

211/04 - APPLICATION FOR NON-STANDARD BM UNIT CONFIGURATIONS AT EAST ANGLIA ONE OFFSHORE WIND FARM

MEETING NAME	ISG 211
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Owner/author	Katie Wilkinson
Purpose of paper	For Decision
Classification	Public
Summary	East Anglia ONE Limited has applied for two non-standard BM Units for its East Anglia ONE Offshore Wind Farm. We invite the ISG to approve the application.

1. Background

- 1.1 East Anglia ONE Limited (EA ONE) is developing the East Anglia ONE Offshore Wind Farm, consisting of 102 wind turbine generating units (WTG), 7MW per generating unit (7MW/WTG), with a total of 714MW installed power output. The project consists of four Offshore Power Park Modules (PPM) connected to the Offshore substation; two PPMs are connected at 66kV to each of the two 220/66/66kV Offshore Grid Transformer (GT). Two 220kV export cables connect the Offshore GTs to the onshore Transmission System. Although the wind farm will be capable of producing 714 MW, there is a 680 MW Export limit (340MW per each export cable) as agreed with the Transmission Company.
- 1.2 EA ONE has confirmed with the Transmission Company that the two PPMs feeding each GT can be comprised in two separate Combined Offshore Balancing Mechanism Units (COBMU) instead of being comprised of four standard BM Units (one per PPM).
- 1.3 EA ONE has submitted three confidential diagrams to support this application. Attachment B is an overall electrical single line diagram of the Offshore and onshore substations. This shows the layout of the WTGs and their connection to the four PPMs, as well as the connection of the PPMs to the two Offshore GTs (shown as AAT10 and AAT20). As shown on the diagram, there is some interconnection between the busbars of some of the PPMs. In case of an outage, generation from one PPM can be rerouted to another PPM's busbar. As the output of those WTGs is measured by HV meters above the PPM busbars, such interconnection does not impact the Aggregation Rules and therefore Settlement¹.
- 1.4 Attachment C is a schematic diagram showing the location and nomenclature of both the onshore and Offshore high voltage (HV) and low voltage (LV) Boundary Point Meters. Each non-standard COBMU will include HV and LV Boundary Point Meters covering all energy flows across the transmission to generator system boundaries. Section 2.3 below describes which Boundary Point Meters will be included in each non-standard COBMU.

¹ The Aggregation Rule for each CoBMU will capture the volumes of energy flowing to/from the two PPMs normally associated with it. If a PPM not normally associated with a particular CoBMU is routed through it, the volumes of that re-routed PPM will be captured by the Meters of that particular CoBMU. Correspondingly, the Meter above the re-routed PPM will read zero Import/Export and therefore the Metered Volumes determined in the Aggregation Rule for that CoBMU will be lowered by the same amount as the Metered Volumes for the particular COBMU are increased. The applicant has confirmed that paralleling the GTs is not possible due to a combination of electrical interlocking arrangements and operational procedures.

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- 1.5 Attachment D is a schematic diagram showing the how the onshore LV Alternating Current (LVAC) generator's assets can alternatively be supplied by a separate Licensed Distribution System Operator (LDSO) connection. The applicant has confirmed the LDSO connected Meter will be registered separately as a Supplier Volume Allocation (SVA) Metering System with an Import Metering System ID (MSID). There are interlocking arrangements to prevent import through the Transmission System and Distribution System concurrently.
- 1.6 EA ONE has confirmed that the total onshore and Offshore LV energy flow is a maximum of 70kW, however normal consumption is expected to be 40.5kW with annual consumption estimated to be 350.4MWh shared between the onshore and Offshore LV supplies.

2. Non-standard BM Unit application

- 2.1 Ordinarily a wind farm like EA ONE's would require standard BMU configurations consisting of:
- two COBMUs - one for each pair of Offshore PPMs (normally associated with each GT); and
 - four other standard demand BM Units (for its Offshore and onshore assets fed by LV circuits).
- 2.2 Where a BM Unit does not fit into the standard configurations set out in the BSC (as summarised in Appendix 1 'BM Unit Configurations' to this paper), the ISG, under authority delegated from the BSC Panel, must consider and determine the outcome for an application for a non-standard BM Unit configuration.
- 2.3 EA ONE is seeking approval for two non-standard BM Units (Attachment A) - one for each of the two COBMUs, and the Offshore and onshore LV assets associated with each COBMU. The metering scheme has been designed and developed around two BMUs as advised the Transmission Company, identified as BM Unit IDs T_EAAO-1 and T_EAAO-2. Each non-standard COBMU will include Boundary Point Meters covering all energy flows across the transmission to generator system boundaries as follows (Attachment C):
- BM Unit **T_EAAO-1** will include:
 - 220/66kV Busbar 1 – Tx AAT10 (1 x Offshore HV Import / Export - PPM 1): FDR1AM/ Main and Check meters (incorrectly referenced as FDR2AM/C in Attachment C)
 - 220/66kV Busbar 1 – Tx AAT10 (1 x Offshore HV Import / Export - PPM 2): FDR1BM/C Main and Check meters
 - 66kV Busbar – Aux Tx BGT10 (1 x Offshore Aux Tx HV Import / Export (connected to PPM1)): AUX1M/C Main and check meters
 - 66kV/0.4kV - 1 x Offshore Generator LV Auxiliary services (Import / Export): OFFLV1M
 - 34.5/0.4kV Busbar – Tx BGT10 (1 x onshore LV Import / Export): ONLV1M
 - BM Unit **T_EAAO-2** will include:
 - 220/66kV Busbar – Tx AAT20 (1 x Offshore HV Import / Export - PPM 3): FDR2BM/C Main and Check meters
 - 220/66kV Busbar – Tx AAT20 (1 x Offshore HV Import / Export - PPM 4): FDR2AM/C Main and Check meters
 - 66kV Busbar – Aux Tx BGT40 (1 x Offshore Aux Tx HV Import / Export): AUX2M/C Main and check Meters
 - 66kV/0.4kV - 1 x Offshore Generator LV Auxiliary services (Import / Export): OFFLV2M

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- 34.5/0.4kV Busbar – Tx BGT20 (1 x onshore LV Import / Export): ONLV2M
- 2.4 Both non-standard BM Units will include the wind farm operator's Plant and/or Apparatus whose flows are measured by:
- the Offshore HV Settlement Meters; and
 - the Offshore and onshore LV (demand) Settlement Meters,
- all of which are located at the Boundary Points (the Defined Metering Points) between the wind farm operator and the Offshore Transmission System in the Offshore substation.
- 2.5 EA ONE does not believe that a standard configuration for EA ONE Offshore Wind Farm will allow them to settle the electricity Imports/Exports in an efficient way. EA ONE is of the opinion that combining these Offshore and onshore LV supplies with the COBMUs reduces cost and complexity associated with their registration, operation and Settlement and as such two non-standard BM Units is the most appropriate and efficient configuration for the project.

3. Transmission Company and ELEXON comments

- 3.1 This application has been sent to the Transmission Company and its comments will be provided verbally at the ISG meeting.
- 3.2 ELEXON recommends that the ISG agree this application on the basis that:
- the responsibility for the flows of electricity associated with the BM Unit lie with one Party (Section K 3.1.2 (a));
 - The Plant and Apparatus associated with each of the EA ONE proposed BM Units is capable of independent control from any other Plant and Apparatus (Section K3.1.2(b));
 - all volumes flowing from and to the BM Units will be captured by compliant Metering Systems and these volumes will be determined separately from volumes to and from other BM Units (Section K 3.1.2 (c));
 - the BM Unit does not comprise Central Volume Allocation (CVA) and Supplier Volume Allocation (SVA) Metering Systems that measure the same Imports or Exports at any one time (Section K 3.1.2 (d)); and
 - Although the BM Unit would not be the smallest aggregation of Plant and Apparatus that satisfies K3.1.2 (a)-(c) (Section K3.1.2(e)), there will be no adverse impact on Settlement by registering two BM Units combining LV and HV assets as opposed to two BM Units for the HV assets and multiple BM Units for the LV Assets. The Settlement Meters and the Aggregation Rule associated with two BM Units will correctly capture all the energy associated with EA ONE.
- 3.3 ELEXON notes that the ISG has previously approved similar configurations, e.g. to combine Offshore PPMs (or COBMUs) with onshore and Offshore LV supplies to wind farm operator assets.

4. Recommendations

- 4.1 We invite you to:
- a) **APPROVE** a single non-standard BM Unit status for the wind farm operator's Plant and Apparatus associated with **T_EAAO-1**.

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- b) **APPROVE** a single non-standard BM Unit status for the wind farm operator's Plant and Apparatus associated with **T_EAAO-2**.

Appendices

Appendix 1 – BM Unit Configurations

Attachments

Attachment A – BSCP15/4.13 – EA ONE non-standard BM Unit application

Attachment B (CONFIDENTIAL) – EA1-ENG-DU-IBR-044128 Rev1 Overall Single Line Diagram

Attachment C (CONFIDENTIAL) – EA1-GRD-DU-IEC-004686 Rev 6 ENGN Metering simplified single line diagram

Attachment D (CONFIDENTIAL) – EA1-OVERALL LVAC BURSTALL (LDSO Backup Supply)

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APPENDIX 1 - BM UNIT CONFIGURATIONS

The BSC states that a BM Unit shall comprise Plant and/or Apparatus for who's Exports and / or Imports a Party is responsible (Section K3.1.1).

A BM Unit must satisfy the following conditions (K3.1.2):

- responsibility for the BM Unit would lie with one Party;
- it would be capable of independent control;
- it would be visible to the Settlement Administration Agent (SAA) as a metered quantity separately from anything that is not included in the BM Unit;
- the BMU does not comprise of CVA and SVA Metering Systems that measure the same Imports or Exports;
- it would be the smallest aggregation of Plant and Apparatus that satisfies the first three bullets above.

The BSC also sets out a number of standard configurations of BM Units (Section K3.1.4), including:

- a single Generating Unit, CCGT or Power Park Module (PPM);
- a Combined Offshore BM Unit;
- the Imports through the station transformers of a Generating Plant; or
- premises, which are directly connected to the Transmission System, at a single Boundary Point.

The BSC states that a Registrant and/or Central Data Collection Agent (CDCA) / Central Registration Agent (CRA) can apply to the Panel for a non-standard BM Unit configuration in the following circumstances (K3.1.5):

- the Plant / Apparatus does not fall into a category listed in section K3.1.4 or the CDCA / CRA considers that there is reasonable doubt that this is the case;
- the Plant / Apparatus does fall into a category listed in K3.1.4 but the responsible Party considers that a different configuration would satisfy the requirements set out in K3.1.2; or
- there is more than one set of Exports / Imports at a CVA boundary Point and more than one Party is responsible for these.