

Challenges delivering the Government's 40 GW offshore wind target and Net Zero

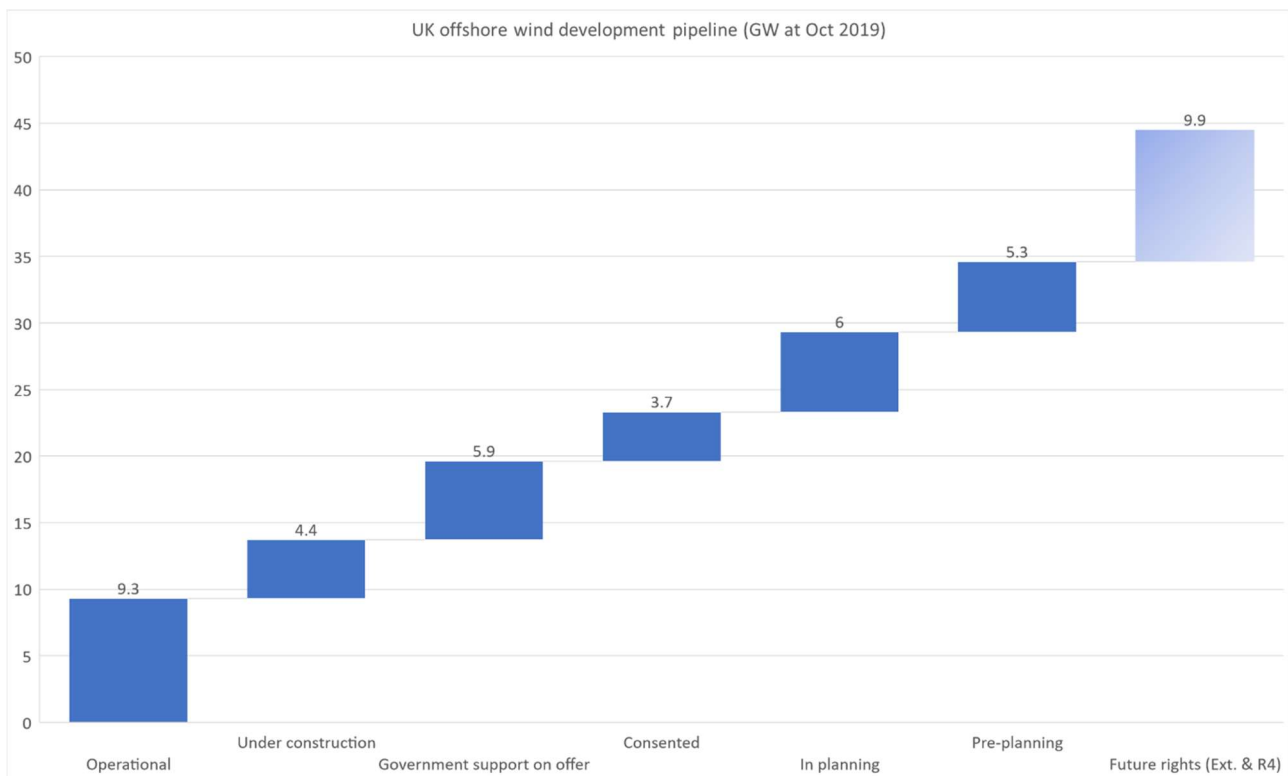
Introduction

1. This consultation response is to support the necessary ambition of Ofgem and the UK Government by pointing out some of the challenges that need to be overcome and the need for a holistic and detailed approach to addressing those challenges if significant inefficiencies are to be avoided with the UK consumer facing higher costs than necessary. The offshore wind target of 40GW by 2030 in the Queen's speech in December 2019 is stretching but we cannot afford to miss it.
2. We applaud the priority Ofgem have given to achieving this critical 2030 goal. Ofgem has a vital role to play in the timely delivery of this goal and this is clearly recognised by Ofgem.
3. In its forward work programme consultation, under the heading Value for Money for Network Projects, Ofgem proposes to *"work with government, the Crown Estate, the ESO and industry to develop coordinated solutions for transmission networks linking the windfarms to the onshore grids while exploring the options for meshed grids rather than radial links."* This has been reinforced by Ofgem's decarbonisation programme action plan in which action 3 is to *"Explore regulatory options to support development of an offshore grid to enable a four-fold increase in offshore wind generation by 2030."*

Background and scope of the challenge

4. It has taken 20 years since the construction of the Blyth offshore wind farm in 2000 (now decommissioned) to get to the 9.3GW of offshore wind capacity now operating (see Figure 1). At October 2019 there was 4.4 GW under construction and 5.9GW with CfDs as part of the total development pipeline, including windfarm extensions and leasing round 4, of 44.4GW.

Figure 1: A strong offshore wind pipeline



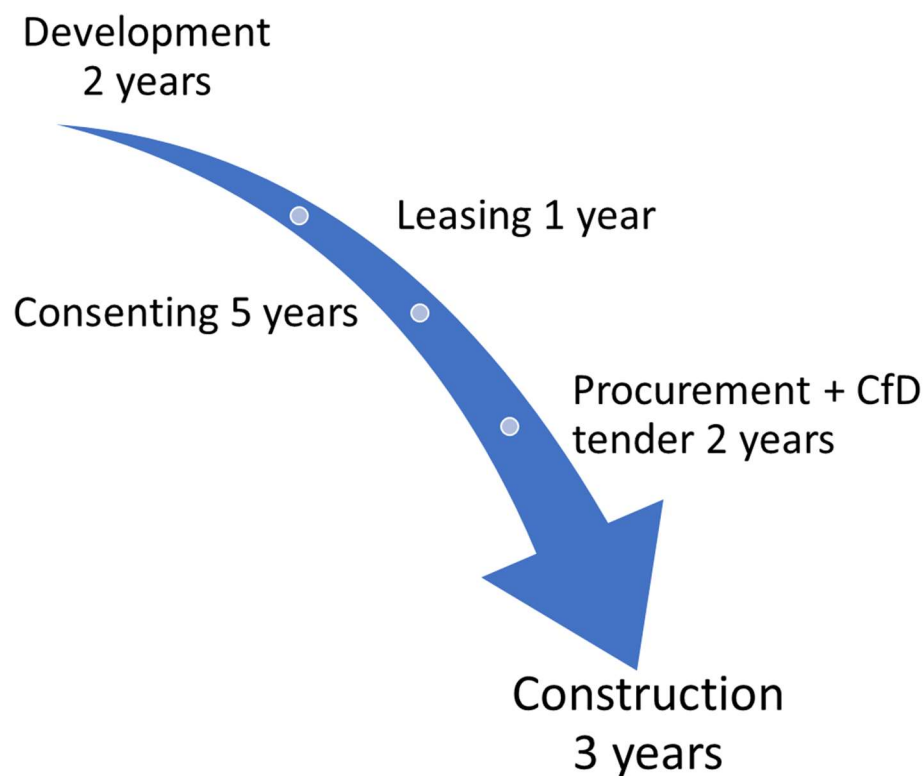
Source: The Crown Estate Offshore wind leasing Round 4 Bidder Information Day, October 2019

5. There are at least 7GW of Crown Estate leases to be developed in the next ten years or so with additional acreage leased by Crown Estate Scotland. These projects will bid for a CfD in the auctions which are conducted by the Delivery Body (National Grid) whereby winners enter 15-year contracts which precipitate a process leading to construction and commercial operation. The lead times on getting new (now big) offshore wind farms into operation is seven years and more. Planning for onshore landing and connection is an increasing environmental and political issue with objections from local groups to many projects. Consenting and organising the specialised ships to facilitate construction and the delivery of all the kit is part of the issue of lead times. Supply chains and planning hurdles are already being stretched which adds to cost and extends timelines.
6. The first offshore wind farms were, by today's standards, small: Scroby Sands, for example, was 60MW. And they were "ankle deep", close to the shore and originally subsidised under the Renewable Obligation (RO) subsidy regime with 20-year contracts. In 2009 offshore wind earned 2 ROC credits (about £150/MWh of output). After the introduction of the CfD regime as part of the Energy Market Reform (EMR), the first Final Investment Decision (FID) administered prices were £110/MWh. Competition has driven down the strike prices achieved by offshore wind projects in the latest CfD auction to around £60/MWh.
7. The cost reduction driving these price cuts is largely the result of much larger turbines now being deployed (typically 10 MW apiece) and the larger numbers of turbines being deployed in any farm. The new farms are also further offshore, in deeper waters and with much higher offshore transmission capacity and on-shore connection and transmission use-of-system charges; the latter can form as much as 50% of on-going operating costs.
8. This development followed the leasing rounds operated by Crown Estates which held and holds auctions for leases of seabed sites and charges an annual lease. There have been

several such rounds with increasing competitive intensity as developers have got used to the market and new entrants such as Oil and Gas companies entered this market. Successive lease areas have effectively moved further and further away from UK shores. Round 3, the previous round, had sites which include the Dogger Bank which is some 120 miles offshore, will require extensive offshore transmission inter-connection and on landing will require a very significant connection and use-of-system arrangement¹.

9. Getting another 31.5 GW of offshore wind in commercial operation by 2030 will require that the bulk of that capacity secures leases and CfDs by 2025 - over 6GW per year - so that planning, contracting, financing and construction can be organised and committed (see Figure 2). It is hard to see that happening without significant changes across a variety of fronts. The Crown Estate has started auction round 4 for site leases. The Delivery Body will need to organise very significant auctions in the next few years, stepping up annual incremental MWs to some 6GW from now to 2025. Without clear signalling and proper planning and advanced/anticipatory transmission system development, supply chains could become stretched far with a real danger that this will increase costs to the consumer. There needs to be a holistic approach to policy and delivery.

Figure 2: Illustrative development timeline



Source: The Crown Estate operational Offshore wind report, 2018

Other components of the challenge ... and some opportunities

¹ A good analysis of cost reduction potential and challenges is presented in The Crown Estate's annual publications on the offshore sector (latest covering the year to December 2018). See <https://www.thecrownestate.co.uk/media/2950/offshore-wind-operational-report-2018.pdf>

10. The GB electricity transmission system has recently been subject to a review of its charges by Ofgem and the forward-looking part of this “targeted charging review” has concluded that it will evolve transmission, connection and use of system charges to reflect current and prospective use of the system and the costs associated with such use to inform the decisions of investors and generators. This will have a locational and, prospectively, a time of use component. This puts significant unknowns into the equation as OFTOs and generators determine their bid price for the CfD auctions. The CfD bid horizons could easily be 20 years from when the bids are submitted to auction to the final operational year of the 15-year contract. TNUoS charges could change more rapidly than RPI in such a time frame and given the scale of these charges this would have a material impact on the economics and risk of the wind farm.
11. A possible solution to this is to allow TNUoS charges as a (partial) cost pass-through. The danger in that solution is that location choices will then not reflect transmission costs and higher total cost solutions are implemented. Alternatively, new projects could be allowed to contract for incremental capacity long-term at a known indexed price, as has happened with gas transmission entry capacity.
12. Offshore transmission to date has been end to end, i.e. from a specific wind farm to a specific main-land connection point. Moving offshore with multiple project owners and geographically distributed wind farms probably requires a more co-ordinated OFTO model. It could mean optimising both offshore interconnection and onshore landing. But it requires a new construct of an OFTO as a transmission business enabled to connect new offshore sites and share connection and use of system costs across existing and new users. Ideally from a regulatory perspective these new OFTOs become RAB-based regulated businesses with a duty to connect and an obligation to plan and optimise. We are encouraged that one of the actions in Ofgem’s Decarbonisation Action Plan² is to “Explore regulatory options to support development of an offshore grid to enable a four-fold increase in offshore wind generation by 2030.”
13. The new 31.5 GW of offshore wind farms will probably sit mainly in the North Sea and in an arc to Scotland from England. At some points on this arc the closest onshore landing points will be as much in continental Europe as in the UK.
14. This reminds one of a Northern Europe interconnected offshore wind energy paradigm, contracting and trading across both GB and (e.g.) Danish/N. Europe markets. The transmission businesses constructed to enable such interconnections between GB and Northern Europe would then have different roles than currently and might be justified by a market-to-market trading rationale and security of supply considerations (interconnectors can bid into the capacity markets). These “hybrid connections” would also encourage investment in offshore wind by reducing risk as a result of greater redundancy in the transmission link and facilitating arbitrage of electricity prices between the UK and on the continent.
15. There appear to be at least five types of change/considerations necessary to facilitate these types of developments. The first three are specific to offshore wind. The last two are more generic to the development of low carbon generation and so also apply to CCUS and Nuclear generation.

² The plan can be found at:

https://www.ofgem.gov.uk/system/files/docs/2020/02/ofg1190_decarbonisation_action_plan_web_0.pdf

16. The first is around trading regulations. At first glance there might not be a big difference from that prevailing for current trading across interconnectors³ with the notable exception that existing offshore generators would need first access to OFTO transmission to enable them to fulfil CfD contractual commitments to the LCC Co. As shared offshore transmission facilities and onshore landing/delivery points become more common, there may need to be a new regulatory regime around the trading of such rights (just as gas transmission entry capacity is tradeable).
17. The second is around the regulations/regimes for access to and use of offshore transmission and how to include existing OFTO assets in any new RAB⁴ regulated open access Offshore Transmission Grid. It is difficult to see how such developments can materialise without some Government intervention and governance - for example, to suggest geographic “families” of assets that might become the basis of a future -regulated Offshore Transmission Grid and some ideas of how to calculate the transfer values of existing OFTO assets into such new aggregated businesses. The EU “PROMOTioN” work stream might be moving in this direction as it is promoting the development of transmission links which are both OFTOs and interconnectors. In Ofgem’s Decarbonisation Action Plan there is a recognition of a need for more effective co-ordination of offshore networks and integration with international offshore transmission networks.
18. The third area is how alternative floating offshore wind farms might come into play in the very deep waters of the Scottish North Sea. Existing potentially non-economic oil and gas platforms in the North Sea could play a role as an interim solution for either or both of new wind assets and transmission linkages. The UK Oil and Gas authority is keen to make use of these existing assets. Pushing back the dates of decommissioning non-economic platforms itself creates value for the owners of these assets and delays the environmental impact of decommissioning.
19. Fourthly, consideration will need to be given to how to deal with the current revenue impact on renewable generators operating under CfDs when wholesale prices go negative in a world where there is much more wind and solar generation. The current EU rules are that generators cannot receive CfD payments when market prices are negative. This event is difficult to predict and plan for but is widely forecast to become a much more frequent occurrence. Moreover, there may be system security circumstances under which wind farms would be dispatched off. The prospect of having access to mainland Europe power markets mitigates such concerns to some extent. But there will be remnant concerns. This issue is relevant for other renewable energy sources. There are no doubt other components of the structure of the CfDs that might need adjustment to facilitate potentially longer gestation and more contingent offshore wind developments; to include longer Target Commissioning Windows (TCWs) and contingent triggers for the commencement of the CfD timing incentives.
20. Finally, an over-riding theme in the EMR was the development of the Levy Control Framework. Some commentators in the industry described this development as negative. The alternative assessment which we believe is that it provides more certainty to investors that the Government realises the costs to be incurred in getting on a lower carbon

³ There is, however, some post-Brexit uncertainty around the cross-border electricity trading regime – especially the continuation (or otherwise) of market coupling and implicit capacity allocation after 1 January 2021.

⁴ Regulated Asset Base

trajectory. It is likewise helpful to learn that Government is considering a similar approach to getting to Net Zero Carbon and is developing a budget framework for that target and importantly that Ofgem is committed to its role in meeting the Net Zero challenges.

Conclusions

21. The purpose of this note is to support the necessary ambition of Ofgem and the UK Government and to point out some of the challenges that need to be overcome and the need for a holistic and detailed approach to addressing those challenges if significant inefficiencies are to be avoided with the UK consumer facing higher costs than necessary.
22. Foundational decisions need to be made now on a North Sea grid in order to hit our 2030 targets and Net Zero. Urgent, key issues are:
 - Will there be a single system owner for all UK waters or several zonal system owners?
 - When and how will the owner(s) be appointed?
 - Is a new independent offshore system operator warranted? If so, who, what is their remit and relationship to National Grid ESO?
 - Do we fold existing and new interconnectors into any new regime? If so, how and when?
 - What are the transition arrangements for existing OFTOs?
 - How will anticipatory investment be approved and funded?

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Charles, Mark and Paul have operated as advisors in and to the British and global power and gas markets for the last three decades and have collective experience of over 100 years. They have joined forces to support delivery of the UK Government's commitment to Net Zero carbon emissions by 2050.

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