**INTERNAL DRAFT**

# Position paper in relation to the Ofgem Electricity Interconnector Policy Consultation

This position paper sets out Statkraft's initial views in relation to the issues raised by the Ofgem consultation on Electricity Interconnector Policy. Forewind, in which Statkraft is a partner, is developing the Dogger Bank Renewable Energy Zone (REZ) as a series of offshore wind farm projects with a cumulative target total capacity of between 9GW and 13GW, or put another way, greater than 10% of the UK's installed capacity. The Dogger Bank REZ is ideally located as an interconnector hub. A case study of one of many interconnector concepts feeding this hub is used below to highlight key issues. Forewind's interests go beyond this one project example.

We first set out the context of our response to the issues raised in the consultation by describing some of the grid[1] connection designs that Forewind is considering for the Dogger Bank REZ together with some of the legal and regulatory issues arising from these designs. We then set out what we believe would be the treatment of such designs with respect to GB transmission access rights under the current GB legislative and regulatory framework. Finally we respond to the questions specifically raised in the Electricity Interconnector Policy Consultation (the consultation) in the context of these grid connection designs, issues and the current GB legislative and regulatory framework.

## The Dogger Bank REZ

The Dogger Bank REZ will comprise between 9GW and 12.8GW of offshore wind farms installed across an area that extends from 164km to 330km from the UK coastline. The furthest reaches of the project will be 370km from the Norwegian coastline.

Offshore wind farms on the Dogger Bank are likely to have capacity factors in the region of 45%, that is they will on average generate 45% of their rated output (although of course at any one time it could be anywhere between 100% and 0%). The current GB offshore transmission planning standards require sufficient transmission connection capacity for 100% of rated output and although this is subject to generator choice, it is Forewind's current intention that there will be sufficient grid capacity to ensure that the output of the Dogger Bank project will not be constrained with the transmission connections normally in service. This implies that, on average, 55% (100-45) of the transmission capacity on a radial cable from Dogger Bank to Britain will be unused.

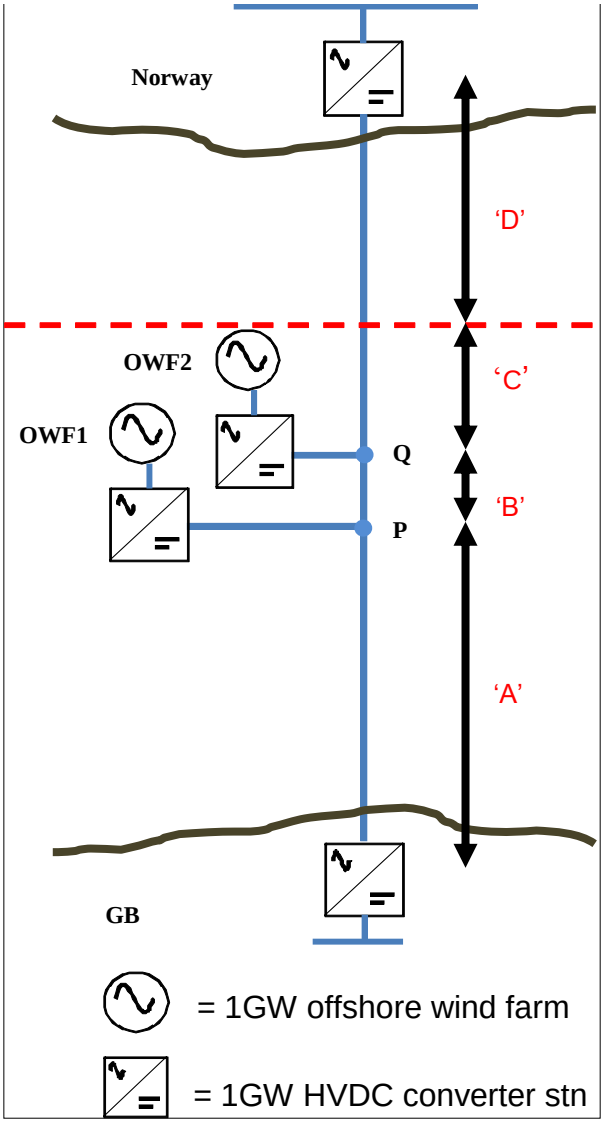
## A Possible Grid Connection Design

With over 9GW of offshore wind to be connected, the Dogger Bank REZ is more than big enough to accommodate multiple interconnectors involving different concepts and access regimes, including some conventional radial connections to the UK.

[1] The term grid is used here to include electricity network capacity of all types, including transmission and interconnection.

An example concept from our initial studies show a cost-benefit of sharing the grid connections for at least the more distant parts of the Dogger Bank project between the UK and Norway – see Figure 1.

**Figure 1 - Example interconnection concept**




The economic rationale for this is that the small additional distance to take the electricity to Norway, the purpose of which would be to store wind power in the Norwegian hydro reservoirs, is more than compensated for by freeing up for UK-Norway trading the 55% of grid capacity that would otherwise be unused.

The offshore grid designs of the type shown in Figure 1 will not be unique to the Dogger Bank project as there are other offshore wind farm zones awarded by The Crown Estate through their Round 3 process that have parts that are close enough to continental Europe to make these designs economic (e.g. Norfolk, Hornsea), and similar grid designs have been proposed for some of the offshore wind farms awarded by The Crown Estate through the Scottish Territorial Waters round[2] and by SSE in relation to their Den Helder project[3].

A connection of the type shown in Figure 1 and some of the other wind-integrated interconnector concepts raise several new issues described below.

*Which of the offshore wind farms are eligible for ROCs and how is this determined*
Assessment to date has concluded that so long as the offshore wind farms are in the REZ and their output can be shown to be supplied to consumers in GB then the output of OWF 1 and OWF 2 should be eligible for ROCs.

*Which parts of the grid (A, B, C, D) are GB transmission, interconnection or Norwegian transmission?*

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[2] "*West Coast Scotland Offshore Wind: A report into connection options and developer co-ordination issues*" a report for The Crown Estate, Transmission Capital, January 2010

[3] "*Regulatory aspects of the integration of wind generation in European electricity market. A CEER public consultation*", CEER, December 2009.

In the absence of the offshore wind farms it would be relatively clear that all parts (A-D) would be classified as interconnection. Even with the offshore wind farms connected if OWF 2 were in Norwegian waters then the grid system would be relatively easy to define as GB transmission (A), interconnection (B), Norwegian transmission (C, D). However, with both OWF 1 and OWF 2 in UK waters, there appear to be several possible alternatives for the classification of B, C and D.

Anything other than A and B being defined as GB transmission and C interconnection may require a change to UK legislation. However simply classifying the grid in this way may give rise to additional issues that would be avoided by other classifications. There are many alternatives here each with their own advantages and disadvantages. This may also be one area (owing to the possible need for legislative changes noted above) where government should also be asked to determine its policy.

*Which nodes (P, Q) are in the GB market and which are in the Nordpool market (for the purposes of grey power after the ROCS have been detached)?*
The context behind this question is that there is insufficient grid capacity in Figure 1 for the full output of both OWF 1 and OWF 2 to be imported into GB. Therefore if both OWF 1 and OWF 2 are part of the GB market then there would need to be a way of managing the shortfall in grid capacity to access the GB for these two offshore wind farms at times of high wind farm output. A different situation would occur if OWF 2 were deemed to be part of the Nordpool market (although this is not being advocated).

*How is grid capacity allocated between the offshore wind farm developers/owners and interconnector traders where there is more demand for grid capacity than available grid capacity (this could relate to several different parts A-D of the grid)?*
There are again several possible alternatives for allocating grid capacity between the offshore wind farms and interconnector traders. These include OWF 2 only having non-firm opportunistic access to the GB market or NETSO managing the constraint through the Balancing Mechanism by either buying down OWF 2 (decrementing OWF 2 output) or by scheduling GB to Norway interconnector trades ("counter trading" with Norwegian TSO Statnett). Similarly with respect to the interconnector traders they can either have non-firm GB transmission access rights or NETSO can manage any constraints through the Balancing Mechanism. Clearly these have different commercial implications for the participants involved. Implications would again be very different for different interconnector concepts[4]. This is a vital area of work to ensure the interests of all key parties are fairly reflected and no party is discriminated against. We would argue that the enduring OFTO regime, which is closely related to interconnectors, has so far failed to recognize the legitimate interests of developers of offshore wind farms. Regulation that works against any key stakeholder seems likely to lead to an underdevelopment or slower development of interconnectors and/or offshore wind farms.

*Who should own each of the parts A-D of the offshore grid?*

[4] There are many different interconnection concepts that may be considered. Clearly that illustrated in Figure 1 has only two onshore connection points and equal transmission capacity connected at each, the total being the total of the two offshore wind farm capacities. Alternative designs can be considered in which the transmission capacity going to each country is not equal, in which the total transmission capacity is not equal to the total capacities of the offshore wind farms, or indeed where there are more than two onshore connection points.

Depending on the classification of each part of the grid (A-D) there will be different rules that apply as to who is able to own each part. For example if A and B are defined as GB transmission then it is clear that the UK offshore transmission regulatory regime would apply and that one or more parties with an offshore transmission license would need to own these elements. Certainty in classification of these grid elements would assist in releasing the investment required for their development and their eventual procurement and construction.

In the UK context the ownership of interconnectors has traditionally been in the hands of affiliates of the UK's monopoly onshore grid companies[5]. In addition the UK onshore grid companies have relationships with the relevant TSOs at the foreign ends of potential interconnectors, and those foreign TSOs have in some cases de facto monopolies with respect to interconnection in their countries. This may in some cases prove to be a barrier to investment.

We are of the opinion that there should be a strong presumption that any new interconnector should connect into an offshore transmission network – likely to be owned by a 3rd party OFTO - wherever feasible and not seek to bypass it in favor of a UK mainland connection point. Connecting interconnectors into the offshore network may well avoid the need for onshore reinforcement.

As a minimum, there is likely to be the two TSO's at each end of an interconnector, maybe a different interconnector developer, maybe an OFTO and maybe an OWF owner. This is already a significant number of stakeholders, partly created by existing regulation - that must agree on arrangements. In the interim, we would recommend interconnectors be managed by exemption and a light regulatory touch to maximise the chances of the necessary complex arrangements being put in place and projects achieving financial close. Alternatively, if the distinction between interconnection and transmission is removed in such instances as we are describing, it may be possible to have fewer parties involved and access issues may become simpler.

*What does the current GB legislative and regulatory framework require?*
Notwithstanding the above alternatives it would appear that under the current GB legislative and regulatory framework, A and B would be defined as GB transmission and C and D as interconnection.

It could be assumed that OWF 1 will connect first with a normal firm[6] access connection agreement, and then subsequently OWF 2 seeks and obtains a non-firm connection to the GB transmission system based on a lower than normal standard connection (i.e. only using GB transmission capacity not used by OWF 1) and finally the interconnector developer/owner seeks and obtains a non-firm connection to the GB transmission system based on a lower than normal standard connection (i.e. only

[5] With the possible exception of the Moyle interconnector which although not owned by a monopoly grid company was established by the Northern Ireland grid company and then divested into a regulated company limited by guarantee

[6] In this document we have used the word "firm" to mean "firm providing an intact offshore transmission system"

using GB transmission capacity not used by OWF 1 and OWF 2 when exporting to GB)[7].

Whilst there are many possible arrangements, this is the assumed current situation with respect to grid ownership and access to the GB transmission system when considering the consultation questions in the next section.

**The consultation questions**

*Question 1.1 Have we accurately captured the benefits of and demand for new interconnection?*
Demand for interconnection will increasingly come not from "pure" interconnector projects but from the combination of offshore wind farm projects and interconnectors. The "Supergrid" concepts currently being promoted at a European level are underpinned by the idea of integrating offshore wind and delivering it to where it can best be used. There are increased benefits from this approach that are not sufficiently recognized in the consultation document as interconnection capacity can be provided at a relatively low incremental cost and negate to a large extent the comments in paragraphs 1.6 and 1.21 of the consultation with respect to the cost of interconnection[8]. Therefore more interconnection capacity should be justifiable in economic terms and should also be constructed if investors are able to take advantage of these improved economics. There should also be an added benefit in making further offshore wind farms more economic if interconnector users can share the costs of their grid connections.

A consequence of this is that interconnector projects that do not have offshore wind farms connected may become less economic than previously.

*Are the projects under consideration all viable?*
Almost certainly not all of the projects listed in Table 1 of the consultation will be constructed as it is unlikely that there are sound economics for all competing projects (e.g. the three "pure" interconnector projects between Ireland and Britain). However, there will be additional projects proposed to those listed in Table 1, as described above, incorporating interconnection capacity into the grid connection of offshore wind farms.

*Would they be sufficient?*
This is an interesting question which is interpreted here as being "*Would they be all that it is economic to build?*". As noted above there are additional economically viable projects that would also connect offshore wind farms, thus (by the interpretation) the projects listed in Table 1 of the consultation are not sufficient.

*Are there other projects being developed?*

[7] In practice it is likely that the one or more connection applications for OWF 2 and the interconnector would be made at the same time by the same party (albeit recognizing that there would need to be separately licensed generation and interconnector owner entities in due course)

[8] The incremental cost of interconnected designs may only include a length of a pair of HVDC subsea cables and no additional converter stations over designs that don't include interconnection

As outlined above Forewind is considering interconnection as part of the Dogger Bank REZ and believe that other offshore wind farm developers may also be doing so where similar geographic circumstances arise.

*Question 1.2 Are there other key aspects of the legal or regulatory framework that we should consider, or should some features be given a different emphasis?*
As outlined above Ofgem should provide greater clarity regarding the classification of grid elements in circumstances where it is not simply a point-to-point interconnector between two onshore transmission systems. Due to its many synergies with offshore transmission, a framework that seeks to co-ordinate interconnectors with OFTOs would be a good thing. Similarly the implications of this in terms of limited transmission capacity and allocation of transmission and interconnection capacity between competing users should be clarified together with charges for use of these systems.

*Question 1.3 How can the Regional Initiative best contribute to development or implementation of policy? Do you agree with the priorities and approach outlined?*
The more complex combinations of offshore wind farms and interconnectors are likely to usually involve only two countries, although in some circumstances they may involve three or more. As developers we would prefer approaches to be taken on regulatory matters that are likely to lead to conclusions within a reasonable time period, and so a bilateral approach on a case-by-case basis would be preferred for now rather than a regional approach to the exclusion of a bilateral approach. However, we recognize the benefits that would be gained by consistency across the North West European region and would support bilateral approaches that have regard to a regional end solution.

*Question 2.1 Are the target models explained in this chapter appropriate for GB? What are the issues that need to be considered? Are there alternative approaches that would be better? Will the target models effectively accommodate increased intermittency?*
Our views on the allocation of interconnector capacity depend on the classification of grid elements between transmission and interconnection and the access that offshore wind farms have to the grid as a whole. In general offshore wind farms will need to have financially firm access to the grid system (under intact grid conditions) to ensure that they have a route to market for its output (including ROCs) and sufficient compensation (including the value of lost ROCs) if their access is constrained under these conditions. Clearly traders would also like firm access but given that up to 200% of interconnector capacity can be superimposed on a midpoint of an interconnector, even if fully dispatched in one direction or the other, access arrangements should not affect real time physical power flows or have a material impact on consumers.

*Question 2.2 What should be our approach to firmness of interconnector capacity? Should this vary between new and existing interconnectors, or between regulated and exempt? What are the categories of costs and benefits from changing approach, where should they fall and can they be quantified?*
Under the current GB offshore transmission regime offshore wind farm owners are only granted firm access onto an intact offshore grid system and do not have a firm connection under outage conditions. Therefore any increased firmness under

interconnector outage conditions would be an improvement on the current grid access regime for offshore wind farms. Whether this is preferable or not would depend on the cost to the offshore wind farm of this improved firmness.

*Question 2.3 Should we seek regional solutions rather than individual project solutions for access rules, such as through a broader North West European solution for market coupling? What are the priority areas for greater regional co-ordination?*
Please see our response to question 1.3.

*Question 3.1 Does this chapter capture the key issues in regulation of new electricity interconnectors? Should we assume that all new interconnectors will seek exemptions?*
We have already raised above some additional issues that we consider Ofgem needs to take into account in its electricity interconnector policy. We note the consultation comments about the introduction of competition into the provision of new regulated interconnection. This appears to be a sensible approach given our comments on de facto monopolies above.

There have been no new interconnectors constructed on a regulated basis that have been underwritten by GB consumers since privatization in 1989. We therefore welcome this policy document and urge Ofgem to consider options 3 and 4.

*Question 3.2 Of the options set out, which are preferable and why? What are the key considerations in taking forward any of the options?*
Option 1 is the true merchant approach, which as the consultation notes, may not have much of a future if the European Commission will in any event impose a cap on the projects returns thus turning it into option 2. Option 2 could be acceptable if the cap on returns is not set at too low a level.
Essentially options 3 and 4 are the same and should enable a much greater growth of interconnector capacity from the UK to the rest of Europe. We would support a regulated approach, either option 3 or 4, for the designs being considered for the Dogger Bank REZ, so long as this still enabled OWF to obtain long-term interconnector access rights and ROCs to secure its route to market. We would see this as a more certain way of ensuring that the interconnection part of the grid will be developed and constructed and indeed could promote the volume and timing of OWF deployment

*Question 3.3 Is it feasible to have a mixture of different approaches for different interconnectors – such as some exempt and others regulated? If not, why and how should this be resolved?*
It is difficult to see how developers of merchant interconnectors can compete with those developing regulated interconnectors given the increased returns that would be required from the merchant approach. As more interconnectors are built merchant interconnectors could become less profitable (as the interconnector capacity value decreases).

We see this as being potentially problematic where a monopoly onshore grid company develops a merchant interconnector and it thereafter has an incentive to prevent further interconnection capacity being added between the same two markets.

We would advocate that where a regulated interconnector is approved to be constructed between two markets, then all existing or under construction merchant interconnectors between those two markets should have the right to opt for a regulated return (under options 3 or 4). This would avoid incentivizing onshore monopoly grid companies to block new developments and would be helpful in enabling any merchant interconnector capacity to proceed by putting a floor under the risk of values being eroded by subsequent regulated interconnectors being constructed.

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