# National Grid ESO Offshore Coordination Project - Consultation response

October 2020

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RenewableUK's members are building our future energy system, powered by clean electricity. We bring them together to deliver that future faster; a future which is better for industry, billpayers, and the environment. We support over 400 member companies to ensure increasing amounts of renewable electricity are deployed across the UK and to access export markets all over the world. Our members are business leaders, technology innovators, and expert thinkers from right across industry.

The offshore wind industry agrees that the existing regime for offshore transmission, which incentivises radial, point-to-point connections, is no longer fit for purpose. The commitment to 40GW by 2030 and the need to reach net zero means that offshore wind development will accelerate. This will only be achievable if integrated grid solutions are found. Equally, however, it is essential that in seeking these solutions, the purpose is held at the front of everyone's mind: increasing deployment of offshore wind and interconnection. While the CBA undertaken shows the clear benefit of shared network solutions, if not done appropriately, risks may increase for wind farm developers – reducing the potential rate of deployment and increasing energy costs.

This is a very complex picture, and teasing apart the issues is my no means a small challenge. The Offshore Coordination Project from the ESO is a welcome addition to the effort to tease apart the issues and challenges as the offshore network expands. We welcome the opportunity to respond.

**Holistic Approach to Offshore Transmission Planning Report**
*Q1. Do you agree with our assessment of the key technology and system risk barriers coming from the Holistic Approach to Offshore Transmission Planning Report?*

**Technology**:
We agree that HVDC breakers and cabling will be very important technologies for the development of an integrated offshore grid, as offshore wind projects are developed further offshore and capacity requirements increase. Furthermore, multi-purpose interconnectors will have similar distance and capacity requirements. However, it is important to recognise that HVAC will still have a role to play going forward, as many of the projects in development already for the 2020s are based on that technology. There will be projects in future where radial connections continue to be the most cost effective solution, depending on the project and location.

The CBA report rightly notes that there is a requirement for reactive compensation platforms for HVAC circuits, but the assumption behind the costs of these are not clear. We would encourage the ESO to address the voltage issues that are not considered in the report (p. 59)

It should also be borne in mind that there will be a spectrum of solutions across the network and pathways to get there. "Full HVDC integration" is at one end of this spectrum, and the current

radial solution is at the other. There are a range of solutions in the middle and in different parts of the country we expect projects to come forward in different places on this spectrum at different times.

As noted on in the CBA analysis, a lot of the technology is relatively new to the industry and much is still being developed. Some in industry are concerned that the assumptions may be too ambitious, and the technology cited has not reached the technology readiness levels required for full deployment (for example, HVDC breakers may only be at TR7). For the integrated offshore network to be a success and to develop as quickly as possible there needs to be a clear strategy of innovation and development within the ESO and the TOs to bring this technology forward for deployment.

The codes and standards associated with the current connection regime are well understood by the supply chain, from front-end studies through to physical equipment construction standards and compliance testing requirements. That understanding and the resulting delivery capability that rests within the supply chain is an important factor in reducing the risk profile of offshore wind and enabling rapid deployment. The integrated offshore transmission technology solutions that are proposed will require material change to industry codes and standards, which in turn will affect design work that needs to be undertaken early in the project development cycle. Prompt action is therefore needed to ensure that necessary amendments to codes and standards are made to enable design and delivery of integrated solutions and that the codes and standards continue to evolve in a nimble way as new best practice develops.

In terms of timing, the cost savings assume that "full integration" starts from 2025. Most projects that will be commissioning in the mid-2020s already have connection agreements and are preparing for the next CfD auction round and are unlikely to be able to deliver integrated connections.

**System risk**

Developers have all opted for developer build offshore transmission assets to date. This is driven by the desire to manage risk of designing and building offshore assets to time and spending. Moving to coordinated and shared assets necessarily means that some developers will be exposed to the third-party risk of non-delivery or cost over runs, which could delay the delivery of large offshore wind volume. Work should be undertaken to fully understand offshore network project management and delivery and the benefits and risks of differing approaches, looking for example to other jurisdictions such as Germany and Denmark and how their networks have been developed and delivered, and the failings therein.

*Q2. Do you have any proposals on how to most effectively bring the technology to market for when needed?*

There is a global move towards HVDC and, as noted in the papers, China has already deployed HVDC circuits and breakers, but these are not available to the European market yet. There is therefore much work that needs to be done to bring these technologies to the European market at the scale and cost necessary. This should focus firstly on standards and network requirements, and secondly on innovation and industrial strategy.

As noted above, without clarity of the standards that industry is working to, supply chains will not be able to fully invest in manufacturing. In this context, we should also consider that the Offshore Wind Sector Deal commits the sector to achieving 60% UK content of projects. Early confirmation of design standards could help support British firms to feed into the development of the offshore network. The UK has some strengths in this area, for example the GE Grid

Solutions site in Stafford. However, we would recommend that the ESO work with the industry to identify specific requirements for the UK's offshore grid and establish funding needs for innovation via BEIS and Innovate UK.

*Q3. Do you have any additional evidence to inform the assessment we have made?*
The assessment is based on the assumptions that projects being built from 2025 will be included in shared connection design. The reality is that all the offshore wind projects entering the upcoming CfD auction in 2021, which will delivered projects from 2025-27 have their connection agreement in place, or soon will do, and some of these may not include shared connection design. The TEC register shows a very high volume of new capacity on the system in the 2021-25 period, before the period for shared connections assumed in the papers.

The open letter, issued by Ofgem and BEIS in the summer of 2020 may open up some projects in the 2025-30 period for share connections, but it is most likely that this will become a reality from the late 2020s only, as planning a design for integrated solutions is more deliverable from project conception, rather than trying to reverse engineer a solution. It is not just the grid connection agreement that needs to be reviewed, but also the range of other planning and consenting requirements, both onshore and offshore, for cable routes that all take time to secure.

*Q4. Do you have any further feedback on the report?*
No comment

**Cost-benefit Analysis Report**
*Q1. Do you agree with our assessment of the costs and benefits?*
The analysis is welcome. It rightly points out that the scale of the challenge to deliver offshore connections is now much greater than when the issues was las investigated, as recently as 2015. It is clear that there are a range of benefits to introducing shared connections, including lower costs, environmental impacts and social impacts.

However, it is yet clear how shared connections will be delivered, and the impacts that this will have on costs and benefits. One of the main barriers to delivering shared connections is the third-party risk that developers, where one developer might be reliant on a competitor to deliver their grid connection. This could impact on consenting, technical specification, timelines and costs. This may be a core reason that OFTO-led build has not been taken forward to date. Higher risk may mean delayed buildout of offshore wind or higher financing costs for either the transmission network or the offshore wind farms, which may reduce the overall benefits. It is essential therefore that we keep in mind the purpose of the offshore transmission network: to enable net zero via higher volumes of offshore wind and interconnection. Therefore the commercial needs of these developers need to be kept front and centre of the future system.

There are number of futher points that our members believe would merit further assessment:

- The report focusses on reduced capex and opex of the offshore transmission. Boundary reinforcement can be delivered via bipole HVDC systems, which will increase overall system resilience and has the potential to reduce constraints on the onshore system in particular. These wider system benefits should be considered in future.
- While the total savings are clear, which will ultimately benefit consumers, more work should be undertaken to assess where the costs and saving fall for developers, National Grid ESO and the TOs. If there are higher costs for developers or those building the offshore network, could this feed through into high CfD results for example?

- We understand the need to consider a single status quo vs counterfactual scenario in the CBA, however, is there an impact on the saving if the number or size of projects is varied? For example, 75GW could be delivered by 50 projects of 1.5GW or 75 projects at 1GW. This could have a substantial impact on the layout of the network, and the scale of the benefits realised.
- Ancillary services provision from offshore wind will be an essential part of the system in future. A more integrated network could have impacts, both positive and negative, on how these are provided.
- As the offshore network becomes more complex, the financing of both the network and the wind farms could become more risky and complex. Impacts of increased costs of capital for these projects should also be considered further.

*Q2. Do you have any other evidence to support or challenge the assessment made?*
The CBA assumes that shared connections will be in place from 2025. Many of the projects that this applies to already have grid connection agreements in place and have completed or are engaging in the planning process, and it is difficult to see that many will be able to draw on shared connections. BEIS and Ofgem have written to industry asking for pathfinders to explore coordination in the 2020s. while industry is open to this, and we understand there are discussions ongoing, it is important that this is a "no regrets" option on an opt-in basis, and if shared connections cannot be pursued, existing agreements are available to fall back on as the target of 40GW by 2030 requires almost all the projects in planning and development now to be delivered.

*Q3. What do you see as the potential impact on the environment of these proposals, particularly the reduction in the number of assets and landing points?*
And
*Q4. Do you have any further evidence on the potential social and community impacts of these proposals? We would particularly welcome responses from local authorities on this question.*
Share connections and integrated solutions will reduce environmental and social impacts. While the individual cables and substations may have larger footprints, there will be fewer of them, meaning construction impacts will be reduced and aggregate impacts will be much lower. It should be noted, however, that although there will be fewer landings, those that are built are very likely to be larger. The impacts of these landings and substations will need to be planned and managed strategically, with land points identified earlier, along with the adequate management of environmental and social impacts.

*Q5. Where do you see value for further work to build on and test these findings? Either from the proposed list or beyond?*
The CBA makes a robust case for moving to a coordinated network, setting out a binary choice between the status quo and an integrated solution. However, the transition will not be this clear cut; rather there will be a process of hybrid and modular projects. A fully integrated network will be preceded by shared connections, of two or more wind farms sharing a single connection to the onshore network, which is envisaged by the pathfinder programme.

Furthermore, a fully integrated network will take time to develop, and may require oversized connections being built for projects to connect into at a later date. We would recommend that the further work should investigate the costs and benefits of building such oversized connections to areas of potential wind farm development, thus assessing the balance of risk stranded assets versus the costs of building out extra capacity at a later date. For example, the Dogger Bank area will certainly continue to be developed well into the 2030s and it seem unlikely that any over-capacity built now would be under-utilised in future.

Currently the charging regime for the allocating the costs of the transmission system is set up to the incentivise the incremental growth of the transmission network by encouraging generation to locate closer to centres of demand and where there is available network capacity. For the transformational change to the transmission system that connecting at 75GW of offshore wind will bring, the incremental charging approach is no longer fit for purpose. The Transmission Network Use of System (TNUoS) charging regime will need to be fundamentally reviewed as part of the OTNR, or the objectives will not be met. BEIS will need to take a strategic view on the future shape of TNUoS to ensure it can deliver on the government's objectives.

**Offshore Connections Review Report**

*Q1. Do you think that if the areas we are highlighting were improved, that the ability to coordinate projects would be significantly increased?*

The CION process is outdated and needs review. The CION process should be used to give a reliable connection agreement within the 90 days of application, but developers report that the pre- and post-CION process is being used to delay extend commitments beyond this time frame If a commitment within 3 months of application is not deliverable, which industry recognizes as a challenge, the CION process should be codified with clear, and more realistic timelines, and clarity about what will be provided, when. For developers, the important factors are the date, location and capacity of connection. Further details can be established later, if necesarry.

We welcome the regional options proposed to develop a more coordinated view. The current CION process does include provisions for coordinated development, but we are not aware of option having been used to date. In the next stage of work, we would recommend that the reasons for this should be investigated and understood, and how will this ensure that projects are not delayed, or capacities limited after connection agreements are in place

As noted above, we need to maintain the pace of development and keep in mind investor confidence in the system. Many projects in development have been through the CION process and have secured connection agreements. While some of these projects may be appropriate pathfinders for shared connections, they will be exposed to the risk reopening connection negotiations negates the existing agreements.

Reopening the CION process presents significant risks to developers. This does not mean that this should not be done – indeed it is necessary for early development of shared connections – but it will need to be undertaken on a opt-in basis, with full engagement with developers and transparency on an opt-in basis. Where the CION process is reopened a full explanation should be provided of why this decision has been taken and the expected benefits of integrating/coordinating more than one application, and with a clear discussion of how the risks noted above will be managed.

The BEIS-Ofgem open letter of July 2020 called for interested developers to come forward with co-ordination ideas, some of which might deliver in this timeframe. These pathfinder projects are a positive step, but remain challenging. RenewableUK understands that there are developers who would be interested in coming forward are concerned that they may lose the "baseline" of existing grid connection agreements. For the pathfinders to be successful in the medium term, they need to be a "no regrets" option to be explored on an opt-in basis, rather than running the risk of losing all connection agreements. As well as a new grid connection agreement, there will also be planning reviews, impacts on CfD, etc, that will also need to be considered and will make a redesign of connections challenging. To avoid a risk that pathfinders are unsuccessful, but

existing agreements are canceled, a “twin track” approach of maintaining existing project development and reforming the process needs to be pursued to minimise project risk and maximise developer engagement.

It is not entirely clear how a regional CION process would work with connection offers. For example would multiple developers be offered the same coordinated connection agreement? We assume that this will build on the existing “coordinated/ integrated offers” process, but it is not clear how the commercial risk and connection development would be managed needs to be understood.

We agree that there will therefore be a much greater role for an shadow “offshore TO”, most likely led by one of the developers to plan and deliver, but this requires further work, and is unlikely to deliver solutions before 2030. The ESO should assess whether, or the extent to which the developer, as “shadow TO” would be party to the STC, and the impacts that may have on deliverability and risk that parties take on. To maintain confidence of all developers, it will need to be open and transparent system, balancing the commercial interests of all developers and transmission network users.

We welcome the next steps and areas the National Grid ESO has out. However, we would like to stress the importance of the following:

- The coordination of the ESO’s planning work with The Crown Estate and Crown Estate Scotland leasing rounds should be a priority. Maximising the benefits of shared connections is inextricably linked to the location of the wind farms themselves, and therefore leasing locations and plans need to be coordinated with the NOA and ETYS processes. With this in mind, the NOA process should be extended offshore.
- The purpose of the developing the offshore transmission arrangements needs to be kept in mind at all times. Deploying higher volumes of offshore wind not only needs greater coordination of the transmission infrastructure, but also acceptable risk and cost to the offshore wind farm (and interconnector) developers.
- The volume of work required to transition to an integrated offshore system, and then the design and management of that system, should not be underestimated. Their will need to be clearly defined role for government departments – primarily BEIS, but also MHCLG and the Treasury – as well as Ofgem, ESO, TOs and industry. Early work needs to be undertaken to define clear lines of accountability and communication between these parties for delivery of an integrated offshore grid and net zero.