

## Offshore wind briefing note:

### A decade to deliver the 40 GW target and the Offshore Transmission Network Review (OTNR)

A rethink of the offshore wind development process



# 1. UK offshore wind – a more strategic approach

With over 10 GW of offshore wind deployed across the UK in the last decade, and a further 7 GW under or awaiting construction, the UK remains at the forefront of the global offshore wind energy sector.

The UK has now set an ambitious target to reach 40 GW<sup>1</sup> of offshore wind capacity by 2030, plus at least 1 GW of floating wind. In terms of deployment, that means an average rate of around 3 GW per year over this decade. By 2035, to achieve net zero carbon electricity, it is estimated that the UK will need to deploy at least 50-65<sup>2</sup> GW of offshore wind, with a significant proportion of new capacity being floating wind.

Regen analysis of the current pipeline of offshore and floating wind projects (Figure 1) shows that, on paper at least, there are sufficient projects in development, or with development leases expected to be awarded through the Round 4 and ScotWind leasing processes, to reach the 40 GW target. But the timetable is extremely tight. Setbacks to deployment, caused by a variety of issues including planning delays, supply chain constraints (turbines, electrical equipment, vessels, port infrastructure) or grid delays, could quickly jeopardise the build out schedule to 2030.

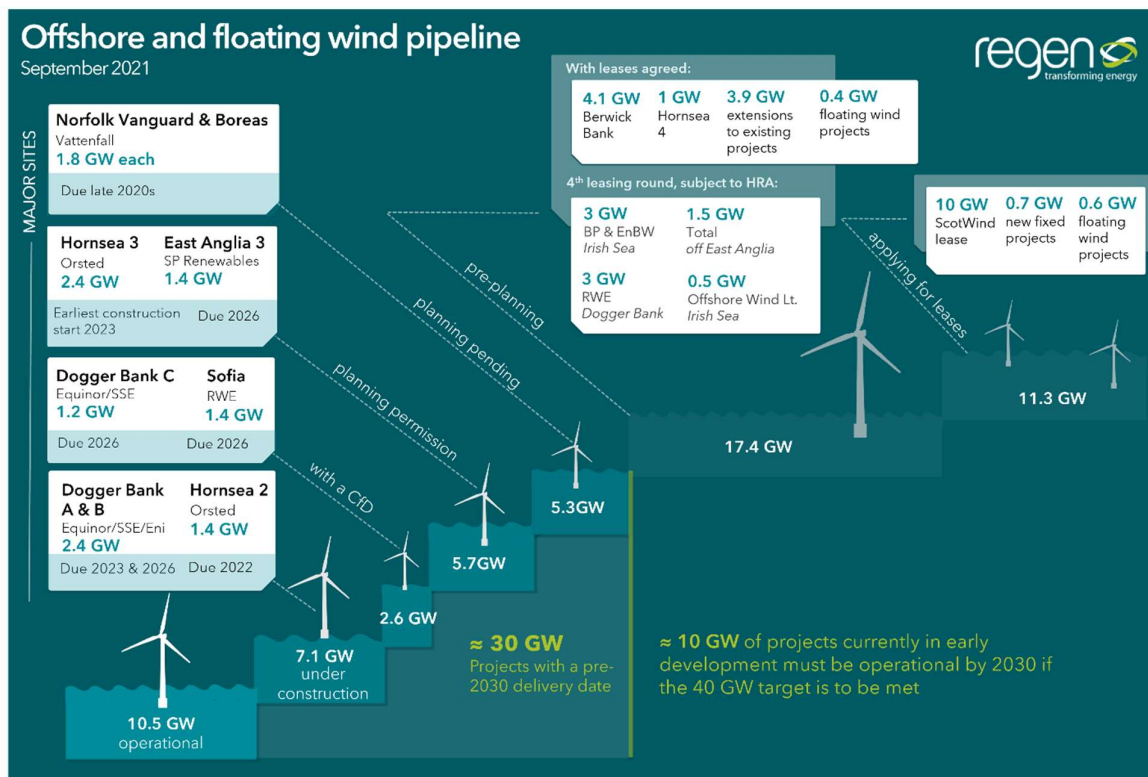


Figure 1: UK Offshore wind pipeline with highlighted projects (September 2021)

<sup>1</sup> 10 Point Plan & Net Zero Strategy: <https://www.gov.uk/government/publications/net-zero-strategy>

<sup>2</sup> A range of estimates from Committee on Climate Change, BEIS NZS, National Grid FES 2021, Regen

Achieving 40 GW by 2030 relies heavily on the successful build out of the Round 4 leases in England and Wales, and the forthcoming ScotWind lease programme. As Regen has previously highlighted, [the Round 4 leasing](#) round has attracted a number of new entrants from the oil and gas sector. This could provide new approaches, and certainly broader balance sheets, to accelerate offshore development. However, it also introduces a new set of risks from less experienced developers.

Getting to 50-60 GW by 2035 will almost certainly require a new “Round 5” lease process. It is expected that the need to access new resource areas, partly to avoid cumulative environmental and marine user impacts, will mean that future projects will be in deeper water, further from shore, and also in new areas of seabed such as the Celtic Sea. Given a timeline of ten years or more between the start of a leasing round and eventual construction, the “Round 5” lease process will need to begin in the next few years.

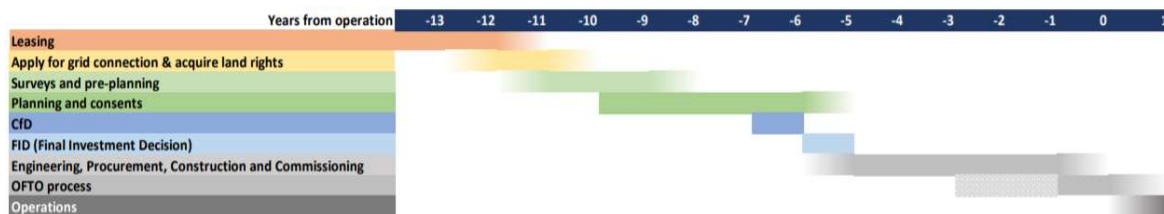


Figure 2: BEIS indicative offshore wind development timeline <sup>3</sup>

While UK offshore wind has so far been a tremendous success story, with falling costs and increasing levels of investment, UK supply chain content and jobs, it is notable that the majority of the UK offshore wind development continues to be focused on the east coast, meaning that the UK energy system will be increasingly lopsided and dependent on weather patterns prevailing in the southern North Sea. As Regen has previously highlighted, the concentration of projects in that area of seabed is leading to cumulative impacts on other marine users, grid and transmission infrastructure, and the marine environment. It is already leading to price volatility issues and energy supply concerns. This has created a strong case to open up new areas of UK waters to development, in the Celtic Sea and across the western seaboard.

A more strategic approach is needed, an approach that considers the full system architecture of UK offshore wind: the technology needed, locations of projects and their supporting infrastructure. Alongside this, an industrial strategy is needed that considers the development of supply chains and the spreading of the undoubted economic benefits that the industry can bring, especially to regions facing the decline of existing, fossil fuel-based industries.

<sup>3</sup> BEIS: OTNR: Enduring Regime and Multi-Purpose Interconnectors, [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1021040/offshore-transmission-enduring-regime-condoc.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1021040/offshore-transmission-enduring-regime-condoc.pdf)

We also need to consider how offshore wind fits within the UK's overall net zero energy system. This includes, for example, integration with energy storage, interconnection across the UK, and with Ireland and Europe, and the increasing use of wind energy to manufacture low carbon hydrogen.

## 1.1. Grid and offshore network planning

A critical area that requires a more strategic approach is the planning and development of onshore grid infrastructure and offshore transmission networks.

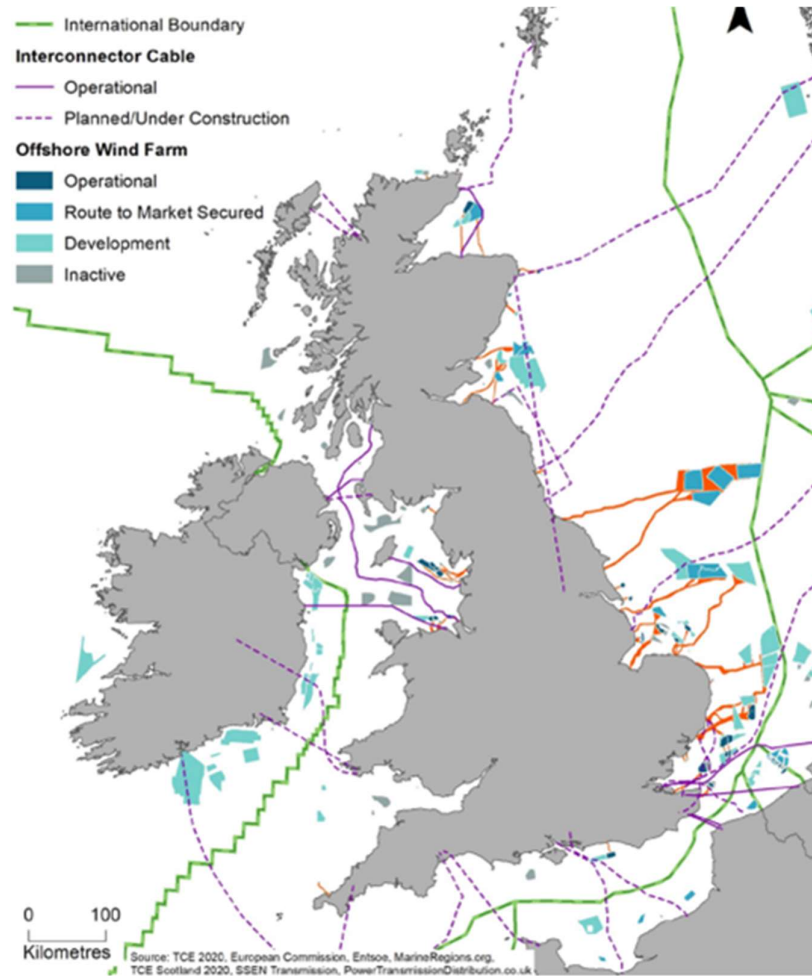
At the start of the Round 3 leasing process, it was expected that the development of offshore transmission infrastructure would be undertaken by a separate Offshore Electricity Transmission Operator (OFTO). Very quickly, however, offshore wind developers flagged that separating out the development of offshore transmission infrastructure from wind farm development would create an unacceptable risk for developers and make the financing of windfarms near-impossible. Understandably, no investor would commit to a wind farm when critical components would be the responsibility of another organisation and development process.

As a compromise, it was decided that the full wind farm development, including the planning and construction of the offshore network and onshore grid infrastructure, would be undertaken by the wind farm developer, giving them control over all aspects of the project. However, once construction was complete, the transmission assets would be "handed over" to a separate, long-term OFTO.

This approach minimised the interdependency between projects and reduced the developers' exposure to external risk, by giving them control over all aspects of their projects. It also allowed leases to be awarded on a standalone, competitive basis, and for the Contract for Difference allocation process to become a competitive auction. This has helped to drive down individual project costs, albeit at a loss of some opportunities to collaborate and share assets. Critically, it helped to get the UK offshore wind sector up and running, delivering deployment and supply chain investment much faster than other EU countries.

Germany, for example, has taken a different approach, with a more proactive and coordinated Offshore Grid Development plan<sup>4</sup> drawn up by the German Transmission System Operators and updated yearly to the Federal Network Agency. German developers then bid for leases and subsidies on the basis that offshore transmission networks will be available and will be financed separately. Arguably, this approach may have delayed Germany's initial offshore wind deployment, but it has given them a strong basis for future growth

<sup>4</sup> See Florence School of regulation <https://fsr.eui.eu/offshore-electricity-grid-development/>



*Figure 3: UK offshore cable landing points*

*The Institution of Engineering and Technology, 2021. "Launch of our offshore energy infrastructure landscaping report"*

The downside for the UK, as has now been identified, has been a piecemeal project-based approach to the development of offshore infrastructure and onshore assets such as substations and transmission network connections.

As a result, opportunities for efficiencies through infrastructure and cost-sharing, and the development of larger-scale projects which could have gained access to EU markets, may have been missed. The cumulative impacts of individual transmission links on other marine users, the environment and local communities have become an increasing consenting risk which could now create significant barriers for the next phase of offshore wind expansion.

In response, the UK Government, Ofgem, the Crown Estate, Crown Estate Scotland, the Energy System Operator (ESO) and other key stakeholders have accepted that the current approach is no longer fit for purpose and have established the 'Offshore Transmission Network Review (OTNR)'. The OTNR's objective is to remove future barriers that could impede the UK's offshore wind industry. By reforming the existing

planning and development processes, it hopes to enable better coordination between projects, and introduce a more strategic approach to offshore infrastructure investment.

## 2. Offshore Transmission Network Review

The Offshore Transmission Network Review, led by BEIS, brings together a wide range of stakeholders, supported by an industry advisory group, to consider the future development process of offshore wind network infrastructure. A full list of OTNR members, newsletters and progress to date reports is available on the website:

<https://www.gov.uk/government/groups/offshore-transmission-network-review>

It is clear that one issue the review is grappling with is that existing pipeline projects have largely been developed under the old working model of isolated, standalone projects. It is very difficult, therefore, to change course to a more collaborative and strategic approach without changing the commercial terms of existing leases and contracts, and without risking significant delays to these projects. It is also clear that there is an urgency to deliver any changes to assist these existing projects as quickly as possible, catching them in as early a stage of development as possible.

The OTNR has, therefore, sought to time-box its review into several workstreams, each looking at different timescales for reform.

### OTNR Workstreams

- 1) Early Opportunities:** This workstream consults with advanced projects to establish if flexibilities or adjustments to the existing regime could enhance coordination in the near term for existing pipeline projects.
- 2) Pathway to 2030:** For the benefit of projects with recent leases, due to be delivered in the late 2020's, and to ensure the delivery of the 40 GW target, National Grid ESO are developing a 'Holistic Network Design' for completion by February 2022. This aims to ensure timely project deliveries by minimising cumulative impacts of infrastructure on communities and the environment, thereby reducing consenting risk. A spatial and temporal Generation Map has been developed by The Crown Estate to aid this process.
- 3) Enduring Regime:** This will develop a new policy framework for all future projects, and those coming through in current leasing rounds.
- 4) Multi-Purpose Interconnectors (MPIs):** A crosscutting workstream to ensure that any changes made as part of the review are compatible with MPIs, and to facilitate MPIs through legislative and regulatory reform.

## 2.1. OTNR Consultations

The review is seeking input from a wide range of stakeholder groups, including developers, technology providers, network owners and operators, the fossil and green energy sectors, community groups and devolved administrations.

Through two consultations led by Ofgem and BEIS, the review hopes to build an evidence base to inform subsequent policy reform, see Table 1.

*Table 1: The review's two consultations and the workstreams they consider.*

Ofgem: Jul-Sept 2021 consultation <sup>5</sup>	Workstreams
Changes intended to bring about greater coordination in the development of offshore energy networks <b>Now closed, awaiting response</b>	<b>“Early Opportunities”</b> <b>“Pathway to 2030”</b> <b>“Multi-Purpose Interconnectors”</b>
BEIS: Sept–Nov 2021 consultation <sup>6</sup>	Workstreams
Enduring Regime and Multi-Purpose interconnectors <b>Deadline 23<sup>rd</sup> November</b>	<b>“Enduring Regime”</b> <b>“Multi-Purpose Interconnectors”</b>

Most significantly for the long-term development of the sector, BEIS is now completing its consultation considering the **“Enduring Regime”** workstream, and resuming the **“Multi-Purpose Interconnectors”** workstream. This sets out the high-level options to create a new, strategic development process, and considers if changes to the legal framework are required to facilitate interconnectors. The responses will be used to develop more detailed proposals which may be consulted on in the later stage of the review.

<sup>5</sup> <https://www.ofgem.gov.uk/publications/consultation-changes-intended-bring-about-greater-coordination-development-offshore-energy-networks>

<sup>6</sup> <https://beisgovuk.citizenspace.com/energy-efficiency/enduring-regime-offshore-transmission/>

## 2.2. Enduring Regime & Multipurpose Interconnectors consultation

This live consultation seeks views on the entirety of the end-to-end process for developing an offshore wind farm, from seabed leasing and planning, to CfD and transmission charging. This new '**Enduring Regime**' will apply to projects which will come through current and future leasing rounds.

Broadly, three high level approaches are suggested:

- 1) **Incremental change:** Retains the developer-led approach, but introduces incentives to encourage cooperation.
- 2) **Holistic Network Design (HND) and delivery:** A more anticipatory approach to transmission; the ESO develops a network design in collaboration with the onshore TO. Detailed design and construction could be completed by several parties. Risk is introduced, with the earlier delivery of infrastructure and the relatively late awarding of government support.
- 3) **Holistic Network Design and delivery with combined seabed lease and financial support:** In addition to HND, the seabed lease and allocation of government support is combined into a single competitive process. Bringing this process forward removes some of the risk associated with early delivery of infrastructure. This centralised approach is more in line with the current German and Danish systems.

These approaches are proposed alongside seven potential delivery models, allocating responsibility for design, construction, and operation to various stakeholders: developers, the Offshore Transmissions Owner, the ESO, and the Transmission Operator (TO). The appropriate allocation of risk and reward among these stakeholders is a key question, which the consultation is seeking views on.

This consultation also resumes the '**Multi-Purpose Interconnectors**' (MPI) workstream. Ofgem's initial consultation had sought views on how best to work within the current legal framework, a barrier to MPIs at present, to encourage near-term interconnector deployment. BEIS' current consultation now considers if the '**Enduring Regime**' can work within the current legal framework, or if legislative change is required to facilitate MPIs and the consequential impact that would have.

### Key consultation questions:

The consultation focusses on gaining feedback on the high-level approach to be taken. It is seeking views on:

- The scope and governance of the strategic plan; should partner organisations be involved, who and what responsibilities should they have?
- Is there a need for a Holistic Network Design, should it include onshore transmission, and who should deliver this design?
- Views on the three high level approaches described, and which delivery model provides the appropriate balance of incentives and cost savings?

- The stage at which detailed design and construction of transmission should be conducted?
- Whether Ofgem's options (described in the previous consultation) to work within the current legal framework to facilitate MPIs are adequate for the Enduring Solution?

## 3. Forward view

The OTNR is a necessary first step from the government towards reform of the offshore wind development process. Whilst the UK has benefitted from its competitive, individual-project led approach up to now, effective reform is needed to ensure the delivery of 40 GW by 2030, and to ensure that further expansion of offshore wind is sustainable and cost-effective.

By working to minimise cumulative impacts to the environment and communities, and the associated consenting risk, the review can remove barriers to accelerate near-term deployment, while laying a foundation for the long term growth of the industry.

There could also be significant opportunities for economies of scale and collaboration, including the potential to better integrate UK offshore wind with Europe and with the emerging green hydrogen manufacturing sector.

The scope of the review is wide, and could have significant impacts for other aspects of the UK's offshore wind strategy. For example, coordination and interdependency between projects and the network operators will require a more strategic approach to offshore leasing and spatial planning. It would also require a change in the way that Contracts for Difference subsidies are applied and awarded. The risk, which must be carefully managed, would be to allow network reform to itself become a barrier and delay projects that are in progress.

Overall, it points to a more strategic and coordinated approach, and the potential for more central decision-making (by a system architect) akin to the German and Danish approaches. It will be interesting to see how industry respond to this.

In the longer term - towards the 50-60 GW needed by 2035, and on to the 70-100 GW needed by 2050. This review is an opportunity to think more strategically about the placement of this capacity and the architecture of the transmission network to serve them.

### 3.1. Implications for floating wind and the Celtic Sea

Although the OTNR does not specifically target the new areas of expansion for floating wind, such as the Celtic Sea, the outcome of the review could have implications and lessons for how these areas are to be developed.

The Celtic Sea is a prime candidate for a strategic network planning approach:

- There is the potential for several projects to be located in adjacent areas of seabed in Welsh, Cornish and Irish waters. If exploited fully, this could lead to tens of gigawatts of deployed capacity. See Figure 3.
- Strategic planning could minimise cumulative impacts on marine users, fishing, shipping and marine habitats, and on communities near points of connection. This would reduce planning risk.
- Existing onshore transmission network connection points in South West Wales, Cornwall and North Devon are limited and constrained. Strategic planning would highlight infrastructural needs and support early investment.
- There is an opportunity to plan strategically and build interconnectors between Ireland, Wales, South West England, and potentially on to France, to create a truly integrated energy system for the western seaboard.

It is important that industry and stakeholders working towards the development of offshore wind in the Celtic Sea, and off the coasts of Ireland and Scotland have the opportunity to input into the OTNR, and can learn from its outcome. It is also critical that any process adopted does not lead to a delay in the development of floating wind in the Celtic Sea, and jeopardise the 29,000<sup>7</sup> jobs, investment and economic opportunities this could bring.

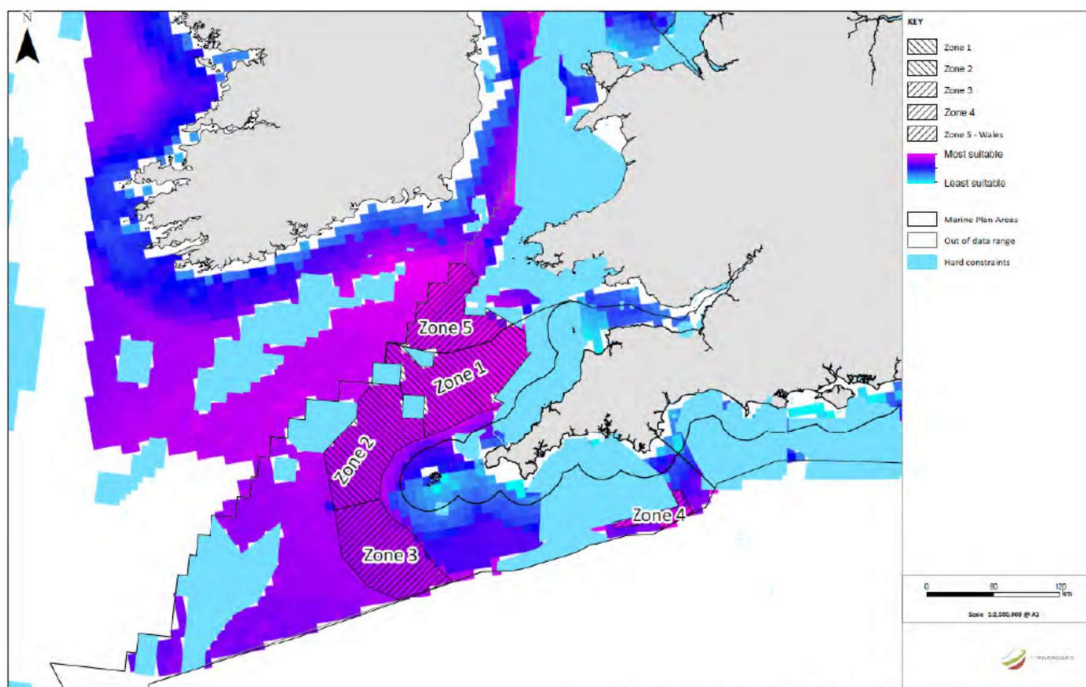


Figure 3 Celtic Sea Development Zones, ORE Catapult, ITPENERGISED analysis, 2020.  
<https://ore.catapult.org.uk/wp-content/uploads/2020/07/Final-Version-small.pdf>

<sup>7</sup> Formation of Celtic Sea Cluster could create 29,000 jobs by 2050  
<https://renewablesnow.com/news/cluster-formed-to-push-floating-wind-in-celtic-sea-754781/>

## Introducing Regen's Offshore Renewables Team:



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Johnny has over 25 years' energy industry experience, in both the conventional and sustainable energy sectors covering oil and gas, renewable energy, offshore renewables, marine technologies, port infrastructure, supply chain development, smart energy systems and energy storage.



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**MScEcon University of Aberdeen** Petroleum, Energy Economics and Finance  
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