4.7 Issue Form

Issue Form - BSCP40/04	Issue Number *(mandatory by BSCCo)*

Issue Title *(Mandatory by originator)*

Busbar voltage transformer metering for Offshore wind farms under OFTO arrangements

Issue Description *(Mandatory by originator)*

The size and weight of Metering Equipment[1] used at Offshore wind farm transformer platforms, which are subject to Offshore Transmission Owner (OFTO) arrangements (>132kV Offshore transmission voltage) can significantly affect the cost and complexity of development. This is because additional space on an Offshore platform results in an increase in cost.

Under the existing BSC requirements there are two approaches that are used for metering Offshore wind turbine string arrays[2], which either use Code of Practice (CoP) 1 'The Metering of Circuits with a Rated Capacity Exceeding 100MVA for Settlement Purposes' or CoP 2 'The Metering of Circuits with a Rated Capacity not exceeding 100 MVA for Settlement Purposes' requirements:

1. Where the entire project goes live at the same time and has the same owner, CoP1 Metering Systems are typically used to meter volumes at the 33kV or 66kV connection to the platform transformers.
2. Where turbine arrays are Commissioned at different stages of a wind farm project, or different arrays have different owners, then CoP2 Metering Systems are installed to meter volumes at the strings for each individual array.

Metering done at the string level (following the CoP2 requirements) requires a voltage transformer (VT) to be installed for each Offshore Power Park String. This adds size and weight requirements, which due to the nature of the Common Collection busbar[3] platform being Offshore adds cost and complexity to the project.

The proposer believes that there are effective alternatives to this metering set up, which can reduce the number of VTs (and hence weight) required, without impacting on the quality of data used in Settlement.

Justification for Examining Issue *(Mandatory by originator)*

The size and weight of VTs used in Metering Systems of Offshore wind farms can add significant weight and space requirements to a project. This in turn can make developing new wind farms more complex and costly, which ultimately will have a negative effect for end consumers who will have to fund this through their energy bills. If a solution to reduce the requirement of VTs in Metering Systems can be delivered, then new projects can be secured with lower investment costs. Based upon current windfarm technology this proposal will reduce investment by circa £1 million per 1000MW windfarm. This will ultimately support competition by making new projects more available, which will benefit the end consumer.

[1] Metering equipment: As per BSC Section X, Annex X-1, Version 91 – General Glossary: Metering Equipment means Meters, measurement transformers (voltage, current or combination units), metering protection equipment including alarms, circuitry, associated Communications Equipment and Outstations and wiring.

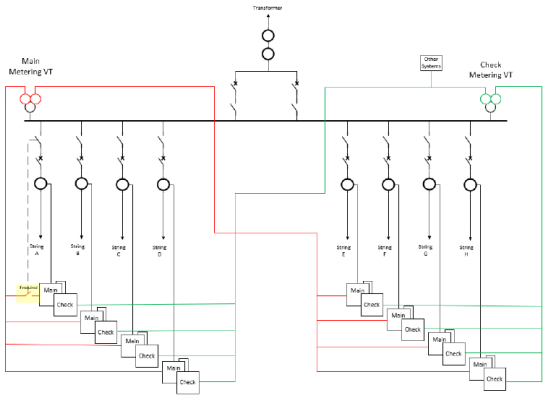
[2] A set of turbines connected in series is known as a 'string'

[3] Common Collection busbar: As per Grid Code Issue 5 Revision 38: A busbar within a Power Park Module to which the higher voltage side of two or more Power Park Unit generator transformers are connected.

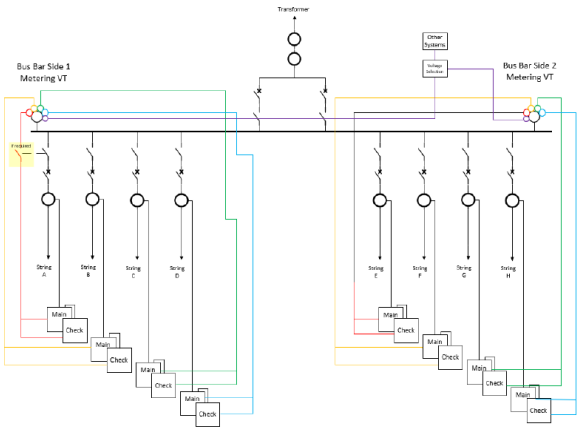
Potential Solution(s) *(Optional by originator)*

The Proposer believes that a solution to reducing the VT requirements for Metering Systems following the CoP2 requirements is to place VTs at the busbar. The Proposer has suggested a number of potential solutions that should be considered by the Issue Group to determine if any should be Progressed as changes to the BSC.

1. As illustrated below, a redundant arrangement where the main Meters are connected to one VT and the check Meters are connected to a separate VT. This increases the availability of the solution as a failure of a VT would not impact on the Metering System. Furthermore, it reduces the need for several VTs on the string levels, which decreases the cost.
   The VTs are electrically connected to same voltage level as the strings and hence metering is performed to the same accuracy as per the current CoP requirements.



2. As illustrated below, busbar VTs are used with several secondary windings. This means that each string would have its own dedicated winding.
   Since this arrangement is not redundant, it does not have the advantage of dealing with a VT failure. However, it still reduces the amount of VTs required for the solution and, in case of a VT failure, generation can be rerouted via another Offshore Power Park Modules with a healthy VT. This arrangement is closer to current requirements of CoP2. The reason is that the current requirement is to have a separate VT per circuit. This proposal uses individual secondary windings, whilst the 1st proposal, whilst redundant uses multiple meters on the same VT secondary winding.



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