Rialtas na hÉireann
Government of Ireland

Offshore Wind

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

June 2020

Table of Contents

1 Overview

1.1 Policy Context

Ireland has ambitious climate targets towards 2030, including a target to develop at least 3.5 GW of offshore wind energy, as published in the Climate Action Plan (CAP) in June 2019. To meet these targets Government has to put in place a policy framework for the delivery model for offshore grid in alignment with National Marine Planning Framework (NMPF).

The CAP established a working group on the framework for offshore electricity grid, chaired by DCCAE. The CAP also directed EirGrid, as Transmission System Operator (TSO), to develop an Options Paper on offshore. Eirgrid engaged consultants, Navigant, to prepare a report which together with this consultation will help inform this policy framework. The Navigant report has been provided alongside this consultation paper for information purposes only and is not intended for consultation.

It is important that a timely decision is made to determine which grid delivery model will be adopted in Ireland, to ensure preparations for this model can commence in time such that the 2030 renewable targets are achievable.

This consultation paper is not intended to provide a decision on the best available option, but rather to present evidence that informs the decision for a grid delivery model suitable for offshore wind development in Ireland. Further, though four models are outlined in the Navigant report underpinning this consultation, these models were chosen as archetypes to explore the advantages and disadvantages, from the various stakeholder perspectives, of the various approaches available. The ultimate choice of grid delivery model will come from any point along the full spectrum of options available, informed by careful consideration of the key drivers in the Irish context.

Based on the policy framework ultimately selected by Government, the Commission for Regulation of Utilities (CRU) will similarly consult and decide on a regulatory framework for offshore wind.

1.2 Responding to Consultation

Respondents are requested to provide responses to the questions provided in Section 5. It is not necessary to provide responses to all questions. Respondents are also invited to supplement their responses with any relevant information, reports and/or analysis.

By responding to the consultation, respondents consent to their name being published online with the submission. The Department will redact personal addresses and personal email addresses prior to publication.

Please note that responses to this consultation are subject to the provisions of the Freedom of Information Act 2014 and Access to Information on the Environment Regulations 2007-2014. Confidential or commercially sensitive information should be clearly identified in your submission, however parties should also note that any or all responses to the consultation are subject in their entirety to the provisions of the FOI Acts and may be published on the website of the Department of Communications, Climate Action and Environment (DCCAE).

All responses to this consultation should be clearly marked "'Offshore Grid Delivery Model Option Consultation' – Name of Respondent".

Responses may be sent to **OffshoreWind@dccae.gov.ie**

Submissions may also be made in writing to:

Offshore Wind Grid Development Consultation
Energy Division
Department of Communications, Climate Action and Environment
29-31 Adelaide Road
Dublin 2
D02 X285

The public consultation will close at 5pm on Wednesday, 1 July 2020.

2 Background

2.1 Recent Developments in Ireland

To support the roll-out of offshore wind capacity, various developments are ongoing in Ireland that are relevant for the choice of grid delivery model for offshore wind:

- The CAP has been developed with ambitious targets of achieving at least 3.5 GW of offshore wind capacity in 2030;
- The RESS support scheme is under development with multiple auction rounds planned by 2030. The RESS 1 design foresees a technology-neutral auction scheme (except for the solar preference category) in which offshore wind competes against other technologies. Future RESS rounds are expected to offer offshore wind specific support, as outlined in the CAP;
- An update in marine spatial planning is being conducted, led by the Department of Housing, Planning and Local Government (DHPLG), with the development of the National Marine Planning Framework (NMPF) and Marine Planning and Development Management (MPDM) Bill, which will impact marine spatial planning and the consenting process for offshore wind developments. These updates are compatible with plan-led and developer-led grid delivery models and variants of same;
- Several legacy offshore wind projects in Ireland have progressed further in development than others by e.g. acquiring a lease or grid connection offer. DHPLG, together DCCAE, has defined criteria to qualify some of these as *Relevant Projects*, which can continue their development under a "transition protocol" prior to enactment of the MPDM Bill;
- The current onshore transmission grid could potentially integrate ~1.5 GW[1] of offshore wind capacity on the Irish East Coast without any significant transmission capacity expansion but would require additional onshore grid reinforcements with significant lead times to integrate the targeted 3.5 GW of offshore wind.
- Earlier this year CRU Directed EirGrid to commence processing grid connection applications from Legacy/Relevant projects. The CRU requested EirGrid revert to

[1] This is based on a high-level assessment of cumulative available capacity informed by EirGrid's East Coast Study.

update the CRU once it had further details of the onshore network reinforcements required.

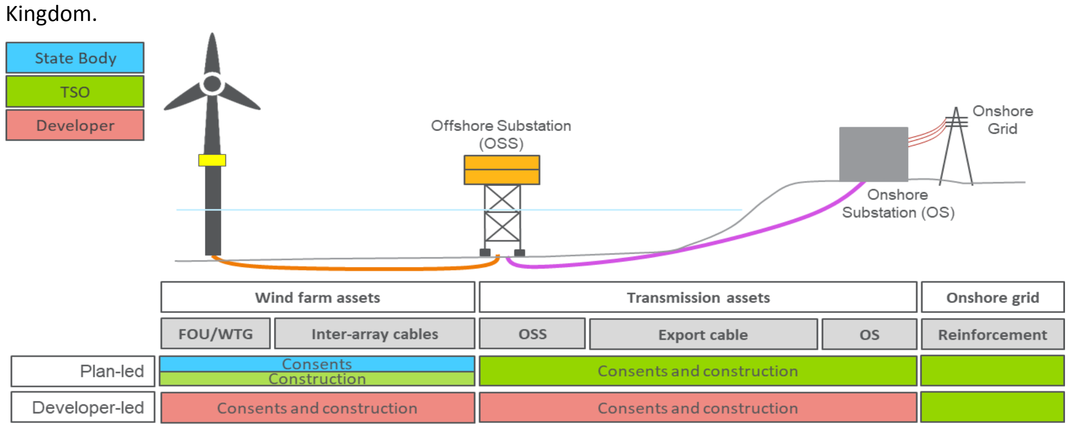
2.2 Offshore Wind Grid Delivery Models

A suitable grid delivery model should be adopted to facilitate the build-out of offshore wind in Ireland in order to meet the target of at least 3.5 GW by 2030. From a review of international approaches, four example delivery model options have been developed and assessed for consideration in the Irish context. The models represent a set of a spectrum of options. It follows that the model option or options ultimately chosen will not necessarily be set out below could contain elements of two or more options.

The two main classes of grid delivery models in the international context are plan-led and developer-led models[2], representing both ends of a spectrum of model options. The definitions of developer-led and plan-led grid delivery models used in this report are defined in Figure 1.

Figure 1. Allocation of development responsibilities of offshore wind farm and transmission assets. (FOU = foundation, WTG = wind turbine generator).

Developer-led model	Plan-led model
Developers prepare the requirements for consents, select and pre-develop wind farm sites and develop and build both offshore wind farm and transmission assets (offshore substation, export cables and onshore connection assets). This model is applied in e.g. the United Kingdom.	A State Body and/or the TSO/TAO is the responsible party for the complete process of wind farm site selection and pre-development and offshore grid connection development. This model is applied in e.g. the Netherlands.

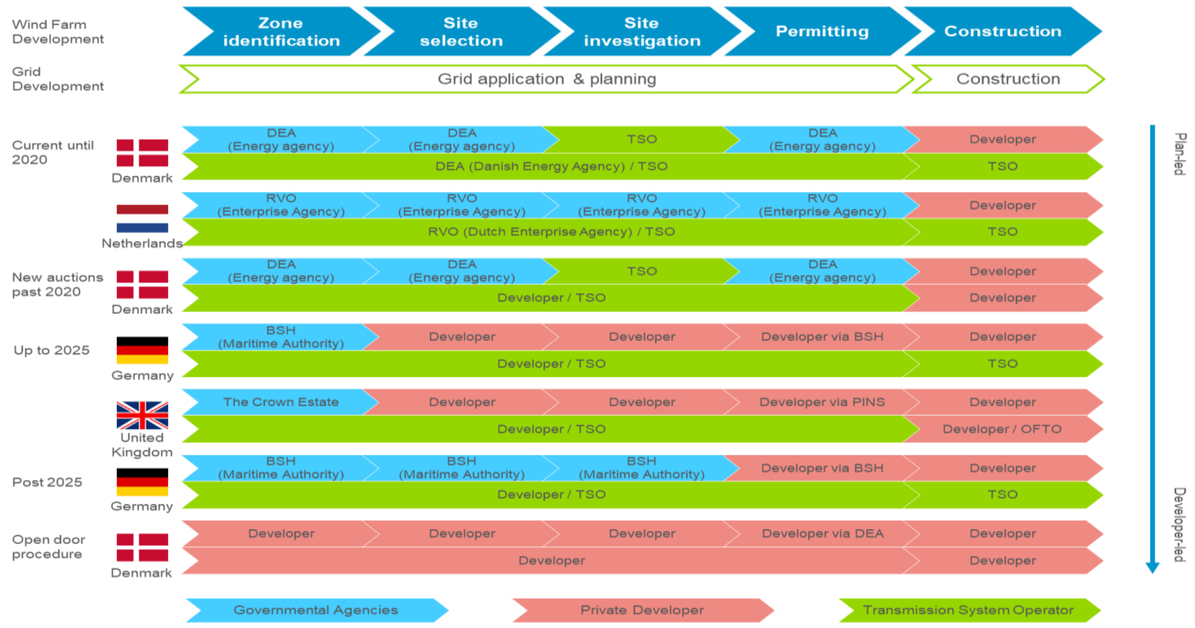


Source: Navigant

Figure 2. Allocation of roles and responsibilities within the grid delivery models across North-Western Europe. Source: adapted from WindEurope, 2019. illustrates the roles and responsibilities within the spectrum of grid delivery models across North-Western Europe.

[2] Plan-led and developer-led can also be referred to as centralised and decentralised grid delivery models, respectively.

Figure 2. Allocation of roles and responsibilities within the grid delivery models across North-Western Europe. Source: adapted from WindEurope, 2019.[3]



Source: Navigant

As a first step, the two main grid delivery models were analysed based on economic/financial, technical, regulatory/policy and international parameters. Subsequently, they were assessed against seven key drivers in the Irish context.

These seven key drivers, which impact the choice of model, include: cost levels, environmental impact, future-proofing of policies and technologies, required infrastructure, compatibility with *Relevant Projects*, social acceptance and facilitating the timely development of offshore wind capacity to achieve the 2030 targets.[4] It should be noted that the Options Paper on Offshore Grid Models report does not apply any weighting to the various drivers.

Next to the ongoing developments in the Irish context, several key stakeholders (EirGrid, DCCAE, CRU, ESB Networks[5] and offshore wind industry representatives) were interviewed to identify and understand the key drivers that might impact the expected performance and resulting choice for a more developer-led or more plan-led grid delivery model for offshore wind.

[3] Wind Europe, 2019. Industry position on how offshore grids should develop.

[4] This includes consistency with existing and proposed legislation/regulations.

[5] ESB Group comprises various separate, ring-fenced, regulated businesses. For ease of reference, in this consultation paper the use of the term "ESB Networks" to describe the ESB licensed Distribution System Owner (referred to as the Distribution Asset Owner or "DAO") and the ESB licensed Transmission System Owner (referred to as the Transmission Asset Owner or "TAO") functions, both of which are operated through the ring-fenced ESB Networks business unit is used collectively.

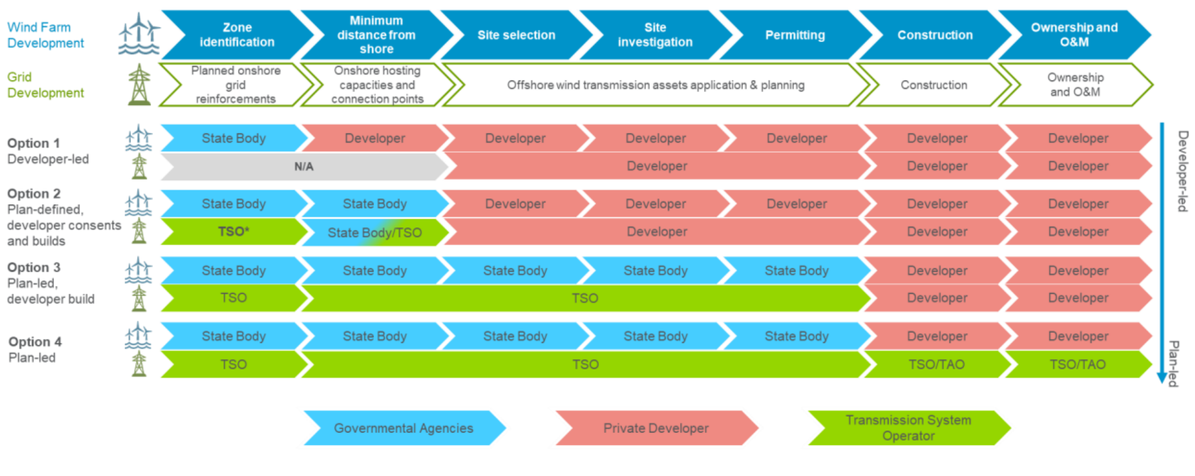
3 Irish Context

3.1 Example Model Options for Ireland

Based on the analysis, four enduring grid delivery models for Ireland were assessed ranging from a fully developer-led model to a fully plan-led model. The models represent a set of options, each with their advantages and disadvantages, indicating a spectrum of options for the Irish context. The constituent elements of the four models presented could be combined in a variety of ways to form a wide range of additional model options. It follows that the model option or options ultimately chosen will not necessarily be set out in this paper and could contain elements of two or more options.

Option 1. Developer-led model	Option 2. Plan-defined, developer consent and build	Option 3. Plan-led, developer build	Option 4. Plan-led model
Fully developer-led grid delivery model	State defines minimum distance from shore for wind farms, as well as grid connection points and available onshore grid capacity for RESS auctions; EirGrid pro-actively plans and coordinates onshore grid reinforcements	Developers responsible for offshore wind farm transmission asset construction, ownership, operation and maintenance in plan-led model	Fully plan-led grid delivery model

Figure 3. Grid delivery model options for Ireland following the phases of a project timeline. (* In option 2 the TSO will pro-actively plan and communicate the timeline for onshore grid reinforcements early in the development process).



Source: Navigant

Option 1 – developer-led – presents the full developer-led model. Developers have the responsibility for offshore wind farm site selection and pre-development, and, following successful participation in an auction, development of the wind farm and offshore wind farm transmission assets. Developers are responsible for securing the required consents, financing, construction and operation and maintenance of both wind farm and transmission assets. The grid connection point lies onshore. Required onshore grid reinforcements are undertaken by EirGrid and ESB Networks in a reactive manner based on the announcement of the successful projects.

Option 2 – plan-defined, developer consents and builds – the State defines a minimum distance to shore to enhance public support for offshore wind developments. In addition, EirGrid pro-actively plans and coordinates onshore grid reinforcements and for each RESS auction, identifies the locations, capacities and timelines for the onshore connection points. In this way, EirGrid can optimise the upgrades of the onshore grid such that the connection capacity to meet the CAP targets is made available in a timely manner. The developer remains responsible for site selection and pre-development, and the consenting and construction of the offshore wind farm transmission assets.

Options 3 and 4 adopt a more central offshore planning and coordination approach by shifting responsibilities from the developers to a State Body such as, or in conjunction with, EirGrid / ESB Networks. A single State Body for offshore renewable energy (ORE) developments will manage the planning and the site pre-development processes for offshore wind farms. Planning of onshore grid reinforcements and offshore developments could be optimised, and shared asset development[6] could be prescribed for offshore wind farm sites, where appropriate.

Under **Option 3 – plan-led, developer build –** the developer winning the auction for a pre-developed site receives the responsibility for construction, financing and operation and maintenance of both the wind farm and offshore wind transmission assets.

Option 4 – plan-led – follows the fully plan-led model, shifting even more responsibilities to EirGrid and ESB Networks compared to option 3. Alongside site pre-development, the construction, ownership, operation and maintenance of the offshore wind transmission assets are now centrally planned by EirGrid and ESB Networks.

A common set of assumptions underpin all four options including *inter alia*:

a) A Government auction scheme is in place specific to offshore wind but with a different auction design depending on the grid delivery model; an auction amongst wind farm sites that are pre-developed by developers for options 1 and 2, and a site-specific auction for sites pre-developed by a State Body for options 3 and 4;

[6] If shared assets are adopted under this model, issues might arise due to unbundling requirements (Directive on common rules for the internal market for electricity (EU) 2019/944) that restrict generation and operation by a single party, in this case the developers. The ownership and operation of shared assets may then have to fall under the responsibility of the TAO/TSO.

b) EirGrid chooses the onshore connection point and defines the connection method (note that the extent of connection method specification [e.g. the cable route] differs between the model options);

c) EirGrid and ESB Networks design and build onshore grid reinforcements and costs are recovered through network tariffs;

d) Sites will be located within zones, see Table 1 below. These will be large areas (e.g. the Irish East Coast), typically including several sites;

e) All offshore assets are built to TSO transmission standards and compliant with Grid Codes (i.e. minimal standards must be met) with appropriate oversight by TSO/TAO;

f) Whoever builds the transmission assets organises financing;

g) Connection charging policy will follow the onshore model;

h) EirGrid can seek to transfer grid connection ownership to the Transmission Asset Owner (TAO) in any option where the developer builds the asset;

i) Under option 4, current outturn availability rules are assumed to apply for offshore wind transmission assets where the developer bears the responsibility for a defined period in case the offshore wind transmission assets owned by ESB Networks and operated by EirGrid experience an outage. Under options 1, 2 and 3 the offshore wind transmission assets are owned and operated6 by the developer, who manages and bears the risk of outages to its transmission assets;

Table 1. Overview of responsibilities for the four model options assessed for Ireland.

Project phase	Responsibility	Description	Option 1 Developer-led model	Option 2 Plan-defined, developer consents and builds	Option 3 Plan-led, developer build	Option 4 Plan-led
Pre-development	**Zone selection**	Selection of location of offshore zone wherein wind farm sites (including transmission assets) could be developed as well as identification and appointment of exclusion zones (e.g. military, shipping, fishing etc.)	DHPLG /DCCAE	DHPLG /DCCAE	DHPLG /DCCAE	DHPLG /DCCAE
	Site selection	Selection of location of offshore wind farm site (including transmission assets) within the selected offshore zone	Developer	Developer	State Body	State Body
	Timing wind farm roll-out	Timing of wind farm site development (roll-out plan)	Developer	Developer	State Body	State Body
	Offshore wind farm transmission asset planning	Timing of offshore wind transmissions asset development	Developer	Developer	EirGrid	EirGrid

Project phase	Responsibility	Description	Option 1 Developer-led model	Option 2 Plan-defined, developer consents and builds	Option 3 Plan-led, developer build	Option 4 Plan-led
Development	**Wind farm consents – application**	Consents for the offshore wind farm site (including surveys, wind resource and environmental assessments, and any required leases or licences)	Developer	Developer	State Body	State Body
	Offshore wind farm transmission asset consents – application	Consents for the offshore wind transmission assets (including environmental assessment and any required leases or licences)	Developer	Developer	EirGrid	EirGrid
	Financing	Financing of offshore wind transmission assets	Developer	Developer	Developer	ESB Networks
	Final selection of onshore grid connection point	Final decision on onshore grid connection point	EirGrid	EirGrid	EirGrid	EirGrid
	Functional design offshore transmission assets	High-level design of the functional requirements and specs of transmission assets beyond grid codes and applicable standards (e.g. voltage level, capacity, cable corridor, offshore substation location, landing points, shared assets if applicable)	Developer	EirGrid and Developer	EirGrid and ESB Networks	EirGrid and ESB Networks
Construction	**Detailed design offshore wind transmission assets**	Detailed design of offshore wind transmission assets (e.g. full technical definition of transmission assets, installation methodology, construction timeline etc.)	Developer	Developer	Developer	EirGrid and ESB Networks
	Offshore wind transmission asset construction	Construction and commissioning of transmission assets	Developer	Developer	Developer	ESB Networks
O&M	**Ownership and maintenance**	Ownership and maintenance of offshore wind transmission assets (including decommissioning)	Developer	Developer	Developer	ESB Networks
	Operation	Operation of offshore wind transmission assets	Developer	Developer	Developer	EirGrid
Onshore grid reinforcement	**Responsibility onshore grid reinforcement**	Planning, specification, consenting (EirGrid) and construction (ESB Networks) of required reinforcements in the onshore grid to facilitate the infeed of offshore wind energy	ESB Networks/ EirGrid Reactive	ESB Networks/ EirGrid Pro-Active	ESB Networks/ EirGrid Pro-Active	ESB Networks/ EirGrid Pro-Active
Auction design	**Auction type**		Amongst sites	Amongst sites	Site-specific	Site-specific
	Definition of offshore capacity in RESS auctions		DCCAE	DCCAE	DCCAE	DCCAE
	Selection and definitions of onshore connection points (stations, capacity, timing) for RESS auctions		N/A	EirGrid and DCCAE	EirGrid and DCCAE	EirGrid and DCCAE
Ownership boundary	Ownership boundary assuming assets do not transfer to TAO in options 1, 2 and 3		Onshore	Onshore	Onshore	Offshore

3.2 Assessment of Advantages and Disadvantages

The advantages of the **developer-led model** include compatibility with the *Relevant Projects* that can be developed quickly and that are more likely to be compatible with existing legislative and policy frameworks, and leveraging existing developer experience in the delivery of offshore wind farms. The disadvantages include minimal onshore-offshore transmission asset coordination, the likelihood that any public acceptance campaign will be focused on a single project rather than multiple projects, greater risk of additional infrastructure with associated environmental impact and more complexity involved in future proofing of offshore transmission assets. Option 2 provides mitigation to some of these disadvantages compared to option 1.

The advantages of the **plan-led model** include long-term onshore-offshore transmission coordination with the potential for reduced infrastructure, the ability to craft a coordinated public acceptance process covering multiple projects and ease of future proofing of technology. The disadvantages include the time needed to develop new governmental capabilities, policy, regulatory, licence and legislative frameworks which are likely required, challenges with state bodies simultaneously developing multiple offshore and onshore renewable energy and transmission projects and incompatibility with *Relevant Projects*. Option 3 gives developers control of the construction of both the offshore wind farm and transmission assets, reducing potential risks as perceived by the offshore wind industry.

Mapping the advantages and disadvantages of each model option assessed showed that in the longer term, options 3 and 4 have specific advantages and a lower risk profile compared to options 1 and 2. It should be noted that these advantages, disadvantages and risks have not been weighted in this consultation paper.

Figure 4 summarises the advantages and disadvantages of the grid delivery model options assessed for Ireland.

Figure 4: Advantages and Disadvantages of grid delivery model options for key drivers in Ireland

<table>
<tr><th>Key drivers</th><th></th><th>Option 1
Developer-led</th><th>Option 2
Plan-defined, developer consents and builds</th><th>Option 3
Plan-defined, developer builds</th><th>Option 4
Plan-led</th></tr>
<tr><td rowspan="5">Cost</td><td rowspan="3">+</td><td colspan="2">Competitive pressure can reduce cost levels transmission assets
No sunken costs associated with Relevant Projects</td><td colspan="2">Optimised transmission asset costs through standardised and holistic planning, and synergies
Optimised cost for onshore grid reinforcements through effective coordination of on- and offshore asset developments
Central pre-development and de-risking of offshore wind sites</td></tr>
<tr><td></td><td>Potential cost upside due to pro-active onshore grid reinforcement</td><td></td><td>Further optimisation of transmission costs through economies of scale on programme level</td></tr>
<tr><td></td><td colspan="3">Potential upside from economies of scale on a project level through hubs and shared infrastructure</td></tr>
<tr><td rowspan="2">-</td><td>Suboptimal costs onshore grid reinforcements through misalignment on- and offshore developments</td><td>Less optimal onshore grid co-ordination with offshore wind capacity compared to options 3 and 4</td><td rowspan="2"></td><td rowspan="2">State exposed to compensating developers for lost revenue in event of fault on offshore transmission connection</td></tr>
<tr><td colspan="2">Sunken costs for pre-development of sites unsuccessful in auction</td></tr>
<tr><td rowspan="2">Environ-ment</td><td>+</td><td></td><td>More optimal onshore-offshore grid coordination compared to option 1 by definition of grid connection point with potential to reduce environmental impact</td><td colspan="2">Lower cumulative environmental impact by coordinating onshore-offshore transmission works, minimising the need for new transmission infrastructure</td></tr>
<tr><td>-</td><td colspan="2">Limited potential to take onshore-offshore transmission asset coordination into consideration resulting in greater environmental impact due to potential need for more transmission infrastructure</td><td colspan="2"></td></tr>
<tr><td rowspan="2">Future proofing</td><td>+</td><td></td><td>Potential upside as EirGrid can specify technologies and connection methods including shared assets</td><td colspan="2">High potential for future-proofing of technology and shared assets due to long planning horizon and societal incentives of State Body
Potential to adopt innovative technologies if not yet cost-effective</td></tr>
<tr><td>-</td><td colspan="2">Limited developer incentive for future-proofing of technology
Only cost-effective technologies and incremental innovations</td><td colspan="2"></td></tr>
<tr><td rowspan="4">Infra-struc-ture</td><td rowspan="2">+</td><td colspan="3">Leverages developer experience and expertise in delivery of offshore infrastructure
Less complex onshore interface
One party (developer) for development, construction and O&M windfarm and transmission assets</td><td>Leverages experience of EirGrid and ESB Networks with delivery of offshore infrastructure</td></tr>
<tr><td></td><td>Increased on- and offshore grid coordination compared to option 1 through pro-active planning and communication of onshore development timeline and alignment with RESS auctions</td><td colspan="2">Long-term planning horizon allows to coordinate and optimise on- and offshore developments and between ORE projects
Reduced procedural complexity with limited stakeholders in consenting process</td></tr>
<tr><td rowspan="2">-</td><td>No coordination and optimisation on- and offshore grid and across ORE projects</td><td>Less coordination potential and optimisation of on- and offshore grid and across ORE projects compared to options 3 and 4</td><td colspan="2">Planning phase by new State Body for ORE development could introduce bottleneck since multiple large-scale projects with similar timelines being developed by a small number of bodies</td></tr>
<tr><td colspan="2">Procedural complexity with more stakeholders and potentially more projects in consenting process grid and across ORE projects</td><td></td><td>Developers perceive a risk as they do not have control of site pre-development and offshore wind transmission infrastructure development
More complex offshore interface</td></tr>
<tr><td rowspan="2">Relevant projects</td><td>+</td><td colspan="2">Compatible with Relevant Projects, and leverages work already completed by developers on Relevant Projects</td><td colspan="2"></td></tr>
<tr><td>-</td><td colspan="2"></td><td colspan="2">Incompatible with Relevant Projects</td></tr>
<tr><td rowspan="3">Social accep-tance</td><td rowspan="2">+</td><td></td><td colspan="3">Prescription of minimal distances from shore</td></tr>
<tr><td colspan="2">Targeted and specific campaigns have the potential to improve social acceptance of some projects</td><td colspan="2">Central public acceptance campaign
Coordination of sites and minimisation of landing points and visibility to increase public acceptance</td></tr>
<tr><td>-</td><td colspan="2">Social acceptance campaign on project-by-project basis</td><td colspan="2">Offshore wind farm developers less likely to be supportive of plan-led model</td></tr>
<tr><td rowspan="3">Timing</td><td>+</td><td colspan="2">Relevant Projects can be developed quickly to commence offshore wind developments in the short-term, leveraging work already completed by developers providing a programme advantage</td><td colspan="2">Controlled and coordinated onshore-offshore transmission asset roll-out plan to timely achieve targets</td></tr>
<tr><td rowspan="2">-</td><td rowspan="2">No control and coordination of onshore-offshore transmission assets roll-out to achieve targets</td><td rowspan="2">Proactive planning of programme for onshore capacity and auctions but less coordination of offshore wind roll-out compared to options 3 and 4</td><td></td><td>Capacity needs to be built up in EirGrid and ESB Networks</td></tr>
<tr><td colspan="2">Transitioning to a plan-led model takes time to develop new governmental capabilities, and policy, regulatory, licence and legislative frameworks, which are likely required
Challenges with state bodies simultaneously developing multiple ORE projects</td></tr>
</table>

Source: Navigant

4 Developing an Offshore Model Grid Delivery Model for Ireland

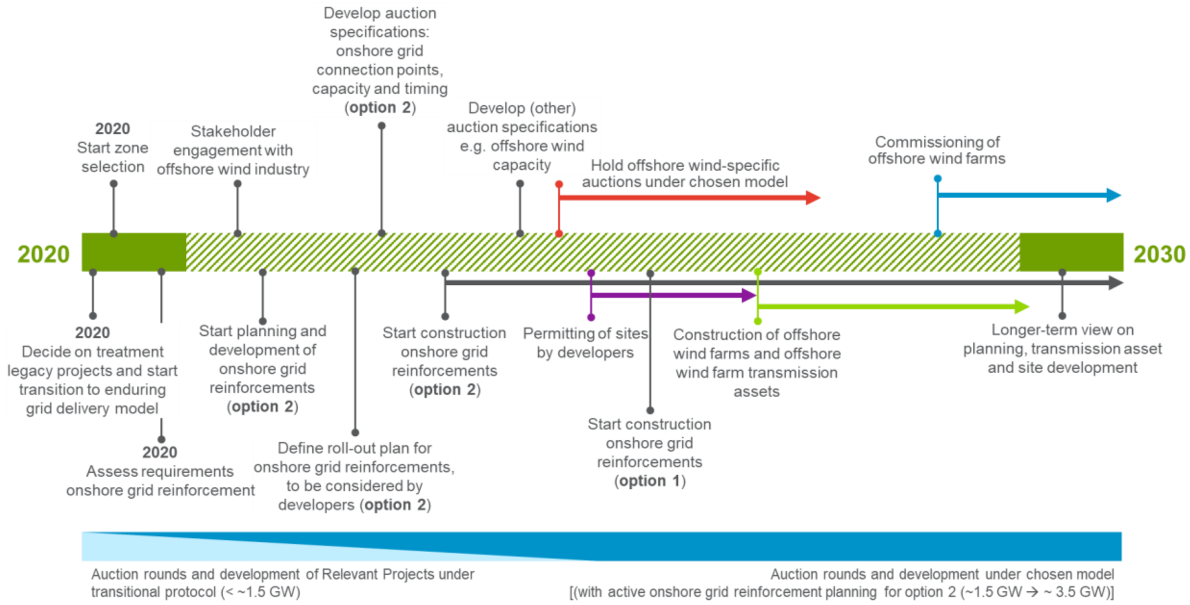
A transition towards an enduring grid delivery model would be required to leverage the development of the *Relevant Projects* in the short term and to implement any required regulatory, policy and legislative changes.

A transition towards option 1 would require limited actions but has a higher risk of misalignment between onshore and offshore developments. A transition to option 2 increases the onshore and offshore coordination and requires action by EirGrid to assess in detail the availability of onshore capacity and align this with auctions. A transition to options 3 and 4 would require significant changes and actions that would need to be implemented as soon as possible but ensures onshore and offshore developments are fully aligned. The 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.

A possible high-level roadmap with key actions and milestones towards 2030 for options 1 and 2 is given in

Figure 5. Significant uncertainty remains regarding the timing and duration of the actions as some are sequentially dependent (e.g. assessment, planning and construction of onshore grid reinforcements). The actions to transition from the current “onshore” model to options 1 and 2 are limited.

Figure 5: Possible high-level roadmap with key actions and milestones towards 2030 for options 1 and 2.



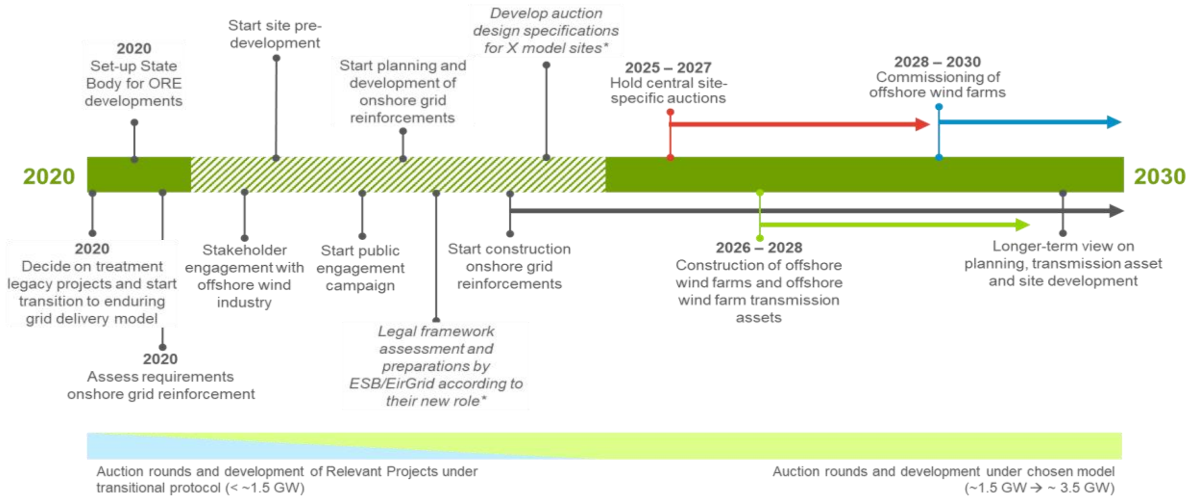
Source: Navigant

Options 1 and 2 share a start-up phase with options 3 and 4, which presents common no-regret actions that should start as soon as possible in line with the planning and development of required onshore grid reinforcements, namely:

- Offshore zone selection;
- Decision on enduring model option;
- Assessments on current hosting capacity of onshore grid.

A possible high-level roadmap for options 3 and 4 with key actions and milestones towards 2030 is given in Figure 6. Some milestones (*) have a different interpretation depending on the option. The exact timing and duration of the actions depends on the time required by the involved stakeholders to perform the required actions.

Figure 6: Possible high-level roadmap with key actions and milestones for options 3 and 4 towards 2030. *these milestones will have a different interpretation depending on the selected model option.



Source: Navigant

While the pre-development of the new enduring model is taking place, the assumed roll-out towards ~1.5 GW (based on expected current available onshore grid capacity) is expected under an interim model to allow some *Relevant Projects* to be developed. If a different enduring option is chosen, this model could be gradually phased out to be replaced with the chosen enduring model. Due to the tight timeline, the next couple of years should focus on the pre-development actions as shown above.

The yearly capacity additions should be decided based on yearly targets, planned roll-out timeline, onshore grid developments and wind resource potential at the identified sites.

It is important that a grid delivery model decision is made to determine which grid model will be adopted in Ireland to ensure preparations for the enduring model can commence in time such that the 2030 RES-E targets are achievable.

5 Consultation Questions

Section 2.2 of this consultation paper sets out seven key drivers, which impact the choice of model, these include:

i. cost levels,
ii. environmental impact,
iii. future proofing of policies and technologies,
iv. required infrastructure,
v. compatibility with *Relevant Projects*,
vi. social acceptance and
vii. facilitating the timely development of offshore wind capacity to achieve the 2030 targets.

Section 3.1 outlines four primary models for the grid delivery in the Irish context; as follows:

Option 1: developer – led delivery model,

Option 2: plan –defined,

Option 3: plan-led,

Option 4: plan-led grid delivery model.

Please respond to the following questions, noting that while four main models are outlined above, responses need not be limited to these options, as many further variants are possible:

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?**