

## BSCP32/4.1 Application for a Metering Dispensation

D/461

## Part A – Applicant Details

<b>To: BSCCo</b>		<b>Date Sent: 18/12/2015</b>	
<b>From: Requesting Applicant Details</b>			
Name of Sender: [REDACTED]			
Contact email address: [REDACTED]			
Contact Tel. No. [REDACTED]		Contact Fax No. n/a	
Name of Applicant Company: DONG Energy Burbo Extension (UK) Ltd.			
Address:			
5 Howick Place			
London			
Post Code: SW1P 1WG		Our Ref: NIBNE	
Name of Authorised Signatory: [REDACTED]			
Authorised Signature:		Password:	

**Confidentiality:**

Does any part of this application form contain confidential information?

Request for Confidentiality **YES**

If 'YES', please state the parts of the application form that are considered confidential, including justification below. Information that is considered confidential:

Appendix A to this form and annexes. The main form can be shared.

**Reasons for requesting confidentiality:**

The document in App. A and other Annexes are supplied by manufactures and these documents should be kept confidential from competitors.

number, site name, expiry date (if any) and BSC Panel determinations will routinely be made available in the public domain unless the applicant informs BSCCo otherwise at the time of application

## BSCP32/4.1 Application for a Metering Dispensation (Cont.)

## Part B - Affected Party Details

Number of Affected parties None<sup>1</sup>

Contact Name at Affected party: [REDACTED]	
Contact email address: [REDACTED]	
Contact Tel. No. [REDACTED]	Contact Tel. No.
Company Name of Affected party: National Grid	
Address: National Grid House, Warwick Technology Park, Gallows Hill, Warwick	
Post Code: CV34 6DA	

Contact Name at Affected party: N/A	
Contact email address: TBC	
Contact Tel. No: TBC	Contact Tel. No. TBC
Company Name of Affected party: TBC	
Address: TBC	
Post Code: TBC	

<sup>1</sup> For more than one Affected party, Part B should be completed for each, using additional copies of Part B as required.

## BSCP32/4.1 Application for a Metering Dispensation (Cont.)

### Part C – Reason for Application

If the application is an extension or update for an existing Metering Dispensation, enter existing ref: D/.....

Generic

Describe why you require a Metering Dispensation. Include any steps you propose to limit the impact on Settlement and other Registrants:

#### 1. Introduction

DONG Energy has developed, built, and operated offshore wind farms in the past ten years in the UK. Since the introduction of the OFTO regime and the approval of P294 in 2013, to achieve full compliance with the current regulation for metering generator consumptions, all DONG Energy's projects under development and to connect in the future, have included a set of settlement meters to measure the generation at the Offshore Grid Entry Point and the consumption of LV equipment that belongs to the Generator in both onshore and offshore substation. Some of this equipment requires DC supply and a specific meter to measure its consumption. The DC circuits involved have a rating which would normally make the requirements of BSC Code of Practice 5 (CoP 5) applicable, however a fully compliant COP5 metering system cannot be used as COP5 relates specifically to metering for alternating current (AC) circuits. There are currently no devices registered under the Electricity Act 1989 or compliance tested under BSCP601 for DC measurement that can provide full compliance with Code of Practice 5. A dispensation against the particular clauses in COP5 which are affected is therefore required. DONG Energy has worked with Siemens Operational Services, which supplies the metering system, to find a solution that satisfies all the metering requirements.

#### 2. Dispensation Requirements

In general, the COP5 requirements outlined in Sections 4 and 5 contain clauses that cannot be fully complied with or are not applicable, details are in the below Table.

COP5 Section	Clause	Reason for Non Compliance	Dispensation Detail
4.1.1	Measured Quantities for Metering Systems Registered in CMRS.	MVArh quantities are not applicable to DC loads.	Dispensation required to allow only MWh Quantities to be measured.
4.1.2	Demand Values for Metering Systems Registered in CMRS.	MVArh Demand Values are not applicable to DC loads.	Dispensation required to allow only MWh Demand Values to be provided.
4.3.1(i)	Overall Accuracy (Active Energy)	0.5 lag and 0.8 lead PF Limits of Error not relevant to DC Metering	Unity PF Limits of Error will be complied with, details in Section 3
4.3.1(ii)	Overall Accuracy (Reactive Energy)	Limits of Error not applicable to DC Metering	
4.3.2	Compensation for Measurement Transformer Errors.	Available DC Energy Meters do not provide this facility.	Overall Accuracy requirement will still be maintained, detail in Section 3
5.1.1	Current Transformers.	Current transformers compliant to IEC Standard 185 cannot be used, as this applies to AC circuits.	Dispensation required to allow the use of Hall Effect Transducers or Shunts to measure the load current and provide suitable signals

			to Metering Equipment. Details in Section 4.
5.3	Meters	Active Energy Meters that meet the requirements of BS EN 61036 Class 2, BS EN 50470-3 Class A or BS EN 60521 and BS 7856 Class2 cannot be used as these relate to AC metering.	Dispensation required to allow the use of DC Metering Equipment with a suitable manufacturers accuracy specification. Details in Section 5.

DONG Energy has worked with Siemens Operational Services, which supplies the metering system, to find a solution that satisfies the key metering requirements supported by this dispensation.

### 3. Overall Accuracy

Some of the Overall Accuracy requirements of COP5 are not relevant to DC metering, therefore only the Overall Accuracy error limits specified in COP5 Section 4.3.1 associated with Active Energy at Unity Power Factor is deemed to be applicable to the DC Metering solution.

Section 5 in COP5 specifies accuracy class indexes for Metering Equipment and Current Transformers which relate to IEC Standards for AC Equipment. Since these standards cannot be directly applied to the DC Metering solution, the Metering Equipment and Current sensors have been selected to meet an equivalent accuracy class index (to an appropriate IEC Standard) or to have a suitable manufacturers' accuracy specification. Calibration results have been provided for the DC Meter and Current Sensors to provide confirmation of the accuracy of the selected devices, as compared to the COP5 error limits. The limits of error specified in COP5 for Metering Equipment at Unity Power Factor will be used as a comparison for the DC meter. The COP5 limits for CT ratio error will be taken as required accuracy limits of the DC Current Sensor. Calibration results are provided in Sections 4 and 5 for sample units.

### 4. Voltage and Current Sensing

#### 4.1. Voltage

The auxiliary supplies to be metered are Low Voltage (LV), therefore the voltage terminals of the meter can be directly connected to the supply.

#### 4.2. Current

A Powertek CTH/100A/4-20/TH/9-36V type 2 current transducer will be used employing the Hall Effect technique. A solid core current sensing head will be used to achieve the manufacturers' accuracy specification of 0.5%. The complete current transducer assembly includes a signal conditioner connected to the output of current sensing head. The purpose of the signal conditioner is to remove any DC offset from the current measurement signal that is presented to the metering equipment, which greatly improves the accuracy of the transducer (particularly at low loads). The transducer will provide a 4 - 20mA DC signal to the meter. Calibration results for a sample unit are shown in Appendix 2, along with a comparison with the limits of error as specified in COP5. The actual units to be used will undergo a similar calibration.

### 5. Metering Equipment

#### 5.1. DC Energy Meter

The meter will be an AcuEnergy AcuDC243 type, which has a manufacturer's accuracy specification of 0.5%. The meter is capable using the 4-20mA signal from the Hall Effect Current Transducer. The meter has its own cumulative register for kWh registration and will provide volt-free, clean contact energy pulses for use with an external data logging outstation. The meter does not provide sealing facilities or password protection for its configuration (as required in Section 5 of COP5). The meter will therefore be housed in a sealed enclosure to protect it from any tampering. The meter also does not provide facilities to compensate for measurement transformer errors, as required in Section 4 of COP5. This will not impact on the Overall Accuracy as the calibration results shown Appendix 2 confirm that accuracy achieved by these devices is comfortably within the limits shown in Section 3. Calibration results for the meter are shown in Appendix 3, along with a comparison with the limits of error, as described in Section 3. Appendix 1 shows the full metering arrangement using the Hall

Effect Transducer.

#### 5.2: Data Outstation

The meter described in 5.1 does not provide Outstation functionality, as described in COP5 Section 5.5, therefore an external data logging outstation will be required. An Elster A1700 data logging meter will be used to perform this function, using a pulse input module. The volt-free, clean contact energy pulses, provided by the DC energy meter, will be received by the Elster A1700 meter to enable logging of half hour demands and make them available for remote collection by an approved Data Collection Agent. The energy pulses will also be used to advance the cumulative kWh energy displays on Elster meter. The cumulative kWh values will relate to the DC energy measurement and will enable local meter readings to be taken for the Outstation. A proving test will be performed over a number of half hour periods to prove that the kWh advances on the Elster A1700 meter align with the kWh advances on the actual DC meter. No derogations under COP5 are required with regards to the Data Outstation, as the Elster A1700 is an approved data logging device.

#### 6. Summary

At present, the proposed solution is deemed by DONG Energy the most suitable and effective for the measurement of DC supply. This BSCP 32 form and the attached documentation shows the proposed solution and to provide all information that are required to demonstrate how DC consumption can be measured. A combination of a DC meter with suitable accuracy and an outstation based on an approved AC meter is considered to be equivalent to a corresponding CoP5 AC meter. The Overall Accuracy Limits, specified in COP5, can be comfortably achieved using the selected devices. DONG Energy intend to use this solution for all future wind farms currently under development (Burbo Bank Extension, Race Bank, Walney Extension and Hornsea P1) and it could also affect the design of future wind farms in DONG Energy's pipeline. For this reason, the intention of this dispensation form is to require a generic dispensation that would apply to all future offshore wind farms.

The annexes submitted to this form refer to the Burbo Bank Extension offshore wind farm, as this is the next project in DONG Energy's pipeline and the first project which will require this dispensation to be necessary. Note that, unless other solutions for DC metering become available in the future, the same proposed design for metering will be made for other wind farms.

#### Period of Metering Dispensation required

Lifetime

If temporary, indicate for how long the Metering Dispensation is required.	
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Provide justified reasoning for the period of Metering Dispensation requested in the box below:

#### Rationale for duration of Metering Dispensation:

The proposed solution will be in place for the entire lifetime of the wind farm and, unless a change to the current regulation is made, a lifetime derogation will be required.

**Materiality**

Please complete the following:

What is the cost of providing compliant Metering Equipment?	What does this cost entail?
No solutions in accordance to CoP are currently available for DC meters, so it is not possible to quantify a compliant solution for comparison	
What is the cost of the proposed solution?	What does this cost entail?
No solutions in accordance to CoP are currently available for DC meters, so it is not possible to quantify a compliant solution for comparison	
What is the impact to Settlement of your proposed solution?	Why?
There is no impact to Settlement	The overall accuracy limits for CoP5 are maintained.
What is the impact to other Registrants of your proposed solution?	Why?
None, no other parties will be affected.	

**Site Details (for Site Specific Metering Dispensation)**

Site Name:	N/A
Site Address:	N/A
MSID(s):	N/A
Registered in: CMRS / SMRS*; *Delete as applicable.	N/A
For SMRS, please advise of SMRA in space provided.	N/A

**Manufacturer Details (for Generic Metering Dispensation)**

Manufacturer Name:	Multiple manufactures, See attached annexes for all details - 020.2 - AcuDC-240-DC-Power-Energy-Meter-
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	Brochure.pdf - 020.3 - dca-sensor-cth.pdf - 020.4 - A1700D_brochure.pdf
Metering Equipment Details:	See attached annexes for all details - 020.2 - AcuDC-240-DC-Power-Energy-Meter- Brochure.pdf - 020.3 - dca-sensor-cth.pdf - 020.4 - A1700D_brochure.pdf

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**BSCP32/4.1 Application for a Metering Dispensation (Cont.)**


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**Part D - Technical Details****Code of Practice details**

Metering Dispensation against Code of Practice*	Code of Practice 5
Issue of Code of Practice*:	Issue 6 (version 12)
Capacity of Metering Circuits/Site Maximum Demand (MW/MVA):	up to 0.025MW
(Proposed) Commissioning Date of Metering:	Dates differ and are project specific
Accuracy at Defined Metering Point:	As per CoP,5 section 4,3
Accuracy of Proposed Solution (including loss adjustments):	As per CoP,5 section 4,3
Outstanding non-compliances on Metering Systems:	N/A
Deviations from the Code of Practice (reference to appropriate clause):	All relevant clauses as CoP 5 is specific to the metering of energy transfers on AC circuits (See part C table in section 2).

\* insert Code of Practice number and issue

**Any Other Technical Information**

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**Declaration**

We declare that other than as set out above we are in all other respects, in compliance with the requirements of the relevant Code of Practice and the BSC. A schematic is attached to this application for clarification of the metering points involved.

*Signature:*

..... *Date:* 18/12/2015

*Password:*

Duly authorised for and on behalf of Applicant Company



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**Confirmation of Receipt and Reference**

The BSCCo acknowledges receipt of this document and has assigned the reference number as indicated on the first page.

Signature: ..... M. SMITH ..... Date: ..... 22/12/2015 .....

Duly authorised for and on behalf of the BSCCo

