



**SCOTTISHPOWER
RENEWABLES**

East Anglia ONE North and East Anglia TWO Offshore Windfarms

Applicants' Comments on Mulbarton Parish Council's Additional Submission

Applicants: East Anglia ONE North Limited and East Anglia TWO Limited
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Applicable to East Anglia ONE North and East Anglia TWO



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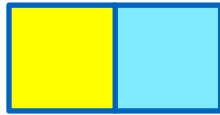


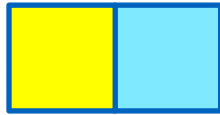
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Glossary of Acronyms

| | |
|------|--|
| DCO | Development Consent Order |
| DML | Deemed Marine Licence |
| AS | Additional Submission |
| PD | Procedural Decision |
| OTNR | Offshore Transmission Network Review |
| BEIS | Business, Energy and Industrial Strategy |
| MPC | Mulbarton Parish Council |
| SEAS | Suffolk Energy Action Solutions |
| HVDC | High Voltage Direct Current |
| ESO | Electricity System Operator |
| HVAC | High Voltage Alternating Current |
| CION | Connection and Infrastructure Options Note |
| ISH | Issue Specific Hearing |
| UK | United Kingdom |

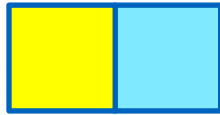


Glossary of Terminology

| | |
|--|---|
| Applicants | East Anglia TWO Limited / East Anglia ONE North Limited |
| The Councils | East Suffolk Council and Suffolk County Council |
| Development area | The area comprising the onshore development area and the offshore development area (described as the 'order limits' within the Development Consent Order). |
| East Anglia ONE North project | The proposed project consisting of up to 67 wind turbines, up to four offshore electrical platforms, up to one construction, operation and maintenance platform, inter-array cables, platform link cables, up to one operational meteorological mast, up to two offshore export cables, fibre optic cables, landfall infrastructure, onshore cables and ducts, onshore substation, and National Grid infrastructure. |
| East Anglia TWO project | The proposed project consisting of up to 75 wind turbines, up to four offshore electrical platforms, up to one construction, operation and maintenance platform, inter-array cables, platform link cables, up to one operational meteorological mast, up to two offshore export cables, fibre optic cables, landfall infrastructure, onshore cables and ducts, onshore substation, and National Grid infrastructure. |
| East Anglia TWO windfarm site | The offshore area within which wind turbines and offshore platforms will be located. |
| Generation Deemed Marine Licence (DML) | The deemed marine licence in respect of the generation assets set out within Schedule 13 of the draft DCO. |
| Horizontal directional drilling (HDD) | A method of cable installation where the cable is drilled beneath a feature without the need for trenching. |
| Landfall | The area (from Mean Low Water Springs) where the offshore export cables would make contact with land, and connect to the onshore cables. |
| Link boxes | Underground chambers within the onshore cable route housing electrical earthing links. |
| National electricity grid | The high voltage electricity transmission network in England and Wales owned and maintained by National Grid Electricity Transmission |
| National Grid infrastructure | A National Grid substation, cable sealing end compounds, cable sealing end (with circuit breaker) compound, underground cabling and National Grid overhead line realignment works to facilitate connection to the national electricity grid, all of which will be consented as part of the proposed East Anglia TWO / East Anglia ONE North project Development Consent Order but will be National Grid owned assets. |
| National Grid substation | The substation (including all of the electrical equipment within it) necessary to connect the electricity generated by the proposed East Anglia TWO / East Anglia ONE North project to the national electricity grid which will be owned by National Grid but is being consented as part of the proposed East Anglia TWO / East Anglia ONE North project Development Consent Order. |
| Natura 2000 site | A site forming part of the network of sites made up of Special Areas of Conservation and Special Protection Areas designated respectively under the Habitats Directive and Birds Directive. |
| Offshore cable corridor | This is the area which will contain the offshore export cables between offshore electrical platforms and landfall. |
| Offshore development area | The East Anglia TWO / East Anglia ONE North windfarm site and offshore cable corridor (up to Mean High Water Springs). |

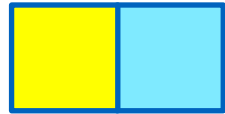


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| Offshore electrical infrastructure | The transmission assets required to export generated electricity to shore. This includes inter-array cables from the wind turbines to the offshore electrical platforms, offshore electrical platforms, platform link cables and export cables from the offshore electrical platforms to the landfall. |
| Offshore electrical platform | A fixed structure located within the windfarm area, containing electrical equipment to aggregate the power from the wind turbines and convert it into a more suitable form for export to shore. |
| Offshore export cables | The cables which would bring electricity from the offshore electrical platforms to the landfall. These cables will include fibre optic cables. |
| Offshore infrastructure | All of the offshore infrastructure including wind turbines, platforms, and cables. |
| Offshore platform | A collective term for the construction, operation and maintenance platform and the offshore electrical platforms. |
| Onshore cable corridor | The corridor within which the onshore cable route will be located. |
| Onshore cable route | This is the construction swathe within the onshore cable corridor which would contain onshore cables as well as temporary ground required for construction which includes cable trenches, haul road and spoil storage areas. |
| Onshore cables | The cables which would bring electricity from landfall to the onshore substation. The onshore cable is comprised of up to six power cables (which may be laid directly within a trench, or laid in cable ducts or protective covers), up to two fibre optic cables and up to two distributed temperature sensing cables. |
| Onshore development area | The area in which the landfall, onshore cable corridor, onshore substation, landscaping and ecological mitigation areas, temporary construction facilities (such as access roads and construction consolidation sites), and the National Grid Infrastructure will be located. |
| Onshore infrastructure | The combined name for all of the onshore infrastructure associated with the proposed East Anglia TWO / East Anglia ONE North project from landfall to the connection to the national electricity grid. |
| Transmission DML | The deemed marine licence in respect of the transmission assets set out within Schedule 14 of the draft DCO. |



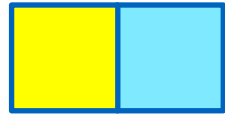
1 Introduction

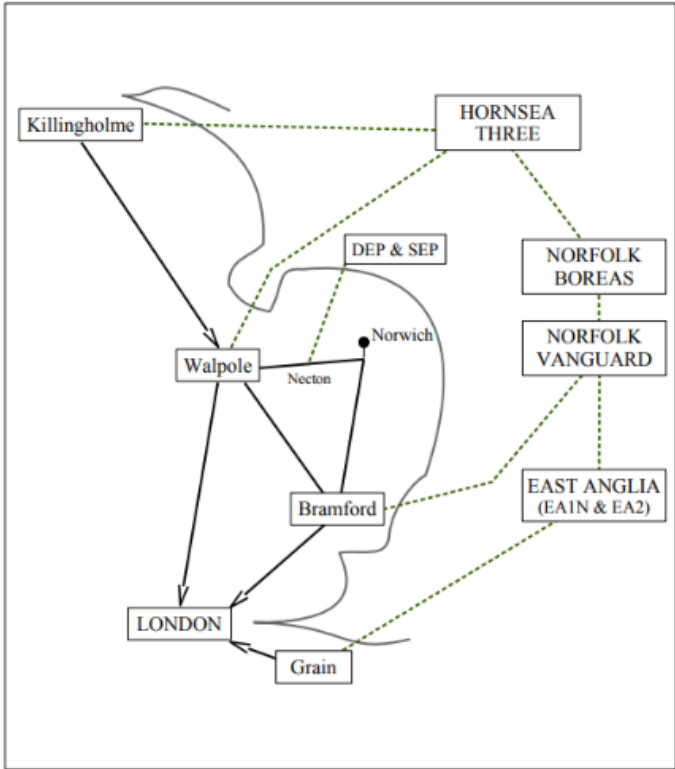
1. This document presents the Applicants comments on Mulbarton Parish Council's (MPC's) Deadline 10 submission (AS-123).
2. This document is applicable to both the East Anglia TWO and East Anglia ONE North Development Consent Order (DCO) applications, and therefore is endorsed with the yellow and blue icon used to identify materially identical documentation in accordance with the Examining Authority's procedural decisions on document management of 23rd December 2019 (PD-004). Whilst this document has been submitted to both Examinations, if it is read for one project submission there is no need to read it for the other project submission.

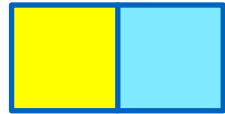


2 Comments on Mulbarton Parish Council's Additional Submission (AS-123)

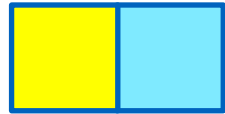
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| Introduction | | |
| 1 | <p>Mulbarton Parish Council is an interested party for several offshore wind farm projects, and is also a participant in the government's Offshore Transmission Network Review.</p> <p>This paper shows how the Round 3 offshore wind farm projects are closely related, and highlights some of the benefits of integrated offshore transmission. It also outlines some of the implications if the integrated approach is not used for East Anglia One North and Two.</p> <p>The Examining Authority is asked to accept this representation at its discretion.</p> | Noted. |
| Key Points | | |
| 2 | <p>Several studies over the last ten years, such as National Grid's IOTP (East) feasibility study of 2015, and its OTNR Phase 1 report of September 2020, have shown that offshore transmission leads to very large cost savings for consumers, and potentially much reduced levels of renewable energy curtailment. This is a benefit for climate change mitigation.</p> | Please see Deadline 3 Submission - Written Summary of Oral Case (ISH2) (REP3-085) for the Applicant's position on the IOTP and the OTNR |
| 3 | <p>The IOTP (East) report and its three appendices are widely available. It was submitted by the applicant and accepted as relevant for the DCO examinations for Norfolk Vanguard and Norfolk Boreas. The East Coast Pathfinder scheme shown in Figure 1 was submitted to the</p> | <p>Please see Deadline 3 Submission - Written Summary of Oral Case (ISH2) (REP3-085) for the Applicant's position on the IOTP.</p> <p>Figure 1 shows seven projects with a potential capacity of nearly 8.5GW, which represents over 21% of the 40GW by 2030 target set by the UK Government.</p> |



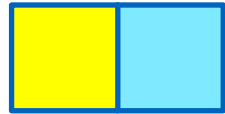
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| <p>Offshore Transmission Network Review in December 2020 and is being reviewed.</p>  <p>Figure 1: East Coast Pathfinder</p> <p><u>Notes:</u></p> | <p>Of these projects, one has already been consented, two are with BEIS/Secretary of State for determination, two are nearing the final stages of the examination process and two are at preliminary environmental information stage. Figure 1 seeks a complete offshore redesign of all transmission connections while failing to consider the onshore knock-on effects this may have on the existing grid network and capacity available.</p> <p>Please also see the Applicants Comments on Suffolk Energy Action Solutions' (SEAS) Deadline 8 Submissions (Ref: REP9-014). Section 2.2. looks at the changing policy environment. In January 2021, National Grid ESO published their Network Assessment Options (appended to REP9-014). This looked at possible offshore reinforcement options that could be delivered towards the end of the decade. This concluded a HVDC link to East Anglia would not be viable.</p> <p>Furthermore, it is not as simple as to suggest the Bramford to Twinstead upgrade is brought forward for an immediate start. Major grid infrastructure upgrades such as this are years in planning, consenting and construction and cannot just be brought forward overnight.</p> <p>Figure 1 does not demonstrate a workable solution either in technology or current regulatory terms.</p> |

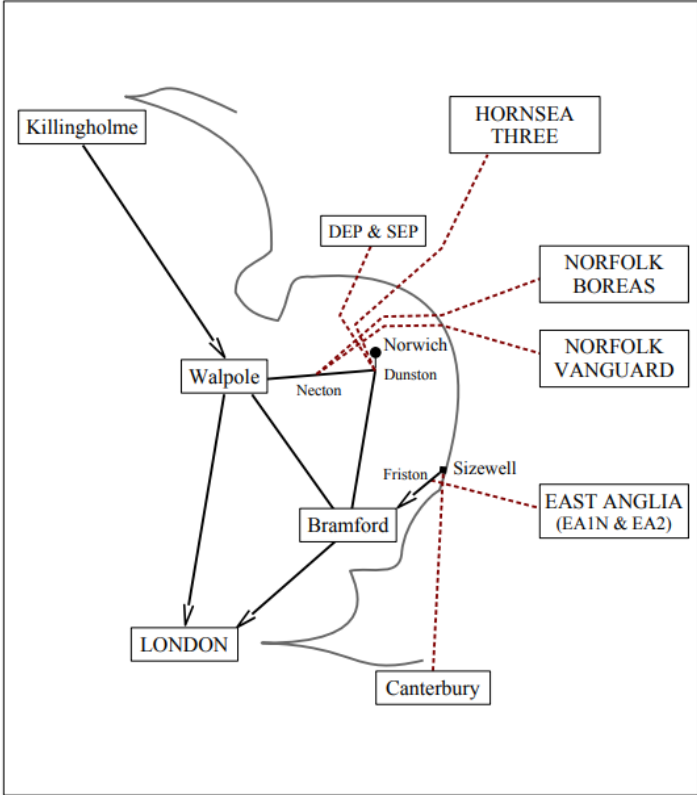


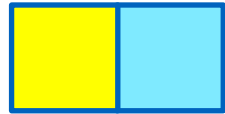
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| | <p>Each offshore project is initially connected with a radial link, thus reducing risk and speeding up delivery. Additional offshore transmission links are added between project zones, and the Bramford to Twinstead Tee capacity upgrade towards London is brought forward for an immediate start.</p> <p>Hornsea Three is restored to its original connection at Walpole; Norfolk Vanguard and Boreas are connected at Bramford; and East Anglia One North and Two (EA1N & EA2) are connected at Isle of Grain. Offshore transmission links provide significant additional north-to-south capacity and alternative pathways in the event of export cable failure or interruption for maintenance. The scale of onshore infrastructure is reduced by up to 20% and environmental impacts are minimised.</p> <p>The Round 4 East Coast offshore wind leases are readily accommodated by increasing the size of the offshore transmission links between the Dogger Bank, Hornsea, and East Anglia zones.</p> <p>This design approach ensures that as much renewable energy as possible reaches the main centres of demand in London and the south east. It speeds up progress towards the UK's binding climate change mitigation targets, and minimises costs for final consumers.</p> | |
| 4 | <p>Two alternative schemes of integrated offshore transmission are now being proposed by Equinor for the Dudgeon and Sheringham Shoal extension projects. Whilst these are smaller scale Round 2 extensions, the technical and regulatory principles are very similar. The two projects, with different legal ownership structures, will use one of the following:</p> <ul style="list-style-type: none"> a) Two grid connections, two offshore substations, and an offshore HVAC transmission link between the two projects (i.e. | <p>The proposed extension projects have a combined capacity of 786MW, which is less than either East Anglia ONE North (800MW) or East Anglia TWO (900MW).</p> <p>It may therefore be possible to combine smaller projects such as these and connect via a single connection. However, this is not possible for larger projects with a combined capacity of 1700MW where two grid connections will be required, whether using HVDC or HVAC technology.</p> |



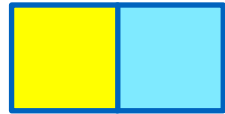
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| | <p>a ring or loop configuration). This increases the reliability of power transmission and may reduce the scale and impact of onshore infrastructure.</p> <p>b) One grid connection, and one offshore substation, shared between the two projects on a commercial basis (i.e. a spine configuration). This may reduce offshore impacts and project costs, but may not improve onshore impacts or power transmission reliability.</p> | |
| 5 | <p>In the absence of integrated transmission, the fragmented approach shown in Figure 2 applies. This appears to introduce higher costs, larger onshore transmission infrastructure, less efficient energy transfer, and much reduced out-of-region transmission capacity.</p> | <p>Please see Deadline 3 Submission - Written Summary of Oral Case (ISH2) (REP3-085) for the Applicant's position on CION process.</p> |



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| <div data-bbox="264 352 958 1150">  </div> <p data-bbox="264 1177 1075 1332"> <u>Notes:</u> After the publication of National Grid's IOTP (East) feasibility study in 2015, the grid connection agreements were modified to introduce a large number of separate point-to-point links: </p> | |



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| | <ul style="list-style-type: none"> - The Hornsea Three grid connection agreement was moved from Walpole to Dunston; - The Norfolk Vanguard and Boreas projects were moved from Bacton and Lowestoft to Necton; - The Dudgeon and Sheringham Shoal extension projects (DEP & SEP) were diverted to Dunston. <p>The grid connections for East Anglia One and Three were left at Bramford, but the agreements for East Anglia One North and East Anglia Two (EA1N & 2) appear to have then been moved from Bramford to Friston. A new 2.0GW offshore transmission link has been proposed between Sizewell and Canterbury North to increase out-of-region transmission capacity towards London.</p> <p>This approach has been shown to be significantly more costly, with potential for consenting and construction delays, and less efficient transfer of renewable energy to the main centres of demand. It would tend to delay progress towards the UK's binding climate change mitigation targets.</p> | |
| Conclusion | | |
| 6 | <p>In view of the conclusions from a variety of studies over the last ten years, it is no longer realistic to propose multiple, separated point-to-point connections for offshore wind farm projects. The point-to-point approach has been shown to lead to unnecessarily high costs for final consumers and, due to higher levels of curtailment, is likely to be less effective for climate change mitigation. It is difficult to see how a compelling public interest, sufficient to offset the negative impacts of the projects, can be shown to exist on such a basis.</p> | <p>Please see Deadline 3 Submission - Written Summary of Oral Case (ISH2) (REP3-085).</p> |



| ID | MPC's Comment | Applicants' Comments |
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| | Mulbarton Parish Council therefore objects to the onshore elements of the two projects. | |