

## Hornsea 1A/1B: Connect & Manage Derogation Report

This report considers the incremental impact of a temporary derogation against requirements contained within the NETS Security and Quality of Supply Standards (NETS SQSS) as a consequence of the connection of the above named generation project to the National Electricity Transmission System, under the Connect & Manage Arrangements, in advance of Wider Transmission Reinforcement Works being completed.

### Note on assessment of incremental constraint costs:

The assessment of incremental constraint costs contained in this derogation report is based upon the contracted connection background at the time the assessment was undertaken. The contracted background will change to the extent that new projects apply for connection or existing contracted projects delay, revise their Transmission Entry Capacity or terminate. Changes to the contracted background may change the level of incremental constraint costs from that assessment contained within this and other derogation reports. Once issued, the derogation reports will not be updated to reflect changes in the contracted connection background used in the calculations.

For updated information on the aggregated costs and benefits of the Connect and Manage regime, please see the latest quarterly Connect and Manage report on the National Grid website.

<http://www.nationalgrid.com/uk/Electricity/Codes/gbsqsscode/ConnectManageDocs/>

### Seven Year Statement boundary information:

- An overview of the Seven Year Statement boundaries and study zones that may be referred to in derogation reports can be found in SYS Appendix A, Fig. A.1.5 (on a geographical basis) and Fig. A.4.4 (on a schematic basis):

<http://www.nationalgrid.com/NR/rdonlyres/FA14F11A-3A49-4C98-9661-A0BCC85FA56E/41468/NETSSYS2010AppendixA.pdf>

### Carbon benefit assumptions:

The carbon benefit assessment contained in this derogation report is based on the following assumptions:

- Load factors assumed: offshore wind = 35%; onshore wind = 30%
- DECC medium-term advice for carbon price (table 3) and emissions factors (table 1) applied (positive marginal carbon impact by displacing gas generation) = 0.39 T\_CO2/MWh

[http://www.decc.gov.uk/assets/decc/Statistics/analysis\\_group/81-iag-toolkit-tables-1-29.xls](http://www.decc.gov.uk/assets/decc/Statistics/analysis_group/81-iag-toolkit-tables-1-29.xls)

### Hornsea 1A - Part 1: Technical Description of Non Compliance

Relevant Paragraph(s) of NETS Security and Quality of Supply Standard	Cause	Part of System Affected	Initial Conditions		Interim Operational Solution	Long Term Solution, to include brief description of access requirements.	Derogation Expiry Date
			System Intact	Circuit Outage			
Design of the Main Interconnected Transmission System – 4.7, 4.8 & 4.9	Thermal performance	South Humber group – Keadby, Creyke Beck, Killingholme, Humber Refinery, South Humber Bank and Grimsby West	Winter peak	N/A	Management of South Humber Group generation through the Balancing Mechanism	<p>The Long Term Solution for this derogation is the construction of the East Coast Strategic Reinforcements.</p> <p>At the point of offer to SMart Wind, these works consisted of:</p> <ul style="list-style-type: none"> <li>• A new 400kV overhead line from Grimsby West through East Lincolnshire to Walpole, via a substation for the Triton Knoll connection</li> <li>• A new 400kV overhead line from Triton Knoll to Bicker Fen</li> <li>• A new 400kV overhead line from Bicker Fen to tee into the Cottam – Eaton Socon – Wymondley route.</li> </ul> <p>These works are currently programmed to complete in October 2018.</p>	This derogation will apply for the period between connection of Hornsea Platform 1A Offshore wind farm and the completion of wider reinforcements. This period is from October 2014 to 2018 based upon the indicative IPC process timescales.

Hornsea Platform 1A is a 500MW offshore wind farm connecting at Killingholme 400kV substation, which requested a connection date of July 2014, which has a signed connection agreement to meet an agreed October 2014 connection date. This connection is via HVDC circuit from Killingholme 400kV substation into the offshore network of the East Coast of England with a connection of October 2014.

Security of supply within the South Humber Group will be maintained by the managing generation in the Balancing Mechanism for the period of this derogation.

### Hornsea 1B - Part 1: Technical Description of Non Compliance

Relevant Paragraph(s) of NETS Security and Quality of Supply Standard	Cause	Part of System Affected	Initial Conditions		Interim Operational Solution	Long Term Solution, to include brief description of access requirements.	Derogation Expiry Date
			System Intact	Circuit Outage			
Design of the Main Interconnected Transmission System – 4.7, 4.8 & 4.9	Thermal performance	South Humber group – Keadby, Creyke Beck, Killingholme, Humber Refinery, South Humber Bank and Grimsby West	Winter peak	N/A	Management of South Humber Group generation through the Balancing Mechanism	<p>The Long Term Solution for this derogation is the construction of the East Coast Strategic Reinforcements.</p> <p>At the point of offer to SMart Wind, these works consisted of:</p> <ul style="list-style-type: none"> <li>• A new 400kV overhead line from Grimsby West through East Lincolnshire to Walpole, via a substation for the Triton Knoll connection</li> <li>• A new 400kV overhead line from Triton Knoll to Bicker Fen</li> <li>• A new 400kV overhead line from Bicker Fen to tee into the Cottam – Eaton Socon – Wymondley route.</li> </ul> <p>These works are currently programmed to complete in October 2018.</p>	This derogation will apply for the period between connection of Hornsea Platform 1B Offshore wind farm and the completion of wider reinforcements. This period is from October 2015 to 2018 based upon the indicative IPC process timescales.

Hornsea Platform 1B is a 500MW offshore wind farm connecting at Killingholme 400kV substation, which requested a connection date of July 2015, which has a signed connection agreement to meet an agreed October 2015 connection date. This connection is via HVDC circuit from Killingholme 400kV substation into the offshore network of the East Coast of England with a connection of 14<sup>th</sup> October 2015.

Security of supply within the South Humber Group will be maintained by the managing generation in the Balancing Mechanism for the period of this derogation.

## Hornsea total - Part 2: Expected Consequence of Non-Compliance

Value of Carbon Benefit (£k)	2014/15: 1,104.66 2015/16: 9,456.03 2016/17: 17,614.57 2017/18: 18,655.68 2018/19: 18,935.51 <b>Total: 65,766.45</b>
Summary of proposed System Operator actions to manage non-compliance	<p>Hornsea and Dogger Bank both connect to the same geographic area of the transmission system (Humberside) and the impact of these connections have been assessed together to ensure interactions between the generation and the required works for each are captured correctly.</p> <p>Costs have thus been calculated on a combined basis and then split out to reflect the costs incurred on a connection by connection basis. This shows how stage 1A of each connection incurs more costs than stage 1B, as expected due to a longer period of generation prior to completion of required works.</p> <p>The volume of generation connecting in this area is significant at 2000MW. Sufficient actions are available on conventional generation to manage the potential constraints; the high costs are due to the volume of generation behind a constraint boundary.</p> <p>The assessment assumes that during periods where derogation is required against 4.7 to 4.9 of the NETSSQSS, no costs are incurred when the transmission system is intact. No requirement for intertrip services to manage conditions in the event of a secured fault is identified in the derogation report and as such, the assessment does not include any costs for post fault actions.</p> <p>For periods where derogation is required against 4.6, costs are incurred where probable transfers for the specified SYS boundaries are in excess of the capacity of that boundary. Information on transfers and boundary capabilities are taken from the 2010 SYS. During outage periods, it is assumed that all new generation (or a volume equal to that new generation) must be restricted.</p> <p>The assessment assumes that the works required to allow compliant connection of Hornsea complete at the end of October 2018 and that these works remove any requirement to constrain Hornsea generation (or a volume of generation equal to it).</p>
Estimated range of costs to manage non-compliance (£k)	<b>Central Case (£k):</b> 2014/15: 0 2015/16: 3,505.64 2016/17: 27,345.90 2017/18: 33,358.61

	2018/19: 20,798.60 <b>Total: 85,008.76</b>
Description of risk due to network non compliance	