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| Workgroup 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**    **Proposal Form**  09 February 2022  **Workgroup Consultation**  21 November 2022 – 21 December 2022  **Workgroup Report**  22 March 2023  **Code Administrator Consultation**  03 April 2023 – 03 May 2023  **Draft Modification Report**  17 May 2023  **Final Modification Report**  05 June 2023  **Implementation**  TBC  **1**  **2**  **3**  **4**  **5**  **6**  **7** | |
| **Have 10 minutes?** Read our [Executive summary](#_Executive_summary_1)  **Have 90 minutes?** Read the full [Workgroup](#_Why_change?) Report  **Have at least 6 working days?** Read the full Workgroup Report and Annexes | | | |
| **Status summary:** The Workgroup have finalised the proposer’s solution as well as 1 alternative solution. They are now seeking approval from the Panel that the Workgroup have met their Terms of Reference and can proceed to Code Administrator Consultation | | | |
| **This modification is expected to have a: High impact**  On Restoration Contractors[[1]](#footnote-2), Generators, Non CUSC Parties, Transmission Licensees, Interconnectors, Transmission Owners, Distributed Network Operators, Non-Embedded Customers, Virtual Lead Parties and the Electricity System Operator | | | |
| **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](mailto:Sade.adenola@nationalgrideso.com) /[antony.johnson@nationalgrideso.com](mailto:antony.johnson@nationalgrideso.com)  0774 818 0789 | | **Code Administrator** **Chair**:  Banke John-Okwesa  [Banke.john-okwesa@nationalgrideso.com](mailto:Banke.john-okwesa@nationalgrideso.com)  0792 971 6301 |

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# Executive summary

What is the issue?

On 24 August 2021, Ofgem published a [decision letter](https://www.ofgem.gov.uk/publications/decision-licence-modifications-facilitate-introduction-electricity-system-restoration-standard) stating that they made the decision to make the licence modifications[[2]](#footnote-3) 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]](#footnote-4). 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]](#footnote-5). 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 Ofgem decision

**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 be able to have critical tools and facilities in place for up to 72 hours and for their Plant to achieve existing cold start times following the loss of site supplies in a Total or Partial Shutdown situation.

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](https://www.nationalgrideso.com/electricity-transmission/industry-information/codes/connection-and-use-system-code-cusc-old/modifications/cmp398-gc0156-cost), [CMP412)](https://www.nationalgrideso.com/electricity-transmission/industry-information/codes/connection-and-use-system-code-cusc-old/modifications/cmp412-cmp398), STC ([CM089](https://www.nationalgrideso.com/industry-information/codes/system-operator-transmission-owner-code-stc-old/modifications/cm089)), BSC ([Issue 100](https://www.elexon.co.uk/smg-issue/issue-100/#:~:text=Issue%20100%20was%20raised%20by,development%20at%20future%20Workgroup%20meetings.)), Distribution Code [(DCRP/MP/22/02)](http://www.dcode.org.uk/dcode-modifications/2022-modifications.html), SQSS (to be presented to Panel on 16 March 2023) and related documents ([EREC G99](http://www.dcode.org.uk/assets/uploads/ENA_EREC_G99_Issue_1_Amendment_9__2022_.pdf) and [EREC G59](http://www.dcode.org.uk/assets/files/Qualifying%20Standards/ENA_EREC_G59_Issue_3_Amendment_7_(2019).pdf)).

What is the issue?

In April 2021, the Department for Business, Energy and Industrial Strategy (BEIS) released a [policy statement](https://www.gov.uk/government/publications/introducing-a-new-electricity-system-restoration-standard) 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](https://www.ofgem.gov.uk/publications/consultation-licence-amendments-facilitate-introduction-electricity-system-restoration-standard) related to the required licence changes in April 2021 followed by a [statutory consultation](https://www.ofgem.gov.uk/publications/statutory-consultation-licence-amendments-facilitate-introduction-electricity-system-restoration-standard-0) 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.

This modification will build on the work completed through the implementation of the EU Emergency and Restoration Code[[5]](#footnote-6) which was in part introduced to the Grid Code through Grid Code modifications [GC0125](https://www.nationalgrideso.com/uk/electricity-transmission/industry-information/codes/grid-code-old/modifications/gc0125-eu-code-emergency-restoration-black), [GC0127](https://www.nationalgrideso.com/uk/electricity-transmission/industry-information/codes/grid-code-old/modifications/gc0127-eu-code-emergency-restoration) and [GC0128](https://www.nationalgrideso.com/uk/electricity-transmission/industry-information/codes/grid-code-old/modifications/gc0128-eu-code-emergency-restoration) and further being implemented through Grid Code modification [GC0148](https://www.nationalgrideso.com/uk/electricity-transmission/industry-information/codes/grid-code-old/modifications/gc0148-implementation-eu-emergency-and-0) (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 Ofgem’s direction. This would also be consistent with the proposals being put forward to change the other industry codes such as the CUSC – [CMP398](https://www.nationalgrideso.com/industry-information/codes/connection-and-use-system-code-cusc-old/modifications/cmp398-gc0156-cost) and [CMP412](https://www.nationalgrideso.com/electricity-transmission/industry-information/codes/connection-and-use-system-code-cusc-old/modifications/cmp412-cmp398), STC – [CM089](https://www.nationalgrideso.com/industry-information/codes/system-operator-transmission-owner-code-stc-old/modifications/cm089), SQSS (to be presented to Panel on 16 March 2023) and BSC – [Issue100](https://www.elexon.co.uk/smg-issue/issue-100/#:~:text=Issue%20100%20was%20raised%20by,development%20at%20future%20Workgroup%20meetings.).

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

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](https://www.nationalgrideso.com/uk/electricity-transmission/industry-information/codes/grid-code/modifications/gc0108-eu-code-emergency-restoration-black-start) (EU Code: Emergency & Restoration: Black Start testing requirements).

Workgroup considerations

The Workgroup met 13 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 5 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]](#footnote-7) 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 6.

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 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.

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](https://www.nationalgrideso.com/industry-information/codes/connection-and-use-system-code-cusc-old/modifications/cmp398-gc0156-cost) 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 (2017/2196)[[7]](#footnote-8) 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 with two different legal meanings. 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:

1. Restoration Contractor which would be defined as “An Anchor Restoration Contractor or a Top Up Restoration Contractor”.

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.

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.

The term Restoration Service Provider is to be retained to reflect the definition in the Emergency and Restoration Code.

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]](#footnote-9), 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 signed document (between the contracted asset owner(s), the ESO and the Network Operator) 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 managed by the ESO except in Scotland where the ESO may delegate this responsibility to the relevant Scottish Transmission Licensee through STCP 06-1.

To develop a LJRP there is liaison between the Restoration Contractor, Relevant TO 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 a 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, at 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 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 a mains resilient system.

The Distributed ReStart Development

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 13.

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:

1. **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 these 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 System (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

1. Ensure that their control Systems 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) 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.

1. **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’[[9]](#footnote-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.

1. **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 assets shall provide this service to either the Transmission System or the distribution System. These assets shall provide this service to either the transmission system or the distribution system. These assets are not required to be capable of energising a dead section of network (ref 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 these assets are supported by independent power supplies to enable them be reconnected immediately when they are instructed when the system is reenergised at their site.

1. **Distribution Network Operators**
2. 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.

1. 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[[10]](#footnote-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 expanded together with the obligations upon specific parties would be specified in the Distribution Restoration Zone Plan.

1. **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 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.

Feedback on the Potential Implications of ESRS on Aggregators

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 Ofgem 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[[11]](#footnote-12), the four GC0156 subgroups were established to examine certain aspects of GC0156[[12]](#footnote-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 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 response 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. 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 response to the consultation addressing queries and concerns are available in Annex 15:

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
  + 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.

Retrospectivity

* Whilst the retrospective application of the [72 hours] mains independence period is necessary to facilitate the requirement for Critical Tools and Facilities, 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 Proposer was not convinced that the requirements of ESRS would be fully met without retrospectivity.

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
* 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](https://www.nationalgrideso.com/industry-information/codes/connection-and-use-system-code-cusc-old/modifications/cmp398-gc0156-cost) 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 that that Ofgem CBA had been undertaken without consideration of the impacts of the proposed GC0156 original solution of 72 hours resilience applying retrospectively.

At Workgroup meeting 11, the Proposer raised a suggestion that, as the CBA is not available to the Workgroup, parties could submit their individual cost assessments for Ofgem to consider (\*ref to above). 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 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 Transmission Demand, 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 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 Electricity System Restoration Standard 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 Relevant Electrical Standard is reasonable as an interim solution but eventually 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 an Electrical Standard but outside of the GC0156 workgroup.

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 and ESO representative noted the following:

* Changes relating to DRZPs will be managed during the contracting stage whilst generic changes arising from evolution of distribution systems will be managed via the assurance framework.
* Consolidating various changes into a separate subcode of the Grid Code introduces additional complexity as some restoration obligations are also relevant during BAU operations.
* 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 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 as the cause (or suspected cause) of the Shutdown will be in terms of compliance with [GC0151](https://www.nationalgrideso.com/industry-information/codes/grid-code-old/modifications/gc0151-grid-code-compliance-fault-ride). 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 explicitly 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 genuine fault ride through problem.

Terms of Reference Review

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

* Objective (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 was raised 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 advised that ………………….
* Objective (b): “*Review draft legal text should have been provided*”- as at meeting 11 the draft legal texts were still due to be finalised following series of 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.
* Objective (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. Details of GC0148 Send Back provided below.

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

The Code Administrator received the Ofgem Send Back letter for GC0148 (Annex 16) stating: “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 Ofgem 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 through the GC0156 discussions) to ensure GC0156 wasn’t also Sent Back for similar reasons, 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 GC0148 Workgroup meetings reconvening………

Supplementary Documents

Following the Workgroup Consultation, the supplementary documents listed below in Annexes 7 – 12 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
* System Defence Plan
* System Restoration Plan
* System Test Plan
* Control Telephony Electrical Standard
* Communications Standard

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 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 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 Original Modification 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[[13]](#footnote-14) 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.

The Proposer commented that the 72hrs 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. CATOs have been excluded from the drafting of the legal text as this is expected to be picked up as part of the [GC0159](https://www.nationalgrideso.com/industry-information/codes/grid-code-old/modifications/gc0159-introducing-competitively-appointed) 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 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 18

The draft legal text for this modification proposal can be found in Annex 6.

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 XX XXXXX to carry out their Workgroup vote. The full Workgroup vote can be found in Annex 17. 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**

1. To permit the development, maintenance and operation of an efficient, coordinated and economical System for the Transmission of electricity
2. 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);
3. 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;
4. 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
5. To promote efficiency in the implementation and administration of the Grid Code arrangements

**Assessment of the Original, WAGCM1 vs Baseline**

The Workgroup concluded unanimously/by majority that the Original and/or WAGCM1 better facilitated the Applicable Objectives than the Baseline.

|  |  |
| --- | --- |
| **Option** | **Number of voters that voted this option as better than the Baseline** |
| Original |  |
| WAGCM1 |  |
| Baseline |  |

**Best Option**

|  |  |  |  |
| --- | --- | --- | --- |
| **Workgroup Member** | **Company** | **BEST Option?** | **Which objective(s) does the change better facilitate? (if baseline not applicable)** |
| Alastair Frew | Drax |  |  |
| Andrew McLeod/Alan Creighton | Northern Powergrid |  |  |
| Andrew Vaudin | EDF |  |  |
| Bill D’Albertanson | UK Power Networks |  |  |
| Garth Graham | SSE Generation |  |  |
| Graeme Vincent | SP Energy Networks |  |  |
| Graz Macdonald | Waters Wye |  |  |
| Gwyn Jones | Western Power Distribution |  |  |
| Michelle Macdonald | SSEN Transmissions |  |  |
| Priyanka Mohapatra | Scottish Power |  |  |
| Robert Longden | Eneco Energy Trade BV |  |  |
| Sade Adenola/Tony Johnson | ESO |  |  |
| Tolu Esan/Gavin Anderson | Electricity North West Ltd |  |  |

When will this change take place?

### Implementation date

10 working days following Ofgem decision

### Date decision required by

Q3 2022

### 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[[14]](#footnote-15) | Other modifications | Other |

Acronyms and key terms

|  |  |
| --- | --- |
| **Acronym / key term** | **Meaning** |
| BEIS | (Department for) Business, Energy and Industrial Strategy |
| BSC | Balancing and Settlement Code |
| BM | Balancing Mechanism |
| CATO | Competitively Appointed Transmission Owners |
| 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 |
| EU | European Union |
| GB | Great Britain |
| GC | Grid Code |
| GCRP | Grid Code Review Panel |
| LJRP | Local Joint Restoration Plan |
| NETS | National Electricity Transmission System |
| NGESO | National Grid Electricity System Operator |
| RC | Restoration Contractors |
| RSP | Restoration Service Providers |
| STC | System Operator Transmission Owner Code |
| SQSS | Security and Quality of Supply Standards |
| OC | Operating Code |
| OFTO | Offshore Transmission Owner |
| T&Cs | Terms and Conditions |
| TO | Transmissions Owner |
| WAGCM | Workgroup Alternative Grid Code Modification |

Annexes

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| **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 | Draft Legal Text |
| Annex 7 | Distribution Restoration Zone Control System Standard |
| Annex 8 | System Defence Plan |
| Annex 9 | System Restoration Plan |
| Annex 10 | System Test Plan |
| Annex 11 | Control Telephony Electrical Standard |
| Annex 12 | Communications Standards |
| Annex 13 | Distributed ReStart and Industry Codes Recommendations |
| Annex 14 | Workgroup Consultation Response summary document |
| Annex 15 | ESO Full Response to Workgroup Consultation |
| Annex 16 | GC0148 Ofgem Send Back Letter |
| Annex 17 | Workgroup Vote |
| Annex 18 | Changes to Legal Text (Post Consultation) |

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 [↑](#footnote-ref-2)
2. Which can be found via this link: [Decision on licence modifications to facilitate the introduction of an Electricity System Restoration Standard | Ofgem](https://www.ofgem.gov.uk/publications/decision-licence-modifications-facilitate-introduction-electricity-system-restoration-standard) [↑](#footnote-ref-3)
3. BEIS is now referred to as Department for Energy Security and Net-Zero (DESNZ) [↑](#footnote-ref-4)
4. BEIS later specified that “electricity Demand” should be calculated as “Transmission Demand” [↑](#footnote-ref-5)
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)](https://www.legislation.gov.uk/eur/2017/2196/contents) &

   [The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019](https://www.legislation.gov.uk/uksi/2019/533/made) [↑](#footnote-ref-6)
6. [What is the Distributed ReStart project? | National Grid ESO](https://www.nationalgrideso.com/future-energy/projects/distributed-restart) [↑](#footnote-ref-7)
7. Which in substance is retained GB law. [↑](#footnote-ref-8)
8. As defined in the Grid Code. [↑](#footnote-ref-9)
9. Black Start Plant provided all of the individual services that will, in combination, now be provided separately by Anchor and Top-Up providers. [↑](#footnote-ref-10)
10. i.e. Anchor and Top-Up plant. [↑](#footnote-ref-11)
11. Established by the ESO, to consider the implementation of ESRS, which concluded before GC0156 was raised. [↑](#footnote-ref-12)
12. (i) Future Networks, (ii) Assurance Activities, (iii) Communications Infrastructure and (iv) Markets and Funding Mechanism [↑](#footnote-ref-13)
13. [Introducing a new ‘Electricity System Restoration Standard’: policy statement - GOV.UK (www.gov.uk)](https://www.gov.uk/government/publications/introducing-a-new-electricity-system-restoration-standard/introducing-a-new-electricity-system-restoration-standard-policy-statement) [↑](#footnote-ref-14)
14. 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. [↑](#footnote-ref-15)