2013 the regime was changed to a fully centrally planned model for grid build out, timings of site specific auctions to deliver specified volumes. Unlike the transitional regime in Germany, all existing developers lost the right to their sites (and their associated development expenditure).

However, it is worth noting that the Dutch experience enabled the first tender in 2016 (following the decision in 2013) including the development of a Bill and Act and with all pre-development work and information available to allow bids, for delivery in 2020. Close collaboration between the Government, TSO, regulator and industry ensured that the right information was available to be provided to developers to make informed bids, and sufficient resource was provided to ensure the necessary regulatory and legislative changes were introduced in order to meet the roadmap to 2020 targets.

Whilst the Netherlands experience may be seen as a "ripping the plaster off" type approach, their transition has been much quicker, with the first centrally planned projects at Borssele starting to generate in April 2020.

Depending on the degree of work that has already been undertaken by the Government on likely marine zones through the OREDP, the German transition model could work, providing an interim step for projects that have started development within the "right" area to continue and have already achieved significant permitting milestones such as completion of met ocean studies and Environmental Impact Assessment.

IWEA believes that further consultation would be required on what this transition to a plan-led approach would look like for Ireland, especially in light of the Programme for Government's increased ambitions to 5GW for 2030 and 30GW of export potential, which is a very different policy context to that in which the Navigant options were initially prepared. Once the model for pre-2030 is decided upon and understood, we will be in a much stronger position to understand how the transition to a plan-led approach would work and for what longer-term ambitions it should be designed. Planning for the transition from the pre-2030 model to the post-2030 more plan-led approach must begin as soon as a pre-2030 model is defined to provide a clear, transparent roadmap for offshore wind

IT IS ACCEPTED THAT A TRANSITION TOWARDS THE CHOSEN ENDURING GRID DELIVERY MODEL WILL BE REQUIRED TO LEVERAGE THE DEVELOPMENT OF THE RELEVANT PROJECTS IN THE SHORT TERM. TAKING INTO ACCOUNT THE HIGH LEVEL ROADMAPS SET OUT AT FIGURES 5 AND 6 ABOVE, WHAT SHO

development into the future. IWEA recommends this model and roadmap are consulted upon once policy decisions to support the Programme for Government export ambitions have been developed.

19 Conclusion

IWEA would again like to thank the DCCAE for the opportunity to respond to the consultation to inform a grid development policy for offshore wind in Ireland. IWEA believes that 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 DCCAE, EirGrid, CRU, ESB Networks and industry will be vital to delivering progress in the coming decade.

IWEA's response to the consultation has been structured to provide background policy context and a 'state-of-play' of the industry in Ireland before subsequently responding to the questions set by DCCAE. However, IWEA's key positions can be summarised as follows for offshore projects which can deliver pre-2030 and offshore projects which can deliver post-2030:

- Pre-2030: IWEA strongly advocates for a basis of Option 1 with strategic components of Option 2, focused on the proactive development of the transmission system, being progressed as a hybrid solution as the appropriate grid option to take Ireland to our 2030 targets. This should be applied to the Relevant Projects and the Enduring Projects which can deliver pre-2030. Together they can deliver Ireland's ambition of 5 GW of offshore wind by 2030 as outlined in the Programme for Government.
- Post-2030: IWEA believes a plan-led approach that is zoned appropriately is likely to be needed post-2030 to unlock investment beyond 5GW and to allow Ireland to tap into the 30GW of potential for export as outlined in the Programme for Government. IWEA believes that further consultation would be required on what this transition to a plan-led approach would look like for Ireland, especially in light of the Programme for Government's increased ambitions to 5GW for 2030 and 30GW of export potential, which is a very different policy context to that in which the Navigant options were initially prepared. Once the model for pre-2030 is decided upon and understood, we will be in a much stronger position to understand how the transition to a plan-led approach would work and for what longer-term ambitions it should be designed. Planning for the transition from the pre-2030 model to the post-2030 more plan-led approach must begin as soon as a pre-2030 model is defined to provide a clear, transparent roadmap for offshore wind development into the future. IWEA recommends this model and roadmap are consulted upon once policy decisions to support the Programme for Government export ambitions have been developed.

IWEA believe that leveraging a hybrid model of Options 1 and 2 will deliver the right framework for Ireland to deliver on its 2030 targets. We simply cannot see the alternatives delivering the offshore

wind required for 2030. Using the hybrid of Option 1 and 2 proposed here will also allow the development of a strong, indigenous offshore supply chain and build up industry experience which can be harnessed in a post-2030 plan-led delivery model. This can place Ireland at the heart of decarbonising Europe's electricity grid using our offshore generation export potential along the west and south coasts in particular.

19.1 Pre-2030 - Option 1 with components of Option 2 in a hybrid grid model

IWEA believes that 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, in particular those projects in development on the east coast. 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 Commission for Regulation of Utilities (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, construction of the wind farm and the offshore and onshore transmission connections will ensure the quickest method of connecting offshore wind to the Irish grid as outlined in Option 1. It leverages the progress which Relevant Projects and pre-2030 Enduring 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 System Operators 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 Relevant and Enduring 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 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 from the windfarm 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, System Operators 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 to 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 to progress alongside the development of the Relevant Projects and pre-2030 Enduring 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 5GW 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 to the consumer. IWEA 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.
- 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 consultation 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 oppose the suggested inclusion of any 'minimum distance to shore' being introduced for offshore wind energy development in Ireland as suggested in Option 2. IWEA believes that there are much more appropriate consultations currently underway in relation to offshore wind in Ireland in relation to this. IWEA strongly believes that the minimum distance to shore should be assessed locally and on a project by project basis through the Environmental Impact Assessment (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 Department of Housing, Planning and Local Government (DHPLG), using vehicles such as the MPDM Bill, the National Marine Planning Framework and the Marine Spatial Plan. 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 has been proven to be 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.

19.2 Post 2030 - Transition towards a plan-led delivery model

IWEA believe that a plan-led model, which is appropriately consulted upon once we have a clearer post-2030 policy framework, would be the best model post-2030 and we would like to highlight the following key points in relation to this:

- As we look beyond the next decade, towards unlocking our 30 GW of offshore potential on the west coast, increased coordination will be needed which builds upon an already established industry. IWEA believe a plan-led approach that is zoned appropriately is likely to be needed to unlock such investment, facilitating Ireland in going above and beyond its own energy needs and enabling offshore wind to contribute significantly on our journey to net zero emissions.
- IWEA believes that further consultation would be required on what this transition to a plan-led approach would look like for Ireland, especially in light of the Programme for Government's increased ambitions to 5GW for 2030 and 30GW of export potential, which is a very different policy context to that which the Navigant options were initially prepared against. Once the model for pre-2030 is decided upon and understood, we will be in a much stronger position to understand how the transition to a plan-led approach would work and for what longer-term ambitions it should be designed for. Therefore, it should be consulted upon then.
- Planning for the transitionary step towards a plan-led approach in the 2030s must begin immediately once a pre-2030 option is defined to provide a clear, transparent roadmap for offshore wind development into the future. Evidence from other jurisdictions has highlighted that the transition must be clearly signalled with a long lead time to allow developers to transition projects and to allow the State to progress required legislative and co-ordination body changes. For the State, these substantive changes include but are not limited to the suitable development of planning and grid connection legislation and frameworks, 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.
- The transition from a pre-2030 Option 1 and 2 hybrid model towards a plan-led model should also take account of development work already completed or underway for post-2030 Enduring Projects, in particular floating projects off the South and West coasts, to ensure progression of these projects can be facilitated through the plan-led model.

Lastly, IWEA believe EirGrid should carry out a techno-economic assessment as soon as possible on the offshore generation export potential of Ireland's West and South coasts, with a focus on the grid capabilities and requirements for reinforcements in these areas to facilitate this. Any such study should be cognisant and complementary to additional interconnection to other jurisdictions and the

emerging developments of large-scale complementary decarbonisation technologies such as electrolysers for Green Hydrogen.