Draft Final Modification Report

GC0182: Standardisation of Power Flow Metering Polarity

Overview: This modification aims to provide a unified standard for Power Flow Metering Polarity when data is sent to the National Energy System Operator (NESO). The standard will be in the format of a diagram and explanatory description.

Modification process & timetable

1. **Proposal Form**
   07 July 2025
2. **Workgroup Consultation**
   14 April 2026 – 12 May 2026
3. **Workgroup Report**
   16 September 2026
4. **Code Administrator Consultation**
   06 October 2026 – 06 November 2026
5. **Draft Final Modification Report**
   18 November 2026
6. **Final Modification Report**
   09 December 2026
7. **Implementation**
   10 Business Days following an Authority Decision

Have 2 minutes? Read our Executive summary
Have 60 minutes? Read the full Draft Final Modification Report
Have 120 minutes? Read the full Draft Final Modification Report and Annexes.

Status summary: The Draft Final Modification Report has been prepared for the recommendation vote at Panel.

Panel recommendation: The Panel will meet on 26 November 2026 to carry out their recommendation vote.

This modification is expected to have a:
Medium impact on: Generators, Network Operators, Interconnectors, Non-embedded customers, Licence Exemptible Embedded Medium Power Station (LEEMPS).
Low impact on: NESO and Transmission Licensees.

Modification drivers: This modification is driven by the need for cross-code consistency, improved efficiency, GB regulatory compliance, harmonisation of standards, and enhancements to system operability, planning, and security.

Governance route	Standard Governance modification with assessment by a Workgroup	
Who can I talk to about the change?	**Proposer:** Thomas Goss, NESO Thomas.Goss2@neso.energy	**Code Administrator Chair**: grid.code@neso.energy

Contents

Executive Summary 3

What is the issue? 7

What is the defect the Proposer believes this modification will address? 7

Why change? 7

What is the solution? 10

Proposer's solution 10

Workgroup considerations 10

Code Administrator Consultation Summary 26

Panel Recommendation vote 27

When will this change take place? 27

Interactions 28

Acronyms, key terms and reference material 28

Annexes 30

Executive Summary

Inconsistent power flow polarity undermines situational awareness, system security, and operational efficiency for NESO Control Room engineers, increasing the risk of Security and Quality of Supply Standards (SQSS) breaches, higher balancing costs, and delays to metering setup. These issues are driven by the absence of a single, mandated metering polarity convention, no code or licence obligation to comply or correct non-compliance, and the use of differing conventions across parties.

What is the issue?

NESO relies on its Supervisory Control and Data Acquisition (SCADA) system to securely operate the GB electricity network in real time by receiving power flow data from external parties (such as Generators, Transmission Owners (TOs), Offshore Transmission Owners (OFTOs) and Network Operators (NOs). However, over 800 meters have been identified as providing data with inconsistent polarity, resulting in misleading information within the SCADA system and its downstream applications. NESO normally identify the meters with inconsistent polarity when the metering signals are sent from external stakeholders, as early as when they obtain the Energisation Operational Notification (EON) or Interim Operational Notification (ION). NESO will liaise with the external stakeholders and request the correction on those identified meters. Certain stakeholders might implement the corrections via their SCADA system if those meters are not easily accessed physically (e.g. in an Offshore station) but the corrections might be undone when their SCADA systems are subsequently updated and reconfigured, leading to inconsistent polarity again. Other stakeholders may turn down NESO's request for the corrections because there is currently no written standard or polarity convention or requirement in the Grid Code or Bilateral Agreements. These data errors due to the meters with incorrect polarity can result in suboptimal system operation, increasing operating costs and ultimately costs to consumers.

What is the solution and when will it come into effect?

Proposer's solution: The Proposer solution is to introduce and publish a new Electrical Standard to define a clear polarity convention for operational metering data submitted to NESO, with the Electrical Standard referenced in the Grid Code. If this modification is approved, the Electrical Standard will apply to operational metering that is newly installed or upgraded from 540 days after the implementation of GC0182. This approach is intended to ensure consistent metering polarity going forward, with an equivalent

modification also proposed for the System Operator Transmission Owner Code Procedure (STCP).

Implementation date: 10 Business Days after Authority decision. However, the Electrical Standard is proposed to become applicable to Code Users around 540 days after the Implementation date.

What is the impact if this change is made?

The proposed change will impact NESO, GB Code Users and EU Code Users. GB Code Users and EU Code Users will need to adopt the convention for new connections during commissioning and when operational metering is installed or upgraded at existing sites, requiring some process updates. The convention has been developed to align with existing practice to minimise disruption; however, there may be instances where work is required to conform to the proposed Electrical Standard such as wiring changes for equipment or software reconfiguration. It should be noted that any Code Users who have already signed a Bilateral Agreement before the implementation of GC0182 and meet the conditions specified in the legal text, will still be required to comply with the Electrical Standard. This is because the Grid Code is binding upon each User from the time, they become a Connection Use of System Code (CUSC) Party and, subject to its terms, a change to the Grid Code will be binding upon each User from the time at which that change becomes effective.

Figure 1 and 2 illustrate various scenarios for GB Code User and EU Code User when they will need to follow the new Electrical Standard, based on the actual cut-off date (being 540 days after the implementation of this Grid Code Modification).

Different Scenarios for GB Code User

- GB Code User 1: obligation to follow polarity standard
- GB Code User 2: obligation to follow polarity standard
- GB Code User 3: no obligation
  - User can choose to follow the guidance note, or
  - NESO shall seek mutual agreement with GB Code User if it is deemed the User should follow the standard
- GB Code User 4: no obligation
  - User can choose to follow the guidance note, or
  - NESO shall seek mutual agreement with GB Code User if it is deemed the User should follow the standard

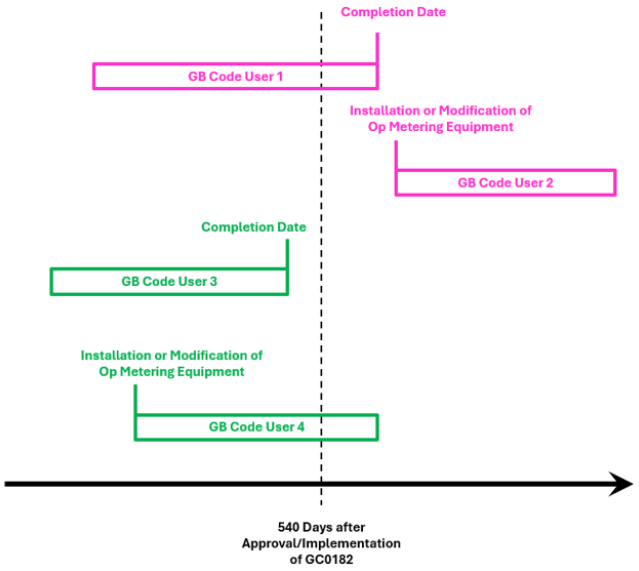

Figure 1: Different Scenarios for GB Code User regarding the obligation to follow the new Electrical Standard

Different Scenarios for EU Code User

- EU Code User 1: obligation to follow polarity standard
- EU Code User 2: obligation to follow polarity standard
- EU Code User 3: no obligation
  - User can choose to follow the guidance note, or
  - NESO shall seek mutual agreement with GB Code User if it is deemed the User should follow the standard
- EU Code User 4: no obligation
  - User can choose to follow the guidance note, or
  - NESO shall seek mutual agreement with GB Code User if it is deemed the User should follow the standard

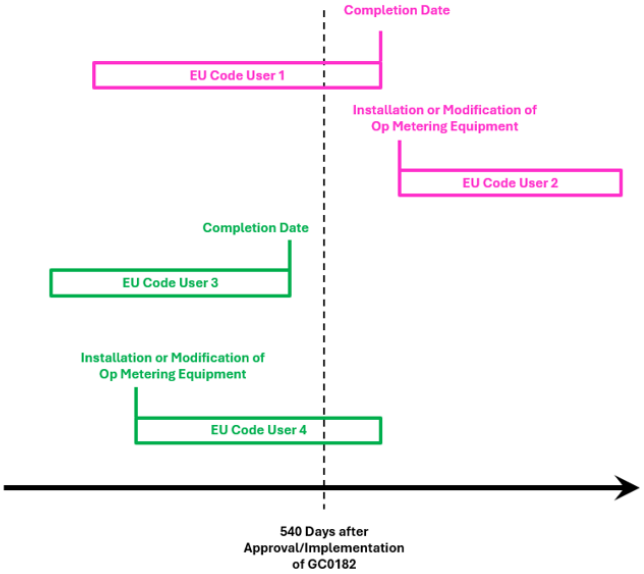

Figure 2: Different Scenarios for EU Code User regarding the obligation to follow the new Electrical Standard

This modification is expected to have low impact on NESO, in the order of £100k's per annum, as the provided metering will be correctly interpreted by NESO's systems without the need for manipulation. NESO may, however, require additional checks and tests to ensure compliance.

For NESO, it will improve situational awareness and decision-making by ensuring consistent polarity in power flow data, reducing errors and enhancing system security.

Positive impacts include improved operability, forecasting accuracy, cost efficiency, consumer cost benefits and alignment with existing conventions. Meanwhile, negative impacts involve implementation effort, transitional challenges, and limited initial scope as the change applies only to new connections whose completion date is after the actual cut-off date and new operational metering at existing sites installed or upgraded after the actual cut-off date, but not legacy operational metering. Various approaches by Code Users including software changes will be acceptable to achieve the compliance, provided that the power flow data submitted to NESO complies with the meter polarity Electrical Standards.

Workgroup conclusions: The Workgroup concluded unanimously that the Original better facilitated the Applicable Objectives than the Baseline.

Code Administrator Consultation: The Code Administrator Consultation received 2 non-confidential responses.

Panel recommendation: Panel will meet on 26 November 2026 to carry out their recommendation vote.

Interactions

The Grid Code Modification interacts with GC0103, which restructures the Annex to the General Conditions of the Grid Code to introduce Relevant and Applicable Electrical Standards. It is not certain if GC0103 will be approved before GC0182, the legal drafting of GC0182 will be based on the current baseline of the Grid Code by adding reference to the new operational metering polarity Electrical Standard in the existing Part (b) of the Annex to the General Conditions. This ensures the proposed Electrical Standard is fully applicable across all Transmission Areas. If GC0103 is approved before GC0182, the reference to the new operational metering polarity Electrical Standard will be added to the updated baseline to remain consistent with the changes introduced under GC0103.

The Authority will be consulted on how the reference to the new metering polarity Electrical Standard will be added to the General Conditions of Grid Code, provided that this Grid Code Modification is approved.

The Workgroup have assessed that GC0182 does not impact any regulated sections of the Grid Code and does not impact the Electricity Balancing Regulation (EBR) Article 18 terms and conditions held within the Code.

What is the issue?

What is the defect the Proposer believes this modification will address?

NESO must operate the GB electricity system securely and safely in real time using the SCADA system. The NESO SCADA system continuously receives power flow data from external parties (including Generators, TOs and in some cases NOs, for example at Bolney 132kV site) to provide NESO Control Room engineers with up-to-date system power flows and support operational decisions. However, sometimes power flow metering data that has polarity inconsistent with NESO's convention (e.g. negative instead of positive flow) is fed into SCADA, due to the lack of a unified metering polarity convention. As of February 2025, more than 800 meters were identified with incorrect polarity (compared with NESO's convention). NESO liaises with the appropriate stakeholders to request the polarity of these meters be corrected where possible. However, without a compulsory convention, the polarity is often not amended, and the number of metering points that don't comply with NESO's convention continues to increase.

NESO currently applies workarounds such as creating a calculated point equal to –1 × the provided metering value or configuring the network model to reverse the input. These workarounds become difficult to manage and are not sustainable as the number of metering points with incorrect polarity increases. Since NESO SCADA data feeds multiple internal downstream systems, errors in operational metering polarity can lead to suboptimal transmission system operation, increasing operating costs and ultimately raising costs for consumers.

Why change?

Receiving power flow metering data with inconsistent polarity compared to NESO's convention can, if not compensated for, undermine situational awareness for NESO Control Room engineers, reduce system security, and lead to suboptimal performance,

potential SQSS breaches, and higher balancing costs. NESO currently apply temporary workarounds, but this is not a favourable or long-term solution.

Polarity validation is carried out during the pre-energisation process but it is difficult to consistently enforced, i.e. ensuring stakeholders always send meter signals with consistent polarity to NESO, because there are currently no written standard or polarity convention or requirement in the Grid Code or Bilateral Agreements. On or after the energisation of the plants, NESO would receive associated meter signals and do check on the polarity of the meters. NESO would then notify the stakeholders of the identified issues and some of them may be corrected via software change on stakeholders' SCADA system but they may happen again when stakeholders' SCADA system is updated or reconfigured. Others may not be corrected because stakeholders can turn down NESO's request due to the lack of written standard or polarity convention or requirement in the Grid Code or Bilateral Agreements. Incorrect polarity issues identified during the commission check may come back in SCADA until it is noticed by NESO Control Room engineers, logged as faulty with the operational metering team, and corrected by the modelling team. This creates periods where incorrect polarity impacts network analysis and balancing actions. These issues become increasingly unsustainable if the number of incorrect metering points grows.

During the Grid Code Development Forum (GCDF) in late 2024, NESO presented the existing issues related to incorrect polarity of the received power flow data and proposed to develop and introduce a unified power flow polarity convention which would be referred to in Grid Code. It was suggested by the stakeholders at the forum that illustrating the criticality of the issue would help the stakeholders better understand the potential impact and would better highlight the motivation when submitting the Grid Code modification proposal to the Grid Code Panel.

NESO conducted further studies and analysis on available metering data as well as liaison with stakeholders and at the GCDF in July 2025 presented the total number of meters with incorrect polarity identified on NESO's SCADA system, potential extra cost resulted from those meters, example cost to fix the issue and the comprehensive unified power flow polarity convention in the format of a diagram.

NESO identified 818 Operational Meters with incorrect polarity, including 416 in OFTO area and 402 in Onshore TO and power stations. An extremely pessimistic hypothesis was made where all these meters contributed to the overestimation of MW simultaneously for 200 hours with average 12MW from each meter. This could add up to an error of approximately 10GW for 200 hours and lead to £100m extra cost, assuming the average electricity price at £50/ megawatt hour (MWh).

However, this pessimistic hypothesis is very unlikely to be true because not all 818 Operation Meters are active power meters and a considerate portion are reactive power meters. In addition, NESO has applied temporary workarounds to fix many of those 818 meters. Moreover, not all meters would contribute to the error at the same time because the corresponding plants and equipment have independent on and off periods.

Therefore, the presented 10GW and £100m were only hypothetical and illustrative figures aiming to quantify the criticality of the issue.

A more realistic example would one from 1 July 2024. During constraint management, incorrect polarity can distort group demand, causing unnecessary reduction of generation. NESO must then procure additional generation to maintain system balance. The associated cost can be approximated as:

Extra Cost = Price of megawatt hour (MWh) to increase Generation in Area B * Amount of Incorrect MW * duration- Price of MWh to reduce Generation in Area A* Amount of Incorrect MW * duration

On 1 July 2024, a constraint was reportedly broken by 500 MW, leading to a 500 MW reduction in Area A. However, due to group demand error, this was a 200 MW oversell. NESO subsequently had to increase generation in Area B by 200 MW to compensate, which resulted in a £64,000 extra cost to NESO:

Extra Cost=£120/MWh* 200MW * 4h-£40/MWh* 200 MW *4h=£96,000-£32,000=£64,000.

Similar situations could occur occasionally, and NESO believed the actual extra cost due to the issue of incorrect polarity of power flow data would be in the range of hundreds of thousands of pounds (~ £100k) rather than hundreds of millions of pounds (~£100m).

For other stakeholders, it can delay operational metering setup for new connections, increase workload due to the need for corrections, and add potential errors in the data and decisions made as a result. Industry stakeholders may also face delays in NESO's approval of outage plans. NESO has worked with industry parties to address these issues, but challenges remain.

This proposal aims to prevent the issue of inconsistent polarity growing further by establishing a unified polarity convention for power flow data sent to NESO. This ensures that NESO Control Room engineers receive accurate data without needing to proactively check polarity or apply manual corrections. NESO will gradually implement this, ensuring new connections and replacement meters adhere to the correct convention. Existing active meters will not be required to conform.

The Original Proposal form can be found in **Annex 01**.

What is the solution?

Proposer's solution

The Proposer suggests publishing a diagram and accompanying explanatory notes as an Electrical Standard, to define a power flow metering polarity convention to be adhered to when sending active and reactive power flow signals to NESO. This Electrical Standard will be referenced in the Grid Code (applicable to GB and EU Code Users) within the Annex to the General Conditions (for all Transmission Areas) and published on NESO's website.

The Electrical Standard will apply where:

Code User's Plant and Apparatus have a Completion Date on or after 540 days following the implementation of GC0182 (10 Business Days after the Authority's decision); or

Code User's operational metering is installed or subject to a Modification on or after 540 days following the implementation of GC0182.

Referencing the Electrical Standard in the Grid Code aims to ensure all Connection and Use of System Code (CUSC) parties, as well as LEEMPS, are captured by the requirements. CUSC parties include those with the following connection agreements: Bilateral Connection Agreement (BCA), Bilateral Embedded Generation Agreement (BEGA) and Bilateral Embedded License Exemptible Large Power Station Agreement (BELLA). These connection agreements are governed by the CUSC and, consequently the relevant parties are bound to the Grid Code. LEEMPS are obligated to meet specific requirements of the Grid Code, as detailed in the BCA (Appendix E) between NESO and the Network Operator. Generators in respect of Small Embedded Power Stations are only subject to the Grid Code if they become a CUSC party and have a BEGA. In the event that a Generator in respect of a Small Embedded Power Station voluntarily chooses to enter into a BEGA, then they would be required to adhere to the Grid Code and, hence, captured by the requirements of the Electrical Standard.

This Proposal has been refined over many months following discussions at the GCDF (October 2024 and July 2025)), in addition to discussion and consultation through the GC0182 Governance Process.

Workgroup considerations

The Workgroup convened ten times to; discuss the issue as identified by the Proposer within the scope of the defect, develop potential solutions, and evaluate the proposal in relation to the Applicable Code Objectives.

Workgroup Discussions ahead of the Workgroup Consultation

The NESO representative proposed the high-level plan where a unified power flow polarity convention, in the form of a diagram with an explanatory description, would be published as an Electrical Standard which would be referred in the relevant Grid Code clauses. It was noted that the proposed Electrical Standard would not apply retroactively. Workgroup members were generally supportive; however, they requested NESO to clarify when the implementation date would be. A Workgroup member also sought clarity on whether the modification applies to TOs, OFTOs, and large demand users, and the need for potential changes to the STC.

The NESO Representative took the Workgroup through the proposed changes to the Legal Text. The changes consisted of adding the reference of a new Electrical Standard to the General Conditions. The Code User would be directed to the Electrical Standard via the proposed new clauses Connections Conditions (CC) 6.5.6 (f) and European Connections Conditions (ECC) 6.5.6.4 (f).

The Workgroup discussed whether the Electrical Standard should be implemented solely via the Bilateral Agreement referencing the General Conditions, or if changes to Connection Conditions (CCs)/European Connection Conditions (ECCs) were necessary. Some members advocated for a streamlined approach using only the Bilateral Agreement and General Conditions, to avoid confusion and conflicting obligations. However, another member suggested that implementing solely via the Bilateral Agreement may miss connections already signed and queued to connect in the future. The Workgroup member suggested adding clauses to CCs/ECCs, with compliance for new connections determined by the Completion Date. It was agreed by all parties the date of 01 November 2026 was not achievable and would need to be amended in the next draft of legal text.

Based on the Workgroup feedback, the NESO Representative outlined a plan for incorporating the metering polarity requirements into the Bilateral Agreement Appendix F5 (Appendix E for LEEMPS) template so that all new offers would need to comply. Should Ofgem approve the proposal, the new metering polarity convention would be formalised as an Electrical Standard and referenced in the Grid Code, creating new clauses CC 6.5.6 (f) and ECC 6.5.6.4 (f).

Once implemented into the Grid Code, the CUSC proforma bilateral connection agreements would be updated to refer to the Grid Code.

Several Workgroup members raised concerns over modifying connection agreements and questioned the appropriateness of introducing a new Electrical Standard into connection agreements before Grid Code approval of the new Electrical Standard. They

highlighted the need for proper governance and the risk of creating confusion or inconsistency with this approach.

The NESO Representative provided context for the interim use of Bilateral Agreements, providing examples such as the first storage and wind farm connections to the system. The NESO Representative explained that such measures were sometimes necessary due to lengthy Grid Code modification processes, while acknowledging the associated risks and the need for consensus. One Workgroup member highlighted that if Ofgem were to reject GC0182, any interim requirements added to Bilateral Agreements would need to be removed from all affected contracts. The Workgroup member added that time, resource, and money may have been spent to comply, which would now be considered unnecessary and wasteful. The Workgroup agreed the preferred approach was not implementing the Electrical Standard into the Bilateral Agreement before Ofgem's decision on GC0182. It was also noted that any interim arrangements required more consideration and possibly further consultation with the Panel and industry stakeholders.

One Workgroup member highlighted the missing scenario of EU Code Users upgrading operational metering. The Proposer agreed an additional ECC clause could be required.

Some Workgroup members voiced concerns around the unknown applicable compliance date. The Proposer said this was to be determined by Ofgem approval and would likely be chosen to align with the implementation of 10 Business Days after the Authority decision. The NESO Representative gave the reasoning for choosing Completion Date, explaining there can be long delays between application submission and connection. The use of Completion Date ensures connections in the queue will be captured, preventing the issue of inconsistent polarity increasing further.

The NESO Representative revised the implementation plan and presented the intention to publish a Guidance Note **(Annex 04)** on the NESO website, adding the link to the Guidance Note **(Annex 04)** in new Connection Agreements, before GC0182 is approved. The Workgroup members voiced their preference for not including the link in new connection agreements, due to there being no governance process for changing a guidance note. The Workgroup raised that adding the link in new connection agreements might give the stakeholders a false impression that the unified metering polarity convention had already been approved and implemented.

The updated implementation plan proposed 2 clause additions to the Grid Code; this can be found in **Annex 03.**

Some Workgroup members questioned the clarity of the clauses, specifically the details of ECC 6.5.6.4. The Workgroup discussed the previously proposed Completion Date and how this was absent from the clauses. Workgroup members also felt the wording was not strong enough to correctly convey who is required to comply and under which

scenarios. The NESO Representative agreed to reconsider the inclusion of Completion Date and to refine the clauses to clearly state the different scenarios of new connections, and existing connection upgrades.

A Workgroup member also raised concern regarding the amount of time (post Ofgem decision) for connections to comply with the Electrical Standard, requesting that there be a longer period between decision and compliance.

A Workgroup member queried whether the implementation of the unified metering polarity convention is as simple as choosing which way to connect two wires and asked about the difficulty of making such changes during a project. The NESO Representative responded that it is generally straightforward to implement when installing or replacing the meter, however, making changes after commissioning is much more challenging and costly. Workgroup members discussed offshore sites, as changing connections after commissioning could cost tens or hundreds of thousands of pounds, highlighting the significant impact of late changes. Costs arise because once a site is commissioned and operational, modifying the outflow contract and physical setup becomes expensive. The NESO Representative also explained the option of complying with the Electrical Standard via software updates, rather than physical re-wiring. The NESO Representative confirmed that correcting polarity via a software fix is acceptable, provided the power flow data submitted to NESO complies with the agreed polarity convention, and the Workgroup raised no objections.

The NESO Representative considered the comments from Workgroup members on how the metering polarity convention can be effectively implemented and refined the proposed approach.

The refined draft of the implementation plan (detailed below) was presented to the Workgroup members;

Step 1: **Before approval of GC0182**, publish a Guidance Note **(Annex 04)** covering the Metering Polarity Convention on the NESO Website to notify and educate as many industry stakeholders as possible, as early as possible, on the best practice when setting up operational metering points and make them aware of the ongoing Grid Code change GC0182 and also an equivalent modification which will be raised for the STCP changes. The Guidance Note **(Annex 04)** will also state that the principles outlined are not mandatory as corresponding Grid Code and STCP Modifications may not be approved.

Step 2: **Before approval of GC0182**, add the following statement into the Bilateral Agreement templates to notify as many industry stakeholders as possible, as early as possible, on the best practice when setting up operational metering points:

"Grid Code Modification GC0182 is currently underway to create a unified metering polarity standard for power flow data submitted to NESO. The operational metering of the EU Code User/GB Code User will need to follow the standard, if GC0182 is approved. A guidance note has been published on the NESO website highlighting the key principles of the proposed metering polarity standard. Please note that the key principles are not mandatory unless the GC0182 is approved and implemented.

Step 3(A): **If GC0182 is approved by Ofgem**, on the Implementation Date:

Publish the Operational Metering Polarity Convention for power flow data as a new Electrical Standard and add reference in Part II (b) of Annex to Grid Code General Conditions.

Add new clauses to Grid Code CC.6.5.6 and ECC.6.5.6.4 to specify that GB Code Users and EU Code Users will need to follow the Operational Metering Polarity Convention for Power Flow Data 540 days after the Implementation Date of GC0182.

Remove the Guidance Note **(Annex 04)** from NESO website.

Update the Bilateral Agreement templates by adding the link to the newly published Electrical Standard and changing statement added in Step 2 to request all meters shall conform to the Operational Metering Polarity Convention for Power Flow Data in accordance with ECC.6.5.6.

The NESO Compliance team will also send out a letter and memo to inform the industry of the new requirement of the Operational Metering Polarity Convention for Power Flow Data and update the ONCC checklist (used during Compliance process) to capture this new requirement.

Step 3(B): **If GC0182 is rejected by Ofgem**:

Keep the Guidance Note **(Annex 04)** on NESO website and remove the statement related to ongoing GC0182.

Update the Bilateral Agreement templates by changing the statement added in Step 2 to "*In order to help the power flow measurement data received by NESO be consistent with the convention used by the NESO SCADA system, a guidance note has been published on NESO website for use when setting up operational metering polarity. The convention used in this guidance is not mandatory, however, it indicates the best practice approach and will be beneficial for all to ensure correct and efficient operation of the network.*"

The NESO Representative clarified that only the Bilateral Agreement templates (BCA, BEGA and BELLA) for future connections will be updated if GC0182 is approved. However,

any Users who have already signed a Bilateral Agreement before the implementation of GC0182 and meet the conditions specified in the legal text, will still be required to comply with the Electrical Standard. Please see Figure 1 and 2 for various scenarios where GB Code User and EU Code User will need to follow the new Electrical Standard, based on the actual cut-off date (being 540 days after the implementation of this Grid Code Modification). It was also suggested, by a Workgroup member, that the statement to be put into the Bilateral Agreement templates before approval of GC0182 should be changed to cover GB Code User and the wording should indicate that the Code User shall follow the process as set out in the GC0182 rather than "follow the standard". The statement to be added into the Bilateral Agreement templates after the approval of GC0182 should also be clearly specified.

Due to previous comments and questions from Workgroup members, the NESO representative also clarified that the Connections Reform process is expected to conclude before the Ofgem decision is reached on this GC0182 modification. Therefore, all offers should be re-issued before the Electrical Standard is published and referenced in the Grid Code, meaning the re-issued offers would not contain any requirement to follow the proposed Electrical Standard. However, any changes to the Connections Reform timescales will not be impacted by GC0182, since Code Users who meet the conditions specified in the GC0182 legal text will be required to comply with the Electrical Standard, regardless of whether they have already signed a Bilateral Agreement or not.

A Workgroup member stated that, as there is no governance process around guidance notes, it needs to be extremely clear that this guidance is not enforceable and is optional for Users to follow, as a best practice approach. The Workgroup member also suggested some updates to be made to the foreword, in the guidance note, to clarify this position. Additionally, another Workgroup member stated that the term 'standard' should not be used, since an Electrical Standard will not be established at the time of publication of the proposed Guidance Note.

When reviewing the proposed legal text, some Workgroup members noted discrepancies in the terminology used, specifically between 'metering points' and 'operational metering signals.' The Workgroup concurred that 'operational metering signals' is more consistent with the language found in the existing Grid Code and Bilateral Agreements. Additionally, the Workgroup discussed the potential confusion caused by describing connections as 'new' or 'existing', as these terms are relative to a particular point in time. Since Completion Date is already referenced in the Grid Code and has been established as the method to determine the application of the Electrical Standard, it was agreed that these terms could be removed.

The Workgroup debated the structure of the new legal text clauses, questioning whether separate clauses for new and existing connections were necessary in ECC.6.5.6.4, and suggested a simplified approach based on the installation or upgrade date of operational metering equipment. It was also suggested by a NESO subject matter expert (SME), that the Electrical Standard should be referenced in both Part I (b) and Part II (b) of the Annex to Grid Code General Conditions if GC0103 is approved before this Grid Code Modification, to which the Workgroup members agreed.

Upon review of the Workgroup Consultation document, Workgroup members highlighted the importance of quantifying the impact of incorrect polarity. The Workgroup emphasised the need to determine the number of meters affected and assess the potential implications for forecasting and overall system operation. The NESO representative confirmed that although the issue of those 800+ meters has not yet been permanently resolved and incorrect values are still being provided, those metering points have been accounted for through a workaround in the model of NESO's SCADA system where the points are reverse. For current planning processes and activities such as Centralised Strategic Network Plan (CSNP), where there is possible interaction with historical datasets to project/forecast future data (e.g Grid Supply Point (GSP) demand), manual corrections have been applied where known. It was agreed that relevant data and figures should be included in the documentation, with the possibility of referencing more detailed analysis in an annex for further clarity.

Bilateral Agreement Discussion

The NESO representative updated the statements to be added to the Bilateral Agreement templates before and after the approval of GC0182, based on suggestion from Workgroup 5.

Before approval of GC0182

"Grid Code Modification GC0182 is currently underway to formalise the requirements for GB Code Users and EU Code Users to follow a unified metering polarity convention when submitting power flow data to NESO. If GC0182 is approved by the Authority, the operational metering signals of GB Code Users and EU Code Users being installed or upgraded after a specific date, will need to adhere to the polarity convention as requested.

A guidance note has been published on the NESO website highlighting the key principles of the proposed metering polarity convention. Please note that the key principles of the metering polarity convention are not mandatory. In the event that the Authority approve

Grid Code Modification GC0182, it is proposed that the metering polarity convention will be developed into an Electrical Standard which would be applicable to those parties caught by the obligations of GC0182."

After approval of GC0182

"All operational metering signals being installed or upgraded after DD/MM/YYYY shall conform to the Electrical Standard for Metering Polarity Convention for Power Flow Data in accordance with CC.6.5.6 and ECC.6.5.6."

The NESO representative presented the updated legal text based on the feedback from the previous Workgroups. The revised legal text addresses the concerns around consistency between documents, replacing the term "metering point" with "operational metering/operational metering signals" and removing reference to "new" and "existing connections". The NESO Representative also considered removing the word "standard" from document titles; consequently, the Electrical Standard has been renamed as *"Operational Metering Polarity Convention for Power Flow Data"*, and this updated terminology is reflected throughout the proposed legal text and the guidance note.

The Workgroup agreed updates to ensure alignment between the legal text and the consultation document, including confirming that mandatory compliance applies 540 days after implementation, not at the point of implementation itself. Drafting was refined to improve consistency of terminology, including replacing references to "metering points" with "operational metering signals", and simplifying clause structures using an agreed format.

The Workgroup also discussed the treatment of installation, upgrade, and modification of operational metering, agreeing to explore use of existing Grid Code–defined terms (such as "Modification") where appropriate. Overall, the Workgroup confirmed the revised legal text was acceptable, subject only to minor drafting updates after agreeing to minor wording updates including changing "upgrades" with "Modification" as a defined Grid Code term, providing clarity.

Workgroup Consultation Summary

The Workgroup held their Workgroup Consultation between 14 April – 12 May 2026 and received 03 responses. The full responses and a summary of the responses can be found in **Annex 06**.

Implementation approach: Respondents broadly supported the implementation approach, noting that it is seen as pragmatic and provides sufficient time for industry compliance.

Support for embedding metering polarity requirements in formal Electrical Standards: There is alignment that these should sit within an Electrical Standard, with legal text generally considered fit for purpose.

Preference for formal governance over guidance notes or connection offers: A clear trend is that obligations should be established through the formal code governance process, rather than informal guidance.

Concern over referencing unapproved or future standards in connection agreements: Respondents warn this could create uncertainty, confusion over which requirements apply, and potentially unenforceable obligations at the point of signing.

Requirements from guidance: Respondents caution that, particularly following any Ofgem rejection, guidance must not be capable of being treated as a requirement in practice, and clearer separation is needed to avoid ambiguity and inconsistent interpretation.

Post Workgroup Consultation Discussion

Following the Workgroup Consultation, the following questions were raised by Workgroup members for the Proposer to confirm.

Q1: What will be the date to be used for actual implementation? Will it be 18 months, 540 days or 547 days?

The Proposer confirmed that the actual implementation date will be written explicitly in day-month-year format once the approval date is known, using 540 days from approval in principle, although limited flexibility may be needed to align the cut-off with a practical date or working-week boundary.

Q2: Will a GB Code User automatically change to an EU Code User if there is a Modification?

The Proposer explained that a GB Code User entering a new bilateral agreement because of a substantial modification may become an EU Code User and then be subject to the EU Code User obligations. Installation or modification of operational metering equipment alone is not intended to constitute a substantial modification where there is no material change to the plant. One Workgroup member explained that a Network Operator may remain a GB Code User because the definition of EU Code User requires its entire distribution system to have been connected after 2019, even where it has an EU Grid Supply Point. The NESO SME agreed that this scenario requires further research and clarification.

One Workgroup member asked how the terms material change and substantial modification would be interpreted in practice. The NESO SME's gave examples indicating

that a like-for-like change to operational metering equipment would not normally be significant, whereas replacing a generator or adding a new unit could be substantial. One Workgroup member stressed that the legal text must use consistent terminology because material change and substantial modification have different meanings and have previously caused uncertainty for Grid Code parties and NESO.

The Workgroup agreed that the legal text and supporting guidance should make the trigger clearer and include practical examples as shown in Figure 3. The practical examples are extracted from the Guidance Notes for Co-location of Different Technologies - Issue 3.1. The distinction between changes to metering equipment and changes to primary plant equipment was taken away for further consideration.

NESO SME suggested this will no longer be relevant for legal text because the legal text will clearly specify situations for GB Code Users and EU Code Users. Regardless of whether a GB Code User will change to an EU Code User and whether the modification is significant or not, the revised CC and ECC will cover the Code Users who are supposed to follow the new Electrical Standard after the cut-off date. See Q4 for details.

Appendix B: Substantial Modifications Examples

This list states what modifications are classified as a substantial modification.

Number	Example Details	Would this be classified as 'Substantial Modification'? If so because….	This wouldn't be classified as 'Substantial Modification' because….	Other comments
1	Existing 20-year-old station comprising synchronous generating units. Excitation and Governor systems to be replaced on a like for like basis	No	No material changes to performance – plant replaced with components of the same type and technology as when constructed.	NESO to be notified of change.
2	Existing Power Station site - old Generating Unit to be replaced with new Gas Turbines	Yes – There is a material change to the plant – a brand-new unit is replacing the existing retired unit	N/A	NESO to be notified and treated in the same way as a new generating unit.
3	A 100MW wind farm comprises 50 x 2MW turbines. The wind turbines are to be replaced by 20 x 5MW turbines.	Yes – The turbines, control systems and performance are all using new plant even though the Grid Connection assets may remain largely unchanged.	N/A	NESO to be notified and treated in the same way as a new generating unit.
4	Generator Transformer replaced at an existing thermal Power Station with a grey spare	No	Plant is using technology of the same type when the station was built.	NESO would need to assess any alterations in performance if different from the original plant eg tap range.
5	Change of Generator Ownership – no change to plant	No	No material changes to plant	Bilateral Connection agreement to be updated using new terms where necessary (eg removal of MCUSA with CUSC)
6	An existing wind farm adds additional new turbines	It's dependent on specifics of the project. If the existing Wind Turbines are not being modified, then the new turbines would need to be compliant with latest Grid Code requirements while the existing continue complying with applicable code version (eg. GB Code in case of pre-RfG plants connected before EU Code cut-off timelines).	It's dependent on specifics of the project. The requirements are based on the module not each turbine. Additional issue is that if the wind farm is small and the additional turbines increase the size of the Power Station to Medium or Large which would probably come under the banner of a substantial modification. The new turbines would have to be compliant with respect to latest (EU Code) requirements.	Difficult to segregate turbine requirements from module requirements. Wind farm extension to be treated in a similar way to a co-located site. Shut down existing units and compliance tests are applied to the new units. Reduced compliance tests are then applied to the whole site. If the plant transitioned from a Small Power Station to Medium or Large Power Station, the whole site would come under the banner of a Medium or Large Power Station and applicable Grid Code requirements would apply to the whole site. The caveat is the old turbines would be caught by the CC's and the new turbines by the ECC's though some compliance assessment of the whole site would be necessary through simulations and onsite tests.
7	Small Power Station replants with a new bigger unit	Yes – There is a material change to the plant – a brand-new unit is replacing the existing retired unit. The new units would be caught by the ECCs as the old plant has been replaced by brand new plant and therefore the full requirements of the ECC's would apply.	N/A	Transfer from Small to Medium or Large. Potentially more onerous requirements than previously but would effectively be treated in the same way as a new Generator.

Figure 3: Practical Examples for Substantial and Non-Substantial Modification

Q3: Are there any other TO Electrical Standard that might mention metering, in additional to TS.3.24.70 and TS.3.24.95?

The NESO SME presented the outcome of a review of TO Electrical Standards to determine whether any standards other than TS.3.24.70 and TS.3.24.95 referred to metering. The review found no additional standards that specifically addressed

operational metering or metering polarity, although some standards contained broader references to equipment used for control, measurement and protection functions.

One Workgroup member sought clarification on whether these references were to operational metering. The NESO SME confirmed they were not, and that the references only related to measurement equipment more generally. The Workgroup member also highlighted the need to consider alignment with GC0103, which is expected to introduce a common set of harmonised TO Electrical Standards. The Workgroup concluded that no further TO Electrical Standards had been identified that specifically referenced operational metering or metering polarity.

Q4: Will modification be applicable to Network Operators? Will a Network Operator (classified as GB Code User) become an EU Code User if it has a new or amended BCA after 2019?

The NESO SME concluded that modification will be applicable to Network Operators classed as a GB Code Users and will not become an EU Code User if it has a new or amended BCA after 2019. Because according to Grid Code definition, "a Network Operator would still be classed as a GB Code User where its entire distribution System was connected to the National Electricity Transmission System at one or more GB Grid Supply Points, even where that entire distribution System may have one or more EU Grid Supply Points but still comprises of GB Grid Supply Points."

NESO SME also confirmed that the legal text for CC6.5.6 has been updated to include the situation where Network Operator could have new Plant and Apparatus to reflect this.

Q5: What does the material change mean? Do we need more clarification/definition on the legal text?

The NESO SME suggested that the material change will no longer be relevant for legal text because the legal text will clearly specify situations for GB Code Users and EU Code Users. Regardless of whether a GB Code User will change to an EU Code User and whether the modification is significant or not, the revised CC and ECC will cover the Code Users who are supposed to follow the new Electrical Standard after the cut-off date.

For CC legal text:

The Network Operator classed as a GB Code User has Plant and Apparatus with a Completion Date on/after 540 days.

The GB Code User's Operation Metering equipment is installed or subject to a Modification on/after 540 days, regardless of if the Modification is substantial or not.

For ECC legal text:

The EU Code User whose Plant and Apparatus has a Completion Date on/after 540 days.

The EU Code User's Operation Metering equipment is installed or subject to a Modification on/after 540 days, regardless of if the Modification is substantial or not.

Discussions on Legal Text:

The Workgroup reviewed the updated Legal text for EU Code Users, including revised obligations linked to active power and active power measurement signals and the proposed implementation arrangements for new agreements and equipment installations after the defined cut-off date.

One Workgroup member sought clarification on how obligations would apply to GB Code Users and EU Code Users under different scenarios.

NESO SMEs proposed to retain the original principle of using only the Completion Date as the cut-off date (this being 540 days after the implementation of this Grid Code modification) for Code Users with new plant and apparatus to implement the new Electrical Standard. The legal text has been modified to cover the situation of Network Operators classed as a GB Code User who may have new Plant and Apparatus.

Terms of Reference Overview

a) Implementation and costs; These points have been central to the Workgroup discussions, and have driven the proposal in terms of scope, expectations and start date of the modification.
b) Review draft legal text should it have been provided. If legal text is not submitted within the Grid Code Modification Proposal the Workgroup should be instructed to assist in the developing of the legal text. The legal text and its proper adjustment have also been a key part of all Workgroup discussions. The Proposer has consistently taken on board feedback and made changes where it improves clarity and ensures the obligations on all parties are clearly defined. The legal text can be found in **Annex 03**.
c) Consider whether any further Industry experts or stakeholders should be invited to participate within the Workgroup to ensure that all potentially affected stakeholders have the opportunity to be represented in the Workgroup.

Industry consultation has been ongoing since before the initial application of this modification, many stakeholders have been engaged since that time. The Workgroup do not feel that there needs to be further additions to the Workgroup members.
d) Consider implications to sections linked to the Regulated Sections of the Grid Code Grid Code changes have been the core part of this modification from inception; the Workgroup regularly discusses Grid Code implications and updates to the proposal are distributed so the discussion can continue.
e) Consider the implementation arrangements of the new electrical standard considering Grid Code and CUSC Bilateral Agreement obligations. The implementation of the modification and new electrical standard need to be simultaneous to ensure all parties are clear on the new requirements and have bene given the agreed upon timescales. This point has been clearly understood throughout the process and the appropriate submissions will be made to Ofgem according to the code modification and new electrical standard processes.
f) Consider the alignment of the Governance processes for the modification and the Electrical Standard. It was decided early in the process that the modification needed significant input from industry partners in order for the specific details in terms of scope and the required legal text to be decided. Therefore, the full Workgroup governance process was desirable so that the discussions could be had with the right stakeholders and a mutually agreeable result achieved.
g) Consider clarity on Power Flow (Active vs Reactive). The proposed new Electrical Standard will apply to both active and reactive power flow and this has been clearly stated in the Introduction of the Electrical Standard.

Proposer's assessment against Code Objectives

Original Proposer's assessment against Grid Code Objectives	
Relevant Applicable Objective	**Identified impact**
(i) To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity;	**Positive** The change will improve situational awareness and system security in general, as well as allowing for better forecasting and reducing balancing costs. Reduce and/or mitigate iterations and delay for setting up new connections and approval for outage and commissioning. Improved coordination, efficiency and transparency between NESO and other parties following unified polarity convention and standardised process. Eliminate situations where some stakeholders (i.e. batteries) are unable to use the current system.
(ii) Facilitating effective competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity);	**Neutral** This Modification will not directly impact on the generation and supply of electricity, however it will instead allow for better overall system management that will be more cost-effective and ensure that no stakeholders are left outside of the system.
(iii) Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole;	**Positive** Improved situational awareness, system security, better forecast and reduced balancing cost. Reduce and/or mitigate iterations and delay for setting up new connections and approval for outage and commissioning. Improved coordination, efficiency and transparency between NESO and other parties following unified polarity convention and standardised process.

(iv) To efficiently discharge the obligations imposed upon the licensee by this license* and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and	**Neutral** This Modification is in line with our license and regulatory obligations, which is facilitating a change to a new Frequency Regulation system as mandated by Ofgem.
(v) To promote efficiency in the implementation and administration of the Grid Code arrangements	**Positive** The data from the meters is used more widely by NESO in multiple aspects, and the current methodology is increasingly unviable as the temporary fixes for the metering polarity issues decline in effectiveness. The changes being proposed will ensure that the Grid Code is much clearer regarding the obligations or all parties and make significant improvements to the administration resulting in time and cost savings.

Workgroup Vote

The Workgroup met on 11 September 2026 to carry out their Workgroup Vote. The full Workgroup Vote can be found in **Annex 07**. The table below provides a summary of the Workgroup Members view on the best option to implement this change.

For reference the Applicable Grid Code Objectives are:

To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity

Facilitating effective competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity);

Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole;

To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and*

To promote efficiency in the implementation and administration of the Grid Code arrangements

** See Electricity System Operator Licence*

The Workgroup concluded unanimously (out of 6 votes) that the Original better facilitated the Applicable Objectives than the Baseline.

Option	Number of voters that voted this option as better than the Baseline
Original	6

Code Administrator Consultation Summary

The Code Administrator Consultation was issued on the 06 October 2026 closed on 06 November 2026 and received 2 non-confidential responses. A summary of the responses can be found in the table below, and the full responses can be found in **Annex 10.**

Code Administrator Consultation summary	
Question	
Do you believe that the GC0182 Original Proposal better facilitates the Grid Code Applicable Objectives?	Both respondents believe GC0182 Original Proposal better facilitates Grid Code Applicable Objectives (i), (iii) and (v).
Do you support the proposed implementation approach?	Both respondents support the proposed implementation approach. One respondent stated they support the 540-day implementation period and prospective application of the Electrical Standard, without

	requiring existing operational assets to comply retrospectively. One respondent supports a delayed implementation timeline to ensure all parties involved have sufficient time to be ready for the change.
Do you have any other comments?	One respondent asks for guidance on which operational metering changes trigger compliance, including like-for-like replacements, CT replacements, refurbishment, SCADA reconfiguration, and software polarity corrections.
Legal text issues raised in the consultation	
No legal text issues were raised.	
EBR issues raised in the consultation	
No EBR issues were raised.	

Panel Recommendation vote

The Panel will meet on the 26 November 2026 to carry on their recommendation vote.

They will assess whether a change should be made to the Grid Code by assessing the proposed change and any alternatives against the Applicable Objectives.

When will this change take place?

Implementation date

10 Business Days after Authority decision.

Date decision required by

31 December 2026.

Implementation approach

For the new connections whose Completion Date is after 540 days from the implementation of GC0182 or existing sites who install or modify their Operational Metering equipment after 540 days from the implementation of GC0182, during the pre-energisation stage, a specific team within NESO will be the contact point and they will inform the third party of the polarity standard. Prior to issue of Operation Notification by NESO (i.e. EON, ION, LON), the metering points will be checked by the NESO SCADA, Operational Metering and Compliance team and agreed with the third party. During ongoing operation, the third party will need to provide evidence to NESO Compliance team the standard is followed.

Interactions

☐CUSC	☐BSC	☒STC -P	☐SQSS
☐European Network Codes	☐ EBR Article 18 T&Cs[1]	☒Other modifications	☐Other
☐NCER Article 4			

The Workgroup have assessed that GC0182 does not impact any regulated sections of the Grid Code and does not impact the Electricity Balancing Regulation (EBR) Article 18 terms and conditions held within the Code.

Acronyms, key terms and reference material

Acronym / key term	Meaning
BCA	Bilateral Connection Agreement
BEGA	Bilateral Embedded Generation Agreement
BELLA	Bilateral Exemptible Large License-exempt Generator Agreement

BSC	Balancing and Settlement Code
CCs	Connection Conditions
CSNP	Centralised Strategic Network Plan
CUSC	Connection and Use of System Code
EBR	Electricity Balancing Guideline
ECCs	European Connection Conditions
EON	Energisation Operational Notification
GCDF	Grid Code Development Forum
GSP	Grid Supply Point
ION	Interim Operational Notification
LEEMPS	License Exemptible Embedded Medium Power Station
LON	Limited Operational Notification
MWh	Megawatt hour
NESO	National Energy System Operator
NO	Network Operator
OFTO	Offshore Transmission Owner
SCADA	Supervisory Control and Data Acquisition
SME	Subject Matter Expert
SQSS	Security and Quality of Supply Standards
STC	System Operator Transmission Owner Code
STCP	System Operator Transmission Owner Code Procedure
T&Cs	Terms and Conditions
TO	Transmission Owner

Annexes

Annex	Information
Annex 01	GC0182 Proposal Form
Annex 02	GC0182 Terms of Reference
Annex 03	GC0182 Legal Text
Annex 04	GC0182 Guidance Note
Annex 05	GC0182 Workgroup Consultation Responses and summary
Annex 06	GC0182 Alternative and Workgroup Vote
Annex 07	GC0182 Workgroup Attendance Record
Annex 08	GC0182 Workgroup Action Log
Annex 09	GC0182 Code Administrator Consultation Responses
Annex 10	GC0182 Code Administrator Consultation Responses summary