Pinsent Masons

Ørsted IPs – Deadline 3 Submission

This submission is made in relation to the examination of the Dogger Bank South Offshore Wind Farm Project (the "**Project**") and is made on behalf of Hornsea 1 Limited, the collective of Breesea Limited, Soundmark Wind Limited, Sonningmay Limited and Optimus Wind Limited (together, the "**Hornsea 2 Companies**"), Orsted Hornsea Project Three (UK) Limited, Orsted Hornsea Project Four Limited, Lincs Wind Farm Limited, Westermost Rough Limited and Race Bank Wind Farm Limited (together, or in any combination, the "**Ørsted IPs**").

The purpose of this submission is twofold, namely:

- To provide responses to the Examining Authority's Written Questions ("**ExQ1**") **[PD-014]** that are directed at the Ørsted IPs; and
- To provide comments on the Applicants' Responses to Deadline 1 Documents **[REP2-058]**, where appropriate.

Responses to ExQ1

ExQ1	Question to:	Question	Ørsted IPs' Response
IOU.1.6	The Applicants, Ørsted Hornsea Project Three (UK) Limited and Ørsted Hornsea Project Four Limited (Ørsted IPs), Dogger Bank Offshore Wind Farm Project 1 Projco Limited, Dogger Bank Offshore Wind Farm Project 2 Projco Limited, and Dogger Bank Offshore	**NPS EN-3 wake loss** Do you consider that existing offshore windfarms are relevant to NPS EN-3 paragraph 2.8.345 as 'other offshore industries'? If not, why not? If so, has the site selection and site design of the Proposed Development been made with a view to avoiding or minimising disruption or economic loss? Are there any design solutions which could resolve concerns regarding wake loss? Explain your answers.	The NPS-EN3, which is the primary policy for Secretary of State ("**SoS**") decision making relating to renewable energy NSIPs (alongside NPS-EN1) requires effects of projects on sea users to be assessed and addressed. In particular, the following provisions are relevant: • Paragraph 2.8.197 requires that, where a potential offshore wind farm is proposed "*close to existing operational infrastructure or has the potential to affect activities for which a licence has been issued by government*" the Applicant should assess the potential effects on that development. • Paragraphs 2.8.344-2.8.345, which relate to SoS decision making, direct that where a project potentially affects other offshore infrastructure or activity, applicants should work with the relevant sector to minimise negative impacts, and that the SoS should be satisfied that "*the site selection and site design of a proposed offshore wind farm and offshore transmission has been made with a view to avoiding or minimising disruption or economic loss… to other offshore industries*". National Policy Statements are constructed with a clear formula, and the policies noted above should be read together. In order for the SoS to exercise decision-

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	Wind Farm Project 3 Projco Limited		making under paragraph 2.8.345, the information required relating to the effects of the Project (as outlined in paragraph 2.8.197 – i.e. a wake assessment considering, amongst other things, the impact of the Project on the Ørsted IPs' offshore windfarms) must be provided. If this examination concludes without such information being provided, the SoS will be in a position where it cannot appropriately apply the policies of the NPS-EN3. Therefore, the Ørsted IPs consider that existing offshore windfarms are relevant to NPS EN-3 paragraph 2.8.345 as "*other offshore industries*". It is clear that the policies noted above should be read together (with offshore windfarms referenced in paragraph 2.8.197), and in any event if offshore windfarms were not intended to be included in the context of paragraph 2.8.345, the Ørsted IPs consider that this would be expressly excluded in the drafting of NPS EN-3. As for the questions in relation to site selection and design solutions, the Ørsted IPs consider that these are for the Applicants to consider. The Ørsted IPs cannot advise on these matters without knowledge of the design process of the Applicants' development to date. The obvious first step to investigate which design would best avoid or mitigate wake loss is to establish a baseline wake loss via an appropriate wake loss assessment from the Applicants. Generally, there are options available to minimise wake loss which the Applicants should consider. The Applicants could modify the site layout or project design to minimise the adverse impact, or to modify the operation of the development. This could include measures such as wind sector management. Wind sector management refers to the process of adapting a different operating mode on the Applicants' turbines when the wind direction is such that it will cause wake on the Ørsted IPs. Under normal conditions, wind turbines aim to operate as efficiently as possible to extract energy from the wind. The more energy that is extracted from the wind, the more the wind speed decreases after it passes through the rotor and the higher the wakes will be. Turbines can change their operating setting to be less aggressive and hence extract less energy from the incoming wind with a subsequent reduction of the wake effect. The changes to operating modes would not be required for wind directions which do not result in wakes on nearby

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			assets and additionally would not be required for low and high wind speeds when the wakes have less impact. The balance between turbine efficiency and wakes is not linear (i.e. a 1% reduction in turbine efficiency for the Applicants would not equal a 1% improvement of the wake effect) and would require a site-specific analysis to determine the cost/benefit of this approach. Other options are also available to reduce adverse impacts, including reductions in power density and/or temporal overlap. In relation to this matter, the Ørsted IPs wish to note that all of the Ørsted IPs have concerns in relation to wake loss, rather than solely Orsted Hornsea Project Three (UK) Limited and Orsted Hornsea Project Four Limited.
IOU.1.9	Ørsted IPs	**Wake loss** Can you provide an assessment and evidence to demonstrate the extent of suggested wake loss and effects on annual energy production from the Proposed Development on Hornsea Project 3 and Hornsea Project 4 OWFs which are referenced in your Deadline 1 submission [REP1-086]? Can you provide this information in kWh and as a percentage of annual energy production? Can you advise the installed capacity and the generating capacity of each offshore windfarm, and confirm what load factor you use to calculate the generating capacity? What is the operational lifespan of	Per the above, and the Ørsted IPs' Deadline 1 Submission **[REP1-086]**, it should be for the Applicants in the first instance to provide an assessment of wake loss on the Ørsted IPs' assets. The Applicants possess the detailed knowledge of the project design that they are pursuing and hence are best placed to estimate the impact that their project will have on neighbouring assets. The Ørsted IPs refer to the approach taken on the ongoing Outer Dowsing Offshore Wind Farm (Generating Station) Project examination, in which the Applicant provided a wake loss assessment in response to the Ørsted IPs' representations, following reasonable consideration of which the Ørsted IPs withdrew its objections in relation to wake loss for certain assets. The Ørsted IPs therefore reiterate that the Applicants should include an analysis of the wake loss impact on the Ørsted IPs' assets as part of the assessment that the Ørsted IPs understand is expected at Deadline 4. The installed capacity of each Ørsted IPs' wind farm is provided in the table below below (noting that Hornsea 04 is in development and specific details regarding wind turbine generators ("**WTGs**") are not in the public domain, however these could be provided to the Applicants under a non-disclosure agreement).

<table>
<tr><th>ExQ1</th><th>Question to:</th><th>Question</th><th>Ørsted IPs' Response</th></tr>
<tr><td></td><td></td><td>each offshore wind farm and how long would wake loss likely be a concern? Can you set out whether you consider any potential effects from wake loss would be significant in EIA terms and how you have derived this conclusion?

Do you consider that any effects from wake loss on Hornsea Project 3 or Hornsea Project 4 would affect their operational viability? If so, can you provide evidence to demonstrate to what extent this would be the case? Provide this information at no later than Deadline 4 (25 April 2025) if you are unable to provide it by Deadline 3.</td><td>
<table>
<tr><th>Wind Farm</th><th>Capacity (MW)</th><th>No. of WTGs</th><th>Turbine rated power (kW)</th></tr>
<tr><td>Race Bank</td><td>546</td><td>91</td><td>6000</td></tr>
<tr><td>Lincs</td><td>270</td><td>75</td><td>3600</td></tr>
<tr><td>Westermost Rough</td><td>210</td><td>35</td><td>6000</td></tr>
<tr><td>Hornsea 01</td><td>1218</td><td>174</td><td>7000</td></tr>
<tr><td>Hornsea 02</td><td>1320</td><td>165</td><td>8000</td></tr>
<tr><td>Hornsea 03</td><td>2995</td><td>197</td><td>15000</td></tr>
<tr><td>Hornsea 04</td><td>2400</td><td>Maximum 180</td><td>TBC</td></tr>
</table>

The Ørsted IPs do not use a fixed load factor to calculate the expected production from their assets. Instead, site specific wind resources are calculated and used in combination with layout and turbine information to model the average production in a given year. The Applicants would be expected to follow a similar process to determine both the production of their assets for business case evaluation purposes, as well as the impact on neighbouring wind farms as a result of the wake effect from their assets.

The wake impact from the Applicants' assets would be expected to impact the Ørsted IP assets for their remaining lifetime, from the date that the Applicants' assets are constructed. The remaining lifetime is not certain at this moment in time; however, minimum durations can be provided if required.</td></tr>
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			With regards to the potential wake effects being considered significant in Environmental Impact Assessment terms, or whether they could impact the operational viability of the Ørsted IP assets, the Ørsted IPs are not able to provide a response to this until the Applicants provide the requested wake loss assessment.
IOU.1.12	Ørsted IPs and Projco IPs	**Wake loss** What resolution do you seek regarding wake loss and if appropriate, how would you wish to see this captured in the draft DCO or any supporting documents? If the ExA and SoS were to determine that wake loss was a relevant consideration under NPS EN-3, can you comment on whether a requirement along the same lines as Requirement 25 of The Awel y Môr Offshore Wind Farm Order 2023 (requiring a wake loss assessment post-consent) would be justified and would meet the relevant legal and policy tests?	The Ørsted IPs cannot make a reasonable judgment on the resolutions sought without seeing an assessment of the wake loss impact on their assets, which the Applicants should provide (per comments above). This assessment must be undertaken pre-consent, in order to meet the relevant policy tests in NPS EN-3. The Ørsted IPs anticipate that its preferred outcome would be to seek a separate agreement with the Applicants on these matters, with protective provisions only being requested in lieu of such agreement. However, as stated, the Ørsted IP's reserve their position until such time that the Applicants provide a sufficient wake loss assessment. The Ørsted IPs would be happy to meet with the Applicants to discuss these matters.

Comments on the Applicants' Responses to Deadline 1 Documents

The Ørsted IPs have included further comments in the table below on matters that are addressed in the Applicants' Responses to Deadline 1 Documents **[REP2-058]**, to the extent that such matters are not already addressed in the Ørsted IPs' responses to ExQ1 above. In the interests of conciseness, the Ørsted IPs have provided comments on a topic-by-topic basis.

Topic	Ørsted IPs' Comments
NPS EN-3	The Ørsted IPs note the comments from the Applicants in relation to NPS EN-3 and initially refer to the Ørsted IPs' response to ExQ1 IOU.1.6 above and the comments on paragraph 2.8.197 in the Ørsted IPs' Deadline 1 Submission **[REP1-086]**. To reiterate, the Ørsted IPs note that paragraph 2.8.44 of NPS EN-3 states that "*there may be constraints imposed on the siting or design of offshore wind farms because of the presence of other offshore infrastructure...*". The Ørsted IPs consider this paragraph provides support for the proposition that the Project should properly assess its potential effects on other offshore wind farms. The Ørsted IPs also note that the NPS EN-3 requires that new offshore wind development assess the effects of development on existing infrastructure, by stating that "*where a potential offshore wind farm is proposed close to existing operational offshore infrastructure, or has the potential to affect activities for which a licence has been issued by government, the applicant should undertake an assessment of the potential effects of the proposed development on such existing or permitted infrastructure or activities*". A proper interpretation of NPS EN-3 requires that the Applicant assess and consider its potential effects on the Ørsted IPs assets. It is noted that wake loss assessments are extremely commonplace in the wind industry. Developers will likely carry out thousands of wake loss assessments while developing a project as they are essential to estimate the expected production of a project which feeds into the economic assessment. There are multiple softwares available in the industry, both commercial and open source, which have been validated with operational data. In addition, specialist consultants provide wake modelling services, typically to feed into an independent view of the project economics to support financing decisions. The Ørsted IPs consider that, if wake effects remain unassessed at the close of the examination, the Examining Authority will not be in a position to understand the degree of the potential effect and how it has been mitigated nor the extent to which a requirement could provide mitigation for any residual impacts. As such, the SoS would not be in a position to make a decision in accordance with the NPS EN-3. In relation to the Awel y Mor decision, the Ørsted IPs refer to the Clean Power 2030 Action Plan, in which the UK Government identified that wake effects between developments present a risk to offshore wind development. In particular, that document recognises that new projects with larger and/or a greater number of turbines have "*an even greater propensity*" to cause wake effects on existing downstream operational projects. The document goes on to describe the Awel y Mor decision as setting a "*precedent*" through the imposition of a wake loss condition (where historically the issue had been dealt with privately). The Government is now working to bring together industry experts to work on this issue, in particular in relation to mitigation. In light of these statements, there can be no doubt that the Government's position is that wake effects from new developments can result in material adverse effects and that there is a need for these effects to be addressed. This does not support the Applicants' position that a wake assessment is outwith the requirements of NPS EN-3. The Secretary of State, via the Awel y Mor decision, has clearly determined that the wording of paragraph 2.8.197 of NPS EN-3 applies to wake loss by one offshore windfarm on another, and concluded that an assessment should have been undertaken by the Applicant.

Topic	Ørsted IPs' Comments
The Crown Estate	The Ørsted IPs note the comments from the Applicants in relation to The Crown Estate and do not have anything further to add on this matter which has not already been stated in the Ørsted IPs' Deadline 1 Submission **[REP1-086]**.
Orsted Hornsea Project Four Limited	Orsted Hornsea Project Four Limited notes the comments from the Applicants in relation to negotiations with Orsted Hornsea Project Four Limited and note that they have returned comments on the draft Heads of Terms for a cooperation agreement to the Applicants on 7 March 2025. Orsted Hornsea Project Four Limited intends to prioritise these negotiations, but in the absence of such negotiations progressing (which the Ørsted IPs are confident will not be the case) Orsted Hornsea Project Four Limited will submit its preferred form of protective provisions into the examination at a later stage for the Examining Authority's consideration.