|  |  |  |  |
| --- | --- | --- | --- |
| Workgroup Consultation | | | |
| **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 transmission 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 – 09 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 5 minutes?** Read our [Executive summary](#_Executive_summary_1)  **Have 20 minutes?** Read the full [Workgroup Consultation](#_Why_change?)  **Have 30 minutes?** Read the full Workgroup Consultation. | | | |
| **Status summary:** The Workgroup are seeking your views on the work completed to date to form the final solution(s) to the issue raised. | | | |
| **This modification is expected to have a:** High impact  On Restoration Service Providers, Generators, Non CUSC Parties, Transmission Licensees, Interconnectors, Transmission Owners, Distributed Network Operators, Non-Embedded Customers and the Electricity System Operator | | | |
| **Modification drivers:** NGESOs compliance with the 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?** | **Proposers:**  Sade Adenola / Tony Johnson  [Sade.adenola@nationalgrideso.com](mailto:Sade.adenola@nationalgrideso.com) /[antony.johnson@nationalgrideso.com](mailto:antony.johnson@nationalgrideso.com)  07748180789 | | **Code Administrator** **Chair**:  Banke John-Okwesa  [Banke.john-okwesa@nationalgrideso.com](mailto:Banke.john-okwesa@nationalgrideso.com)  07929716301 |
| **How do I respond?** | Send your response proforma to [grid.code@nationalgrideso.com](mailto:grid.code@nationalgrideso.com) **by 5pm on 09 December 2022** | | |

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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[[1]](#footnote-2) to introduce the ESRS within the GB regulatory framework. The modification decisions are publicly available and were implemented from 19 October 2021. 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 to be restored within 24 hours in all regions and 100% of electricity demand 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. 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, that 60% of transmission demand can be restored within all regions of GB in 24 hours and 100% of transmission demand can be restored in 5 days nationally. This is against the background that the GB electricity system electricity system is in an intact and operable state and that there is not significant damage to electrical plant and apparatus.

**Implementation date:** 10 working days following Ofgem decision

**Summary of potential alternative solution(s) and implementation date(s):** No alternative raised to date

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 Service Providers (RSPs), transmission network owners, distribution network operators (DNOs) and the ESO.

Interactions

There are likely to be consequential changes for the other electricity industry codes, for example the CUSC, STC, BSC, Distribution Code and related documents/G99, ERECG99 and EREC G59.

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) 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 to be restored within 24 hours in all regions and 100% of electricity demand 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 Service Providers, 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 NETS, that 60% of transmission demand can be restored within all regions of GB in 24 hours and 100% of transmission 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 ([EU 2017/2196](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0631&from=EN)) 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 Re-Start 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 ‘electricity system restoration’ in line with the licence changes described above. This would also be consistent with the proposals being put forward to change the other industry codes such as the CUSC, STC and BSC.

The solution will also need to include changes to the System Restoration Plan and potentially the Test Plan.

As part of this modification, the proposer will also 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 8 times to discuss the issues, detail the scope of the proposed defect, devise potential solutions and assess the proposal in terms of the applicable code objectives. The workgroup was well-represented; 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, required experts were invited to join the workgroup/subgroup meetings to provide their views.

ESO Presentation on Modification Requirements

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

* The aim of this GC0156 modification is to facilitate the implementation of the ESRS requirements including, in particular that 60% of transmission 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.
* GC0148 is progressing and includes updates to low frequency demand disconnection, communications systems, critical tools and facilities, the System Defence Plan, System Restoration Plan, Test Plan, how smaller 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 Project[[2]](#footnote-3) 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 Distributed Re-Start provisions were best placed within the scope of this GC0156 modification. The Distributed Re-Start project seeks to introduce the necessary Grid Code modifications to support provision of services by distribution connected generators who are able to energise and restore sections of the Distribution Network Operators system. This is seen as a further tool to restore sections of the Total System against a background of diminishing traditional Black Start Service providers
* The Distributed Re-Start provisions are included within the GC0156 legal text available in Annex 5.

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 initial findings that had been compiled by the workgroups reflecting the majority views, including the suggestion to create 4 sub-groups. These subgroups form subsets within the GC0156 Workgroup and continue to explore the options and issues in the following areas: (i) Future Networks, (ii) Assurance Activities, (iii) Communications Infrastructure and (iv) Markets and Funding Mechanism. The agreed Terms of Reference for each of these GC0156 subgroups are available in Annex 4. Full details of the ESO’s ESRS working group recommendations and reports. The reports are available in Annex 3.

Implementation Costs

Workgroup members expressed the need to draft the legal text for the GC0156 solution so that they could understand the extent of the proposed changes and the draft legal text before deciding whether there is a need for a cost benefit analysis to be undertaken and what factors would need to be considered within this. Some workgroup members expressed that some form of cost estimation will be sufficient not necessarily a full Cost Benefit Analysis (CBA).

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

In summary, the proposed approach with GC0156 would, currently, see parties provided with additional obligations which, in turn, gives rise to implementation costs. Who these parties are and the mechanism by which they could (or could not) recover those implementation costs are set out in the table below:

|  |  |
| --- | --- |
| **Obligated Party** | **Cost Recovery Mechanism** |
| ESO | Price Control / Re-opener |
| TO | Price Control / Re-opener |
| DNO | Price Control / Re-opener |
| OFTO | Unclear |
| Contracted Restoration Service Providers | Contract with ESO |
| Non Contracted Restoration Service Providers | None |

Discussions on Restoration

The ESO representative explained that 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[[3]](#footnote-4), 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. which is a process set out in a tri-party agreement (between the contracted asset owner, the ESO and the network owner). From this, transmission system energisation steps within the Plans (LJRPs) are implemented whereby sections of Distribution system distribution networks are connected together to the transmission system, with subsequent blocks of demand connected. During this process there is liaison between the power station and the DNO in coordination with the ESO. In each case the LJRP is used to form a Power Island. As the restoration progresses these individual Power Islands are subsequently connected together to form a skeleton network to facilitate the connection of other Power Stations including those within distribution networks and those without a current ‘black start’ capability. This also enables restoration of demand (as detailed in OC9 of the Grid Code, The Proposer noted O that going forward, the number of traditional restoration service providers is reducing, and additional provision and solutions need to be developed to restore the NETS in accordance with the ESRS parameters. Thus, it remains in everyone’s best interest to restore the system as quickly as possible in the most economic manner.

Clarification of Definition of Restoration Demand

Given a number of conflicting potential definitions. The Workgroup reviewed the proposed definition of ‘Demand’ in the context of the restoration of 60% of demand in 24 hours and the100% in five days as set out in the ESRS. Workgroup members sought clarification of the definition of Demand as stated demand in the BEIS direction letter to NGESO. The workgroup noted the definition is critical and highlighted the following practical broad concerns:

* It is too vague; it and does not specify the expectations of areas where the transmission demand may be zero or negative at the time of GB peak[[4]](#footnote-5) ;
* There is no consideration of the significant variation in demands between weekends versus weekday impacts[[5]](#footnote-6)
* Focussing on transmission demand as opposed to the target percentages to be restored related to the whole total system demand or transmission demand[[6]](#footnote-7) leaves the restoration of the total system demand uncertain and undefined.

A colleague from BEIS clarified the definition at one of the Workgroup Meetings. They confirmed that BEIS’s direction specifies that “electricity demand” should be calculated as “transmission demand”, that being demand on the NETS. The requirement to restore 60% of transmission demand within 24 hours (and 100% 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 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 ‘distribution demand’; that is demand, over and above that arising from the NETS, from the DNOs and IDNOs; and that this may not be sufficient to stabilise the NETS meaning the GB electricity system as a whole including (at transmission and / or distribution network demand). 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 are obliged to restore enough demand to stabilise the system advising 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 ESO representative clarified that the proposed 60% of transmission demand had been developed by simulations undertaken by the ESO and it was simply a proxy for a level of restoration which broadly reflects the nations critical infrastructure and welfare requirements. The BEIS representative suggested that the ESO and industry need to work together to facilitate the ESRS and ensure any ‘nuances’ are understood.

**The Distributed Restart Project**

The Distributed Restart Project[[7]](#footnote-8) was an Network Innovation Competition funded initiative that examined if embedded assets (such as generation and batteries connected to distribution networks) can provide restoration services to the ESO in the event of a partial or total shutdown. The conclusions of the project has proposed the creation of Distribution Restoration Zones (DRZs) as a means for facilitating the restoration process with distribution connected assets. The Distributed Restart Project provides this additional facility for the wider restoration process and, as a result, substantial changes to both the Grid Code and Distribution Code associated with it are being developed. However, the conclusions of the Distributed Restart Project is that it is not a mandatory requirement for DNOs, or potential restoration service providers to develop or participate in a Distributed Restoration Zone, , as the necessary embedded generation facilities may not exist or there may not be an appropriate network topology. Nevertheless, following the live trials which have been established as part of the Distributed Restart Project, the information exists for DNOs to consider developing these capabilities to help support achieve the implementation of the ESRS.

In the event of a partial or total shutdown the traditional approach to System Restoration in GB is a top-down approach where black start stations (traditionally transmission connected) are instructed by the ESO to energise dead sections of transmission network to form a power island. Blocks of demand (block load) are then connected by the TO / DNO under the requirements of a Local Joint Restoration Plan (LJRP). . The LJRP process runs in parallel across the transmission system to form a skeleton network whereby further power stations and demand are restored. Traditionally, black start stations have been drawn from the fleet of coal, hydro, and gas power stations with some input from HVDC Interconnectors. Going forward it is recognised that, primarily in terms of thermal plant which are generally carbon based, these providers are reducing in numbers as a result of the drive toward renewable technologies.

The conclusions of the Distributed Restart Project recognises the growth in embedded generation and from this, the pool of capability from distribution connected assets that could be used to energise sections of the distribution network to form a distribution restoration zone. In this scenario, the ESO would instruct the DNO (following formal agreement between the ESO and the DNO, including covering the DNO undertaking any necessary enabling works) to establish a DRZ which would be defined in an accompanying distribution restoration zone plan (DRZP), similar to an LJRP.  The aim here is to run the traditional black start arrangements at transmission in parallel with the DRZs at distribution to restore the whole system to normal operation as soon as possible whilst also capitalising on the Embedded Generation assets.

The DZRP revolves around the new rôle of anchor generator, which is an embedded generator that is capable energising and loading sections of the Distribution Network. An Anchor Generator would be expected to provide a voltage source and therefore a grid forming capability would be required. The anchor generator may be supported by one or more top-up service providers who are capable of providing addition electrical energy input, albeit not necessarily grid forming, or a range of ancillary services to assist with running a stable power island, such as reactive power capability, inertia etc, and even flexible demand so as to assist with the load growth. Collectively all of these parties are referred to as restoration service providers. The Distributed Restart Project considered the balance between requirements embodied in the industry codes and contractual requirements, the various models for both the structure of any necessary contracts, who the contracts should be between, and who the lead procurement party should be.  These considerations are covered in sections 10.1 and 3.3 of the Project’s conclusions report “Distribution Restoration future commercial structure and industry codes recommendations” (December 2021) (See Annex X of this consultation document).  The Distributed Restart Project’s preferred approach is for tripartite agreements between the DNO, NGESO and the restoration service providers (be they either as an anchor generator or as a top-up service provider), with NGESO taking the procurement lead.  This would require that restoration service providers enter into a tripartite contract with NGESO and the relevant DNO.  The contract would be procured by NGESO through a tendering process.  Figures 2.0 and 3.0 below show the proposed relationships.

Diagram

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Figure 2.0

Figure 3,0Diagram

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Figure 3.0

NGESO has the licence obligation associated with ESRS and the income stream to remunerate the restoration services and therefore the technical requirements need to be placed in the Grid Code (hence this GC0156 modification).  The Grid Code legal text which is part of this modification encapsulates the whole distribution restoration process through a DRZ, and specifically covers the requirements on DNOs and restoration service providers. The current Grid Code does permit Embedded Generators to be part of an Local Joint Restoration Zone Plan or a Distribution Restoration Zone Plan. In a Local Joint Restoration Plan instructions are given directly from the ESO to the parties within that plan whereas in the case of a Distribution Restoration Zone Plan instructions are given by the Network Operator to parties with the specific aim of energising and loading parts of the Distribution System. .  Stakeholders views on the design of the contractual arrangements and the relationship with the codes will be welcome.

Sample contracts for anchor generators and top up services are included in Annex X and views on these contracts is sought through one of the consultation questions.

**Effects of this Proposed Modification on Generators, Storage and Interconnectors**

There are a number of areas of this proposed modification which will affect both existing and new generators who are either going to be just providing the proposed new mandatory requirements, or others who are providing additional commercial services via a contract with the ESO (awarded via a tendering process). The proposed changes are as follows:

**Generators, Storage and Interconnectors only providing Mandatory Services**

This section applies to all new and existing generators, storage and interconnectors who are transmission connected or large embedded. It is proposed by the ESO with the GC0156 Original that all these connected assets shall:-

1. Ensure that all communications equipment within their site connected to the ESO commination’s system (i.e. Control Telephony) shall continue to operate within the site for a minimum of 72 hours after the failure of all external electricity supplies to the 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 synchronise and load up typically as per its cold start dynamic parameters. For the avoidance of doubt 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 the external electricity supplies. This capability to start must be maintained for a period of at least 72 hours from the failure of the external electricity supplies. Also the cold start dynamic parameters are those which have been submitted in the week 24 schedule 2 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).
3. 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 also these operating modes are interfaced into the main control point controls and staff are familiar with these requirements.

A Workgroup member examined these proposed new technical obligations (set out above) concerning 72 hours resilience for existing assets (plus the communications on site) and noted that compared to the baseline situation today these proposed changes 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 paper can be found at Appendix [X] to this consultation.

The Workgroup would welcome views as to which of the above two scenarios for non-contracted assets are the most realistic.

**Anchor Generators**

For existing Black Start providers, this is just a change of terminology. However whereas the previous Blackstart Generator terminology generally applies to generation and interconnectors and (pump) storage assets; they would also be part of a Local Joint Restoration Plan which would also apply to Embedded Generators. The term Anchor Generator has been used to define a Generator which can re-energise part of the Distribution System as part of a Distribution Restoration Zone. The Anchor Generator together with Top Up Restoration Service Providers can be used to supply increasing volumes of demand formed as part of the Distribution Restoration Zone. Going forward it is proposed to have similar terminology for Anchor Plant and Top Up restoration Service Providers be they part of a Local Joint Restoration Zone Plan or a Distribution Restoration Zone Plan. This will ensure parity between providers and also acknowledge the difference in Transmission arrangements between England and Wales, Scotland and Offshore.

**Top-up Generators**

This is a new category of asset which is proposed to be introduced by this modification and will only apply to assets who enter into a commercial agreement with the ESO to provide this service. 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, however they are required to be capable of starting quickly when external electricity supplies are restored to the site and then provide their contracted capability to assist in restoring demand as part of the Local Joint Restoration Zone Plan or Distribution Restoration Zone Plan. The exact requirements of these will be detailed in the asset Owner’s contract.

**Effects of this Proposed Modification on DNOs**

There are a number of areas of this proposed modification which will affect both existing and new DNOs who are just providing mandatory requirements and recovering the associated costs via their price control mechanism (or associated ‘re-opener’), The proposed changes are as follows

**DNOs without Distribution Restoration Zone Plans**

This section applies to all new and existing DNOs and it is proposed that all DNOs shall:-

1. Ensure that all communications equipment connected to the ESO communication’s system shall continue to operate for a minimum of 72 hours after the failure of all external electricity supplies to the site.
2. Ensure that on the failure of all external electricity supplies to substation sites, all equipment on the site shall shutdown safely. 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. For the avoidance of doubt the DNO substation sites 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 unavailable. This capability to start must be maintained for a period of at least 72 hours from the failure of the external electricity supplies.
3. Ensure that they have the capability of energising all core Transmission and Distribution substations within 24 hours.
4. Ensure that they have the capability of energising all customers within 96 hours.

**DNOs with Distribution Restoration Zone Plans**

If a DNO decides to implement a DRZ then they will enter into a tri lateral contract with the Restoration Service Provider and ESO. They may install a DRZ controller and other equipment to operate the DRZ should they wish to do so. They shall also be required to be able to select different protection setting changes, and modified earthing, to enable the DRZ to operate

**Effects of this Proposed Modification on BM Participants**

Currently BM Participants who are not directly connected to the Transmission System or Large Embedded Power Stations are only required to comply with Connection Condition (& European Connection Condition) sections in either CC.6.5 or ECC.6.5 and submit data as per the BCs. This is so they can operate and be instructed in the wholesale market.With this modification there are more significant changes. 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 commination’s system shall continue to operate for a minimum of 72 hours after the failure of all external electricity supplies to the 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, their Plant shall be able to synchronise and load up as would be expected from a cold start unit. For the avoidance of doubt, the site needs to either have or be capable of mobilising all required personnel and resources to site within the required timescales whilst all external ESI electricity supplies are dead. This capability to start 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 schedule 2 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 electricity supplies were restored to the site).

**GC0156 Subgroups Objectives**

In line with the recommendation of the non-code working group four GC0156 subgroups were established to examine certain aspects of GC0156[[8]](#footnote-9) which met on a bi-weekly basis between July 2022 – October 2022. The aim of these subgroups was to consider and develop the necessary 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 only although the report will feed into other codes (modification proposals, CUSC & BSC most especially).

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 network operators, TOs, OFTOs, DNOs, restoration service providers and any other relevant parties required to facilitate the implementation of the ESRS.

The ESO representative and a Workgroup member representative advised the workgroup that the December 2026 deadline is challenging to get the required 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. Full details of the subgroups Terms of Reference and the subgroup reports are available in Annex 4

## Draft legal text

The legal drafting for this modification was achieved by a collaborative approach between 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 CATO modification proposal raised at the Grid Code Review Panel in September 2022.

The draft legal text for this modification proposal can be found in Annex 5.

What is the impact of this change?

## Proposer’s assessment against Code Objectives

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| **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 service providers and CUSC Parties and to put measures in place to restore the NETS as soon as possible following a total or partial national power outage. |
| (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 national power outage 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 Oct 2021 can be satisfied and discharged. |
| (e) To promote efficiency in the implementation and administration of the Grid Code arrangements | **Neutral** |

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| 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 national power outage 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 national power outage. 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. |

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[[9]](#footnote-10) | Other modifications | Other |

How to respond

## Standard Workgroup consultation questions

1. Do you believe that GC0156 Original proposal better facilitates the Applicable Objectives?
2. Do you support the proposed implementation approach?
3. Do you have any other comments?
4. Do you wish to raise a Workgroup Consultation Alternative request for the Workgroup to consider?

## Specific Workgroup consultation questions

1. Do you believe that a cost benefit analysis should be undertaken by the Workgroup and if yes what factors should be considered?
2. Do you believe that parties obligated by GC0156 should have a cost recovery mechanism in place?
3. Do you agree that the draft legal text is appropriate and sufficient to implement GC0156? If not please provide your suggestions?
4. The GC0156 proposed solution would be applied retrospectively to existing assets.  Do you agree with this retrospective application and if not, what is your rationale / view about this?
5. Are they any barriers to new entrants to provide restoration services that are not covered in the GC0156 legal drafting?
6. Do you believe it is appropriate to have a mains independence minimum resilience period of 24 hours as required by the NCER or 72 hours general GB standard for existing black start purposes as proposed as part of the ESRS work for all BM parties? Do you agree with a retrospective application of this and if not, what is your suggestion / views about this?
7. As a stakeholder, are there any implications of the proposed future requirements which are not clear?
8. Do you think that the proposals will help restore customer supplies as soon as possible?
9. Do you think that the proposals are sufficient to ensure that NGESO can Do you think that there is a common understanding between stakeholders of the demand to be restored in GB required by ESRS?
10. Do you think that there is a common understanding between stakeholders of the demand to be restored in GB required by ESRS?
11. The distributed restart legal text has been drafted on the basis that NGESO will lead on the procurement of restoration services. Do you think this should move to DNO led in future? If yes, please explain why
12. Do you believe the approach proposed to introduce non-CUSC parties under the framework of the NCER (i.e. non-CUSC parties who have a contract with the ESO as restoration service providers) is an appropriate solution going forward? If not, please explain why you believe this is the case.
13. Do you agree that all the costs associated with TO/DNO implementation of ESRS should be recovered through their respective price controls? If not, what funding mechanism do you favour?
14. Do you believe that cyber security requirements in accordance with the NIS standard are sufficient and should be referenced in the Grid Code?
15. Do you see any barriers for Network Operators and Users to deliver the changes proposed to implement the ESRS by December 2026?
16. Do you think the right requirements have been identified for Network Operators in terms of Network design and operational capability as summarised in the consultation document and described in detail in the proposed legal text in CC/ECC.6.4.6.3b?   
    OC9.1.1, OC9.2.1, OC9.4.7.5.1 (b)(x); OC9.4.7.5.1 (c)(xi); OC9.4.7.5.2 (a)(xii); OC9.4.7.5.2 (b)(xii);
17. Do you believe there should be further assurance activities in addition to those described in the proposed legal text within OC5? If yes, please state the activity and explain why.
18. Do you believe there should be further assurance activities in addition to what we have described in the proposed legal text within OC5? If yes, please state the activity and explain why.
19. Do you believe there are further changes to the network i.e NETS and/or Distribution Network required to implement ESRS obligations?
20. The distributed restart legal text has been drafted on the basis that   
    i) there will be a connection agreement with the DNO that binds an embedded restoration service provider to the Distribution Code and   
    ii) a tripartite agreement that binds the embedded restoration service provider to the relevant parts of the Grid and Distribution Codes.   
    Do you see any difficulties with this proposed contractual arrangement?
21. Do you have any views on how the requirements should be implemented into the Grid Code bearing in mind the requirements of the ESRS are not enforceable until 31 December 2026.

The workgroup is seeking the views of Grid Code users and other interested parties in relation to the issues noted in this document and specifically in response to the questions above.

Please send your response to [grid.code@nationalgrideso.com](mailto:grid.code@nationalgrideso.com)using the response pro-forma which can be found on the [GC0156](https://www.nationalgrideso.com/electricity-transmission/industry-information/codes/grid-code-old/modifications/gc0156-implementation-electricity-system) modification page.

In accordance with Governance Rules if you wish to raise a Workgroup Consultation Alternative Request please fill in the form which you can find at the above link.

*If you wish to submit a confidential response, mark the relevant box on your consultation proforma. Confidential responses will be disclosed to the Authority in full but, unless agreed otherwise, will not be shared with the Panel, Workgroup or the industry and may therefore not influence the debate to the same extent as a non-confidential response.*

Acronyms, key terms and reference material

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| **Acronym / key term** | **Meaning** |
| BEIS | Department for Business, Energy and Industrial Strategy |
| BSC | Balancing and Settlement Code |
| CATO | Competitively Appointed Transmission Owners |
| CUSC | Connection and Use of System Code |
| DNO | Distribution Network Operator |
| EBR | Electricity Balancing Regulation |
| ESRS | Electricity System Restoration Standard |
| EU | European Union |
| GC | Grid Code |
| GCRP | Grid Code Review Panel |
| NETS | National Electricity Transmission System |
| NGESO | National Grid Electricity System Operator |
| RSP | Restoration Service Providers |
| STC | System Operator Transmission Owner Code |
| SQSS | Security and Quality of Supply Standards |
| OFTO | Offshore Transmission Owner |
| T&Cs | Terms and Conditions |
| TO | Transmissions Owner |
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### Reference material

* Not applicable

Annexes

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| --- | --- |
| **Annex** | **Information** |
| Annex 1 | Proposal form |
| Annex 2 | Terms of Reference |
| Annex 3 | ESRS Steering Group Reports |
| Annex 4 | Subgroup Terms of Reference and Reports |
| Annex 5 | Draft Legal Text |

1. 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-2)
2. [What is the Distributed ReStart project? | National Grid ESO](https://www.nationalgrideso.com/future-energy/projects/distributed-restart) [↑](#footnote-ref-3)
3. As defined in the Grid Code. [↑](#footnote-ref-4)
4. The Workgroup was advised by some network colleagues that at certain times of the year some DNO areas have very low transmission system demand or even export (to the transmission system) which could mean, in that scenario, that 60% or 100% could be based on a low / zero /negative number. [↑](#footnote-ref-5)
5. The Workgroup noted that if, for example, the partial or total shutdown occurred on, say, a Friday then the quantum of the demand (upon which the 60% target in 24 hours is then based) would be lower for a weekend / Bank Holiday, than if it had occurred, say, on a Monday and vice versa. [↑](#footnote-ref-6)
6. The Workgroup was unclear initially if the ‘Demand’ was based just on NETS demand only or NETS demand plus the demand on the GB distribution systems combined. [↑](#footnote-ref-7)
7. [What is the Distributed ReStart project? | National Grid ESO](https://www.nationalgrideso.com/future-energy/projects/distributed-restart) [↑](#footnote-ref-8)
8. (i) Future Networks, (ii) Assurance Activities, (iii) Communications Infrastructure and (iv) Markets and Funding Mechanism [↑](#footnote-ref-9)
9. 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-10)