

Hornsea 2A/2B: 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

Hornsea 2A - 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. Based on a contracted generation background, we have assumed that no Killingholme generation will be running (KILNS-1, KILLPG-1 and KILLPG-2 all 0)	N/A	Management of South Humber Group generation through the Balancing Mechanism	<p>The Long Term Solution for this derogation is the construction of an integrated offshore transmission network between Killingholme and Walpole, that will complement the onshore transmission system, and ensure ongoing SQSS compliance.</p> <p>It is assumed that no onshore circuit access is required to commission the offshore transmission network</p> <p>Our current best view for completion of these works is October 2019.</p>	<p>This derogation will apply for the period between connection of Hornsea Platform 2A Offshore wind farm and the completion of wider reinforcements. This period is from December 2016 to October 2019 based upon the indicative timescales for construction works at Walpole.</p>

Hornsea Platform 2A is a 500MW offshore wind farm connecting at Killingholme 400kV substation, which requested a connection date of December 2016. The connection is via HVDC circuit from Killingholme 400kV substation into the offshore network of the East Coast of England.

The generation is assumed to ramp up in a linear fashion from 0 to 500 MW between December 2016 and December 2017.

Hornsea 2B - 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. Based on a contracted generation background, we have assumed that no Killingholme generation will be running (KILNS-1, KILLPG-1 and KILLPG-2 all 0)	N/A	Management of South Humber Group generation through the Balancing Mechanism	<p>The Long Term Solution for this derogation is the construction of an integrated offshore transmission network between Killingholme and Walpole that will complement the onshore transmission system, and ensure ongoing SQSS compliance.</p> <p>It is assumed that no onshore circuit access is required to commission the offshore transmission network</p> <p>Our current best view for completion of these works is October 2019.</p>	<p>This derogation will apply for the period between connection of Hornsea Platform 2A Offshore wind farm and the completion of wider reinforcements. This period is from December 2017 to October 2019 based upon the indicative timescales for construction works at Walpole.</p>

Hornsea Platform 2B is a 500MW offshore wind farm connecting at Killingholme 400kV substation, which requested a connection date of December 2017. The connection is via HVDC circuit from Killingholme 400kV substation into the offshore network of the East Coast of England.

The generation is assumed to ramp up in a linear fashion from 0 to 500 MW between December 2017 and December 2018.

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

Value of Carbon Benefit (£k)	<table border="1"> <thead> <tr> <th>Year</th> <th>Total Carbon benefit (£k)</th> </tr> </thead> <tbody> <tr> <td>2016/17</td> <td>£1,138</td> </tr> <tr> <td>2017/18</td> <td>£9,706</td> </tr> <tr> <td>2018/19</td> <td>£18,147</td> </tr> <tr> <td>2019/20</td> <td>£11,211</td> </tr> <tr> <td>Total:</td> <td>£40,202</td> </tr> </tbody> </table>	Year	Total Carbon benefit (£k)	2016/17	£1,138	2017/18	£9,706	2018/19	£18,147	2019/20	£11,211	Total:	£40,202
Year	Total Carbon benefit (£k)												
2016/17	£1,138												
2017/18	£9,706												
2018/19	£18,147												
2019/20	£11,211												
Total:	£40,202												
Summary of proposed System Operator actions to manage non-compliance	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.												
Estimated range of costs to manage non compliance (£k)	<table border="1"> <thead> <tr> <th>Year</th> <th>Constraint Costs (£k)</th> </tr> </thead> <tbody> <tr> <td>2016/17</td> <td>£548</td> </tr> <tr> <td>2017/18</td> <td>£10,393</td> </tr> <tr> <td>2018/19</td> <td>£30,491</td> </tr> <tr> <td>2019/20</td> <td>£30,053</td> </tr> <tr> <td>Total:</td> <td>£71,484</td> </tr> </tbody> </table>	Year	Constraint Costs (£k)	2016/17	£548	2017/18	£10,393	2018/19	£30,491	2019/20	£30,053	Total:	£71,484
Year	Constraint Costs (£k)												
2016/17	£548												
2017/18	£10,393												
2018/19	£30,491												
2019/20	£30,053												
Total:	£71,484												
Description of risk due to network non compliance													