

## CP Assessment Report

# CP1575 'Permitting the use of busbar voltage transformers within metering Codes of Practice 1 and 2'

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### About This Document



Not sure where to start? We suggest reading the following sections:

- Have 5 mins? Read section 1
- Have 15 mins? Read sections 1, 4, 5 and 6
- Have 30 mins? Read all sections
- Have longer? Read all sections and the annexes and attachments
- *You can find the definitions of the terms and acronyms used in this document in the [BSC Glossary](#)*

This document is the Change Proposal (CP) Assessment Report for CP1575 which Elexon will present to the ISG at its meeting on [6 June 2023](#). The Committee will consider the proposed solution and the responses received to the CP Consultation before making a decision on whether to approve CP1575.

There are 5 parts to this document:

- This is the main document. It provides details of the solution, impacts, costs, and proposed implementation approach. It also summarises the ISG's initial views on the proposed changes and the views of respondents to the CP Consultation.
- Attachment A contains the CP proposal form.
- Attachments B-C contain the proposed redlined changes to deliver the CP1575 solution.
- Attachment D contains the full responses received to the CP Consultation.



#### Committee

Imbalance Settlement Group (ISG)

#### Recommendation

Approve

#### Implementation Date

2 November 2023  
(November 2023 Release)



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# 1. Summary

## Why change?

The size and weight of voltage transformers (VTs) used at Offshore wind farm power transformer platforms, which are subject to Offshore Transmission Owner (OFTO) arrangements, can significantly affect the cost and complexity of development.

Under [Code of Practice \(CoP\) 2 'The metering of circuits with a rated capacity not exceeding 100 MVA for Settlement purposes'](#)<sup>1</sup>, where Metering Equipment is installed at the wind turbine string array (string) level, the current requirement is to have a separate VT per string/circuit.

[Issue 87 'Busbar voltage transformer metering for Offshore wind farms under OFTO arrangements'](#)<sup>2</sup> proposed an alternative arrangement that reduces the need for multiple VTs at the string level on Offshore wind farm power transformer platforms by allowing the placement of VTs at the busbar. As well as reducing the number of VTs required, this arrangement offers increased redundancy than the status quo and enables a higher availability of metered data for wind farms.

To recognise this configuration under the BSC, a change to CoP2 is necessary to allow busbar VTs to be used at the string level. [CoP1 'The metering of circuits with a rated capacity exceeding 100 MVA for Settlement purposes'](#)<sup>3</sup> will also need to be amended to future-proof the solution as the size of wind turbine generators increases.

Elexon raised CP1575 on behalf of the Issue 87 Workgroup to progress their recommendation.

## Solution

To update CoPs 1 and 2 to allow busbar VTs to be used. The solution will apply to onshore sites (generally), as well as Offshore wind farms, in line with the recommendations of the Issue 87 Workgroup.

## Impacts and costs

CP1575 will impact Registrants, BSC Parties who are Equipment Owners, the Central Data Collection Agent (CDCA), Half Hourly Data Collectors (HHDCs), and Central Volume Allocation (CVA) and Supplier Volume Allocation (SVA) Meter Operator Agents (MOAs).

This CP will require changes to CoP1 and CoP2. The central implementation cost will be less than £1k to implement the relevant document changes. No BSC central systems changes are anticipated.

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<sup>1</sup> <https://bscdocs.elexon.co.uk/codes-of-practice/code-of-practice-2-the-metering-of-circuits-with-a-rated-capacity-not-exceeding-100-mva-for-settlement-purposes>

<sup>2</sup> <https://www.elexon.co.uk/smg-issue/issue-87/>

<sup>3</sup> <https://bscdocs.elexon.co.uk/codes-of-practice/code-of-practice-1-the-metering-of-circuits-with-a-rated-capacity-exceeding-100-mva-for-settlement-purposes>

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## Implementation

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CP1575 is proposed for implementation on 2 November 2023 as part of the November 2023 BSC Standard Release.

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## Recommendation

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We invite the **ISG** to:

- **APPROVE** the proposed changes to Code of Practice 1 and Code of Practice 2 for CP1575; and
- **APPROVE** CP1575 for implementation on 2 November 2023 as part of the standard November 2023 Release.



### What is a voltage transformer?

A voltage transformer is a piece of Metering Equipment that is designed to accurately measure high voltages and feed lower voltage signals to a measuring instrument, like a Meter. The primary winding is connected to the high voltage circuit being measured and it steps down the voltage in the secondary winding so this can be safely, and accurately, fed to a Meter.

### What is the issue?

The size and weight of VTs used at Offshore wind farm power transformer platforms, which are subject to OFTO arrangements<sup>4</sup>, can significantly affect the cost and complexity of development. This is because additional space on an Offshore platform is required to accommodate the VTs within the Gas Insulated Switchgear (GIS). This results in the need for larger Offshore platforms, leading to an increase in cost.

Under existing BSC requirements, there are two approaches that are used for metering Offshore wind turbine string arrays<sup>5</sup>:

1. CoP1 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(s) to the platform transformers.
2. CoP2 is applied where:
  - a. wind turbine string arrays are Commissioned at different stages of a wind farm project; or
  - b. different wind turbine string arrays have different owners.

CoP2 Metering Systems are installed to meter volumes at the string level for each individual array.

For Metering Systems installed at the string level (following CoP2), the current requirement is to have a separate VT per circuit (string). Its secondary winding must be dedicated to the main and check Meters for that circuit. If another secondary winding is provided the check Meter can be connected to it along with any non-Settlement burden, provided overall accuracy can be maintained.

Siemens Transmission and Distribution Limited (STDL) raised Issue 87 on 3 March 2020 as they believe that there are effective alternatives to this metering set up.

## Background

### Offshore Transmission Owners

OFTOs are the owners of Offshore transmission assets which connect certain Offshore wind farms to the onshore electricity network.

In 2007, Ofgem and the Department of Energy and Climate Change (DECC), now the Department for Energy Security and Net Zero (DESNZ), 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, where the Offshore transmission assets convey electricity from or to shore at or above 132kV, need to transfer the Offshore transmission assets to an OFTO via a competitive tender process. When the assets are transferred to the

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<sup>4</sup> Where the Offshore transmission voltage is at or above 132,000V (132kV).

<sup>5</sup> A set of wind turbines sharing a common circuit, connected in parallel, is known as a 'string' or 'string array'.

OFTO, Ofgem will grant a Transmission Licence to the OFTO to operate those Offshore transmission assets.

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### BSC requirements for Settlement metering for Offshore wind farms

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[Section L](#) of the BSC requires flows of electricity at Boundary Points and Systems Connection Points to be measured and recorded for Settlement purposes, including at Offshore wind farms that are subject to the Offshore Transmission Regime. The Metering Equipment must:

- comply with the relevant CoP for the circuit capacity/demand; and
- be commissioned in accordance with [CoP4 'The Calibration, Testing and Commissioning Requirements of Metering Equipment for Settlement Purposes'](#)<sup>6</sup>.

The BSC Party responsible for the flows of electricity must register the Metering Equipment as a Metering System(s) in the relevant registration system (i.e. Central Meter Registration Service (CMRS) or a Licensed Distribution System Operator's (LDSO) Supplier Meter Registration Service (SMRS)).

For Offshore wind farms that are subject to the Offshore Transmission Regime, most of the Metering Equipment needs to be registered in CMRS as a CVA Metering System(s). Any back-up supplies, in the onshore substation, associated with the Offshore wind farm, that are fed from the Distribution System of an LDSO, must be registered in SMRS as a SVA Metering System.



#### What is a Boundary Point?

Boundary Point means a point at which any Plant or Apparatus not forming part of the Total System is connected to the Total System.



#### What is a Systems Connection Point?

A Systems Connection Point is a point of connection (whether consisting of one or more circuits) between two or more Systems excluding:

(a) a point of connection between Distribution Systems in the same GSP Group; and

(b) a point of connection between Offshore Transmission System User Assets and the Transmission System.

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<sup>6</sup> <https://bscdocs.elexon.co.uk/codes-of-practice/code-of-practice-4-the-calibration-testing-and-commissioning-requirements-of-metering-equipment-for-settlement-purposes>

### 3. Solution

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#### Proposed solution

Elexon presented the Issue 87 Report to the BSC Panel (315/07<sup>7</sup>) at its meeting on 10 June 2021. The Issue Workgroup agreed a solution that reduces the need for multiple VTs at the string level, on Offshore wind farm power transformer platforms, by allowing the placement of VTs on the busbars that the strings connect to, and share.

Under these arrangements, two busbar VTs are used, each with a single secondary winding. The main Meters are connected to the 'main' VT's secondary winding and the check Meters are connected to the 'check' VT's secondary winding. This offers redundancy if the main VT fails as the check VT continues to feed the check Meters.

To recognise this configuration under the BSC, a change to CoP2 is necessary to allow busbar VTs to be used.

Moreover, STDL recently confirmed that as WTGs get larger in capacity, and busbar voltages increase to 132kV, string arrays will begin to need CoP1 metering. Following discussions with the Issue 87 proposer, Elexon recommends that the proposed solution should also be future-proofed to cover CoP1 metering at the string level. This is because, as the size of WTGs increases, so too will the string level circuit capacities. If these go above 100MVA then CoP1 metering will be required at the string level.

The proposed solution is not intended to exclude current requirements under the status quo. The desired outcome is that the change provides optionality within the CoPs for additional configurations (i.e. placement of VTs at the busbar) that parties are free to choose, should they wish to.

Finally, having considered the benefits to this approach, the Issue 87 Workgroup believes it would be appropriate for the solution to apply to onshore sites (generally), as well as Offshore wind farms.

Although the solution proposed for CoPs 1 and 2 could be extended to CoP3 and, in a different (unspecified) form, CoP5, Elexon recommends limiting the scope to CoPs 1 and 2 as this is where we believe the most benefit will be derived. It is likely that most CoP3 connections will not have more than two feeder circuits fed from a single, electrically separate busbar and thus benefit by fitting only two VTs. CoP5 does not require a check Meter so this solution would not be appropriate and would not provide the redundancy this solution provides.

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#### Proposer's rationale

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

The Issue 87 Proposer believes that 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 1 gigawatt (GW) site could expect savings of around £1 million, with a 1.5 GW

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<sup>7</sup> <https://www.elexon.co.uk/meeting/bsc-panel-315/>

site expecting savings of around £1.5 million. This will ultimately support competition by making new projects more viable, which will benefit the end consumer.

The Issue 87 Workgroup also identified the following benefits:

- The solution offers increased redundancy than the status quo and enables a higher availability of metered data for wind farms. This is because the main Meters are connected to one VT and the check Meters are connected to a separate VT. The failure of a VT would not impact on the Metering System which allows for a greater quality of data entering Settlement in these instances.
- There is an environmental benefit in that 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 via leakage.
- A solution that decreases the likelihood of engineers needing to perform maintenance, on a hard-to-reach site, may offer operational safety benefits.

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## Proposed redlining

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The proposed redlining to CoP1 and CoP2 can be found in Attachments B and C.

## 4. Impacts and Costs

### BSC Party & Party Agent impacts and costs

#### Participant impacts

Elxon anticipates low impacts to the following BSC Parties and Party Agents.

BSC Party & Party Agent Impacts	
BSC Party/Party Agent	Impact
Registrants	<p>Registrants will have to agree more estimates (sent by the HHDC or CDCA) if a 'main' busbar VT fails. However, instead of replacing estimates with non-Settlement metered data, the Registrant could simply agree the (validated) check Meter data for all of the circuits affected. Estimates from the check Meters should be accurate and therefore easier to agree.</p> <p>Registrants will also need to ensure that busbar VTs are Commissioned correctly in accordance with CoP4 (usually via their appointed MOA), in particular where the owner of the VTs is not a BSC Party.</p>
BSC Parties (Equipment Owners)	<p>Equipment Owners (i.e. a person which is the owner of Metering Equipment, such as VTs, comprised in that Metering System but is not the Registrant of that Metering System) will need to ensure that their busbar VTs are Commissioned correctly in accordance with CoP4.</p> <p>Where an Equipment Owner is not a BSC Party, the responsibility for Commissioning busbar VTs will remain with the Registrant of the Metering System comprising those VTs.</p>
CDCA	<p>The CDCA will be required to estimate more in the event of a failure of a main busbar connected VT compared to a circuit connected VT. This is because a busbar VT secondary winding will be supplying multiple main Meters (or multiple check Meters) for multiple circuits. Multiple sets of estimates would therefore be needed.</p> <p>In the case where the faulty busbar VT feeds multiple main Meters, the CDCA will estimate using check Meter data.</p>
HHDCs	<p>HHDCs may be impacted as busbar VTs could be used for SVA Metering Systems. For SVA registered Metering Systems, HHDCs will also need to do more metered data estimation in the event of a fault with a busbar connected VT, versus a circuit connected VT.</p> <p>In the case where the faulty busbar VT feeds multiple main Meters, the HHDC will estimate using check Meter data.</p>
CVA and SVA MOAs	<p>CVA and SVA MOAs may need to update internal processes/documents to ensure that, where a busbar VT is being used, that the main and check Meters are connected correctly and have been Commissioned correctly in accordance with CoP4.</p>

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## Central impacts and costs

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### Central impacts

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CP1575 will require changes to CoP1 and CoP2. No central system changes are anticipated.

Central Impacts	
Document Impacts	System Impacts
<ul style="list-style-type: none"><li><a href="#">Code of Practice (CoP) 1 'The metering of circuits with a rated capacity exceeding 100 MVA for Settlement purposes'</a></li></ul>	<ul style="list-style-type: none"><li>None</li></ul>
<ul style="list-style-type: none"><li><a href="#">CoP 2 'The metering of circuits with a rated capacity not exceeding 100 MVA for Settlement purposes'</a></li></ul>	

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### Central costs

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The central implementation costs for CP1575 will be less than £1k to implement the document only changes.

## 5. Implementation Approach

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### Recommended Implementation Date

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CP1575 is recommended for implementation on 2 November 2023 as part of the standard November 2023 BSC Release.

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## 6. Initial Committee Views

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### ISG's initial views

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The CP1575 Progression Paper ([ISG264/01](#)<sup>8</sup>) was presented to the ISG at its meeting on 4 April 2023.

The ISG questioned why MOAs would be impacted if CoP4 was not being changed. Elexon confirmed that there are no redline changes proposed for CoP4 but CVA and SVA MOAs may need to update their internal processes/documents to ensure that, where main and check busbar VTs are used, that the main and check Meters are connected correctly to the relevant busbar VT and have been Commissioned correctly in accordance with CoP4.

The ISG had no other comments.

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<sup>8</sup> <https://www.elexon.co.uk/meeting/isg264/>

## 7. Industry Views

This section summarises the responses received to the CP Consultation. You can find the full responses in Attachment D.

We received one response to the CP1575 Consultation. The respondent was a Supplier Agent and they agreed with the proposed solution.

Summary of CP1575 CP Consultation Responses				
Question	Yes	No	Neutral/No Comment	Other
Do you agree with the CP1575 proposed solution?	1	-	-	-
Do you agree that the draft redlining delivers the intent of CP1575?	1	-	-	-
Will CP1575 impact your organisation?	1	-	-	-
Will your organisation incur any costs in implementing CP1575?	1	-	-	-
Do you agree with the proposed implementation approach for CP1575?	1	-	-	-
Do you have any further comments on CP1575?	-	1	-	-

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### Comments on the proposed redlining

One minor comment was received from the respondent on the redlining.

Comments on the CP1575 Proposed Redlining		
Document & Location	Comment	Elaxon's Response
Code of Practice 1	The tag 'CP1575' is not present but there are changes. This ought to be used in Appendix C along with all the other changes.	Elaxon thanks the respondent for this observation. Elaxon uses tags to highlight where redlined changes are made, but these are not included in the implemented text. Elaxon has included the tag in Attachment B for the purpose of this Assessment Report.

## 8. Recommendations

We invite the **ISG** to:

- **APPROVE** the proposed changes to Code of Practice 1 and Code of Practice 2 for CP1575; and
- **APPROVE** CP1575 for implementation on 2 November 2023 as part of the standard November 2023 Release.