

Grid Code Modification Proposal Form

GC0148:**Implementation of EU
Emergency and
Restoration Code Phase II**

Overview: Under the NCER, there are a number of articles which have a completion date of 18 December 2022 and 18 December 2024. The aim of this Modification is to outline the work that needs to be completed within GB to ensure compliance with NCER and address some other related items which neatly fit within the Emergency and Restoration Code arena.

Modification process & timetable

Status summary: The Proposer has raised a modification and is seeking a decision from the Panel on the governance route to be taken.

This modification is expected to have a: **High impact**

The ESO, Users (e.g. DNOs, Generators, Interconnectors, Non-Embedded Customers etc) Transmission Licensees, owners and operators of electricity storage modules, Non-CUSC Parties, Defence and Restoration Service Providers

Modification drivers: EU network code and GB Grid Code Compliance

**Proposer's
recommendation
of governance
route**

Standard Governance modification with assessment by a Workgroup

**Who can I talk to
about the change?****Proposer:**

Antony Johnson

Antony.Johnson@nationalgrideso.com

07966 734856

Code Administrator

Chair: Sally Musaka

Sally.musaka@nationalgrideso.com

07790 778 560

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What is the issue?

The EU Emergency and Restoration Code has a number of deadlines when it comes into legal force. The majority of the requirements applied from 18 December 2018 with the requirements for implementation of the System Defence Plan, System Restoration Plan and Test Plan to be in place by 18 December 2019. Emergency and Restoration Code, Article 55 states that Articles 15(5) to 15(8), Article 41 and 42(1),(2) and (5) shall apply from 18 December 2022. In addition, it is noted that Article 48(3) applies from 18 December 2024. Grid Code modification GC0148 proposes to implement those Articles with deadlines of 2022 and 2024 respectively.

As part of the UK's withdrawal from the EU, the requirements of the Emergency and Restoration Code have been incorporated into GB law through Statutory Instrument SI 533 2019¹. In January 2022 the ESO was made aware that Article 55 had been removed from SI 533 2019. The ESO discussed this issue with Ofgem in February in addition to further raising it with BEIS. Ofgem have advised that they will discuss it with their legal team, but the general advice was to work to the current deadlines as provided for in the Emergency and Restoration Code.

In GB, implementation of the Phase I of the EU Emergency and Restoration Code was achieved through Grid Code modifications GC0125 (EU Emergency & Restoration: Black Start testing requirements for Interconnectors), GC0127 (EU Emergency & Restoration: Requirements resulting from System Defence Plan) and GC0128 (EU Code Emergency & Restoration: Requirements resulting from System Restoration Plan). These modifications were approved by the Authority on 5 February 2020.

This modification GC0148 comprises of three parts, these being:-

- i) the requirement to implement Article 15(5) – 15(8) which relates to low frequency demand disconnection, Article 41 which relates to communications systems and Article 42(1), (2) and (5) which relates to critical tools and facilities. All of these requirements have a compliance date of 18 December 2022.
- ii) the requirement to address some outstanding issues from the implementation of Grid Code modifications GC0125, GC0127 and GC0128 which relate to:-
 - (a) How Non-CUSC parties would fall under the framework of the EU Emergency and Restoration Code noting that the solution provided under Grid Code modifications GC0125, GC0127 and GC0128 applies only to CUSC Parties.
 - (b) Clarity relating to the treatment of Electricity Storage Modules during low System Frequencies as provided for under Article 15(3).
- iii) to consider, if time permits and the workgroup believe appropriate, the requirements relating to Distributed Restart. Distributed Restart is a Network Innovation Allowance project which aims to explore the

¹ <https://www.legislation.gov.uk/uksi/2019/533/contents>

practicality of System Restoration using Embedded Generation and Embedded Restoration Service Providers to restore supplies to parts of Distribution Network Operators' Systems, which to date is an approach that has not been used in GB for overall System Restoration purposes. As this project relates to System Restoration Activities it falls under the provisions of the EU Emergency and Restoration Code.

In addition to the above, there is also the requirement to consider Article 50 which relates to compliance testing and periodic review of the System Defence Plan and Article 48(3) which relates to the requirement to define a Test Plan.

To address the defect, the proposer believes that the Grid Code together with other documents (System Defence Plan, System Restoration Plan and Test Plan) and industry related codes, (the STC, and Distribution Code for Distributed Restart) need to be updated to reflect the NCER requirements (Articles 15(5) – 15(8), Article 41 and 42(1), (2) and (5)) which are effective from 18 December 2022. It is noted that Articles 50, 48(3) and 15(9) are also related to Articles 15(5) – 15(8), 41 and 42(1)(2) and (5), with Article 48(3) having a date of legal effect of 18 December 2024.

Why change?

These changes are necessary to: -

- Ensure compliance with NCER by the required date of 18 December 2022
- Address the outstanding issues raised from implementation of Phase I of NCER.
- The Distributed Re-Start Project recognises the changing system behaviour and the need to obtain Black Start and restoration services from Embedded Generation. The code changes likely to be developed as a result of this work directly relate to the NCER with the same stakeholders, and therefore it is believed to be appropriate to include this within the scope of this workgroup.

What is the proposer's solution?

To address the defects, the Grid Code needs to be updated to be compliant with the updated requirements. Specifically, requirements for the following impacted items should be applied through this modification: Low frequency demand disconnection, Communications Systems, critical tools and facilities, the System Defence Plan, System Restoration Plan, Test Plan, the inclusion of smaller Non-CUSC Parties and requirements for Electricity Storage Modules during low system frequencies. This modification also includes the development of Grid Code requirements to support Distributed Restart.

It is acknowledged that Distributed Restart is a National Innovation Competition (NIC) Project. This is not a mandatory requirement under the Emergency and Restoration code but if the provisions of the Distributed Restart Project were implemented in GB, the requirements of the Emergency and Restoration would apply to the Distributed Restart provisions. The GC0148 Terms of Reference do specifically allow for Distribution Restart to be considered as part of this modification, alongside the associated Distribution Code Changes with the option for it to be removed if the Grid Code Review Panel and Distribution Code Review Panel believe there is insufficient time for it to be progressed.

Draft legal text

The legal text will be delivered and developed during the course of the Workgroup. This together with the workgroup findings will then be subject to a Workgroup Consultation.

What is the impact of this change?**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 [Please provide your rationale]
(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 [Please provide your rationale]
(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 [Please provide your rationale]
(d) To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and	Positive [Please provide your rationale]
(e) To promote efficiency in the implementation and administration of the Grid Code arrangements	Neutral [Please provide your rationale]

Proposer's assessment of the impact of the modification on the stakeholder / consumer benefit categories

Stakeholder / consumer benefit categories	Identified impact
Improved safety and reliability of the system	Positive Click or tap here to enter text.
Lower bills than would otherwise be the case	Neutral [
Benefits for society as a whole	Positive

	Click or tap here to enter text.
Reduced environmental damage	Neutral [
Improved quality of service	Positive

When will this change take place?

Implementation date

10 working days after the Authority's decision to approve

Date decision required by

02 December 2022

Implementation approach

No system or process changes required. However, the (DSOs) Defence Service Providers and Restoration Service Providers will have a 12-month period, starting from the date they receive formal notification, to implement the measures on their equipment

Proposer's justification for governance route

Governance route: Standard Governance modification with assessment by a Workgroup

Interactions

- | | | | |
|---|--|---|---|
| <input type="checkbox"/> CUSC | <input type="checkbox"/> BSC | <input checked="" type="checkbox"/> STC | <input type="checkbox"/> SQSS |
| <input checked="" type="checkbox"/> European
Network Codes | <input type="checkbox"/> EBR Article 18
T&Cs ² | <input type="checkbox"/> Other
modifications | <input checked="" type="checkbox"/> Other |

Acronyms, key terms and reference material

Acronym / key term	Meaning
BSC	Balancing and Settlement Code
CUSC	Connection and Use of System Code
EBR	Electricity Balancing Regulation
ESO	National Grid Electricity System Operator
GC	Grid Code
G99	Engineering Recommendation G99
LJRP	Local Joint Restoration Plan
STC	System Operator Transmission Owner Code
NCER	Network Code Emergency and Restoration
SQSS	Security and Quality of Supply Standards
T&Cs	Terms and Conditions
TSO	Transmission System Owner Code
SGU	Significant Grid User

Reference material

- Add links to reference material

Appendix A Relevant Extracts from NCER

Articles 15(5) – 15(9)

5. *Each TSO shall design the scheme for the automatic low frequency demand disconnection in accordance with the parameters for shedding load in real-time laid down in the Annex. The scheme shall include the disconnection of demand at different frequencies, from a ‘starting mandatory level’ to a ‘final mandatory level’, within an implementation range whilst respecting a minimum number and maximum size of steps. The implementation range shall define the maximum admissible deviation of netted demand to be disconnected from the target netted demand to be disconnected at a given frequency, calculated through a linear interpolation between starting and final mandatory levels. The implementation range shall not allow the disconnection of less netted demand than the amount of netted demand to be disconnected at the starting mandatory level. A step cannot be considered as such if no netted demand is disconnected when this step is reached.*

² 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.

6. *Each TSO or DSO shall install the relays necessary for low frequency demand disconnection taking into account at least load behaviour and dispersed generation.*
7. *When implementing the scheme for the automatic low frequency demand disconnection pursuant to the notification under Article 12(2), each TSO or DSO shall:*

- (a) avoid setting an intentional time delay in addition to the operating time of the relays and circuit breakers;*
- (b) minimise the disconnection of power generating modules, especially those providing inertia; and*
- (c) limit the risk that the scheme leads to power flow deviations and voltage deviations outside operational security limits.*

If a DSO cannot fulfil the requirements under points (b) and (c), it shall notify the TSO and propose which requirement shall apply. The TSO, in consultation with the DSO shall establish the applicable requirements based on a joint cost-benefit analysis.

8. *The scheme for the automatic low frequency demand disconnection of the system defence plan may provide for netted demand disconnection based on frequency gradient provided that:*

(a) it is activated only:

(i) when the frequency deviation is higher than the maximum steady state frequency deviation and the frequency gradient is higher than the one produced by the reference incident;

(ii) until the frequency reaches the frequency of the demand disconnection starting mandatory level;

(b) it complies with the Annex; and

(c) it is necessary and justified in order to maintain efficiently the operational security.

9. *In case the scheme for the automatic low frequency demand disconnection of the system defence plan includes netted demand disconnection based on frequency gradient, as described in paragraph 8, the TSO shall submit, within 30 days of the implementation, a report containing a detailed explanation of the rationale, implementation and impact of this measure to the national regulatory authority.*

Article 41

1. *Each DSO and SGU identified in accordance with points (b) and (c) of Article 23(4), each restoration service provider and each TSO shall have a voice communication system in place with sufficient equipment redundancy and backup power supply sources to allow the exchange of the information needed for the restoration plan for at least 24 hours, in case of total absence of external electrical energy supply or in case of failure of any individual voice communication system equipment. Member States may require a minimum backup power capacity higher than 24 hours.*
2. *Each TSO shall establish, in consultation with the DSOs and SGUs identified in accordance with Article 23(4) and with restoration service providers, the technical requirements to be fulfilled by their voice communication systems as well as by the TSO's own voice communication system in order to*

allow their interoperability and to guarantee that the TSO's incoming call can be identified by the other party and answered immediately.

- 3. Each TSO shall establish, in consultation with its neighbouring TSOs and the other TSOs of its synchronous area, the technical requirements to be fulfilled by their voice communication systems as well as by the TSO's own voice communication system in order to allow their interoperability and to guarantee that the TSO's incoming call can be identified by the other party and answered immediately.*
- 4. Notwithstanding paragraph 1, those SGUs identified in accordance with Article 23(4) that are type B power generating modules and those restoration service providers that are type A or B power generating modules, shall have the possibility to have only a data communication system, instead of a voice communication system, if agreed upon with the TSO. This data communication system shall fulfil the requirements laid down in paragraphs 1 and 2.*
- 5. Member States may require that, in addition to the voice communication system, a complementary communication system be used to support the restoration plan; in that case, the complementary communication system shall fulfil the requirements laid down in paragraph 1.*

Article 42 (1), (2) and (5)

- 1. Each TSO shall make available critical tools and facilities referred to in Article 24 of Regulation (EU) 2017/1485 for at least 24 hours in case of loss of primary power supply.*
- 2. Each DSO and SGU identified pursuant to Article 23(4) as well as restoration service provider shall make available critical tools and facilities referred to in Article 24 of Regulation (EU) 2017/1485 and used in the restoration plan for at least 24 hours in case of loss of primary power supply, as defined by the TSO.*
- 5. Substations identified as essential for the restoration plan procedures pursuant to Article 23(4) shall be operational in case of loss of primary power supply for at least 24 hours. For substations in the synchronous area Ireland and Latvia, the duration of operation in case of loss of primary power supply may be lower than 24 hours and shall be approved by the regulatory authority or other competent authority of the Member State, on proposal of the TSO.*

Article 48(3)

- 3. By 18 December 2024 each TSO, in consultation with other TSOs, shall define a test plan for testing the inter-TSO communication.*

Article 50

- 1. Each DSO concerned by the implementation of the low frequency demand disconnection on its installations shall update once a year the communication to the notifying system operator provided for in point (b) of Article 12(6). This communication shall include the frequency settings at which netted demand disconnection is initiated and the percentage of netted demand disconnected at every such setting.*
- 2. Each TSO shall monitor the proper implementation of the low frequency demand disconnection on the basis of the yearly written communication referred to in paragraph 1 and on the basis of implementation details of TSOs' installations where applicable.*
- 3. Each TSO shall review, at least every five years, its complete system defence plan to assess its effectiveness. The TSO shall in this review take into account at least: (a) the development and evolution of its network since the last review or first design; (b) the capabilities of new equipment installed on the*

transmission and distribution systems since the last review or first design; (c) the SGUs commissioned since the last review or first design, their capabilities and relevant services offered; (d) the tests carried out and the analysis of system incidents pursuant to Article 56(5) of Regulation (EU) 2017/1485; and (e) the operational data collected during normal operation and after disturbance.

- 4. Each TSO shall review the relevant measures of its system defence plan in accordance with paragraph 3 before any substantial change in the configuration of the grid.*
- 5. When the TSO identifies the need to adapt the system defence plan, it shall amend its system defence plan and implement these amendments in accordance with points (c) and (d) of Article 4(2) and Articles 11 and 12.*