



Hornsea Project Four

Written Summary of the Applicant's Oral Case at Issue Specific Hearing 1: Part 2 bp

Deadline 03: 21 April 2022
Document Reference: G3.16
Revision:01

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Revision Summary

<i>Rev</i>	<i>Date</i>	<i>Prepared by</i>	<i>Checked by</i>	<i>Approved by</i>
01	April 2022	Amy Stirling	Francesca De Vita	Jamie Baldwin

Revision Change Log

<i>Rev</i>	<i>Page</i>	<i>Section</i>	<i>Description</i>

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1 Introduction

- 1.1.1.1 Issue Specific Hearing 1 Part 2 (ISH) on bp for Hornsea Four took place on 12th April 2022 virtually.
- 1.1.1.2 A list of the Applicant's participants that engaged in the ISH can be located at Appendix 1 of this note.
- 1.1.1.3 The broad approach to the ISH followed the form of the agenda published by the Examining Authority (the ExA) on 7th April 2022 (the Agenda).
- 1.1.1.4 The ExA, the Applicant, and the stakeholders discussed the Agenda items which broadly covered the areas outlined below.
- 1.1.1.5 Where possible and where relevant, the Applicant has included responses to [EV-013](#), Hearing Action Points arising from Issue Specific Hearing 1 dealing with matters relating to the draft Development Consent Order held virtually on Tuesday 12 April 2022.

2 Written Summary of the Applicant's Oral Case at ISH 1: Part 2 bp

Item	ExA Question/Context for discussion	Applicant's Response
<i>Agenda Item 8 (Protective Provisions suggested by the Applicant and BP [REP-1-057] with regard to the overlap zone)</i>		
	<p>The Examining Authority queried the extent of the Overlap Zone between Hornsea Four and Endurance</p>	<p>The Applicant stated that the Overlap Area is 110km² and bp stated that the Overlap Area together with the Notification Area is 130km²</p> <p>The Applicant has subsequently checked the co-ordinates and for accuracy is able to confirm that the Overlap Area is 112.851km², the Notification Area is: 20.086km², and 132.937 km² is the Overlap Area plus the Notification Area. The small discrepancy between the areas requires further discussion between the parties.</p>
	<p>The Examining Authority sought clarification on the origin of the parties' rights in the Overlap Zone</p>	<p>The Applicant confirmed that the Zone Development Agreement (ZDA) was dated December 2009 which terminated in 2016 and a separate Agreement for Lease was granted in March 2016.</p> <p>Miss Howard on behalf of bp confirmed that the overlapping Agreement for Lease was granted in 2013 and the store licence was granted in 2012 and transferred to bp (being the operator on behalf of NEP partners) in 2020. There is a store permit that will also be obtained and bp will apply for the store permit later this year.</p> <p>The Applicant has subsequently checked the dates of the Agreements for Lease and for clarity confirms that the Zone Development Agreement was dated 22nd December 2009 and terminated on 3rd March 2016. Contemporaneous with the termination of the ZDA the zone was split into four areas subject to four separate Agreements for Lease. The Applicant entered into the Agreement for Lease which includes the developable area the subject of this Application on 3rd March 2016. The Applicant also holds an Agreement for Lease for the export cable corridor dated 3rd March 2022. For completeness the Applicant holds a generation licence pursuant to section 6(1)(a) of the Electricity Act 1989 dated 21st September 2020.</p>

	<p>The Examining Authority sought confirmation on the turbine parameters within the Overlap Zone on an “unfettered basis” i.e. without Endurance. The Examining Authority stated that the discussion would be on a without prejudice basis.</p>	<p>Mr Phillips on behalf of the Applicant stated that on Indicative basis the estimate is between 30 to 45 turbines with minimum spacing of 810m as per the rest of the array. The Examining Authority also queried whether originally 80 turbines were proposed in this area (REP1-057 5.12) The Applicant was unable to locate the reference to 80 turbines within the document REP1-057. The Examining Authority agreed to clarify the reference as an action point.</p> <p>The Examining Authority also queried the layout to avoid wake effects in an unfettered situation. Mr Phillips confirmed that this is not defined and would come through detailed design. Mr Phillips also confirmed that there is no advancement on whether a 14 or 15MW turbine will be used.</p> <p>Following the ISH the Applicant would like to clarify that the layout will be in accordance with the MCA layout principles (a certified document pursuant to article 38 of the draft Order). The Applicant has expanded upon the design plan process below in answer to action point 41.</p> <p>Following the ISH the Applicant considered the Examining Authorities reference to 80 turbines and queries whether the Examining Authority has assumed a potential 80 WTG reduction in the overall Hornsea Project Four array when the Overlap Area is excluded as it has not made this submission in Examination (or otherwise).</p> <p>In addition the Applicant would refer the Examining Authority to para. 5.11.1 of G1.29 Appendix 1: The Applicant’s Position Statement (REP 1-057), the Applicant states that: “The Overlap Zone represents approximately 25% of the developable area. A 25% reduction in turbine numbers would mean a loss of 45 turbines resulting in a project capacity of 630mw to 675mw depending upon whether a 14 or 15 mw turbine is deployed”. Note that the comparison made is simply to reflect how a 25% array reduction would potentially impact a similar 25% reduction in WTGs (i.e. 45 WTGs being 25% of a maximum number of 180 WTGs).</p> <p>Para 13.3 of G1.29 Appendix 2: bp’s Position Statement (REP 1-057) states that: “The total number of turbines remains at 180 as per Hornsea 4’s DCO, with an estimated</p>
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		<p>60 turbines requiring relocation to the southern part of the array area” or alternatively the Applicant queries whether this is the paragraph to which the Examining Authority referred albeit the paragraph refers to 60 turbines rather than 80 turbines.</p>
	<p>The Examining Authority queried the consequences of removing turbines from the Overlap Zone and the Rochdale Envelope</p>	<p>Mr Phillips on behalf of the Applicant confirmed that the reduction in turbines would not make the project unviable. The Applicant’s position is that it would adversely affect the competitiveness of the project in the CFD auctions as a result of the electricity the project can generate due to the reduction of the turbines. The outcome will be increased cost across a smaller project. The second factor relates to whether the chosen transmission technology is HVAC or HVDC.</p> <p>The Applicant has provided further clarity regarding the application of HVAC and HVDC technology in answer to action point 42 below.</p> <p>Bp were asked what distance apart the turbines would need to be should the Applicant squeeze the turbines into the remaining area and whether that would fit the minimum spacing required in the DCO. Miss Howard confirmed that the relocation of the turbines into the smaller area takes into account the minimum separation distance.</p> <p>Mr Phillips on behalf of the Applicant made additional representations relating to the difficulties faced by the Applicant in moving turbines into a smaller area, taking into account the other constraints noting that not all of the area will be developable. Additional seabed conditions need to be established through surveys. It is not therefore a safe assumption to assume the turbines can be located in a smaller area. It’s also important to note the wake loss impacts.</p> <p>Following the hearing the Applicant has considered further the questions raised by the Examining Authority regarding the number of turbines included within the Rochdale Envelope. The site investigation strategy for the development of Hornsea Four is split into two phases: 1. Reconnaissance and 2. Detailed Design. The</p>

reconnaissance phase is to support the technical development of the windfarm and deliver site investigation data for the DCO process. For Hornsea Four this culminated in surveys from 2019 to 2022 which served to build and update the geotechnical and geological ground-model for the windfarm site and export cable areas. Reconnaissance surveys are performed in a staged approach with alternating geophysical and geotechnical investigations. This method is used to optimise the survey scope and focus site investigation acquisition towards areas with highest subsurface uncertainties and therefore project risk. The specific surveys within each phase are listed below:

Reconnaissance Phase

2019: Geophysical survey 1A (Identification of the geological framework)

2020: Geotechnical reconnaissance survey 1 (Initial understanding of the geological/geotechnical properties)

2021: Geophysical survey 1B (Refinement of the geological framework) and full bathymetry pre-construction survey (sand waves mobility)

2022: Geotechnical reconnaissance survey 2 (Advanced understanding of the geological/geotechnical properties)

The detailed design phase is to deliver site specific geotechnical/geophysical data at the planned turbine locations to optimise the construction preparations. Hornsea Four currently have planned surveys from 2024 to 2026 as described below. Part of this phase is also to identify possible unexploded ordnance (UXO) in the vicinity of any construction activities and recommend micro-siting of turbine positions or cables routing to minimise the number of unexploded ordnances requiring removal by detonation. The specific surveys for the Detailed Design Phase are:

Detailed Design Phase

2024: Geotechnical detailed design (Geotechnical properties at each turbine location)

2025: Geophysical survey detailed design (Geophysical survey at each turbine location for construction preparations and UXO identification)

		<p>2026: Geophysical survey (UXO inspection and Detonation).</p> <p>The approach to the Rochdale Envelope allows the Developer to take advantage of best available technology bearing in mind the timescales between consent award and the commencement of offshore construction.</p> <p>Mr Phillips made representations regarding the need to retain flexibility regarding the number of turbines within the Rochdale Envelope. The Examining Authority sought information regarding other windfarms as to how many turbines have been built out compared to the number of turbines consented. Mr Phillips confirmed that there is no rule of thumb with regards to how many turbines are built out under a consent. It is dependent upon seabed characteristics (as explained above), ornithological constraints, commercial viability of turbine selection and the supply chain.</p> <p>The Applicant has provided a table below in answer to action point 43 referring to previous Orsted projects and noted the number of turbines consented compared to the number of turbines constructed.</p>
	<p>The Examining Authority sought clarification on the timescales for development within the overlap area.</p> <p>The Examining Authority sought clarification as to the consenting process for bp and the timescales. Applications to be submitted to BEIS in September 2022 and application to NSTA in November 2022.</p> <p>The Examining Authority requested bp walk them through the decision process and queried whether the timescales are similar to the DCO process and whether given it is a "first of its kind" project what confidence can there be in the proposed timescales? Questions</p>	<p>Mr Phillips on behalf of the Applicant confirmed that this is a single phase development and construction would be in Q1 2028.</p> <p>Miss Howard confirmed the timescales and that there is one permit together with an EIA.</p> <p>Mr Kek on behalf of bp confirmed that there has never been an application for a storage permit in the UK and that OPRED would approve the EIA and the NSTA would approve the final permit.</p>

<p>were also raised as to the public consultation process and the timescales.</p> <p>The Examining Authority queried a three-year period to construct and the level of confidence in those timescales.</p> <p>The Examining Authority invited the Applicant to comment.</p>	<p>Mr. Kek on behalf of bp confirmed that guidelines have been published on the NSTA website as to the expected duration (this would be submitted at DL3). As part of their licence terms there is a pathway towards a storage permit that involves at least a quarterly engagement on a number of topics. Following submission there will be a no comments period prior to making the final decision. Bp confirmed that the storage permit process is not a public scheme. The EIA does have a public component to it of approximately 12 months.</p> <p>Mr Kek confirmed that a May/June indicative decision is anticipated. The EIA happens in parallel with the decision for the storage permit.</p> <p>Mr Kek confirmed that they would start to inject in 2026. As part of the NEP, bp have benchmarked the duration of their projects and for natural gas offshore pipelines given that bp are going to specialist contractors within planned weather windows there have been numerous examples – typically of 2.5 years taking into account the vessels available, extensive supply chain built up in the UK and the shallow water environment.</p> <p>Mr Phillips stated that in trying to compare the two consenting processes the reality is that they are not similar at all. There is no transparency in the storage permit process. There is a potential aspect for consultation in the EIA itself but in terms of this forum, speaking directly to those advising the decision maker, the Applicant won't have that opportunity. In terms of the timescales the dates are considered "very soon" by the Applicant.</p> <p>The Applicant has reconsidered their answer to the timescales for construction of turbines within the Overlap Area and confirms that it is not currently known exactly when WTGs could be constructed in the Overlap Area, should consent be granted to do so. The current installation programme anticipates all Hornsea Four WTGs to be constructed between Q4-27 to Q4-28. No decision has been made as to the relative order in which WTGs are constructed in specific areas of the array (i.e. the Overlap Area).</p>
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	<p>The Examining Authority sought clarity from bp on the presence of other structures overlapping the Endurance project and whether those would need to be monitored, namely how would monitoring be undertaken in those locations if there are other structures.</p>	<p>Mr Kek on behalf of bp referred to Garrow and noted it could acquire data via a local data point to supplement its seismic survey. Orsted notes that a local data point is effectively an ocean bottom node as promoted by Orsted.</p>
	<p>The Examining Authority sought clarification from bp that the issue of colocation comes down to monitoring and the ability to access wells.</p> <p>The Examining Authority also referred to some uplift that could affect the foundations of turbines i.e. there could be some ground heave albeit limited to the cap of the aquifer. The Examining Authority queried whether the Applicant had factored this into their considerations. The relevant paragraph is 7.2.3 REP1-057 (bp's submission part of that document).</p>	<p>Mr. Kek confirmed on behalf of bp that was correct.</p> <p>Mr. Kek on behalf of bp indicated that due to the wide area, the actual displacement is in the very low cm range. Mr Phillips on behalf of the Applicant stated that evidence has not been received in this regard so has not been factored in. This has been expanded upon below by the Applicant in response to action point 44 below.</p>
	<p>The Examining Authority sought clarity from bp on approved survey technology (para 5.3.3 of REP2-062).</p> <p>Who is the regulator and what regulations they are enforcing?</p> <p>Referring to para 5.4 of REP2-062 the Examining Authority referred to bp's submission that short offset</p>	<p>Miss Howard on behalf of bp confirmed the relevant regulations are the Carbon Storage Regulations 2010 and the regulator is the North Sea Transition Authority (formerly the OGA).</p> <p>Mr Kek on behalf of bp confirmed that under the regulators a monitoring plan needs to be put together to submit to the regulator to demonstrate the safety and effectiveness of the monitoring technology in question. A summary was provided</p>

	<p>towed technology exists but it is not approved by the regulator.</p> <p>The Examining Authority also confirmed that they did not wish to do a deep dive into the different forms of technologies and that would be better addressed in writing.</p>	<p>which demonstrated there is no regulator requirements for a particular form of technology, and specifically no requirement for 4d towed streamers. Miss Howard confirmed that the best available technology must be used and that is considered to be 4D streamers is considered best available technology.</p> <p>In response to bp's assertion that there had been no use of ocean bottom nodes and short towed streamers anywhere in the world, Orsted invited the Examining Authority to allow one of its technical consultants to provide evidence to demonstrate that OBN and short towed streamers are regularly used and in parallel.</p> <p>The Examining Authority sought a written response on this point rather than presenting oral evidence. The Applicant will provide the additional evidence relating to this point at Deadline 4. This will be consolidated with the Applicant's response to bp's technical responses submitted at Deadline 1, 2 and 3.</p>
	<p>The Examining Authority requested that future submissions between bp and Orsted check consistency in numbering to ensure the same numbering isn't used across multiple parts of the same document.</p>	<p>The Applicant has noted this request and will ensure that numbering is clear in this and all future submissions.</p>
	<p>Reference para 8.4 (page 17) of REP 1-057 bp have stated that once the Aquifer is full and monitoring complete colocation would be possible. The Examining Authority wanted to understand the timescales for surveys.</p> <p>The Examining Authority pointed out that 4 surveys would be required with the first survey 4 years after injections commenced and then at intervals adding up to 21 years. However at para 8.4 the transfer</p>	<p>Miss Howard confirmed that co-location would be possible after monitoring of the aquifer is complete.</p> <p>Miss Howard confirmed that bp would have to undertake an additional 20 years monitoring once the aquifer was full so a minimum of 40 years monitoring would be required.</p>

	<p>regulations liability remains with the bp until carbon is secured for a period of 20 years after closure.</p> <p>The Examining Authority enquired as to the operational lifetime of Hornsea Four.</p>	<p>Orsted confirmed that the indicative operational lifetime of Hornsea Four is 35 years.</p>
	<p>Reference to REP1-057: The Examining Authority wished to explore the comparative carbon savings between Endurance and Hornsea Four as made by bp.</p>	<p>Mr Phillips confirmed it was not the Applicant's intention to address comparative carbon savings as the Applicant's position is that the UK can benefit from both projects, as coexistence is possible.</p> <p>The Applicant has answered the question raised by the Examining Authority pursuant to action point 45 below.</p>
	<p>The Examining Authority sought to explore the Applicant's Protective Provisions with reference to:</p> <ul style="list-style-type: none"> a) What is the timescale in para 5 as it does not seem to have a date specified, it talks about three months of coming into force of the Order a proximity agreement must be progressed. b) The Examining Authority queried the timescale for the Endurance consents to be obtained c) The Examining Authority queried a drafting error in paragraph 8 of the provisions d) The Examining Authority queried Orsted's proposals for the Interface Agreement in its provisions 	<p>Mr Phillips stated the below:</p> <ul style="list-style-type: none"> a) The date would be three months from the date the Order comes into force. b) The Applicant noted the timescale was proposed without bp's comments, but in light of its proposed project development timescale which it has confirmed it has significant confidence in, this timescale has been updated this timescale to four months. Mr Phillips made representations regarding the confidence the Applicant can have in their proposal to demonstrate the effectiveness of short toed streamers and OBN technology. The Examining Authority stated that it has to put forward a draft DCO which the Secretary of State could use should they want to approve the scheme, therefore it's important that the provisions are reasonable. On a without prejudice basis the Protective Provisions should be amended because the timescales do not align. Mr Phillips on behalf of the Applicant stated that as the examination continues there may be a "coming together" of opinions. On a without prejudice basis however the protective provisions can be updated. c) An error hasn't been identified at para 8 (e).

		<p>d) Orsted confirmed its protective provisions ensure the terms of the Interface Agreement prevail between the parties and there is no proposal to disapply the Interface Agreement.</p> <p>Following the ISH the Applicant has aligned their timescales with the representations made by bp pursuant to the indicative timescales in the guidance issued by the NSTA and proposed an additional month to serve the notice. This additional month aligns with bp’s proposal that the DCO for the NZT application will be forthcoming in May 2023 and the storage permit will be issued around this time allowing FID to be taken in June/July 2023.</p> <p>Further amendments have also been made to the protective provisions to concede reciprocal exchange of information between the Applicant and bp.</p> <p>Finally the Applicant considers it appropriate to include provision for the final decision as to coexistence should be made by the Secretary of State, given the national interest in the delivery of both projects. The Applicant also notes that in its commentary on the Applicant’s proposed protective provisions, bp requested that the Secretary of State was the ultimate decision-maker (see paragraph 6.5 of bp’s Deadline 2 response REP2-062).</p>
	<p>Reference Annex 3 REP02-62 - The Examining Authority sought legal submissions from Orsted on bp’s proposed disapplication of the Interface Agreement, noting that there are potential human rights issues although not seeking submissions on this during the hearing. The discussion was on a without prejudice basis.</p>	<p>Regarding disapplication the Applicant made the following submissions:</p> <ul style="list-style-type: none"> a) Section 123 of the Planning Act is broadly drafted but through extensive legal research we have not identified any example of where the provision has been used to enable the disapplication of a private commercial agreement. b) The Interface Agreement was entered into in respect of the Applicant’s interest in the seabed. If this is removed, then it prevents the Applicant from taking enjoyment of the land interest it has been given. c) It is noted that the IA was entered into in 2013, varied in 2016 and bp acceded to it in 2021. At no point have the parties to the IA sought to

amend it in the manner now proposed by bp. This is despite the White Rose report in 2016.

- d) The burden of proof is on bp to demonstrate the power is available, appropriate to be included within the DCO, proportionate and in accordance with the other provisions of the DCO to enable the Examining Authority to make its recommendation to the Secretary of State. To date, bp has provided very little justification for its proposal.
- e) Protective provisions are a qualification of a power in a DCO as are requirements, and so the provision is being sought in the wrong part of the DCO.
- f) The Crown Estate will need to consent to the inclusion of the power in the DCO pursuant to s135(2) of the Planning Act 2008. There is no indication that the Crown has been asked to or will provide this consent. For the avoidance of doubt, it is not for the Applicant to seek this consent but for bp to do so and to provide an update to the Examining Authority.

The Applicant confirmed that it does not object to the disclosure of the Interface Agreement into Examination.

Following the ISH the Applicant has received confirmation from bp that it will submit a copy of the Interface Agreement (and deeds of adherence/variation), into Examination at Deadline 3. Further submissions will be made regarding the disapplication of the Interface Agreement (including with reference to human rights) by the Applicant in accordance with the timetable set out by the Examining Authority in its Rule 17 letter dated 14 April 2022 and issued following the ISH.

3 Responses to relevant Hearing Action Points arising from ISH 1: Part 2

Action	Description	Action by	Deadline	Applicant's Comment/where has the action been answered
41	Clarify what would the Wind Turbine spacing be for the overlap area in an unfettered situation to minimise wake effects and what would be the differential in spacing between 14 MW and 15MW output Wind Turbines?	Applicant	4	<p>The Applicant has made this initial response to assist the Examiners but reserves their position to make further submissions at DL4.</p> <p>The spacing would be the same as for the rest of the site. Larger spacing in some areas of the wind farm would make the wind farm denser in another part of the wind farm. The minimum distance between WTCs stated in the Project Description is 810m.</p> <p>Spacing depends on wake optimization based on the rotor diameter not the MW output of the Wind Turbine.</p> <p>Where MW start to have an effect is when the total capacity installed could be larger than the grid capacity. The Applicant would need to evaluate if 180 WTCs still would be the best solution. However the Applicant would still seek to use the entire site area for all WTCs to minimise the wake loss.</p> <p>Another reason why spacing will be the same for different WTCs capacities is that the WTC positions most likely are decided before the Applicant knows what WTCs will be installed.</p>

42	Provide additional evidence on the choice of HVAC versus HVDC and in particular explaining the constraint of 1.2GW multiples as a deciding factor over which technology to use and the effects this would have on competitiveness in Contract for Difference auction.	Applicant	4	<p>Developing an Efficient Wind Farm</p> <p>The Applicant’s primary argument does not relate to the choice of HVAC versus HVDC technology but the choice of transmission technology is a factor taken into account in order to achieve the Applicant’s clear objective to fulfil its secured grid connection of 2.6GW.</p> <p>Should the Overlap Area be excluded from hosting WTGs, to meet the secured grid capacity of 2.6GW would require squeezing 180 WTGs into an array area 25% smaller than the current array order limits. Doing so would have a significant impact on the generation performance of the wind farm due to wake loss impacts within the wind farm. In turn this would have a significant detrimental impact on the overall business case for the project, particularly in light of the highly competitive Contract for Difference Auction Round model where projects are effectively competing against other projects. An inefficiently designed wind farm with high wake losses is very likely to be at a significant disadvantage.</p> <p>HVDC & AC Modulisat</p> <p>HVDC systems are designed and manufactured by a very small number of suppliers globally. If that is combined with an increasing number of offshore wind projects committing to or forced technically to implement an HVDC design, the result is a drastic reduction in competitiveness with a seller market dominated by a few companies and large demand for their products in a very short period of time.</p> <p>These suppliers have developed HVDC monopole modules which in many respects are broadly similar to each other, and each of which is “standardised” through their own design and manufacturing processes to have standard capacities of approx. 1,200MW to 1300MW. Such capacity is defined by the current HVDC technical constraints such as export cable thermal limits; or Grid Code requirements such as the infeed loss limit (set currently at 1320MW). Based on the Applicant’s wider experience, larger capacities can be reached with additional engineering and optimization of the existing standard design and reach the normal infeed loss limit defined by the Grid Code at 1320MW.</p> <p>The modular approach makes possible to reach larger capacities by connecting individual modules, and therefore, we currently expect that it is technically possible to develop HVDC projects with capacities of approx. 1.2-1.3GW, 2.4-2.6GW, or 3.6-3.9GW, for example. So, in the event that a HVDC transmission solution is selected for the project, the Applicant expects that it will be selected and designed on the basis of an industry “standard” capacity as outlined above.</p> <p>If project capacities do not closely correlate with those of an optimized HVDC system, then the project economics start to look very uncompetitive for HVDC, and the project may not be taken forward on this basis.</p> <p>HVAC systems are also modular, although the step-up and down is less severe than in the case of HVDC. The electricity carrying capacity of the AC cable tends to be the limiting factor. A typical AC cable designed for a large offshore wind farm is likely to carry in the region of 300-500MW per cable depending on the specific characteristics of the wind farm, cable length and seabed/soil conditions.</p> <p>Furthermore, a HVAC transmission system usually comprises of several different components from a number of suppliers, rather than the fully integrated modular HVDC system where a single supplier would provide the entire HVDC system.</p> <p>Selection of HVAC (High Voltage Alternating Current) or HVDC (High Voltage Direct Current)</p> <p>The key factors which influence a decision on the transmission technology type include (in no particular order):</p> <ul style="list-style-type: none"> • Project capacity (which is directly related to the grid connection capacity, number of wind turbine generators, and scope of Energy Balancing Infrastructure); • Technical suitability for the specific project, including overall electrical system design and offshore substation design & installation constraints; • Supplier market conditions; • Procurement programme; • Contract commercial conditions; • The projects’ business case; <p>So, whilst the constraint of the HVDC “modular” capacities may be relevant in the detailed design of the transmission system, on its own it is not the sole determining factor in deciding between the two transmission technologies</p> <p>From a technical perspective, HVAC and HVDC modules could be integrated and operate together, but it is not considered practical within the same windfarm when other elements are considered. It significantly complicates the maintenance of the windfarm, increases</p>
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				costs and introduces an additional layer of programme risk in both construction and operational phases.																																																
43	Provide a comparative table of the size and output of existing and consented wind farms, including where available details of the number of turbines that have been constructed versus the number consented.	Applicant	4	<table border="1"> <thead> <tr> <th>Orsted Project</th> <th>Assessed</th> <th>Consented</th> <th>Built</th> </tr> </thead> <tbody> <tr> <td>Hornsea Project One</td> <td>332</td> <td>240</td> <td>174</td> </tr> <tr> <td>Hornsea Project Two</td> <td>360</td> <td>300</td> <td>165</td> </tr> <tr> <td>Hornsea Project Three</td> <td>300</td> <td>231</td> <td>Has not been built</td> </tr> <tr> <td>Walney One and Two</td> <td>152</td> <td>150</td> <td>WOW01: 51 WOW02: 51</td> </tr> <tr> <td>Walney Extension</td> <td>207</td> <td>207</td> <td>WOW03: 40 WOW04: 47</td> </tr> <tr> <td>Burbo Bank Extension</td> <td>30</td> <td>30</td> <td>BBW01: 25</td> </tr> <tr> <td>Burbo Bank Extension</td> <td>69</td> <td>69</td> <td>BBW02: 32</td> </tr> <tr> <td>Gunfleet Sands One and Two</td> <td>52</td> <td>52</td> <td>GFS01: 30 GFS02: 18</td> </tr> <tr> <td>West of Duddon Sands</td> <td>139</td> <td>139</td> <td>108</td> </tr> <tr> <td>Westermost Rough</td> <td>50</td> <td>50</td> <td>35</td> </tr> <tr> <td>Race Bank</td> <td>206</td> <td>106</td> <td>91</td> </tr> </tbody> </table>	Orsted Project	Assessed	Consented	Built	Hornsea Project One	332	240	174	Hornsea Project Two	360	300	165	Hornsea Project Three	300	231	Has not been built	Walney One and Two	152	150	WOW01: 51 WOW02: 51	Walney Extension	207	207	WOW03: 40 WOW04: 47	Burbo Bank Extension	30	30	BBW01: 25	Burbo Bank Extension	69	69	BBW02: 32	Gunfleet Sands One and Two	52	52	GFS01: 30 GFS02: 18	West of Duddon Sands	139	139	108	Westermost Rough	50	50	35	Race Bank	206	106	91
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West of Duddon Sands	139	139	108																																																	
Westermost Rough	50	50	35																																																	
Race Bank	206	106	91																																																	
44	Provide response on implications for foundation design of potential ground heave [Para 7.2.3, REP1-057].	Applicant	4	<p>The Applicant provides a brief response at deadline 3 but may make further submissions in this regard at deadline 4.</p> <p>The Applicant's position is that heave would not be an issue and if heave was predicted the design team could make some allowances for it in design of the offshore substation and WTGs to mitigate the impact.</p> <p>As it is stated that heave would take place over a large area then differential heave leading to increased structural stresses from the ground movement is not likely to be an issue in line with bp's position. So the main issues would be serviceability related aspects like hub-height changes and cable entry and exit issues.</p> <p>It may become necessary to make an assessment of potential heave during the wind farms lifetime as the likelihood is- that the predicted heave would be very site-specific and depend on many things such as injection amounts and pressures, rockhead cover, stiffness of rock above reservoir and the reservoir size, etc. For completeness such an assessment should consider if the CO2 injections could lead to micro-seismicity. The current thinking however is that this is unlikely to be an issue as the design would still be governed by the wind and wave conditions as the magnitude of these seismic events would be small.</p> <p>To fully understand the anticipated heave the Applicant requests that bp shares the anticipated vertical displacement results from their modelling.</p>																																																
45	Provide a response to BP's submission [REP1-057] on the comparative carbon abatement potential of the Endurance and Hornsea 4 projects related to the overlap area of the seabed.	Applicant	4	<p>The Applicant believes it is misleading to draw parallels between carbon savings and carbon abatement between the two projects. CCUS is a carbon abatement technology which allows fossil fuels still to be used but with a significant reduction to carbon emissions being released into the atmosphere. Offshore wind farms provide direct replacement of fossil fuels for electricity generation. It is recognised that there is a need for both technologies in order to transition towards net zero, and this is supported through UK Government policy.</p>																																																
46	Submit to the Examination information from North Sea Transition Authority on consenting timescales.	BP	3																																																	

47	BP to review whether its suggested protective provision needs to include drafting that the obligations or the provision would no longer have effect if consent for Endurance was not forthcoming.	BP	3	
48	Applicant to review timescale of Paragraph 5 of its proposed protective provision in light of the proposed timescale for consenting for Endurance.	Applicant	3	The timescales in the draft protective provisions have been updated to align with bp's submissions. The DCO has been amended accordingly.
49	Consider writing to The Crown Estate to get its consent to the Interface Agreement (IA) being submitted into the Examination.	ExA	Action superseded following the Applicant advising that consent to submit the IA has been secured.	
50	Set out the timelines for responses from both the Applicant and BP regarding the proposed setting aside of the Interface Agreement.	ExA	ASAP	
51	When producing reports that consist of collating a number of different reports into one document consider using different ways of numbering paragraphs to ease navigation of the documents and reporting.	All Parties	Ongoing	

4 Appendix 1: List of participants that attended ISH 1: Part 2 on behalf of the Applicant

4.1.1.1 Mr. Gareth Phillips

4.1.1.2 Mr. Michael Branston (not called on to speak)