ESO

Final Modification Report

GC0156:

Facilitating the Implementation of the Electricity System Restoration Standard

Overview: In October 2021, BEIS issued a direction in accordance with Special Condition 2.2 of National Grid's Electricity System Operator's Transmission Licence implementing an Electricity System Restoration Standard (ESRS) which requires 60% of electricity Demand to be restored within 24 hours in all regions and 100% of electricity Demand to be restored within 5 days nationally. The ESO is proposing a number of changes to the Grid Code to facilitate these requirements.

Modification process & timetable

1. **Proposal Form**
   09 February 2022
2. **Workgroup Consultation**
   21 November 2022 – 21 December 2022
3. **Workgroup Report**
   19 April 2023
4. **Code Administrator Consultation**
   02 May 2023 - 09 June 2023
5. **Draft Modification Report**
   21 June 2023
6. **Final Modification Report**
   24 July 2023
7. **Implementation**
   10 Working days after Ofgem decision

Have 10 minutes? Read our Executive summary

Have 120 minutes? Read the full Final Modification Report

Have at least 7 working days? Read the full Final Modification Report and Annexes

Status summary: This report has been submitted to the Authority for them to decide whether this change should happen

Panel recommendation: The Panel has recommended by majority that the Proposer's solution and WAGCM1 better facilitated the Grid Code Objectives than the baseline. The Panel also recommended by majority that WAGCM1 (8 out of 10 votes) was the best option.

This modification is expected to have a: High impact On Restoration Contractors[1], Generators, Non CUSC Parties, Transmission Licensees, Interconnectors, Transmission Owners, Distributed Network Operators, Non-Embedded Customers, Virtual Lead Parties, and the Electricity System Operator (ESO).

Modification drivers: ESO's compliance with Special Condition 2.2 of National Grid's Electricity System Operator's Transmission Licence.

Governance route	Standard Governance	
Who can I talk to about the change?	**Proposer:** Sade Adenola / Tony Johnson Sade.adenola@nationalgrideso.com /antony.johnson@nationalgrideso.com 0774 818 0789	**Code Administrator Contact**: Milly Lewis Milly.Lewis@nationalgrideso.com 07811036380

[1] Please note, during the working group consultation, it became apparent that the term Restoration Service Providers already exist with a different meaning therefore, a new terminology Restoration Contractors has been defined for Anchor and Top Up service Providers. Within this report, all references to Restoration Service Providers (RSP) is now Restoration Contractors

ESO

Contents

Executive summary

What is the issue?

On 24 August 2021, Ofgem published a decision letter stating that they made the decision to make the Licence modifications[2] to introduce the Electricity System Restoration Standard (ESRS) within the GB regulatory framework. These Licence modifications include but are not limited to:

- introducing the definition of "Restoration Services" in Standard Condition C1 and amending the definition of balancing services to include "Restoration Services".
- replacing all references to "Black Start" with "Electricity System Restoration" in the Electricity Transmission Licence, including in the ESO's Special Licence Conditions, to align the Licence terminology with BEIS's policy.
- introduction of updated Special Condition 2.2 of National Grid's Electricity System Operator's Transmission Licence requiring the introduction of an Electricity System Restoration Standard (ESRS) which requires 60% of electricity Demand on the Transmission System to be restored within 24 hours in all regions and 100% of electricity Demand on the Transmission System to be restored within 5 days nationally.

As a result of the introduction of ESRS and the associated Licence changes, this GC0156 modification is therefore necessary to change the Grid Code and ensure that the ESO is following the direction issued to it by BEIS[3]. The date by which BEIS require the ESO to be compliant with the ESRS is 31 December 2026.

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

Proposer's solution: The ESO's aim for the implementation of the ESRS is to put in place measures, tools, and procedures via the Grid Code such that in the event of a Total or Partial Shutdown of the GB electricity System, 60% of Demand can be restored within all regions of GB in 24 hours and 100% of Demand can be restored in 5 days nationally[4]. This is against the background that the GB electricity System is in an intact and operable state and that there is no significant damage to electrical Plant and Apparatus.

Implementation date: 10 working days following The Authority decision.

This would provide clear obligations on parties so the requirements of the ESRS can be met by 31 December 2026.

Summary of alternative solution(s) and implementation date(s):
WAGCM 1 – This alternative will have the same effect as the Original Modification Proposal in terms of changes to the system by re-enforcing System Restoration arrangements, but it will not retrospectively require existing Generators to modify their plant to maintain asset resilience at their site(s) for 72 hours after a Partial or Total Shutdown in order to achieve existing cold start times following the loss of site supplies. Instead, it will require the ESO to procure all ESRS services commercially using Anchor & Top-Up services contracts.

[2] Which can be found via this link: Decision on Licence modifications to facilitate the introduction of an Electricity System Restoration Standard | Ofgem
[3] BEIS is now referred to as Department for Energy Security and Net-Zero (DESNZ)
[4] BEIS later specified that "electricity Demand" should be calculated as the forecast peak "Transmission Demand" in the 24 hours before a Shutdown.

Workgroup Conclusions: The Workgroup concluded by majority that WAGCM1 better facilitated the Applicable Objectives than the Baseline.

Panel recommendation: The Panel has recommended by majority that the Proposer's solution and WAGCM1 better facilitated the Grid Code Objectives than the baseline. The Panel also recommended by majority that WAGCM1 (8 out of 10 votes) was the best option.

What is the impact if this change is made?

Modification of restoration requirements and clarification of relevant code obligations of parties. This will impact all CUSC parties, Restoration Contractors, Transmission Network Owners, Distribution Network Operators (DNOs) and the ESO. For clarity, in GB, a Restoration Contractor has been defined as any party with an Anchor Restoration Contract or Top Up Restoration Contract whereas a Restoration Service Provider – as defined in the EU Emergency and Restoration Code is "*a legal entity with a legal or contractual obligation to provide a service contributing to one or several measures of the restoration plan*". In GB a Restoration Service Provider (as defined in Appendix A of the System Restoration Plan) is therefore a CUSC Party or Non-CUSC Party with an Anchor Restoration Contract or Non-CUSC Party with a Top Up Restoration Contract. In GB, a Restoration Contractor is therefore a subset of a Restoration Service Provider.

Interactions

There are likely to be consequential changes for the other electricity industry codes, for example the CUSC (CMP398, CMP412), STC (CM089), BSC (P451), Distribution Code (DCRP/MP/22/02), SQSS (GSR032) and related documents (EREC G99 and EREC G59).

ESO

What is the issue?

In April 2021, the Department for Business, Energy and Industrial Strategy (BEIS) released a policy statement setting out the need to introduce a legally binding target for the restoration of electricity supplies in the event of a National Electricity Transmission System (NETS) failure. This new policy is called the Electricity System Restoration Standard (ESRS).

As a consequence of BEIS's policy statement, Ofgem performed an initial consultation related to the required Licence changes in April 2021 followed by a statutory consultation in July 2021 on Licence amendments to facilitate the introduction of an ESRS, and to align the regulatory framework for procurement of restoration services with that of other balancing services.

These Licence modifications include but are not limited to:

- introducing the definition of "Restoration Services" in Standard Condition C1 and amending the definition of balancing services to include "Restoration Services".
- replacing all references to "Black Start" with "Electricity System Restoration" in the Electricity Transmission Licence, including in the ESO's Special Licence Conditions, to align the Licence terminology with BEIS's policy.
- introduction of updated Special Condition 2.2 of National Grid's Electricity System Operator's Transmission Licence requiring the introduction of an Electricity System Restoration Standard (ESRS) which requires 60% of electricity Demand on the Transmission System to be restored within 24 hours in all regions and 100% of electricity Demand on the Transmission System to be restored within 5 days nationally.

Why change?

This modification is required so that National Grid ESO can satisfy the new ESRS Licence obligations. This will include altering, updating, and clarifying the responsibilities and requirements of the ESO, CUSC Parties, Restoration Contractors, Transmission Licensees and Distribution Network Operators, taking part in restoration activities.

What is the solution?

Proposer's solution

The Proposer's aim for the implementation of the ESRS is to put in place measures, tools and procedures such that in the event of a Total or Partial Shutdown of the Total System (that being the NETS and the DNOs' networks), that 60% of the forecast peak Demand on the Transmission System can be restored within all regions of GB in 24 hours and 100% of that forecasted peak Demand can be restored in 5 days nationally. This is against the background that the GB electricity System is in an intact and operable state and that there is not significant damage to electrical Plant and Apparatus.

As highlighted in sub note 4, where BEIS specified that "electricity Demand" should be calculated as the forecast peak "Transmission Demand" in the 24 hours before a Shutdown, this was subsequently reflected in the legal text in OC9.1.1 and OC1.7. The workgroup discussed the restoration of demand and how this would work against the requirements of the ESRS. The information to be published by the ESO through the BMRS System is defined in the legal text developed through OC1.7 – see extract below.

OC1.7 SYSTEM RESTORATION

OC1.7.1 From 31 December 2026 and during normal system operation, **The Company** shall publish on a daily basis, 60% and 100% of the peak **National Demand**, under pre **System** shutdown conditions for the following day, based on the latest forecast that would feed into the **System Restoration Regional** targets by means of messages inputted by **The Company** to the **Balancing Mechanism Reporting Service** (**BMRS**).

OC1.7.2 From 31 December 2026 and during **System Restoration**, **The Company** shall publish for each **System Restoration Region**, the **Demand** that is used to calculate the **National Demand** on an hourly basis on a reasonable endeavours basis by means of messages inputted by **The Company** to the **Balancing Mechanism Reporting Service** (**BMRS**).

An example discussed by the Workgroup members: if the shutdown was to occur at say 09:30 on a Thursday morning, then the latest ESO demand forecast (from before 09:30) would, typically in Winter, show the peak demand as being the Thursday evening. If that peak demand forecast was, say, 50GW then, based on the 60% in 24 hours, the ESO would aim to have restored 30GW of demand by 09:30 on the Friday morning (that being 24 hours after the initial shutdown and being 60% of the forecast peak demand). The only exception to this rule would apply for example where the shutdown occurred at say 05:30 in the morning and 60% of peak demand was less than the forecast demand at 05:30 had the shutdown not occurred. In other words, whilst the ESO are required to restore 60% of demand 24 hours after the event, if System conditions are such that it may not necessitate 60% of demand to be restored, then the demand restored would be restored up to 60% of the required demand.

This modification will build on the work completed through the implementation of the EU Emergency and Restoration Code[5] which was in part introduced to the Grid Code through Grid Code modifications GC0125, GC0127 and GC0128 and further being implemented through Grid Code modification GC0148 (Implementation of EU Emergency and Restoration Code Phase II).

In addition, the work will build on the Distributed ReStart Project for which code changes were originally developed in the GC0148 modification. Many of the requirements being introduced through Grid Code modification GC0148 provide essential tools in achieving the objectives of the ESRS. It should be noted that whilst the legal text for Distributed ReStart was initially included within the scope of Grid Code Modification GC0148, it was subsequently removed following the GC0148 Workgroup Consultation on the basis that it better fitted within the framework of the Electricity System Restoration Standard and was not an obligation of the EU Emergency and Restoration Code.

The Proposer's solution is to replace all references to 'Black Start' with 'System Restoration' based on BEIS's direction. This would also be consistent with the proposals being put forward to change the other industry codes such as the CUSC – CMP398 and CMP412, STC – CM089, SQSS – GSR032 and BSC – P451.

The solution will include changes to the System Defence Plan, System Restoration Plan, and the Test Plan.

[5] Commission Regulation (EU) 2017/2196 of 24 November 2017 establishing a network code on electricity emergency and restoration (Text with EEA relevance) (legislation.gov.uk) &
The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019

As part of this modification, the Proposer will take the opportunity to undertake a house keeping change to OC5.7.1(b)(i) which is a correction that needs to be addressed following an inadvertent error arising from the implementation of Grid Code modification GC0108 (EU Code: Emergency & Restoration: Black Start testing requirements).

Workgroup considerations

The Workgroup met 16 times to discuss the issues, detail the scope of the proposed defect, devise potential solutions, and assess the proposal in terms of the applicable Grid Code objectives. The Workgroup had good representation; potentially affected stakeholders were included and opinions of relevant industry experts who were not Workgroup members were sought as and when required. In some circumstances, experts with relevant expertise were invited to join the Workgroup/subgroup meetings to provide their views. Some of the key points raised by these external parties and discussed with the Workgroup have been documented in this report.

ESO Presentation on Modification Requirements

The Proposer delivered a presentation which highlighted the following key points:

- The aim of GC0156 is to facilitate the implementation of the ESRS requirements including, in particular that 60% of Demand is restored within 24 hours (across all regions of GB) and 100% is restored within five days. This can only be achieved on the basis that network assets and Users Plant (e.g., generation, storage, HVDC etc) are in an operational and functional state and there is no extensive or prolonged network or equipment damage.
- In November 2021, the ESO set up 7 non-code working groups to engage with the wider industry for initial consideration of the possible requirements that may arise from the ESRS and to seek views on recommendations on how to implement the new ESRS Licence obligations. All the working groups were disbanded at the end of April 2022 and the working group reports were shared with the GC0156 Workgroup for further development.
- The Distributed ReStart Project[6] had initially been included within GC0148 as a non-mandatory requirement, however following general industry agreement as a result of the GC0148 Workgroup Consultation, it was agreed that the provisions related to Distributed ReStart were best placed within the scope of this GC0156 modification.
- GC0148 has progressed and includes updates to low frequency demand disconnection, communications Systems, Critical Tools and Facilities, the System Defence Plan, System Restoration Plan, Test Plan, how Non-CUSC Parties would fall under the remit of the EU Emergency and Restoration Code and requirements for Electricity Storage Modules during low System Frequencies.
- The Distributed ReStart provisions are included within the GC0156 legal text available in Annex 20.

Non-code working groups - ESO's ESRS Working Groups Report

The ESO's ESRS Implementation Team provided a high-level overview to the GC0156 Workgroup of the work undertaken (ahead of GC0156) by the ESRS non-code Working Group whose initial findings had been compiled reflecting the majority views, including the suggestion to create 4 sub-groups within the GC0156 Workgroup. These reports explore

[6] What is the Distributed ReStart project? | National Grid ESO

the options and issues in the following areas: (i) Future Networks, (ii) Assurance Activities, (iii) Communications Infrastructure and (iv) Markets and Funding Mechanism.

Full details of the ESO's ESRS Working Groups recommendations and reports are available in Annex 3. The agreed terms of reference for each of these GC0156 subgroups (which mirrored the title of the Working Groups (i)-(iv) above) are available in Annex 4 along with the final reports from those subgroups.

Implementation Costs

The Market and Funding subgroup concluded that the requirements for likely costs will need to be revisited once Ofgem has approved the set of technical requirements proposed by GC0156 and at that point it might be more appropriate for the generators to provide an indicative cost.

In discussions over several Workgroup meetings, no consensus was reached as to the need for a cost benefit analysis (CBA). The ESO requested, in the autumn of 2022, that BEIS write out to CUSC Parties seeking information from them on the likely costs of meeting heightened resilience (as those parties understood them at the time) at their sites. BEIS contacted CUSC Parties accordingly and limited replies were provided to the ESO who collated the responses and provided an anonymised summary to the Workgroup. The ESO's legal advice is not to share this confidential information. Also, it was noted that the implementation cost for ESRS should include costs incurred by CUSC Parties, Transmission Owners, Network Operators and the ESO. At the time of this report, these costs are unknown except for the above.

Some Workgroup members expressed the view that a full cost benefit analysis should be undertaken to ensure that the measures considered will satisfy the ESRS criteria, and that this will be achieved at the least cost. Other Workgroup members held the view that a full CBA might not be necessary, and some form of cost estimation/ impact assessment would suffice to quantify the implementation costs.

Funding Mechanisms

It was noted that some funding mechanisms had been considered within the Markets and Funding subgroup discussions which are available in Annex 4.

The proposed approach with GC0156 would result in additional obligations on parties which could consequently cause a rise in implementation costs. For information, the table below shows the existing cost recovery mechanisms through which parties could (or could not) recover their implementation costs.

Obligated Party	**Existing Cost Recovery Mechanism**
ESO	Price Control / Re-opener
TO	Price Control / Re-opener
DNO	Price Control / Re-opener
OFTO	Unclear
Restoration Service Providers*	Contract with ESO
CUSC Parties without a Restoration Contract	None

In relation to the above table, there is currently no cost recovery mechanism in place for CUSC parties without a Restoration Contract. However, a CUSC proposal CMP398 has recently been raised to seek to address this and, unless that proposal is approved, a mechanism does not exist for those parties. Some Workgroup members considered that this could have considerable financial consequences for those relevant parties.

Note:

*As part of the GC0156 Workgroup discussions, it was noted that there was a risk of confusion between the definition of a 'Restoration Service Provider' as used in the EU Emergency and Restoration Code (EU 2017/2196)[7] and the term 'Restoration Service Provider' that was initially proposed to be used in the GC0156 solution: in simple terms it is not advisable to have the GB Grid Code using the same term but with a subtly different legal meaning. The ESO has investigated this issue and agreed that there is potential confusion between these definitions. As a solution, it is therefore proposed (within this GC0156 solution) to introduce the below definition into the Grid Code:

> Restoration Contractor: "An Anchor Restoration Contractor or a Top Up Restoration Contractor".

Therefore, in the Grid Code a Restoration Contractor is any party with an Anchor Restoration Contract or a Top Up Restoration Contract whereas a Restoration Service Provider, as defined in the EU Emergency and Restoration Code, is "*a legal entity with a legal or contractual obligation to provide a service contributing to one or several measures of the restoration plan*". In GB this translates to Restoration Service Provider as defined in Appendix A of the System Restoration Plan, i.e., all CUSC Parties, or a Non-CUSC Party with an Anchor Restoration Contract or a Non-CUSC Party with a Top Up Restoration Contract. A Restoration Contractor (in the Grid Code) is therefore a subset of a Restoration Service Provider (in the EU Emergency and Restoration Code).

Therefore, the term 'Restoration Contractor' is used within this document (and the GC0156 legal text) to denote parties who provide contracted restoration services. For the avoidance of doubt parties who may, based on the EU definition, be a 'Restoration Service Provider' would not, based on the GC0156 definition, be a 'Restoration Contractor' if they did not have a requisite Anchor or Top-Up contract.

Discussions on Restoration

The current approach to restore the NETS System is to have contracts with strategically located Black Start Power Stations or interconnectors across GB. These are generally Transmission connected assets such that in the event of a Partial or Total Shutdown[8], these contracted assets or Power Stations are instructed by the ESO to start within two hours and energise parts of the NETS in accordance with a Local Joint Restoration Plan (LJRP). An LJRP is a process set out in a document (between the contracted asset owner(s), the ESO and the Network Operator, and the Relevant Transmission Licensee) outlining the process of how a contracted asset owner energises part of the Transmission or distribution System and then picks up Demand from a DNO. The whole process is

[7] Which in substance is retained GB law.
[8] As defined in the Grid Code.

managed by the ESO except in Scotland where the ESO may delegate this responsibility to the relevant Scottish Transmission Licensee through STCP 06-1[9].

To develop a LJRP there is liaison between the Restoration Contractor, Relevant Transmission Licensee, and the relevant Network Operator(s) in coordination with the ESO. In each case, the LJRP is used to form a Power Island. As the restoration progresses individual Power Islands are subsequently connected together to form wider Power Islands. This facilitates the connection of other parties including Generators and Embedded Generators without any current restoration capability. This also enables restoration of Demand as detailed in OC9 of the Grid Code.

Clarification of Definition of Restoration Demand

The Workgroup reviewed the proposed definition of 'Demand' in the context of the restoration of 60% of Demand in 24 hours and the 100% in five days as set out in the ESRS. Workgroup members sought clarification of the definition of 'Demand' as stated in the BEIS direction letter to ESO. The Workgroup noted the definition is critical and highlighted the following practical concerns:

- It is too vague; it does not specify the expectations of areas of the GB system where the Transmission Demand may be zero or negative at the time of GB peak (such as where Demand, from end consumers, is being met in whole or in part by distribution connected assets).
- Some network colleagues advised the Workgroup that at certain times of the year, some DNO areas have very low Transmission System Demand or were even exporting (to the Transmission System) which could mean, in that scenario, that the expected Transmission connected Demand, in such DNO areas could be based on a low / zero / negative number.
- There is no consideration of the significant variation in Demands between weekends versus weekday impacts. For example, if the Partial or Total Shutdown occurred on, a Friday then the quantum of the forecast Demand (upon which the 60% target in 24 hours is then based) would be lower for a weekend / Bank Holiday, than if the shutdown had occurred on a Monday and vice versa.
- Focussing on Transmission Demand as opposed to the target percentages to be restored related to the whole total System Demand or Transmission Demand, leaves the restoration of the total System Demand uncertain and undefined.
- The proportion of Transmission to distribution Demand is expected to decrease in coming years in the context of increased distribution generation and therefore over time the 60% target becomes less meaningful. A BEIS representative who attended a Workgroup meeting advised that whilst there were no current plans to change the ESRS, it was likely to be revisited as part of the long-term future System resilience work.

The representative from BEIS clarified the definition and confirmed to the Workgroup that the BEIS's direction specifies that "electricity Demand" should be calculated as the forecasted peak "Transmission Demand", that being Demand on the NETS. The requirement to restore 60% of Transmission Demand within 24 hours and 100% of Transmission Demand in five days is an obligation placed on the ESO as is the requirement to ensure that the necessary services and tools required to meet the standard are in place

[9] 1 Introduction (nationalgrideso.com)

by 31 December 2026. It was confirmed that 60% was the minimum standard required within 24 hours, with the expectation that industry parties would be doing everything possible to return the System to normal as quickly as possible.

Following this, several Workgroup members highlighted further concerns that the ESRS was based around 'Transmission Demand'; that is Demand on the NETS; versus 'total Demand'; that is Demand, over and above that arising from the NETS, from the DNOs and IDNOs. The BEIS representative confirmed that the ESRS had been agreed based on assurance from the ESO that the proposed level would be sufficient to maintain a stable electricity grid therefore, the ESO is obliged to restore enough Demand to stabilise the System.

The ESO representative clarified that the proposed 60% of forecasted peak Transmission Demand had been developed by simulations undertaken by the ESO and provided to BEIS and was simply a proxy for a level of restoration which broadly reflects the nation's critical infrastructure and welfare requirements. Although there was a request for the simulation studies to be shared with the Workgroup, the Proposer did not have the permission to share this information at that point in time.

The BEIS representative suggested that the ESO and industry need to work together to facilitate the ESRS and ensure any nuances are understood.

As a result of these discussions, this has been reflected in the draft legal text as follows:

> "Electricity System Demand in the "Electricity System Restoration Standard" is treated by The Company to be the forecast peak National Demand which would have occurred within the 24-hour period following the start of the Total Shutdown or Partial Shutdown had the Total Shutdown or Partial Shutdown not occurred." This has been clarified in the proposed legal text of OC9 with the reporting being declared in accordance with OC1.7 via the Balancing Mechanism Reporting Service (BMRS). As part of the Workgroup discussions, it was clarified that BMRS is resilient to loss of electricity supplies in the event of a Shutdown.

<u>The Distributed ReStart Development</u>

The Distributed Restart Project was a Network Innovation Competition funded initiative that examined if Embedded assets (such as generation and batteries connected to distribution networks) can provide restoration services in the event of a Partial or Total Shutdown.

Originally the Distributed ReStart Project was intended to be incorporated into the GC0148 modification. However, as GC0156 addresses the wider issues of System Restoration, it was deemed to be more appropriate for GC0156 to pick up the restoration work via Distributed ReStart. Following the GC0148 Workgroup Consultation, the Distributed ReStart provisions were removed from GC0148 and transferred to GC0156.

The GC0148 discussions on the incorporation of Distributed ReStart into System Restoration were quite advanced and discussions from GC0148 which are now directly relevant to GC0156 are included in Annex 5. Also, the Distributed ReStart and Industry Codes Recommendations are available in Annex 12.

Analysis of effects of GC0156 on Parties

To provide clarity, some Workgroup members requested documenting their analysis of the effects of some of the proposed GC0156 solution on all parties, these are detailed in the sections below:

a. All Generators required to provide Mandatory Services

Regarding all new and existing Generators, storage and interconnectors owners who are either Transmission connected or form a Large Power Station (including those which are Embedded), it is proposed that these connected assets they shall in the event of a Partial or Total Shutdown: -

1) Ensure that all communications equipment within their site connected to the ESO's communications network (i.e., Control Telephony) shall continue to operate for a minimum of 72 hours after the failure of all external electricity supplies to that site.

2) Ensure that on the failure of all external electricity supplies to the site, all equipment on the site shall shutdown safely and be maintained in a condition such that when external electricity supplies are reconnected, if a start instruction is received from the ESO, the asset shall be capable of synchronising and load up typically as per its cold start dynamic parameters.

   To clarify, the generating site or storage site or interconnector site needs to either have or be capable of mobilising all required personnel and resources to site within the required timescales whilst all external electricity supplies are dead. This capability to start must be maintained for a period of at least 72 hours from the failure of external electricity supplies. Also, the cold start dynamic parameters are those which have been submitted in the week 24 data for a Shutdown period of greater than 48 hours (note these parameters shall apply even if the Shutdown period is less than 48 hours if the site was de-energised from all external electricity supplies and the times shall apply from the time supplies of electricity were restored to the site).

   Note: Some stakeholders expressed concern in their Workgroup consultation responses about the retrospective application of this requirement. An alternative proposal (WAGCM1) raised post consultation provides an alternative approach to this issue (see below); and

3) Ensure that their control equipment have governors or equivalent which are capable of operating in an island mode. The mode of governor control should be selectable so that either speed control or load control or an alternative can be used to ensure stable conditions during island mode operation. This does not only mean the equipment is capable of working in this mode, but also these operating modes are interfaced into the main control point and staff are familiar with these requirements.

A Workgroup member stated that the new proposed technical obligations relating to 72 hours resilience for existing assets (plus the communications on site) after a Shutdown (that is after a loss of external electricity supplies) were materially different from a 'cold-start' where external electricity supplies are maintained to the site.

The associated issues were explored in a paper, which was shared with the Workgroup, that examined the situation where external electricity supplies are maintained ('scenario 1') and where they are not maintained ('scenario 2'). The full details of these scenarios can be found on pages 29 – 34 of the Future Networks subgroup report in Annex 4.

b. Anchor Plant

Currently, Plant used to energise parts of the total System have generally been referred to as Black Start Plant; it is proposed to change the Grid Code term 'Black Start Plant' to 'Anchor Plant'[10]. The Anchor Plant together with Top Up Plant can be used to supply increasing volumes of Demand. This will also ensure parity between Restoration Contractors and also acknowledges the difference in Transmission arrangements between England and Wales, Scotland and Offshore. In addition, there is a requirement for Anchor Plant to have the capability to switch specific protection and control modes into service in order to participate in the wider restoration process.

c. Top-up Restoration Providers

This is a new category of service which is proposed to be introduced by this modification and will only apply to parties who enter into a commercial agreement with the ESO (or ESO and DNO in the case of a Distribution Restoration Zone Plan) to provide this service. These services can be provided to either the Transmission System or the distribution system. The assets providing these services are not required to be capable of energising a dead section of network (as this is the role of Anchor Plants), however they are required to be capable of starting quickly, or to connect demand, when external electricity supplies are restored to the site and then provide their contracted capability to assist in restoring Demand as part of the LJRP or DRZP. This requires that these assets are supported by independent power supplies to enable them to be reconnected immediately when they are instructed when the System is reenergised at their site.

d. Distribution Network Operators

i. DNOs without Distribution Restoration Zone Plans

This section applies to all new and existing DNOs, and it is proposed that all DNOs shall ensure that on the failure of all external electricity supplies to relevant substation sites, all equipment on their sites shall be power resilient for 72 hours in accordance with the requirement of Engineering Recommendations G91. Whilst there are no external electricity supplies the ability to operate and reconfigure the substation shall be maintained so that the substation can be reconfigured to permit re-energisation.

ii. DNOs with Distribution Restoration Zone

If a DNO agrees to implement a DRZ, then it will create a Distribution Restoration Zone Plan (DRZP) with the ESO, the Restoration Contractors (and possibly the relevant Transmission Licensee). It will also separately agree tripartite contract with Restoration Contractors[11] and the ESO. The DNO may choose to install a DRZ controller and other equipment to operate the DRZ should it wish to do so. The DNO shall also be required to be able to select different protection and control settings, and in some cases modified earthing may be necessary to enable the DRZ to operate safely. The detailed arrangements of how a Distribution Restoration Zone would be energised and

[10] Black Start Plant provided all of the individual services that will, in combination, now be provided separately by Anchor and Top-Up providers.

[11] i.e., Anchor and Top-Up plant.

expanded together with the obligations upon specific parties would be specified in the Distribution Restoration Zone Plan.

e. BM Participants & Virtual Lead Parties

Currently, BM Participants (including Virtual Lead Parties which are aggregators) who own and operate Plant that are not directly connected to the Transmission System or who do not own / or operate Large Embedded Power Stations are only required to comply with section CC6.5 of the Connection Conditions or ECC.6.5 of the European Connection Conditions (depending on when they connected) and Balancing Code 1 and 2 of the Grid Code. This is so they can operate and be instructed in the wholesale market. With this GC0156 modification, there are other significant changes, and no matter the size or connection point of a BM Participant they will be required to:

1) Ensure that all communications equipment connected to the ESO communication's System including their internal communication shall continue to operate for a minimum of 72 hours after the failure of all external electricity supplies to their site.
2) Ensure that on the failure of all external electricity supplies to their site, due to a Partial or Total Shutdown, all equipment on the site shall shutdown safely and be maintained in a condition such that when external electricity supplies are reconnected, if a start instruction is received from the ESO, their Plant shall be able to Synchronise and load up as would be expected from a cold start unit. This means that the site needs to have or be capable of mobilising all required personnel and resources to site within the required timescales whilst all external electricity supplies are dead due to a Total or Partial shutdown. This capability to resume operations (once external supplies are restored to the site) must be maintained for a period of at least 72 hours from the failure of the external electricity supplies. The cold start dynamic parameters are those which have been submitted in the week 24 data for a shutdown period of greater than 48 hours (note these parameters shall apply even if the shutdown period is less than 48 hours if the site was de-energised from all external electricity supplies due to a shutdown and the times shall apply from the time electricity supplies were restored to the site). So far as the Grid Code Planning Code is concerned the ESO has updated the GC0156 legal text to require start up data to be supplied at time intervals of 12 hours, 24 hours, 36 hours, 48 hours, and 72 hours after a Plant had been Shutdown to avoid using the term "hot" and "cold" unit.

<u>Feedback on the Potential Implications of ESRS on Aggregators</u>

An Aggregator representative was invited to a Workgroup meeting (pre-consultation) to provide their views on the potential implications that GC0156 could have on Aggregators. Following their review of the proposed ECC draft legal text in respect of the 'Critical Tools and Facilities' requirements, they provided the following feedback to the ESO representative and also discussed this with GC0156 Workgroup members:

-The addition of "BM Participant" is a powerful disincentive to enter the BM. This preserves the BM as the domain of large Generators only, because the proportional costs of complying with this aspect of the code will be much higher for smaller units.

- BM Participants are not a static population from whom things can be required; a sizeable number of them can do all of their trading in wholesale markets. It was noted that the

obligation to comply with the requirements for Critical Tools and Facilities could provide a barrier for smaller parties participating in the BM when they would otherwise choose to do so.

- In relation to “adequate control equipment redundancy”, adding redundancy to each of the sites is not pragmatic. Where an aggregator controls many sites, redundancy is required, but this is surely better dealt with by reference to the control point thresholds set out in regard to EDL/EDT of the Electrical Standards.

- Many Generators and all VLP-controlled assets are distribution-connected. This could place them under potentially contradictory requirements (G99 versus this definition) hence it may be better to either apply this requirement only to Restoration Contractors, and/or carve out something less general than “Plant or Apparatus necessary for System Restoration”.

The Workgroup noted that there was an interaction with GC0148, which was sent back by The Authority on 24th January 2023, which related to the situation with regard to Aggregators (see below).

GC0156 Subgroups Objectives

In line with the recommendations from the non-code working groups[12], the four GC0156 subgroups were established to examine certain aspects of GC0156[13] which met on a bi-weekly basis between July 2022 – October 2022. The aim of these subgroups was to consider and develop aspects of the GC0156 modification requirements as outlined below. Some Workgroup members queried the relevance of the Markets and Funding Mechanism Subgroup to GC0156 (rather than CUSC), and after deliberations on this it was decided that the outputs of the Markets and Funding Subgroup will be for information purposes only although the report will feed into other codes (modification proposals, CUSC & BSC most especially).

Full details of the subgroups Terms of Reference and the subgroup reports are available in Annex 4.

Future Networks

Objective: To determine further future network requirements that may have implications for network operators, TOs, OFTOs and CATOs to facilitate how the industry can meet the requirements of the ESRS.

Assurance Activities

Objective: To develop the assurance framework and performance monitoring framework and to enable Industry performance against the ESRS to be assessed.

Communications Infrastructure

Objective: To propose changes to the telecommunication requirements for DNOs, TOs, OFTOs, Restoration Contractors and any other relevant parties required to facilitate the implementation of the ESRS with the DNO being responsible for ensuring the data is

[12] Established by the ESO, to consider the implementation of ESRS, which concluded before GC0156 was raised.
[13] (i) Future Networks, (ii) Assurance Activities, (iii) Communications Infrastructure and (iv) Markets and Funding Mechanism

secure and meeting legal and Network and Information Security (NIS) Directive requirements.

The ESO representative and a Workgroup member representative advised the Workgroup that the 31 December 2026 deadline is challenging to get the required communications technologies in place, and the implementation costs that may need to be incurred by stakeholders to implement the required changes are unlikely to be determined within the set timeframe to complete subgroup meetings.

Markets and Funding Mechanism

Objective: To estimate costs (if possible) associated with the activities to implement the ESRS requirements; advise the CUSC/ BSC Panels of the funding implications for relevant stakeholders/parties, advise the GC0156 Workgroup on costs on other parties involved in facilitating the implementation of ESRS and suggest how these should be accommodated.

The subgroup had insufficient time to make an assessment of the costs that might be incurred by stakeholders.

Workgroup Consultation Summary

The Workgroup consultation was launched on 21 November 2022 and closed on 30 December 2022. The ESO prepared a reply to the Workgroup Consultation Responses received which is available in Annex 14. Seventeen non confidential responses were received and some of the key findings are summarised below:

- Out of 17 respondents, 9 supported the original proposal agreeing that it better facilitated one or more of the applicable Grid Code objectives (mostly a, b, c); 5 respondents did not agree and 2 had no comment. There was a split between respondents who supported the implementation approach (6) and respondents who did not (5).
- All respondents that answered the question on cost recovery agreed that there is need for a cost recovery mechanism for parties obligated by GC0156; 10 agreed that a Cost Benefit Analysis should be undertaken by the Workgroup.
- All respondents, aside from the ESO, either felt that the GC0156 proposals are NOT sufficient and cost effective to ensure that ESO can meet its ESRS Licence obligations (7) or had no comments (8).
- 3 of the 6 respondents agreed with the ESRS restoration target being expressed as Transmission Demand and not total Demand and some did not agree with the implications. 5 respondents did not agree that it was the appropriate term and 5 did not comment.
- Only 2 respondents supported that there is a common understanding between stakeholders around Demand to be restored in GB required by ESRS. The majority of respondents (11) agreed that there will be barriers for Network Operators and Users to deliver the changes proposed to implement the ESRS by 31 December 2026.
- Some respondents (8) expressed that, to implement ESRS obligations, further changes are required to the network i.e., NETS and/or distribution network. There were split responses as to whether the proposed solution of 72 hrs resilience should be applied retrospectively to existing assets owned by CUSC Parties.

- Some respondents (8) believed that cyber security requirements in accordance with the NIS standard are sufficient and as referenced in the proposed Grid Code drafting.
- 7 out of 11 respondents that provided feedback regarding the legal text did not agree that the draft legal text is appropriate and sufficient to implement GC0156.
- 6 of 11 respondents did not feel that there should be further assurance activities in addition to those described in the proposed legal text within OC5. Others provided no answer.
- 9 respondents supported the proposal that a separate subgroup should be established under the umbrella of GC0156 to develop a set of technical requirements associated specifically with Restoration Contractors' Plant for inclusion in the Relevant Electrical Standards. 3 respondents were unsupportive and 4 had no comment.
- The majority of respondents (11) expressed a view that the implications of the proposed future requirements are not clear.

Post Workgroup Consultation Discussions

At Workgroup meeting 10, the Workgroup reviewed and discussed the consultation responses to address issues that had been raised. Some key points and aspects of the modification proposal highlighted from the consultation responses are summarised in related headings below and a comprehensive ESO reply to the consultation response addressing queries and concerns are available in Annex 14:

Implementation Approach

- There is a lack of detail in the implementation framework approach that will make it difficult for affected parties to fully understand what will be required until specific LJRPs and DRZPs are drawn up.
- The development and implementation of DRZPs is a new concept and could inevitably bring issues that will need to be addressed in the future.
- The implementation approach does not provide sufficient time to comply with the consequential industry and code changes required from GC0156.

Implementation Date

- There is no clarification of when each of the new obligations on parties would take effect, specifically whether they will come into effect before 31 December 2026.
- There were 2 suggested approaches to be considered in relation to the proposed 31 December 2026 date:
    - Have a mirrored version of the code which is available as soon as the GC0156 code change is approved by The Authority for stakeholders to be aware of their obligations until the requirements become live on 31 December 2026; or
    - Place obligations on parties with applicable dates of 31 December 2026 whilst the remaining elements continue to apply.

In view of the discussions the ESO quickly discounted the option of having a mirrored version of the Grid Code. The ESO has since considered the best approach is to have a phased approach with specific dates for the application of these requirements being specified in the Grid Code and to ensure that tender documents and Restoration Plans are

consistent with the updated Grid Code terms. This is the approach that the drafting of the legal text has now taken.

Retrospectivity

- Whilst the retrospective application of the 72 hours mains independence period is necessary to facilitate the requirement for Critical Tools and Facilities, some Workgroup members and the ESO believed that retrospective application of this requirement would not be appropriate for Aggregators and Offshore Generators.
- Sufficient consideration and background work has not been performed to evaluate the impact that retrospective changes to the Grid Code will have on existing Users.

Note: WAGCM1 seeks to remove the retrospective application (of the 72 hours resilience of assets) to existing Generators (who are not Restoration Contractors) to modify their Plant to achieve existing cold start times following loss of external electricity supplies to the site(s). The GC0156 Original Proposer was not convinced that the requirements of ESRS would be fully met without the retrospective application of this 72 hours asset resilience obligation to existing sites.

Impact on Parties / Coordination between parties

- It is not appropriate or cost-effective for all existing Users to be required to comply when not all Users are intended to be contracted to offer System Restoration Services.
- The impact of the ESRS on TO obligations have not been clearly defined; detailed regional studies and plans need to be developed to minimise risks and ensure that TOs, DNOs and OFTOs understand the differences in response between various connected assets during restoration and prepare for adequate contingencies and resilience.
- The financial and practical impact on various classes of generation has not been established.
- No clarity of the ESRS role of aggregators and other CUSC parties without physical assets and no clear means of applying the GC0156 resilience requirements to these parties.
- Further consideration of VLPs / Aggregators is needed to enhance understanding of risks (particularly common mode risks) that may prevent them from contributing to a System Restoration.

In response to the above concerns, the ESO representative clarified that:

  - Not every generator will be contracted to offer the service;
  - TO obligations will be addressed through an STC modification; and
  - The ESO will run overall restoration and have plans in place which will be used to drive LJRPs and DRZPs.

Cost impacts / cost recovery mechanism

- How the level of cost imposed on generation will be recovered from consumers, what the costs are that will be incurred by Generators and what the wider social benefits might be, have not been discussed in the Workgroup.

The ESO representative noted that CMP398 was raised in order to introduce (into the CUSC) a cost recovery mechanism for recovering costs arising from GC0156 obligations.

Cost Benefit Analysis

There were split views on this as outlined below:

Views for Cost Benefit Analysis

- A CBA will be necessary to assess the impact of standardised requirements across regions against ESRS tender and market requirements being derived through regional studies and study of capabilities of types of generators based in different LJRPs and DRZPs.
- A CBA should be performed on a case-by-case basis; some Plants may not be able to accommodate any of the proposed changes and should not be penalised for this.

Views against Cost Benefit Analysis

- A lighter review and cost comparison should be carried out and not a CBA. This should examine the costs to end consumers and work upon services the ESO buys rather than network costs. It should look at comparable value against conventional and revised mechanisms.

In response to the view for a CBA, the Proposer acknowledged the usefulness of a CBA however, Ofgem had carried out a CBA to justify the benefit(s) of ESRS prior to including the ESRS in the ESO's License as an obligation. Therefore, a repeat CBA would add no value because regardless of the findings, ESRS will remain as a Licence obligation and would need to be implemented. However, other Workgroup members noted (and Ofgem subsequently confirmed to the Workgroup – see 'Terms of Reference' below) that Ofgem CBA had been undertaken without the benefit of being able to consider the detailed cost impacts of the proposed GC0156 original solution (for example, 72 hours resilience of assets applying retrospectively) as this was unknown to Ofgem at the time its CBA was undertaken.

At Workgroup meeting 11, the Proposer raised a suggestion that, as the CBA is not available to the Workgroup, parties (including Generators, ESO, TO and DNOs) could submit their individual cost assessments for Ofgem to consider as that would provide the actual cost impact of implementing ESRS. It was also noted by some Workgroup members that the ESO had already obtained, via BEIS, in the autumn of 2022 cost information regarding providing 72 hours resilience from a limited number of assets and that this should be included in this Workgroup Report to aid stakeholders and Ofgem to understand the cost impacts. The ESO's legal advice is not to share this confidential information. Accordingly, most Workgroup members felt that the Proposer's suggestion (at meeting 11) will not be valuable and will not change the basis for which requirements of this modification were determined, which is what the Workgroup wanted to confirm.

The following assumptions were specifically requested by the Workgroup:

- Total cost assumed for Generators to comply with specified annual cost including 1st year and subsequent years.
- A proportion of the existing CUSC Party fleet that have the capability of being captured by GC0156.
- Any consideration of Aggregators, size of Plant under 50MW.

Transmission Demand vs Total Demand

- Basing the restoration percentage upon the Demand on the Transmission System alone and not the total system Demand would mean that at certain times of the year, a significant volume of overall Demand on the whole of the GB System will not be taken into account when looking at the 24-hour target restoration quantum at the time of a Total or Partial Shutdown.
- The term Transmission Demand poses the risk of raising customer expectations about supply restoration that are greater than those required or that will be delivered by the ESRS. Gross Demand that should be restored at each Grid Supply Point would be more appropriate.

The Proposer reiterated that the percentage targets (60% within 24 hours, 100% within five days) was based on the forecasted peak Transmission Demand only, which is the directive from BEIS and had been confirmed by a BEIS official in Workgroup meeting 5 on 18 August 2022.

New Entrants

- Concern that in the medium to long term, exemption of 'new entrants' (in 2022) from the GC0156 obligations will impede the ability of the ESO to meet the ESRS obligations from 2026 and this detriment could increase over time.

The Proposer clarified that there is no intention to exempt new entrants from the GC0156 obligations.

Contractors (Restoration Contractors)

- It is not entirely clear what parts of the Grid Code apply to Embedded Restoration Contractors where they are not CUSC Parties. It would be clearer if the technical requirements for an Embedded generator providing Restoration Services were in the Distribution Code and only OC9 and BCs applied.
- It was suggested to align the same legal definition of a 'Restoration Service Provider' (as per statute) within the Grid Code.

The ESO representative clarified that the Distribution Code is being updated in parallel with the Grid Code. Also, post consultation, it was decided that the terminology "Restoration Service Provider" should be replaced, within the proposed legal text for GC0156, with "Restoration Contractor".

Technical Requirements for Restoration Contractors Plant

- There was a suggestion that a separate group, involving appropriate experts from across the industry, should be established to develop a set of technical requirements specifically for Restoration Contractors Plant, these specifically relating only to those technical requirements to that Restoration Contractors plant rather than other technical requirements necessary for implementation of the ESRS but included in the Grid Code. This subject was discussed at length prior to the Workgroup Consultation and as a result Question 21 was included in the consultation questions.
- It was noted that developing the technical requirements associated with restoration services as a single Relevant Electrical Standard applicable across GB is reasonable as an interim solution but eventually, they should be included in the Grid Code.

The ESO Representative acknowledged the need to have a robust set of requirements, but it was noted that in view of the rapid change of technologies and variation in potential Restoration Contractor technologies, it was in hindsight better to develop this work outside of GC0156 where more time would be able to be allocated to this issue. It would still however be possible for these requirements to be developed as part of a single Electrical Standard applicable across GB but outside of the GC0156 work.

Restoration Plans

The Workgroup queried whether LJRPs are considered to be a legal document as part of the Grid Code. The ESO representative clarified that legal advice was sought on this and it was confirmed that LJRPs do indeed form part of the Grid Code (see Grid Code reference to OC9.4.7.12(b) and (c)). Some Workgroup members suggested that this needed to be made more explicit.

Other suggestions

- Due to the proposed radical changes to the design and operation of distribution Systems with Embedded generation, it will be important to keep an appropriate project management approach in place for the implementation of ESRS by 31 December 2026.
- Consider consolidating various changes associated with restoration into a separate subcode of the Grid Code in a similar way to the Connections Conditions or European Connection Conditions.
- The recommendations of the Communications Infrastructure Working Group Report are not an agreed output of the Communications Infrastructure Working Group. Specifically, the need for ICCP links was not established as a requirement for ESRS in the context of the GC0156 Communications Working Group deliberations.

In response to the above suggestions, the Proposer noted the following:

- Changes relating to DRZPs will be managed in accordance with the provisions defined in OC9.4.7.6;
- Consolidating various changes into a separate subcode of the Grid Code introduces additional complexity as some restoration obligations are also relevant during BAU operations; and
- ICCP Links were discussed during the Communications Infrastructure subgroup meetings and captured in the Communications Infrastructure report (page 20). Reference to ICCP Links was removed from the GC0156 draft legal text and replaced with "…. appropriate data links….".

Fault Ride Through

The Workgroup considered what the impact of a Fault Ride Through (FRT) event would be if it was the cause (or suspected cause) of the Shutdown in terms of compliance with GC0151. The Workgroup agreed that the solution proposed for GC0156 is aligned in that in the case of a Total or Partial Shutdown, the obligations placed on parties in respect of the requirements for GC0151 would be suspended during a System Restoration event. The proposed legal text in OC5.4.2.7 excludes plant from having to satisfy the requirements of OC5.4.2.1 – OC5.4.2.6 under a System Restoration event unless explicitly notified by the ESO, for example where a plant is known to have a fault ride through issue, or a plant owner suspects their plant may have a fault ride through problem.

Terms of Reference Review

At meeting 11, the Workgroup talked through the Workgroup items within the Terms of Reference and agreed that all elements had been considered and addressed. Some of the items that were further discussed were:

- Item (a): "*Implementation and costs*", Workgroup members reiterated that without visibility of Ofgem's CBA or the assumptions it was built on, it would be difficult to fully conclude that this element was fully resolved. A freedom of information request to the UK Government was raised on 21st February 2023[14] following discussions at the meeting and the Chair took the action to request for some specific assumptions that had been considered in the CBA carried out by Ofgem. In response to this request, the Ofgem Representative on behalf of Ofgem provided these findings:

"Our CBA compared costs to industry with societal impacts for a number of different potential restoration times (60% & 100% demand).

The non-black start generator costs for resilience within the CBA was informed by a survey of in scope generators for 60% restoration only'

Generators considered in scope were all CCGT or Hydro Power Stations >300MW in capacity, totalling circa 24GW in capacity. Costs for 18, 24, and 36 hours resilience were surveyed.

The CBA focuses on finding the optimal restoration timeframe for consumers (societal impacts) and it is up to ESO/industry to determine what requirements are needed from market participants to meet the ESRS. The ESO's restoration modelling may assume resilience requirements as per GC0156 proposal, however to the best of our knowledge, the costs associated with providing this capability do not appear to be explicitly included within the CBA beyond the above costs associated with in scope non-black start power stations.

We do not believe the GC0156 generator resilience requirements should be tied to the CBA. The CBA was not intended to prescribe the generation requirements to meet the ESRS"

- Item (b): "*Review draft legal text should have been provided*"- as at meeting 11 the draft legal text was still due to be finalised following a series of detailed review sessions. The legal text drafting was later completed by the ESO Representative and updated versions were shared with the Workgroup on 3 March 2023 for final review. It was reviewed again in Workgroup meetings 14 and 15.
- Item (e.vi): "*Build on the proposed solutions set out in other Grid Code modifications such as GC0148 (Implementation of Emergency and Restoration Code Phase II) and other developments such as the Distributed ReStart NIC project to achieve the requirements of the Electricity Restoration Standard*" – This had been considered and addressed but due to the GC0148 Ofgem Send Back, it was noted as a risk. Further details concerning the GC0148 Send Back are provided below.

[14] DESNZ replied on 21st March 2023 to that FOI request and declined to provide the information requested for the reasons set out in that reply.

GC0148 Implementation of EU Emergency and Restoration Code Phase II Send Back

The Code Administrator received The Authority Send Back letter for GC0148 (Annex 15) which stated, amongst other things, that: "Aggregators are considered Significant Grid Users and if the Proposal was approved in its current form, it is likely that aggregators would be in breach of their obligations under the Grid Code".

The Grid Code Review Panel on 26 January 2023 was asked to take into consideration an industry member's concerns around the legality of the terms of the Send Back letter, which Panel Members agreed needed to be clarified.

At the Grid Code Review Panel on 23 February 2023, Panel Members were given a verbal confirmation from The Authority representative that further work could be undertaken on the GC0148 Final Modification Report to address the deficiency (identified by Ofgem in the Send Back letter) in the original submission and allow the GC0148 Workgroup to take the new information into account and ensure the intent of that modification is met.

The GC0156 Workgroup agreed that the resolution of GC0148 was critical (the issue was highlighted throughout the Workgroup discussions) to ensure GC0156 wasn't also Sent Back by The Authority for similar reasons to those for GC0148, but that work should progress on GC0156 as the issue highlighted within the GC0148 Send Back was, for the purposes of GC0156, related to Critical Tools and Facilities only.

Post the GC0148 Workgroup reconvening, the decision from the GC0148 Workgroup was that the legal text would be updated to fulfil The Authority request to clarify what would be required for full compliance with the relevant obligations. The proposed changes for the GC0148 legal text as at the time of this report is available in Annex 16. At GC0148 meeting 15, the Workgroup discussed the need to be consider how the GC0148 legal text interacts with the GC0156 solution and legal text; working on the premise that the GC0148 would need to be approved and implemented ahead of GC0156. It was suggested that certain aspects of the GC0156 legal text would need to be updated including adding a new section 7.11 and this was reviewed by the GC0156 Workgroup in meeting 14 and agreed as appropriate.

Supplementary Documents

Following the Workgroup Consultation, the supplementary documents listed below in Annexes 6 – 11 were revised and updated to include the comments received from the Workgroup consultation responses. In general, all comments were minor in nature other than the Distributed Restoration Zone Control System Standard which had to be fundamentally re-written.

- Distribution Restoration Zone Control System Standard (Annex 6)
- System Defence Plan (Annex 7)
- System Restoration Plan (Annex 8)
- System Test Plan (Annex 9)
- Control Telephony Electrical Standard (Annex 10)
- Communications Standard (Annex 11)

The supplementary documents were shared again as part of the Code Administrator Consultation, whilst the documents will be shared as part of the Final Modification Report

the governance of these documents will follow the Grid Code Electrical Standards Procedure as set out in General Conditions (GC.11).

Workgroup Alternatives

One Workgroup alternative solution was raised post Workgroup Consultation. The Workgroup debated it and agreed that it was within the scope of the defect.

Workgroup Alternative Vote

On 21 February 2023, the Workgroup voted as to whether or not the proposed "Request for an Alternative" should become a Workgroup Alternative Grid Code Modification (WAGCM).

The Workgroup voted by majority that the Alternative better facilitates the Grid Code Objectives rather than the Original, and that it should be taken forward as a Workgroup Alternative Grid Code Modification (WAGCM1). The full results from this vote are set out in Annex 18 and the Alternative Proposal is available in Annex 17.

WAGCM1 (Drax):

This Alternative Modification Proposal submitted by Drax will have the same effect as the Original Modification Proposal by re-enforcing System Restoration arrangements, but it will not retrospectively require existing Generators to modify their plant to maintain asset resilience at their site(s) for 72 hours after a Partial or Total Shutdown in order to achieve existing cold start times following the loss of site supplies. Instead, it will require the ESO to procure all ESRS services commercially using Anchor & Top-Up services contracts.

Some Workgroup members noted that utilising commercial services accorded with the legal obligations placed upon the ESO (and The Authority) in Article 4 (1) of the Emergency & Restoration Network Code:

> "*When applying this Regulation, Member States, **regulatory authorities**, competent entities and **system operators** **shall:**" [emphasis added] and
>
> [d] "*ensure that TSOs make use of market-based mechanisms as far as is possible to ensure network security and stability"*

It was noted by those Workgroup members that it is not clear that this utilisation of market-based mechanisms as far as is possible, is being achieved by the GC0156 Original Proposal.

A Workgroup member also noted that this utilisation of market-based mechanisms as far as is possible, accorded with the ESRS policy as set out by BEIS in April 2021[15] which, for example, stated that the ESRS should be implemented in a way which does not commercially disadvantage individual parties and that any new services, arising from ESRS, will not commercially disadvantage individual parties.

[15] Introducing a new 'Electricity System Restoration Standard': policy statement - GOV.UK (www.gov.uk)

The Proposer commented that the 72 hrs resilience requirement is not expected to be implemented at a cost to the CUSC Parties. CMP398 was established to address the cost implications.

Legal text

The initial legal drafting for this modification was achieved by a collaborative approach between the ESO and Distribution Code Administrator and then the active collaborative engagement of Workgroup members alongside the ESO and Distribution Code Administrator. Consideration of CATOs have been excluded from the drafting of the legal text as this is expected to be picked up as part of the GC0159 CATO modification proposal raised at the Grid Code Review Panel in September 2022. For the avoidance of doubt, the ESRS obligations would be expected to apply to CATOs (when they are established in due course).

Following the Workgroup Consultation, amendments were made to the draft legal text to accommodate some of the suggested made from Industry. High level details of these changes are available in Annex 19. To further refine the draft legal texts, post consultation, some legal text review sessions were set up to thoroughly assess and review suggestions that had come in from Workgroup Consultation responses. More legal text review was again carried out in Workgroup meetings 14 and 15.

The legal text for this modification proposal can be found in Annex 20.

What is the impact of this change?

Proposer's assessment against Code Objectives

Proposer's assessment against Grid Code Objectives	
Relevant Objective	**Identified impact**
(a) To permit the development, maintenance, and operation of an efficient, coordinated, and economical system for the transmission of electricity	**Positive** Provides a level playing field for Restoration Contractors and CUSC Parties and to put measures in place to restore the NETS as soon as possible following a total or partial Shutdown.
(b) 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);	**Positive** Competition for restoration services is encouraged via the tender process to ensure a good availability of services at strategically

	located points which provides value for money.
c) 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** Provide assurance of restoring the System following a total or partial Shutdown as quickly as possible
(d) To efficiently discharge the obligations imposed upon the licensee by this licence and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and	**Positive** Provide assurance that the new Licence obligation issued in October 2021 can be satisfied and discharged.
(e) To promote efficiency in the implementation and administration of the Grid Code arrangements	**Neutral**

Proposer's assessment of the impact of the modification on the stakeholder / consumer benefit categories	
Stakeholder / consumer benefit categories	**Identified impact**
Improved availability of the System	**Positive** It is in the widest possible interest of the country and consumers as a whole to restore power supplies as soon as possible following a Total or Partial Shutdown. This modification seeks to do that and therefore seen as Positive.
Lower bills than would otherwise be the case	**Positive** The financial implications of a Shutdown can run into many tens of millions of pounds very quickly. Restoring power supplies as soon as possible and in the shortest possible time frame is essential to the country as a whole. Whilst not having a direct effect on consumer bills the loss of production for business and the wider community would be substantial and therefore insurance to minimise against the risk of a power outage is imperative.
Benefits for society as a whole	**Positive** This proposal puts measures in place that would reduce the time taken to restore electricity System Demand following partial or total Shutdown. This is a significant benefit to society as a whole.
Reduced environmental damage	**Positive**

	This proposal will support the use of a diverse range of technologies, many of which are low carbon sources. The proposal also recognises the important role of all technologies following a Total or Partial shutdown and therefore this modification is seen as a net positive in minimising environmental damage.
Improved quality of service	**Positive** This modification provides the potential for Restoration from renewable sources in addition to encouraging the use of Embedded generation which is currently being trialled through the Distributed ReStart project.

Workgroup Vote

The Workgroup met on 03 April 2023 to carry out their Workgroup vote. The full Workgroup vote can be found in Annex 18. The table below provides a summary of the Workgroup members view on the best option to implement this change.
The Applicable Grid Code Objectives are:

Grid Code

a) To permit the development, maintenance, and operation of an efficient, coordinated, and economical system for the transmission of electricity
b) 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);
c) Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution system in the national electricity transmission system operator area taken as a whole;
d) 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
e) To promote efficiency in the implementation and administration of the Grid Code arrangements

Assessment of the Original, WAGCM1 vs Baseline
The Workgroup concluded by majority that WAGCM1 better facilitated the Applicable Objectives than the Baseline.

Option	Number of voters that voted this option as better than the Baseline
Original	9
WAGCM1	11
Baseline	0

Best Option

Workgroup Member	Company	BEST Option?	Which objective(s) does the change better facilitate? (if baseline not applicable)
Alastair Frew	Drax	**WAGCM1**	**a, b, c, d**
Andrew McLeod/Alan Creighton	Northern Powergrid	**WAGCM1**	**a, b, c**
Andrew Vaudin	EDF	NA	NA
Garth Graham	SSE Generation	**WAGCM1**	**a, b, c, d**
Graeme Vincent	SP Energy Networks	**WAGCM1**	**a, b, c, d**
Graz Macdonald	Waters Wye	**WAGCM1**	**a, b, c, d**
Gwyn Jones	Western Power Distribution	**WAGCM1**	**a, b, c, d**
Lewis Morgan	NGET	**Original**	**b, c, d**
Michelle Macdonald	SSEN Transmissions	**Original**	**a, b, c, d, e**
Priyanka Mohapatra	Scottish Power	**WAGCM1**	**a, b, c, d**
Robert Longden	Eneco Energy Trade BV	**WAGCM1**	**a, b, c, d**
Sade Adenola/Tony Johnson	ESO	**Original**	**a, b, c, d**
Tolu Esan/Gavin Anderson	Electricity North West Ltd	**WAGCM1**	**a, b, c, d**

Code Administrator Consultation Summary

The Code Administrator Consultation was issued on the 02 May 2023 and closed on 09 June 2023 with 10 non-confidential responses and 1 partially confidential response received, including 2 late responses. A summary of the non-confidential responses can be found in Annex 21, and the full responses can be found in Annex 22.

Code Administrator Consultation summary	
Question	
Do you believe that GC0156 Original Proposal or WAGCM1 better facilitates the Grid Code Objectives?	Most of the respondents felt that WAGCM1 (9 out of 10) and the Original (7 out of 10) better facilitated the Grid Code Objectives.
Do you support the proposed implementation approach?	All respondents supported the implementation approach. However, several respondents highlighted that they only supported the implementation of one solution.
Do you have any other comments?	The key points that were raised: - Five respondents considered the Original solution to be uneconomical. Whereas WAGCM1 would avoid retrospective mandatory compliance on all

	generators and would be dependent on an assessment of the capability of the generator to contribute to meeting the ESRS requirements. - One respondent felt that the cost recovery proposed in CMP398 was to complex when compared to the solution provided if GC0156 WAGCM1 were adopted. - Four respondents felt that GC0156 was at a very high level and further work/discussion was needed to clarify the detail. Including defining the relationship between parties and responsibilities during an ESR situation and planning how the ERS standard would be achieved if a Total Shutdown were to occur. - One respondent felt that the Original was not making full use of market-based mechanisms by only using 10% or less of the overall market (for the provision of restoration services). - Two respondents felt that the extent of the current shortfall in capability to achieve ESRS had not been demonstrated and no analysis on the feasibility of achieving compliance with mandatory obligations by 2026 had been provided. - One respondent queried the testing timescales of elements within the DRC. - One respondent felt that WAGCM1 was more likely to be implemented within the necessary timescale. Two respondents felt that neither solutions may be able to meet the required deadline, because of the challenges of having to meet the necessary resilience. - One respondent felt that the volume of Restoration Contracts required to meet the ESRS would be inefficient under WAGCM1. - One respondent did not feel WAGCM1 would lead to an efficient, coordinated, and economical system and did not discharge the obligations as the Original did.
Legal text issues raised in the consultation	
A summary of the numerous Legal Text queries raised through the Code Administrator Consultation along with the ESO responses and any provisional typographical amendments made to the Legal Text can be found in Annex 23.	
EBR issues raised in the consultation	
No EBR issues were raised in the consultation.	

Panel Recommendation Vote

The Panel met on the 12 July 2023 to carry out their recommendation vote.

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

Panel comments on Legal text

Ahead of the vote taking place, the Panel considered the legal text amendments proposed as part of the Code Administrator Consultation and determined that they were either typographical or not required. A summary of these legal text changes made can be found in Annex 23.

Vote 1: Does the Original or WAGCM1 facilitate the objectives better than the Baseline?

Panel Member: **Alan Creighton: Network Operator Representative**

	Better facilitates AO (a)?	Better facilitates AO (b)?	Better facilitates AO (c)?	Better facilitates AO (d)?	Better facilitates AO (e)?	Overall (Y/N)
Original	Yes	Neutral	Yes	Yes	Neutral	Yes
WAGCM1	Yes	Yes	Yes	Yes	Neutral	Yes

Voting Statement

WAGCM is more likely to be implemented within the target timescale. Under the WAGCM, the System Operator will need to undertake an assessment of whether the current resilience arrangements of the existing generation fleet (whether contracted to provide restoration services or not) are sufficient or whether there is a need to target expenditure, or contract via the market for further restoration services, to resolve any issues which arise.

Panel Member: **Alastair Frew: Generator**

	Better facilitates AO (a)?	Better facilitates AO (b)?	Better facilitates AO (c)?	Better facilitates AO (d)?	Better facilitates AO (e)?	Overall (Y/N)
Original	No	Neutral	Yes	No	Neutral	No
WAGCM1	Yes	Yes	Yes	Yes	Neutral	Yes

Voting Statement

In terms of the original I believe it does not better facilitate objective A as it mandates changes on everyone and does not consider that it might be more economical and efficient to allow the market to offer up the parties which are best suited to provide services.
It is neutral on objective B. It improves objective C as it introduces more requirements which should improve system security. It is negative on objective D as this mandates changes on everyone whereas the Network Code on Electricity Emergency & Restoration requires in Article 4 paragraph 1 c “apply the principle of optimisation between the highest overall efficiency and lowest total costs for all parties involved;” and in paragraph 1 d “ensure that TSOs make use of market-based mechanisms as far as is possible to ensure network security and stability;”. Finally, it is neutral against objective E.

More generally the requirements in the original modification for all generators to start within their cold stat times is a significant request for most sites, not only in terms of

equipment but also in staffing and finally costs. In terms of achieving current cold start times, I cannot see how parties, who are correctly quoting their cold start times, can then add a whole lot of additional tasks to re-energise their power station firstly before then starting their units can be fitted into their original cold start time. This will be a particular problem with sites where there are no temperature effects, and the cold times are the same as the hot start times and these are very short.

In terms of the WAGCM1 I believe it does better facilitate objectives A, B & D as it allows the market to offer up the parties which are best suited to provide services that are more economical and efficient. It improves objective C as it introduces more requirements which should improve system security. Finally, it is neutral against objective E. More generally WAGCM1 is a better option as it firstly asks additional questions in the DRC to try and force generators to fully assess their current capabilities if all external power supplies are lost and then provide more realistic start up times. This would have the benefit that the ESO would have a better idea of the current situation and then be able to assess additional requirements and the best commercial method of procurement.

Panel Member: **Darshak Shah: Generator**

	Better facilitates AO (a)?	Better facilitates AO (b)?	Better facilitates AO (c)?	Better facilitates AO (d)?	Better facilitates AO (e)?	Overall (Y/N)
Original	Neutral	Yes	Yes	Neutral	Neutral	No
WAGCM1	Yes	Yes	Yes	Neutral	Neutral	Yes
Voting Statement						
Provides further clarity on restoration arrangements during operation and connection.						

Panel Member: **David Monkhouse: Offshore Transmission Licensee**

	Better facilitates AO (a)?	Better facilitates AO (b)?	Better facilitates AO (c)?	Better facilitates AO (d)?	Better facilitates AO (e)?	Overall (Y/N)
Original	Yes	No	Neutral	Yes	Neutral	No
WAGCM1	Yes	Yes	Yes	Yes	Neutral	Yes
Voting Statement						
Provides further clarity on restoration arrangements during operation and connection.						

Panel Member: **Jamie Webb: National Grid ESO**

	Better facilitates AO (a)?	Better facilitates AO (b)?	Better facilitates AO (c)?	Better facilitates AO (d)?	Better facilitates AO (e)?	Overall (Y/N)
Original	Yes	Yes	Yes	Yes	Neutral	Yes
WAGCM1	No	Yes	No	Yes	Neutral	No
Voting Statement						
I support the Original proposal in facilitating the implementation of the Electricity System Restoration Standard.						

In my opinion, The Original facilitates Grid Code objectives a), b) and c) and in particular d) which is necessary to implement the Electricity System Restoration Standard which has been introduced into special condition 2.2 of the ESO's Transmission License.

Whilst I agree WAGCM1 better facilitates Grid Code objectives b) and d) I do not believe it supports Grid Code objectives a) and c) as I believe it restricts the ESO of its ability to restore the system in the most economic manner by having to strike individual contracts, whilst I appreciate the reason the alternative has been raised, my anticipation is that CMP398 would cover that.

Overall I support the Original Solution

Panel Member: **John Harrower: Generator**

	Better facilitates AO (a)?	Better facilitates AO (b)?	Better facilitates AO (c)?	Better facilitates AO (d)?	Better facilitates AO (e)?	Overall (Y/N)
Original	No	No	Yes	No	Neutral	No
WAGCM1	Yes	Yes	Yes	Yes	Neutral	Yes
Voting Statement						
The original places retrospective obligations on existing generators to be compliant without a clear understand of costs to individual parties or the overall system benefits, potentially introducing expensive and unnecessary/ineffective changes. It also does not appear to meet the legal requirement for the ESO to make use of market-based mechanisms as far as is possible. WAGCM1 addresses these significant deficiencies.						

Panel Member: **Robert Longden: Supplier**

	Better facilitates AO (a)?	Better facilitates AO (b)?	Better facilitates AO (c)?	Better facilitates AO (d)?	Better facilitates AO (e)?	Overall (Y/N)
Original	Yes	Neutral	Yes	Yes	Neutral	Yes
WAGCM1	Yes	Neutral	Yes	Yes	Neutral	Yes
Voting Statement						
Retrospective requirements on existing generators should be avoided wherever possible. If services are required from existing generators they should be procured by the ESO on a commercial basis. GCO156 implements the requirements of the ESRS and WAGCM1 follows accepted industry practice regarding the treatment of existing plant.						

Panel Member: **Ross Kirkwood: Onshore Transmission Licensee**

	Better facilitates AO (a)?	Better facilitates AO (b)?	Better facilitates AO (c)?	Better facilitates AO (d)?	Better facilitates AO (e)?	Overall (Y/N)
Original	Yes	Yes	Yes	Yes	Yes	Yes
WAGCM1	Yes	No	No	Yes	No	No
Voting Statement						

It would be advantageous for all plant (existing and planned) to be fitted with the 72 hour resilience required to ensure that plant is available to help the restoration of the system.

Panel Member: **Sigrid Bolik: Generator**

	Better facilitates AO (a)?	Better facilitates AO (b)?	Better facilitates AO (c)?	Better facilitates AO (d)?	Better facilitates AO (e)?	Overall (Y/N)
Original	Yes	Yes	Neutral	Yes	Neutral	Yes
WAGCM1	Yes	Yes	Yes	Yes	Neutral	Yes
Voting Statement						

Panel Member: **Graeme Vincent (On behalf of Steve Cox): Network Operator Representative**

	Better facilitates AO (a)?	Better facilitates AO (b)?	Better facilitates AO (c)?	Better facilitates AO (d)?	Better facilitates AO (e)?	Overall (Y/N)
Original	Yes	Yes	Yes	No	Neutral	Yes
WAGCM1	Yes	Yes	Yes	Yes	Neutral	Yes
Voting Statement						
Both modification proposals help the ESO facilitate the requirements of the ESRS. Whilst I recognise the need for resilience from generators is required in order to help the ESO to meet these obligations and in particular those related to timescales, I don't believe that applying the requirement retrospectively to all generators is the most economical or efficient option to achieve the desired outcome.						

Vote 2 – Which option is the best?

Panel Member	BEST Option?	Which objectives does this option better facilitate? (If baseline not applicable).
Alan Creighton	WAGCM1	a, b, c, d
Alastair Frew	WAGCM1	a, b, d
Darshak Shah	WAGCM1	a, b, c,
David Monkhouse	WAGCM1	a, b, c, d
Jamie Webb	Original	a, b, c, d
John Harrower	WAGCM1	a, b, c, d
Robert Longden	WAGCM1	a, c, d
Ross Kirkwood	Original	a, b, c, d, e
Sigrid Bolik	WAGCM1	a, b, c, d
Graeme Vincent	WAGCM1	a, b, c, d

Panel conclusion

The Panel has recommended by majority that the Proposer's solution and WAGCM1 better facilitated the Grid Code Objectives than the baseline. The Panel also recommended by majority that WAGCM1 (8 out of 10 votes) was the best option.

When will this change take place?

Implementation date
10 working days following The Authority decision

This would provide clear obligations on parties so the requirements of the ESRS can be met by 31 December 2026.

Date decision required by
Q4 2023

Implementation approach
Implementation of ESRS will be facilitated by a New Restoration Decision Support Tool, Restoration Tool, Local Joint Restoration Plans, Distributed Restoration Zone Plans & Annual Assurance Framework.

Interactions

☒CUSC	☒BSC	☒STC	☒SQSS
☒European Network Codes	☐ EBR Article 18 T&Cs[16]	☒Other modifications	☐Other

Acronyms and key terms

Acronym / key term	Meaning
BC	Balancing Code (within the Grid Code)
BEIS	(Department for) Business, Energy, and Industrial Strategy[17]
BSC	Balancing and Settlement Code
BM	Balancing Mechanism
CATO	Competitively Appointed Transmission Owners
CBA	Cost Benefit Analysis
CUSC	Connection and Use of System Code
DESNZ	Department for Energy Security and Net-Zero
DRZ	Distribution Restoration Zone
DRZP	Distribution Restoration Zone Plan
DNO	Distribution Network Operator
EBR	Electricity Balancing Regulation
ECC	European Connections Conditions
ESRS	Electricity System Restoration Standard
ESO	Electricity System Operator (aka NGESO)
EU	European Union
GB	Great Britain

[16] If your modification amends any of the clauses mapped out in Annex GR.B of the Governance Rules section of the Grid Code, it will change the Terms & Conditions relating to Balancing Service Providers. The modification will need to follow the process set out in Article 18 of the Electricity Balancing Regulation (EBR – EU Regulation 2017/2195). All Grid Code modifications must be consulted on for 1 month in the Code Administrator Consultation phase, unless they are Urgent modifications which have no impact on EBR Article 18 T&Cs. N.B. This will also satisfy the requirements of the NCER process.
[17] As noted, during the course of the GC0156 Workgroup the name of the relevant UK Government Department changed from BEIS to DESNZ (the Department for Energy Security and Net Zero).

GC	Grid Code
GCRP	Grid Code Review Panel
LJRP	Local Joint Restoration Plan
NETS	National Electricity Transmission System
NGESO	National Grid Electricity System Operator (aka ESO)
RC	Restoration Contractors
RSP	Restoration Service Providers
STC	System Operator Transmission Owner Code
SQSS	Security and Quality of Supply Standards
OC	Operating Code (within the Grid Code)
OFTO	Offshore Transmission Owner
T&Cs	Terms and Conditions
TO	Transmissions Owner
WAGCM	Workgroup Alternative Grid Code Modification

Annexes

Annex	Information
Annex 1	Proposal form
Annex 2	Terms of Reference
Annex 3	Non-code working groups - ESO's ESRS Working Groups Reports
Annex 4	Subgroup Terms of Reference and Reports
Annex 5	Distributed ReStart Development
Annex 6	Distribution Restoration Zone Control System Standard
Annex 7	System Defence Plan
Annex 8	System Restoration Plan
Annex 9	System Test Plan
Annex 10	Control Telephony Electrical Standard
Annex 11	Communications Standards
Annex 12	Distributed ReStart and Industry Codes Recommendations
Annex 13	Workgroup Consultation Response Summary Table
Annex 14	ESO Full Response to Workgroup Consultation
Annex 15	GC0148 Ofgem Send Back Letter
Annex 16	GC0148 Send Back submitted Legal Text
Annex 17	Alternative Proposal (WAGCM1)
Annex 18	Alternative and Workgroup Vote
Annex 19	Changes to Legal Text (Post Workgroup Consultation)
Annex 20	Legal Text
Annex 21	Code Administrator Consultation Responses Summary
Annex 22	Code Administrator Consultation Responses
Annex 23	Summary of Legal Text queries raised through the Code Administrator Consultation and actions taken
Annex 24	ESRS Modifications Timeline