National Grid Ventures (NGV) Written Response to East Anglia One North and East Anglia Two Examinations Deadline 11

Monday 7th June 2021 (Deadline 11)

East Anglia ONE North & East Anglia TWO PINS Reference Numbers: EN010077 & EN010078

NGV IP reference numbers: 20024636 (East Anglia ONE North) & 20024639 (East Anglia TWO)

NGV Response to ExA Questions (ExQs3)

Informative note – separate converter stations would be required for the Nautilus and EuroLink projects, therefore if both projects were to be constructed, two converter stations would be required.

	ExA Question	NGV Response
Question 3.14.1	Extension of National Grid Substation Appraisal The ExAs note that, in addition to substation extension bays, the Nautilus and EuroLink interconnector projects would require a converter station "in proximity" to any substation and that this equates to some 5km radius (maximum) from the NGET substation for size and efficiency reasons [REP9-062]	a) The most efficient technical solution is to locate the converter station as close to the substation extension bays as possible. This minimises the length of the HVAC cable circuits needed to connect the converter station to the substation. Longer HVAC cable routes result in reactive power transmission losses which require extra equipment in the

	a) Is it most efficient to provide a converter station as close as possible to the substation extension bays? b) A 5km radius equates to roughly 3.1miles from the proposed Friston substations. Outline the process by which the proposed converter stations sites will be chosen. Would the presence of a permitted NGET substation at Friston weigh in favour of a site being chosen adjacent to the same site? Appendix 1 to [REP9-062] contains a Nautilus Project Update document (April 2021). This document contains details of "The vision for MultiPurpose Interconnectors" which it is stated will help to reduce impacts on coastal communities with fewer individual connections and less construction works needed. c) While reducing the number of individual connections could reduce overall impacts on coastal communities, could conversely this also lead to larger impacts on the area chosen for the single, presumably larger, connection? d) Is Friston being considered as a Multi-Purpose Interconnector?	converter station, such as shunt reactors, to compensate these losses. A 5 km radius reduces the likelihood of needing this equipment. HVAC cable routes typically require a larger working width than that of HVDC cables. A longer HVAC cable route between the converter station and the NGET substation therefore has the potential to impact a larger area. Bundled underground cables will need to be installed between the converter station and the NGET substation. Minimising the distance between the infrastructure helps reduce disruption and the land take required for cable burial. **Appendix A** sets out examples of HVAC cable route lengths between converter stations and NGET substation connections for other NGV Interconnector projects. b) NGV intend to hold a public consultation for Nautilus in late Summer 2021 which will include information on the siting and routeing process. Based on the assumption of a connection to the proposed Friston substation (please refer to NGV's Deadline 3 submission dated 15th December 2020 for further detail on the connection agreements for both Nautilus and EuroLink) NGV have identified an initial 5km search area for possible converter station site options for Nautilus; the process is iterative. Environmental, socio-economic and technical considerations are informing the process. Feasibility work

		is also being undertaken for the proposed EuroLink project although this is not currently as advanced. Co-location of a converter station and substation is considered to have an advantage because it reduces / avoids transmission losses. Furthermore, the aggregation of infrastructure can minimise intrusion in the landscape. However, a search area of 5km allows for consideration of identified options to be appraised against criteria to inform feasibility. The presence of a permitted NGET substation at Friston does not necessarily mean an adjacent site will be the most appropriate for a converter station when balancing environmental, socio-economic and technical objectives. c) There is a demand for coastal connections given the UK Government target to deliver 40GW of power from offshore wind by 2030 as set out in the Energy White paper (December 2020) and the Ten Point Plan for a Green Industrial Revolution (November 2020). It is therefore inevitable that any consented NGET substation asset at this location would attract interest until capacity of the NGET substation is reached. Reviews such as the Offshore Transmission Network Review (ONTR) recognise this position and the need for more co-ordinated solutions to come forward. Instead of dozens of individual wind farms connecting one by one to the shore, MPIs would allow clusters of wind farms to connect all in one go; reducing the impact on the marine and onshore environment by reducing and consolidating the number of

		cable runs and onshore substations when compared to the existing individual developer led approach. MPIs would therefore provide a more co-ordinated and cheaper solution for consumers and reducing impacts on local communities. In the case of the proposed Friston substation, substation extension bays would be required to accommodate new connections, including an extension bay each for the Nautilus project and EuroLink project. Extension bays would increase the overall footprint of the NGET substation. d) Both the Nautilus project and EuroLink project are intended to be Multi-Purpose Interconnectors (MPIs), an evolution from the original intention of point to point interconnectors. This decision was made in response to a need for a more co-ordinated approach, which was called for by stakeholders. A MPI would comprise an offshore converter station with HVDC cables running to an onshore converter station (in each country). HVAC cables would then run between the onshore converter station to the point of connection. The MPI would connect into the National Transmission System via a substation. These components are shown in the MPI diagram at Appendix 2 of NGV's Deadline 9 response. As detailed in NGV's Deadline 3 response, NGV have undertaken feasibility work based on the assumption that the proposed NGET substation connection for both the

		proposed Nautilus and EuroLink Multi-Purpose Interconnector projects will be at Friston.
Question 3.14.5	Future uncertainty Bearing in mind any implications of the Norfolk Vanguard judgement, how would the parties propose the ExAs advise the Secretary of State in relation to the uncertainty about possible future development at Friston and in the wider area created by the precedent case, in the event that either one or both projects is approved, and by the clear evidence submitted to the examinations that (a) the potential to extend the proposed National Grid substation has been demonstrated and (b) the proposed Eurolink and Nautilus inter-connectors are exploring a landfall location between Thorpeness and Sizewell and the possibility of making a National Grid connection in the Leiston area, via onshore substations located within 5k of a National Grid substation?	NGV have made submissions (at Deadlines 3, 4, 9 and 11) regarding the proposed Nautilus project and EuroLink project. A SoCG has also been agreed with the Applicant. As set out in the agreed SoCG with the Applicant, both the Applicants and NGV recognise there are benefits in ensuring that the design of the East Anglia TWO project and East Anglia ONE North project does not unnecessarily limit or restrict the opportunity for the Nautilus project and EuroLink project to connect to National Transmission System (NTS) at the National Grid substation. Any future application/s for Development Consent by NGV would assess cumulative impacts in the context of EA1N and EA2 and other relevant developments.

Appendix A

Examples of HVAC Cable Route Lengths between Converter Stations and NGET substation connections for NGV Interconnector Projects

NGV Project	Status	HVAC Route Length (Converter to NGET)	Description
IFA	Operational, 1986	N/A	Co-located NGET substation and converter station site.
BritNed	Operational, 2011	<0.5km	Short route between NGET substation and converter station.
Nemo	Operational, 2019	<0.5km	Converter station site located adjacent to NGET substation.
IFA2	Operational, 2021	Approx. 10km	It was not feasible to connect within 5km of the substation, therefore an alternative location was identified in this geography. The longer HVAC link between converter station and substation meant that additional compensating equipment (a shunt reactor) had to be incorporated into the converter station design to compensate for transmission losses.
NSL	Under construction	Approx. 600m	Converter station and NGET substation in close proximity.
Viking	Under construction	Approx. 2.3km	Converter station and NGET substation relatively close proximity.