

**Consideration of alternatives**

Summary

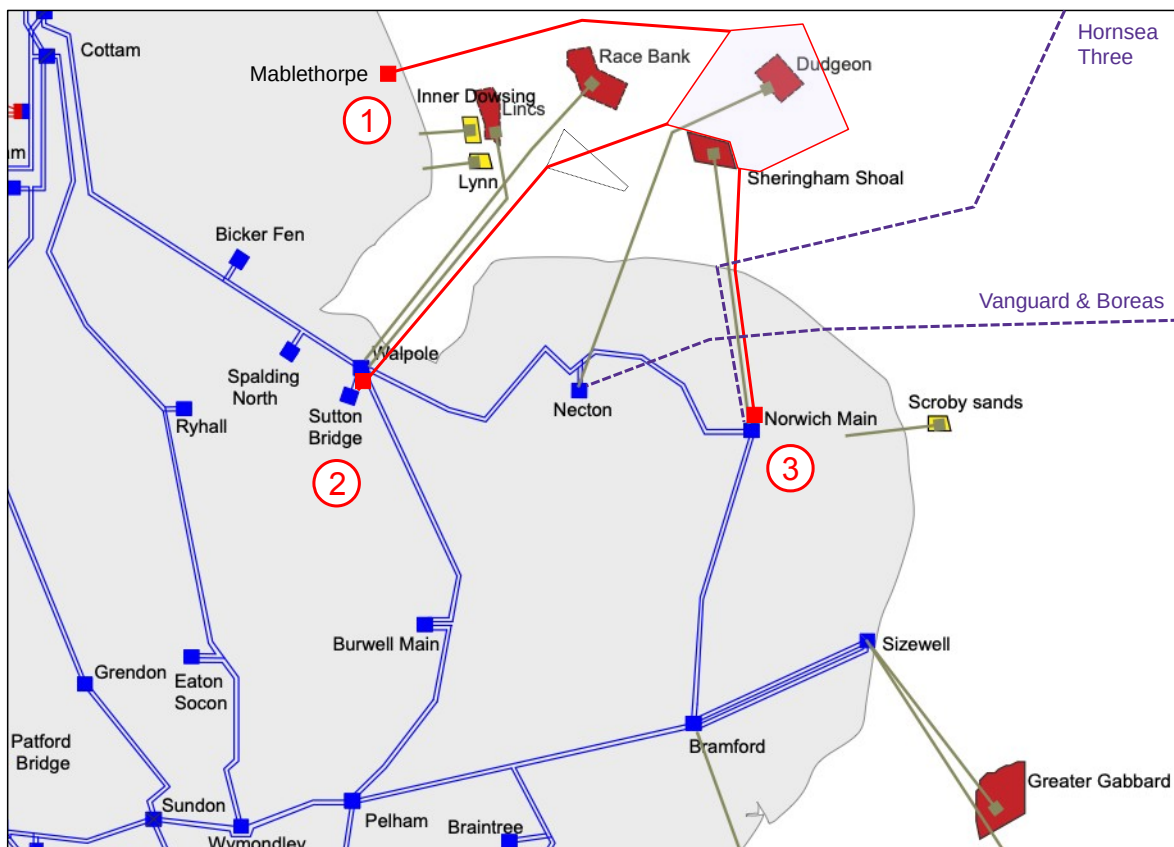
There is no reason to suppose that a grid connection offer made under the Electricity Act 1989 will satisfy all the requirements of the Planning Act 2008, or the Climate Change Act 2008, taking into account subsequent amendments of those Acts. A proper consideration of alternatives is required.

This representation outlines three alternative grid connection points, and objects to the application as submitted on the grounds that an adequate consideration of alternatives was not described at the pre-application consultation stage, and has not been provided by the applicant for this examination.

Alternative grid connections

Three alternative grid connections are identified in this representation:

1. The Lincolnshire Connection Node at Mablethorpe. This has been proposed by National Grid for connection of the Round 4 Outer Dowsing offshore wind farm and other projects in its Holistic Network Design, and is an example of the output from the Offshore Transmission Network Review.
2. Sutton Bridge or Walpole. Several other Interested Parties have made reference to this option, which is described in detail in a previous representation (REP3-172, EN010109-001254, pp. 8-12).
3. A grid connection at Norwich Main was described during the pre-application consultation, and in the application as submitted. This alternative would be combined with the cumulative coastal and onshore impacts of Vanguard, Boreas and Hornsea Three, a new onshore pylon route from Norwich to Tilbury, and industrial scale battery storage projects clustered around the onshore substation site.



Source: Electricity Ten Year Statement 2022, with Dudgeon and Sheringham Shoal Extension projects added, together with the proposed export cables and grid connection points for Vanguard, Boreas and Hornsea Three.

## General approach

Under the Climate Change Act 2008 (as amended), it is the duty of the Secretary of State to ensure that net UK carbon account for a budgetary period does not exceed the corresponding budget and, for the year 2050, is at least 100% lower than the 1990 baseline of greenhouse gas emissions.

National Policy Statement EN-1 para 3.2.3 calls for substantial weight to be given to considerations of need. The weight given, however, should be no more than substantial, and “the weight which is attributed to considerations of need in any given case should be proportionate to the anticipated extent of a project’s actual contribution to satisfying the need for a particular type of infrastructure”.

The outcome of grid connection offers must also be efficient, economic and coordinated, and should take account of offshore and onshore environmental impacts as required by the Electricity Act 1989.

The cost to the electricity consumer, including onshore grid reinforcements, Contract for Difference subsidy awards, and the expected network balancing and constraint costs, is an important factor.

## Design assumptions

The applicant has explained that an output of 900MW is feasible and may be adopted post-consent without a material amendment of the DCO. Recognising the urgent need for renewable energy, this increased output level is therefore assumed. A multi-stage development scenario is also assumed for each of the alternatives identified, as described in the Scenarios Statement (EN010109-000212).

A ratio of 2:1 is applied to convert the onshore cable distances to an offshore equivalent. This takes account of the relative cost per km of undergrounding with multiple crossing points, as compared to offshore cable with an allowance for intertidal zones and landing points. This approach is supported by the reference documents cited below. Onshore substation costs are the same for each alternative.

## Option 1

The Outer Dowsing offshore wind farm is 53km off the Lincolnshire coast and will make landfall near Mablethorpe. If the proposed Lincs Connection Node does not become available, the onshore export cable will be extended southwards by 50km to Weston Marsh, which lies to the north-east of Spalding. Further details can be found in the Outer Dowsing Scoping Report (EN010130-000037).

The Dudgeon and Sheringham Shoal Extensions are slightly further offshore and would require an independent 60km offshore cable route to a landfall near Mablethorpe. The Lincs Connection Node would need a new pylon route to Wymondley in Hertfordshire. If this is not available, the Extension projects would share the Outer Dowsing onshore export cable route to Weston Marsh. In this case, the 2:1 cost ratio need not be applied, and the equivalent offshore cable distance would be 110km.

Due to the need for multi-stage development scenarios, the 50km onshore route to Weston Marsh could raise significant difficulties for communities and landowners. These aspects would need to be weighed against the ability to accommodate the desired output of 900MW at a relatively early date.

## Option 2

Connection of the Extension projects at Sutton Bridge would require an offshore distance of 85km and an onshore distance of about 7.5km. Applying the conversion ratio of 2:1 gives an equivalent total distance of 100km. The difficulties associated with multi-stage development scenarios would not arise and it is likely that an output of 900MW could be accommodated at a relatively early date.

Both Option 1 and Option 2 could lead to an efficient, economic and coordinated outcome without requiring significant onshore grid reinforcements. There is however a clear balance of advantage in favour of Option 2, which would avoid the onshore impacts arising from multi-stage development scenarios and also offers additional long term local benefits, as previously described in REP3-172.

### Option 3

Connection of the Extension projects at Norwich Main would require an offshore distance of 20km and an onshore distance of about 60km. Applying the conversion ratio of 2:1 gives an equivalent total distance of 140km. Due to the need for multi-stage development scenarios, the onshore route to Norwich Main would, in all cases, raise significant difficulties for communities and landowners.

(i) In the event that Vanguard, Boreas and Hornsea Three do not proceed, or are connected offshore, then the Extension projects would effectively have unrestricted access to the existing onward grid transmission capacity from Norwich Main towards Bramford. The higher output level of 900MW could be accommodated at a relatively early date, but curtailment and constraint would be likely to arise from Bramford towards the main centre of demand in London and the south east. There is again a clear balance of advantage in favour of Option 2, which would avoid the onshore impacts of the multi-stage development scenarios whilst offering lower costs and longer term local benefits.

(ii) If, however, Vanguard, Boreas and Hornsea Three do proceed with grid connections in Norfolk, in combination with connection of the Extension projects at Norwich Main, adequate onward grid transmission capacity to the main centre of demand is not available. Significant weight cannot be given to the need for renewable energy under these circumstances. In addition, the actual onshore distance of the projects in combination would be increased to a total of 185km.

In the specific case of the Extension projects, the applicant has also stated that the higher output of 900MW would require a 180km pylon route from Norwich Main to Tilbury. This would introduce a potential delay of at least four years at an estimated cost to the consumer of more £1,000m. Such an outcome does not seem to be compatible with the duties laid upon the Secretary of State by climate change legislation. It follows, therefore, that Option 3 is the least preferable alternative.

(iii) If, however, the Extension projects are connected as in Option 2, whilst Vanguard, Boreas and Hornsea Three continue with grid connections at Necton and Norwich Main, it would still not be possible to describe the proposals for those projects as efficient, economic or coordinated. Further, in the absence of adequate onward grid transmission capacity, there seems to be no justification for giving significant weight to the need for renewable energy when considering Vanguard, Boreas and Hornsea Three in relation to their offshore and onshore impacts. As shown in many studies and reports over many years, offshore transmission is preferable for these very large Round 3 projects.

### Grid connection agreements

The applicant has drawn attention to the TEC Register, which is a list of projects that hold contracts for Transmission Entry Capacity (TEC) with National Grid. The latest position, at 28th April 2023, is shown overleaf in Appendix 1. This information shows that the existence of a grid connection agreement does not provide evidence that planning requirements have been satisfied and should not be allowed to limit or restrict the consideration and description of alternative grid connection points.

### Objection

The application as submitted is unacceptable due to inadequate consideration of alternatives.

### References

1. National Grid Strategic Options Technical Appendix. Updated in June 2022 with estimated construction costs shown in 2020/21 prices. Distributed in connection with the East Anglia Green non-statutory public consultation.
2. Electricity Transmission Costing Study. An independent report endorsed by the Institution of Engineering and Technology. Updated with minor revisions in 2019 and cited in the Strategic Options Technical Appendix. Parsons Brinckerhoff with Cable Consulting International Ltd.

Grid connection agreements

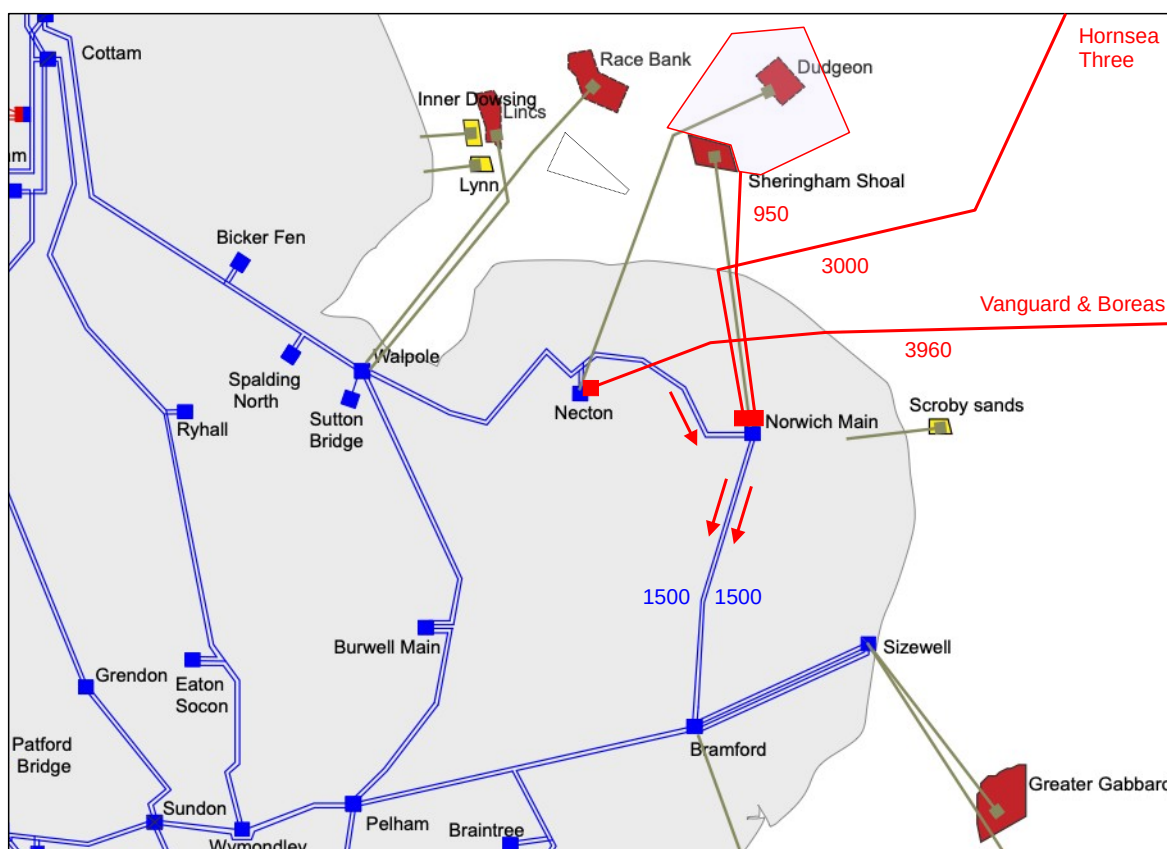
Existing grid connection agreements are shown in the TEC Register, which is published at regular intervals by National Grid. The TEC Register is updated twice per week and is subject to numerous changes as grid connection agreements are introduced, corrected, modified, transferred, or removed.

At the beginning of October 2020, the two grid connection agreements for Vanguard and Boreas at Necton were shown as 1800MW each. The grid connection for Hornsea Three at Norwich Main was shown as 2000MW with an increase in December 2028 to 3000MW. The Dudgeon and Sheringham Shoal Extension projects were listed with a grid connection capacity at Norwich Main of 719MW.

At 28th April 2023 the TEC Register contained the following entries in the rows indicated:

Row	Project Name	Customer Name	Month/Year	Increase (MW)	Cumulative (MW)
540	Hornsea Power Station 3	Orsted Hornsea Project Three	10/2026	2250	2250
541	Hornsea Power Station 3	Orsted Hornsea Project Three	12/2028	750	3000
784	Norfolk Boreas	Norfolk Boreas Limited	08/2026	1320	1320
925	Scira-Dudgeon Extension	Equinor New Energy Limited	07/2027	719	719
926	Scira-Dudgeon Extension	Equinor New Energy Limited	10/2031	231	950
1080	Vanguard	Norfolk Vanguard Limited	12/2025	1320	1320
1081	Vanguard East	Norfolk Vanguard East Limited	03/2027	960	960
1082	Vanguard East	Norfolk Vanguard East Limited	12/2028	360	1320

These agreements far exceed the existing circuit capacity as shown below:



Source: Circuit capacities are shown in the Electricity Ten Year Statement 2022, Appendix B, Section B-2-1c.