Issue Report

Issue 87 'Busbar voltage transformer metering for Offshore wind farms under OFTO arrangements'

Contents

About This Document

This document is the Issue 87 Group's Report to the BSC Panel. Elexon will table this report at the Panel's meeting on 10 June 2021.

There are two parts to this document:

- This is the main document. It provides details of the Issue Group's discussions and proposed solutions to the highlighted issue and contains details of the Workgroup's membership.
- Attachment A contains the Proposal Form for Issue 87.

Contact
Ivar Macsween

020 7380 4270

ivar.macsween@elexon.co.uk

bsc.change@elexon.co.uk

1 Summary

Background

The size and weight of Metering Equipment 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.

There are costs borne from the need to comply with arrangements in the BSC, which has requirements for measuring and recording flows of electricity for Settlement purposes at Offshore wind farms that are subject to the Offshore Transmission Regime and Metering Equipment that must comply with the relevant metering Code of Practice (CoP).

Offshore Transmission Regime

Offshore wind farms that connect onshore to the Transmission System, or a Distribution System, where the Offshore transmission assets convey electricity from or to shore at or above 132,000 volts (132kV) are subject to Offshore Transmission Owner (OFTO) arrangements

Conclusions

The Issue 87 Proposer believes that a solution to reducing the Voltage Transformer requirements for these Offshore Metering Systems, following the CoP2 requirements, is to place VTs at the busbar, proposing an 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 generation as a failure of a VT would not impact on the Metering System and reduces the need for several VTs on the string levels, which decreases the cost without compromising the integrity of Settlement.

The Issue 87 group members agree and recommend that a change to the BSC be progressed to take forward the findings of Issue 87.

This would be an enabling change to the Codes of Practice that allows busbar VTs to be used and is not intended to exclude current arrangements under the status quo. It would provide optionality within the Codes of Practice for additional configurations that parties are free to choose from, should they wish to.

Having considered the benefits to this approach, the group believe it would be appropriate for the solution to apply onshore sites (generally), as well as Offshore wind farms.

2 Background

What is the Issue?

Wind is recognised as being an important source of renewable energy, but significant weight and space requirements can make developing new wind farms complex and costly, which ultimately has a negative effect for end consumers who have to fund this through their energy bills.

The size and weight of Metering Equipment 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, which either use:

1. Code of Practice (CoP) 1 'The Metering of Circuits with a Rated Capacity Exceeding 100MVA for Settlement Purposes', which is applied 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. CoP 2 'The Metering of Circuits with a Rated Capacity not exceeding 100 MVA for Settlement Purposes', which is applied:

a) Where turbine arrays are Commissioned at different stages of a wind farm project; or

b) Different arrays have different owners.

In these cases CoP2 Metering Systems are installed to meter volumes at the strings for each individual array and the current requirement is to have a separate VT per circuit.

What is a Metering System?

A Metering System is made up of items of Metering Equipment including:

- Voltage transformers
- Current transformers
- Meters and Outstations
- The wires and connections between each item
- Connections required to transfer metered data to the outside world (e.g. modems and communication lines).

Benefits to addressing the Issue

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. Savings could be expected to scale with the capacity of the site - therefore a 1GW site could expect savings of around £1 million, with a 1.5 GW site expecting savings of around £1.5 million under the group's recommendation.

This will ultimately support competition by making new projects more available, which will benefit the end consumer. A reduction in the number of necessary VTs has additional environmental and operational safety benefits that are described in further detail in Section 3 'Issue Group Discussions'.

Background

Offshore Transmission Owners

Offshore Transmission Owners (OFTOs) are the owners of offshore transmission assets which connect offshore wind farms to the onshore electricity network.

In 2007, Ofgem and the Department of Energy and Climate Change (DECC); now the Department for Business, Energy and Industrial Strategy (BEIS), proposed new arrangements aimed at encouraging Offshore generation. These arrangements were incorporated into the BSC at 'Go Active' (24 June 2009), and the regime fully commenced on 10 June 2014. Under the arrangements, developers of Offshore wind farms, that connect to the Transmission System (or a Distribution System) onshore at 132kV or above, need to transfer the Offshore transmission assets to an Offshore Transmission Owner (OFTO), via a competitive tender process. When the assets are transferred to the OFTO Ofgem will grant a Transmission Licence to the OFTO to operate those Offshore transmission assets.

BSC Requirements for Settlement Metering for Offshore Wind Farms

The BSC has requirements for measuring and recording flows of electricity for Settlement purposes at Offshore wind farms that are subject to the Offshore Transmission Regime, i.e. Offshore wind farms that connect onshore to the Transmission System, or a Distribution System, where the Offshore transmission assets convey electricity from or to shore at or above 132,000 volts (132kV).

Section L 'Metering' of the BSC requires the quantities of electricity (i.e. Active Energy, and where relevant, Reactive Energy) Exported or Imported at a Boundary Point to the Total System, or flowing between Systems at Systems Connection Points, to be measured (and recorded) by Metering Equipment.

The Metering Equipment must:

- comply with the relevant metering Code of Practice (CoP) for the circuit capacity/demand;
- be commissioned in accordance with CoP4 'Code of Practice for the Calibration, Testing and Commissioning requirements for Settlement purposes' ; and
- for Metering Equipment that is to be registered in the Central Meter Registration Service (CMRS) as a Central Volume Allocation (CVA) Metering System, undergo a proving test in accordance with BSCP02 'Proving Test Requirements for Central Volume Allocation Metering Systems'.

The Party responsible must register the Metering Equipment as a Metering System in the relevant registration system (i.e. CMRS or a Licenced Distribution System Operator's (LDSO) Supplier Meter Registration Service)

Metering Codes of Practice

Codes of Practice (CoPs) detail the technical requirements for Metering Systems. These versions are not time limited in the same way as other documents. When Metering

Equipment is first registered in Settlement, it must comply with the requirements which are set out in the relevant Code of Practice in place at that time.

CoP 1 'The Metering of Circuits with a Rated Capacity Exceeding 100MVA for Settlement Purposes' states the practices that shall be employed, and the facilities that shall be provided for the measurement and recording of the quantities required for Settlement purposes on each circuit where the rated capacity exceeds 100MVA.

It derives force from the BSC, and in particular the metering provisions (Section L), to which reference should be made.

CoP 2 'The Metering of Circuits with a Rated Capacity not exceeding 100 MVA for Settlement Purposes' defines the minimum requirements for the Metering Equipment required for the measurement and recording of electricity transfers at Defined Metering Points where the rated circuit capacity does not exceed 100MVA.

Code of Practice 1 Requirements for Voltage Transformers

CoP1 paragraph 5.1.2 places the following requirements on Voltage Transformers forming part of a Metering System.

"Two voltage transformers or one voltage transformer with two or more secondary winding sets in accordance with IEC 60044-2 and with a minimum standard of accuracy class 0.2 shall be provided.

The VT secondary winding supplying the main Meters shall be dedicated to that purpose.

The VT secondary winding supplying the check Meters may be used for other purposes provided the overall accuracy requirements in clause 4.3.1 are met and evidence of the value of the additional burden is available for inspection by the Panel or Technical Assurance Agent. The additional burden shall not be modified without prior notification to the Panel, and evidence of the value of the modified additional burden shall be available for inspection by the Panel or Technical Assurance Agent.

A VT test certificate(s) showing errors at the overall working burden(s) or at burdens which enable the working burden errors to be calculated shall be available for inspection by the Panel or Technical Assurance Agent.

The total burden on each secondary winding of a VT shall not exceed the rated burden of such secondary winding.

Separately fused VT supplies shall be provided for each of the following:-

(a) the main Meter

(b) the check Meter

(c) any additional burden

Such fuses shall be located as close as practicable to the VT.

Code of Practice 2 Requirements for Voltage Transformers

CoP2 paragraph 5.1.2 places the following requirements on Voltage Transformers

"Voltage transformer primary windings shall be connected to the circuit being measured for Settlement purposes and a dedicated secondary winding shall be provided for the main and check metering.

The voltage transformer secondary winding shall be in accordance with BS EN/IEC 61869-3 and with a minimum standard of accuracy to Class 0.5. Where a voltage transformer has other secondary windings these may be used for the check metering of that circuit and for other purposes provided the overall accuracy requirements in clause 4.3.1 are met and evidence of the value of the additional burden is available for inspection by either the Panel or the Technical Assurance Agent."

The additional burden shall not be modified without prior notification to the Panel, and evidence of the value of the modified additional burden shall be available for inspection by either the Panel or the Technical Assurance Agent.

A VT test certificate(s) showing errors at the overall working burden(s) or at burdens which enable the working burden errors to be calculated shall be available for inspection by either the Panel or the Technical Assurance Agent.

The total burden on each secondary winding of a VT shall not exceed the rated burden of such secondary winding."

3 Issue Group's Discussions

Two Issue Group meetings were held on 6 July 2020 and 22 September 2020. Following this, Elexon prepared and published a 'one pager' document explaining the Issue and its expansion of scope to onshore sites, seeking industry engagement between November 2020 and March 2021.

Assessing the potential solutions to Issue 87

In the first meeting, the Proposer outlined his rationale for raising Issue 87 (captured in section 2) based on previous experience with wind farm projects (including the metering of these sites) .

To aid understanding and highlight differences in approach, Elexon and the Proposer first presented a line diagram for the status quo of CoP2 requirements for Metering done at the string level which requires a VT to be installed for each Offshore Power Park String.

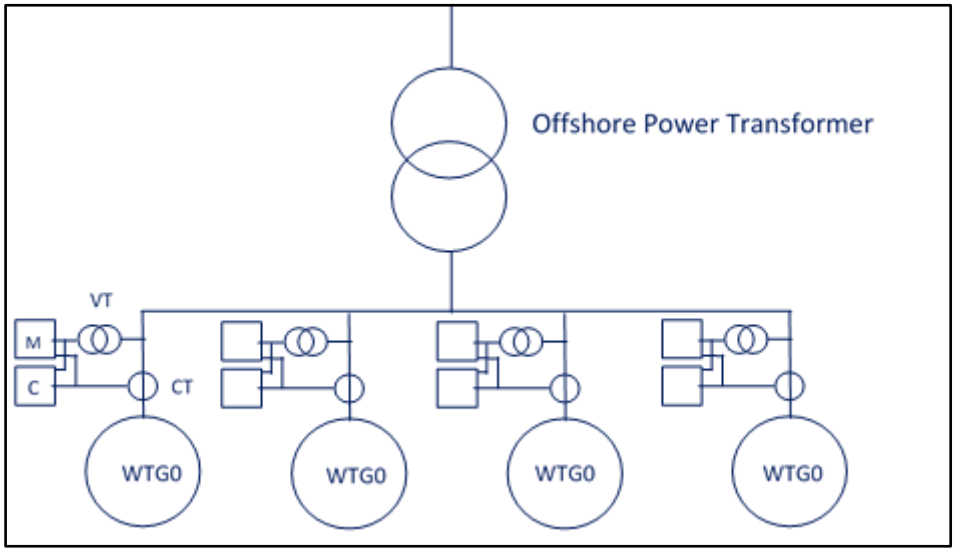


Figure 1 - Status Quo: Existing CoP2 solution for Offshore wind farms

The Proposer explained that, under this status quo arrangement, there is no redundancy offered as the failure of one VT will cause the entire string to drop out and lose the generation associated with that string. The requirement for a VT to be installed for each Offshore Power Park String adds additional weight (and therefore cost) to make developing new wind farms more complex and costly than the Proposer believed was necessary.

The Proposer then presented several different configurational options that would place VTs at the busbar and thereby achieve the goal of reducing the number of needed VTs, with the group invited to comment on the level of redundancy, operational impact and risk offered by each option.

Option 1

Option 1 presents an arrangement where the main Meters are connected to one VT and the check Meters are connected to a separate VT.

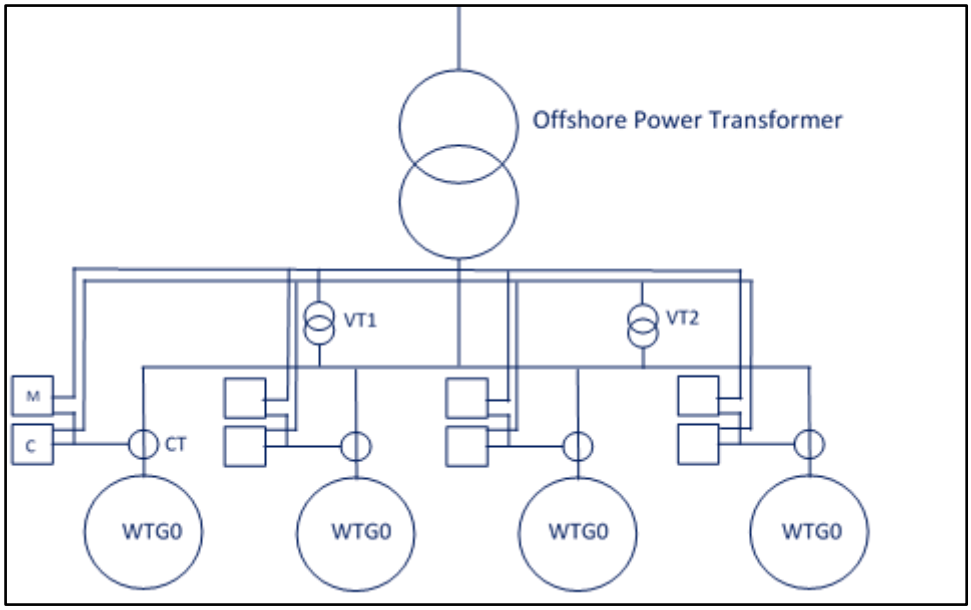


Figure 1 - Proposed CoP2 solution for Offshore wind farms

The Proposer then outlined several different variants of Option 1 (outlined in Appendix 1) depending on the primary equipment arrangement, demonstrating that this arrangement can function with or without a bus section and can be scaled to meet CoP1 (rated capacity exceeding 100MVA) or CoP2 (rated capacity exceeding 100MVA) Metering.

Each variant of Option 1 reduces the need for several VTs on the string levels from 8 to 2 and provides greater redundancy than the status quo as the potential failure of one VT would not impact the Metering System as a whole.

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.

Option 2

The Proposer then outlined an alternative approach, whereby busbar VTs are used with several secondary windings. This means that each string would have its own dedicated winding and this approach mirrors current requirements in CoP2 more closely than Option 1 (which uses multiple meters on the same VT secondary winding), as the current requirement is to have a separate VT per circuit.

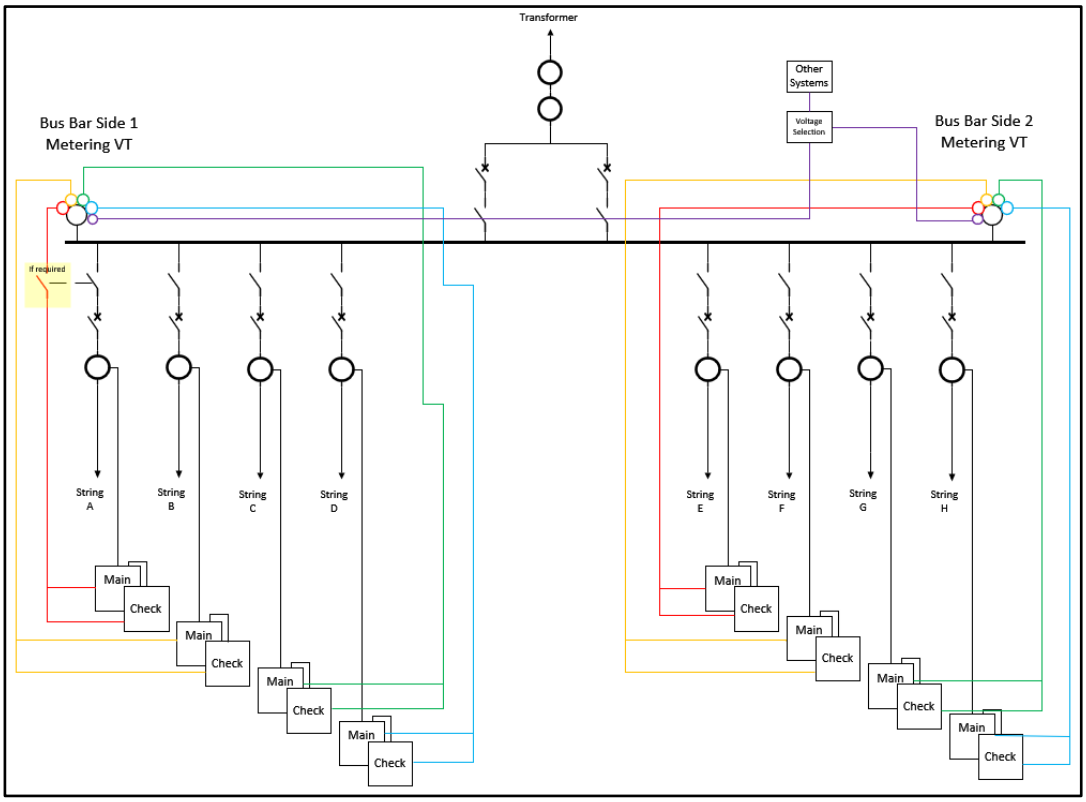


Figure 2 - Solution Option 2

Under Option 2, the number of VTs is reduced from 8 to 2, but unlike Option 1 there is no redundancy offered in the case of VT failure.

Workgroup Discussions and Outcomes

The group were reminded that any consequential change from Issue 87 would be an enabling one, allowing but not mandating the placement of VTs at the busbar if desired.

The group noted that Option 2 uses individual secondary windings, whilst Option 1, whilst redundant, uses multiple meters on the same VT secondary winding.

The Issue Group unanimously preferred Option 1 as a cost effective and resilient solution to Issue 87, on the basis that it offered greater redundancy than both Option 2 and the status quo (as CoP2 does not mandate an extra VT but instead presents it as an optional addition).

Expansion in Scope

In the 1st Meeting, the Proposer noted that the proposed application of the solution to offshore sites was a result of having come across examples from offshore only, but would be happy to extend the solution if there was appetite to do so.

Having considered the benefits offered by the initially-proposed solution, the group wondered whether this approach works only for Offshore wind farms or if it would be acceptable to extend the solution to cover onshore sites as well, noting that an extended solution could offer similar benefits as the initial proposal and provide futureproofing for more difficult onshore configurations.

Elexon and the Proposer agreed to consider the feasibility of extending the solution to cover onshore configurations and look for examples that might to help illustrate the benefits.

A group member helpfully provided an example of a wind farm and a windfarm extension.

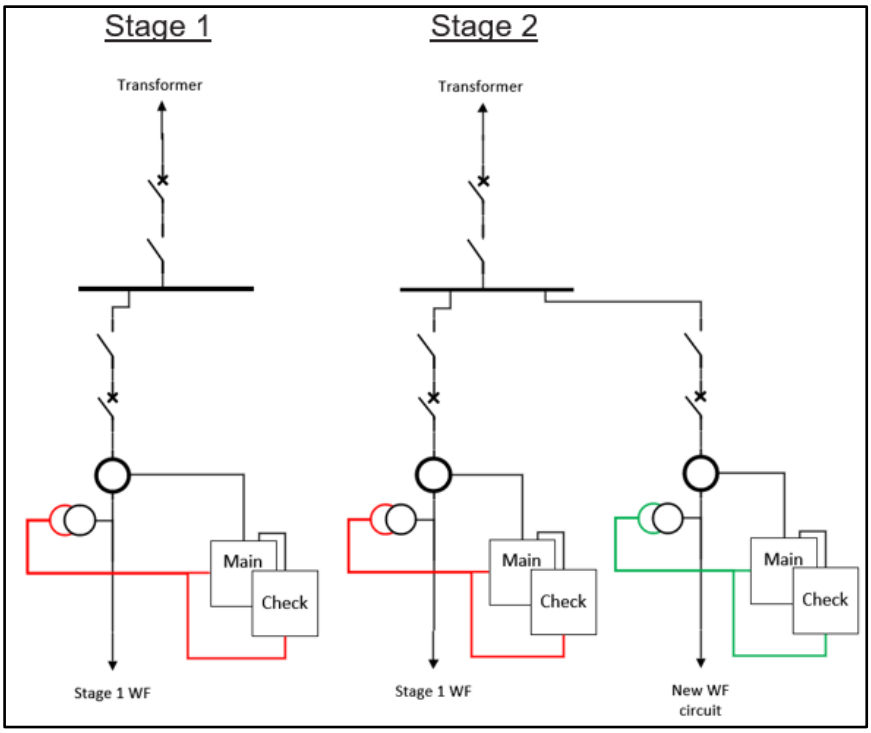


Figure 3 onshore wind farm and a windfarm extension

Under current requirements, any extension to this onshore wind farm requires a VT per circuit, adding to the cost of doing so.

An arrangement with bus bar VTs (i.e. applying the optionality afforded by the Issue 87 solution) would not require any further VTs to be purchased if the windfarm gets extended further as the bus bar VTs can be used for the future circuits.

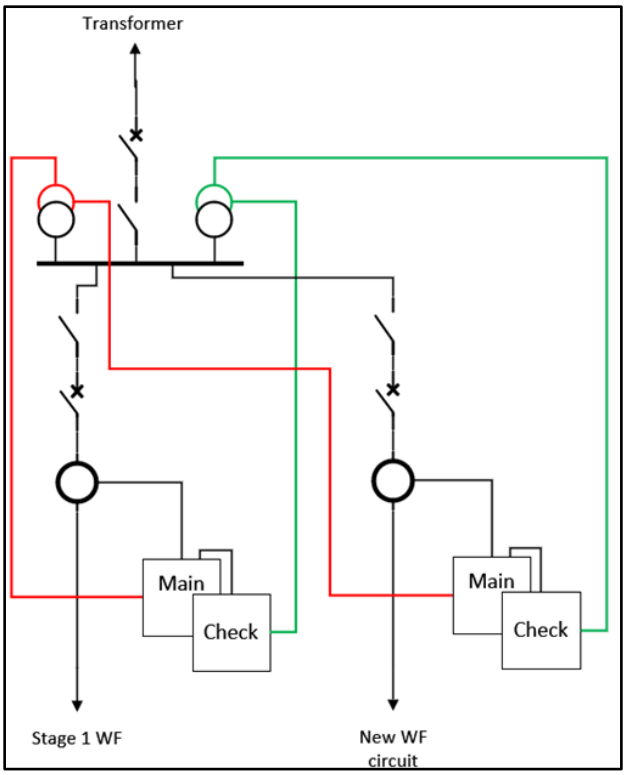


Figure 4 onshore arrangement with bus bar VTs

The group noted that this arrangement offered futureproofing as the bus bar VTs could potentially be used for future circuits.

The group were satisfied that this seemed to offer the same resilience but for less cost. On the basis that it is robust, effective and costs effective, they were happy to support this extension, with the Proposer agreeing.

Outcome:

The group agreed that the scope of the defect should be broadened to encompass onshore sites as well as offshore wind farms.

Benefits to addressing the issue

The group established several benefits associated with progressing a change to the BSC to take forward the Issue 87 findings when compared with the baseline.

As noted previously, the solution recommended by Issue 87 offers increased redundancy than the status quo and enables a higher availability of generation for wind farms, as well as a greater quality of data entering Settlement, in cases of VT failure at such sites.

In addition, the suggested solution works for either CoP1 or CoP2-level Metering allowing a standardised primary arrangement regardless of whether CoP1 or CoP2 is required.

The reduction of necessary VTs within such sites from 8 VTs to 2 VTs would also infer reduced costs for investment, maintenance, Commissioning and installation of those VTs. This will ultimately support competition by making new projects more financially attractive investment opportunities, which will benefit the end consumer.

The proposed change is expected to have a positive impact on Metering System Registrants due to the reduced administrative burden under the suggested solution.

There is also a distinct environmental benefit to making this change, as any reduction in VTs will lead to a reduction in the greenhouse gas Sulphur Hexafluoride (SF6) which is used to make VTs and would ultimately end up in the atmosphere. Additionally, less costly wind farms will make green technology more attractive.

Finally, it was noted that offshore wind farms are difficult and sometimes dangerous to access, usually requiring transport via boat or helicopter to reach. A solution that decreases the likelihood of engineers needing to perform maintenance on a hard-to-reach site was also felt to offer operational safety benefits.

'One Pager' and feedback from additional industry engagement

Following the second meeting, Elexon put together a One Pager about Issue 87 and its expansion in scope, publicising this on its communication channels and inviting comments and feedback from any interested parties.

Elexon received feedback from several respondents representing organisations involved in the operation of both onshore and offshore wind farms.

Sulphur Hexafluoride

Sulphur Hexafluoride (SF6) is an extremely potent and persistent greenhouse gas that is primarily utilized as an electrical insulator and arc suppressant

Extension of scope to on-shore

Elexon received only one piece of feedback related to the extension in scope to onshore wind sites.

One market participant highlighted that continued compliance for class and rating would need to be established for any extensions to existing onshore wide farms.

In response to this clarification the Issue 87 Proposer endorsed additional language along the lines of 'for any extension of an existing bus bar metering system with additional settlement meters, the class and the ratings of the VTs have to be revalidated' for the eventual redlining that will be developed following the closure of Issue 87, should a Change Proposal be raised to take forward its outcomes.

Use of voltage selector relays

In the first meeting some examples of potential arrangements using a voltage selector relay had been presented to the Issue Group.

One respondent stated that he believed configurations using voltage selector relays would not be allowed under current CoP requirements - which state that voltage transformer primary windings shall be connected to the circuit being measured for Settlement purposes. The respondent added that that this was due to concerns over accuracy and risk in the event of a fault where the neighbouring feeder voltage becomes the primary source.

The Proposer acknowledged that schemes using voltage selector relay might not be allowed under the current CoPs, but added that they were unaware of risks associated with VT selection schemes, which the Proposer noted are widely used for synchronising and metering applications. Describing a requirement is to use fail-safe Normally Closed (NC) contacts, in case of a VT failure there is no loss of VT input to the meters. Furthermore, in cases of VT failure, Miniature Circuit Breaker (MCB) contacts are usually used, which are supervised and alarmed in the Supervisory control and data acquisition (SCADA) Systems.

Supervisory control and data acquisition systems

Supervisory control and data acquisition is a control system architecture comprising computers, networked data communications and graphical user interfaces for high-level process supervisory management,

Windings

One respondent commented that they thought it best to employ only one or two secondary windings, due to increased testing requirements for each additional winding that would incur no real benefit and make it more difficult to accurately predict working burden errors.

The Proposer agreed with this assessment, but highlighted that this concerned option 2, which was not the preferred option to take forward (option 1 being the preferred solution), but acknowledged that concerns around burden on the VT was one of the reasons why option 1 was chosen.

Outcome

While the feedback received on the One Pager had been helpful in clarifying some relatively minor aspects of Issue 87, no material arguments against the group's recommendation were made and the Proposer agreed that no further meetings to discuss any of the feedback would be necessary prior to the delivery of the Issue Report.

Potential impact on CDCA

Elexon had taken an action in 1st meeting to develop understanding of potential operational impact caused by increased estimation incurred by the Issue 87 solution. The outcome of this was presented in the 2nd meeting, along with clarifications on the processes undertaken by the Central Data Collection Agent (CDCA) in the case of VT failure.

Elexon explained the processes that CDCA undertake when estimation is required. Under the status quo, with a CoP2 installation on an Offshore platform, if the VT on one circuit fails, the CDCA has to estimate to zero (for generation sites) and get new estimates agreed with the Registrant. In the proposed solution, if the VT feeding the main Meters/Outstations fails, the CDCA will use the (validated) check Meter data which the Registrant should agree.

This is estimated to take 4 times as long per failure as the VT feeds more Meters under the solution. Elexon understand that this would not be a significant impact on CDCA operations. Additionally, it has the benefit of improving the accuracy of this representation of the data, than under the status quo, thus improving the quality of data entering Settlement.

The group also identified a positive impact on Registrants, noting that under the status quo the Registrant has to provide more realistic estimates (if generating) to replace zero estimates when a VT fails, whereas under the solution they just have to agree the estimates from the check Meters, thus saving effort.

Outcome

Noting the benefits of a higher quality of data (due to availability of a check Meter data in cases of VT failure) and reduced impact on the Registrant, the group are comfortable that the advantages of the proposed solution outweigh the central impact on CDCA.

Issue 87 materiality

The group requested greater clarity as to the potential cost benefits offered by the proposal in comparison to indicative wind farm costs.

In the 1st Meeting, the Proposer estimated that with using current windfarm technology the proposal would reduce investment by circa £1 million per 1000MW windfarm. The group requested greater clarity as to the potential cost benefits offered by the proposal in comparison to indicative wind farm costs.

The Proposer undertook an analysis of UK projects over the years with information about the overall capital expenditures on the wind park, also analysing the OFTO reports with regards to the transferrable assets.

These projects are very large and costly, hence, the Proposer considered 2 aspects:

1. Cost improvement for the overall project: about 0.04% average – excluding the OFTO assets did only make a small change, only 0.01% more
2. Cost improvement for the offshore platform (* According to 4cOffshore information the offshore platform makes up for about 5% of the overall assets

Central Data Collection Agent

The CDCA is appointed by BSCCo for the purpose of providing a central data collection service relating to Metering Systems collecting, processing and aggregating metered data associated with Metering Systems registered with the CRA

depending on design): about 0.64% average, but the values vary a lot with higher numbers in the current years, up to 0.92%. Depending on the design, the saving could be up to 1%.

The Proposer also clarified that the savings could be expected to scale with the capacity of the site. Therefore a 1GW site could expect savings of around £1 million, with a 1.5 GW site expecting savings of around £1.5 million under the proposed solution.

Who will raise any consequential change?

Noting that the purpose of Issue 87 is to discuss the defect and determine whether any changes to the BSC is appropriate, it was noted that the Proposer is not a BSC Party and therefore cannot raise any consequential Change Proposals of Modifications themselves.

The Proposer intends to find a BSC Party to raise a Change Proposal following outcomes of Issue 87, but if no Party is found, it was noted that Elexon can raise it on behalf of the Issue group and the Proposer.

4 Conclusions

Issue Group Recommendation

In order to take forward the findings of Issue 87, the group recommend that a Change Proposal be progressed.

The Issue 87 group has identified a solution that reduces the need for multiple voltage transformers (VTs), at the feeder/string level on Offshore wind farm platforms, by allowing the placement of VTs at the busbar.

This would be an enabling change to the Codes of Practice that allows busbar VTs to be used and is not intended to exclude current arrangements under the status quo. It would provide optionality within the Codes of Practice for additional configurations that parties are free to choose from, should they wish to.

Having considered the benefits to this approach, the group wish for the solution to apply onshore sites (generally), as well as Offshore wind farms.

Potential change to Codes of Practice

The Codes of Practice are owned by the Imbalance Settlement Group (ISG) and Supplier Volume Allocation Group (SVG).

This is an enabling change that allows busbar VTs to be used if it convenient to do so and the group consider it appropriate to extend the scope of redlining to all suitable metering Codes of Practice to ensure alignment.

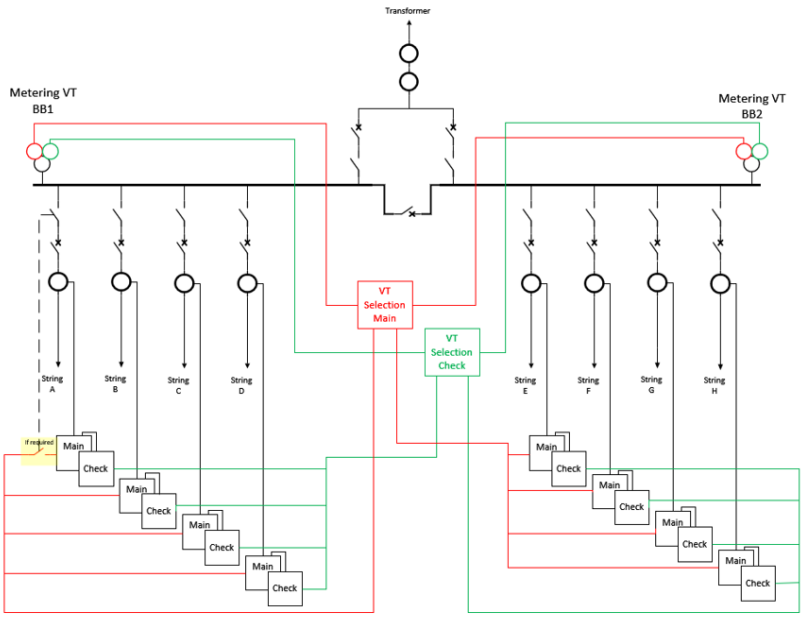
The group identified several requirements for the drafting of redlining to the Codes of Practice. Suggested principles for redlining drafting are that the eventual redlining must deliver the intention of the Issue 87 outcomes, account for all variants of the solution and be considered alongside CoP1 requirements.

Potential impacts and risks

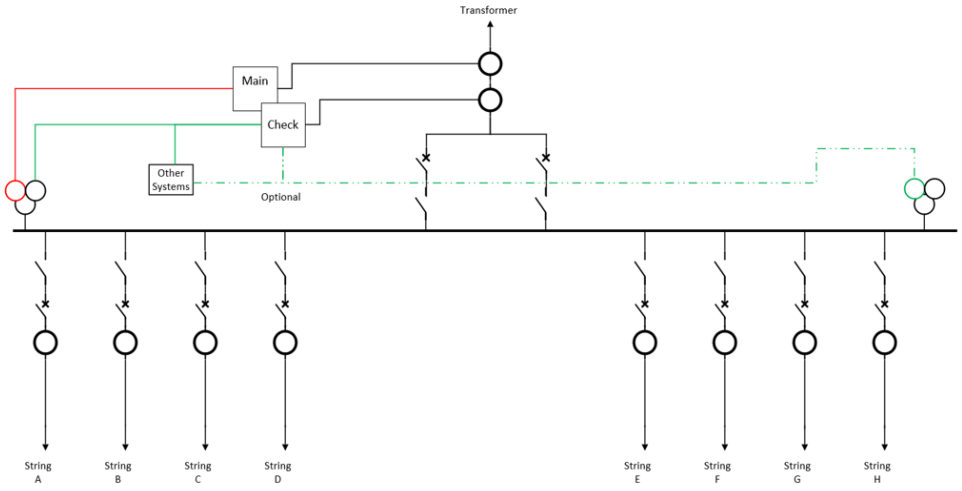
The group identified a minor operational impact on CDCA in cases of VT failure. No system impacts for Elexon or market participants are anticipated. The group have identified no risks to Settlement with the proposed approach.

Issue Group membership and attendance

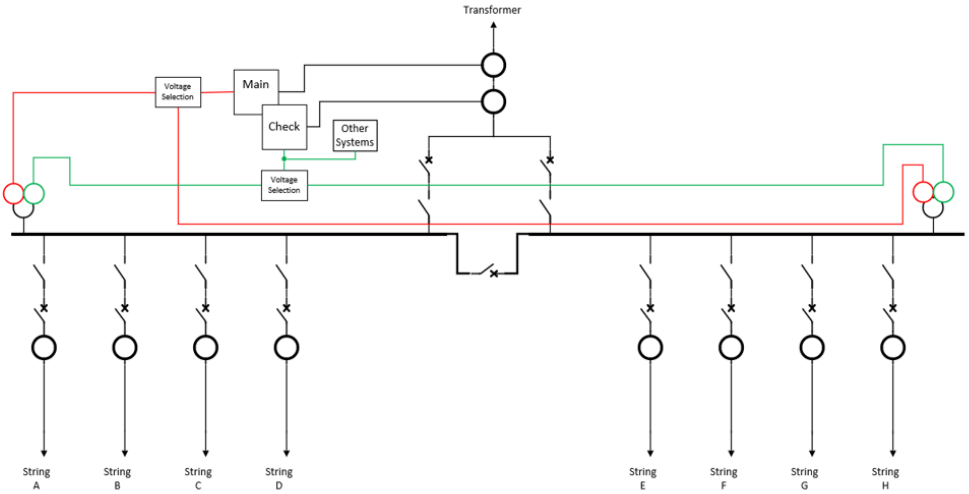
- CoP2 Metering – with bus section
- Reduction of VTs from 8 to 2
- VT Selection used
- Redundant VTs



- CoP1 Metering – no bus section
- BB1 VT – Main Meters
- BB2 VT – Check Meters
- Redundant VT is optional



- CoP1 Metering – with bus section
- VT selection scheme required for Meters
- Redundant VTs



Appendix 2: Issue Group Membership

Issue Group membership and attendance

Issue 87 Group Attendance			
Name	Organisation	6 July 2020	22 September 2020
Elliott Harper	Elexon *(Chair)*	☎	☎
Ivar Macsween	Elexon *(Lead Analyst)*	☎	☎
Jeremy Caplin	Elexon *(Design Authority)*	✗	☎
Mike Smith	Elexon *(Subject Matter Expert)*	☎	☎
Otto Daniel	Siemens Transmission and Distribution (Proposer)	☎	☎
David Meadows	Siemens Transmission and Distribution	☎	☎
Pranesh Murari	Siemens Transmission and Distribution	☎	☎
Matt Bennett	Siemens PLC	☎	✗
Anthony Steele	Siemens PLC	☎	☎
Lorna.Short	RWE	☎	☎
Iain McIntosh	Orsted	☎	✗
Tom Chevalier	Association of Meter Operators	☎	☎
Dave Siggers	EDF	☎	✗
Mike Turrington	EDF	✗	☎

Appendix 3: Glossary & References

Acronyms

Acronyms used in this document are listed in the table below.

Acronyms	
Acronym	Definition
BSC	Balancing and Settlement Code
BSCP	Balancing and Settlement Code Procedure
CDCA	Central Data Collection Agent
CMRS	Central Meter Registration Service
CoP	Code of Practice
DECC	Department of Energy and Climate Change
GW	Gigawatt
MW	Megawatt
OFTO	Offshore Transmission Owner
SF6	Sulphur Hexafluoride
VT	Voltage Transformer

External links

A summary of all hyperlinks used in this document are listed in the table below.

All external documents and URL links listed are correct as of the date of this document.

External Links		
Page(s)	Description	URL
3	Code of Practice 1	https://www.elexon.co.uk/csd/cop-code-of-practice-1/
3	Code of Practice 2	https://www.elexon.co.uk/csd/code-of-practice-2-the-metering-of-circuits-with-a-rated-capacity-not-exceeding-100-mva-for-settlement-purposes/
5	BSC Section L 'Metering'	https://www.elexon.co.uk/the-bsc/bsc-section-l-metering/
5	Code of Practice 4	https://www.elexon.co.uk/csd/cop-code-of-practice-4/
7	BSCP02 'Proving Test Requirements for Central Volume Allocation Metering Systems'	https://www.elexon.co.uk/csd/bscp02-proving-test-requirements-for-central-volume-allocation-metering-systems/
10	Issue 87 Summary and Extension of Scope	https://www.elexon.co.uk/documents/change/issues/51-100/issue-87-summary-and-extension-of-scope/