nationalgridESO

# EU NCER: System Restoration Plan

Issue 4~~3~~

February~~September~~ 2022~~1December 2019~~

**Commented [VG1]:** Will this need updated to reflect the new Restoration Standard and Assurance Framework document that is required? AJ Response – ESRS is outside the scope of GC0148.

Agree with Alans comment below – significant redraft required post GC0148 & Distributed Restart AJ response – agree – this will be undertaken. As part of the workgroup discussion it was initially agreed to separate pre and post GC0148 work but this is no longer the case and the SRP has been updated to reflect this.

**Commented [AMC2]:** This plan prob needs quote a bit of edition for Dist Restart – as part of GC0148? AJ Response – Agree –

# Contents

# EU NCER: System Restoration Plan

# 1 Version Control

| Version | Date | Author | Rationale |
|---|---|---|---|
| Issue 1 | Dec 2018 | NGESO | By December 2018, each TSO shall notify the regulatory authority of the system restoration plan designed pursuant to Article 23. |
| Issue 2 | July 2019 | NGESO | Further detail added to define SGU's and outline the plan review. |
| Issue 3 | December 2019 | NGESO | Updates to the SGU list and High Priority SGUs. Updates to glossary and definitions. Updated to reflect compliance requirements for implementation of NCER by December 2019. |
| Issue 4 | September 2021 | NGESO | Refresh of document to reflect Grid Code updates (GC0096, GC0125, GC0127, GC0128, GC0144 and GC0147) and approval of SGU list, T&Cs and Test Plan. |

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# 2 Introduction

The European Network Code on Emergency & Restoration[1] (EU NCER) came into force on 18 December 2017 and this document is NGESO's approach to discharging that requirement which has been developed in consultation with industry stakeholders. ~~Pursuant to the provisions in Chapter 3 below is the proposed System Restoration Plan~~.

**Commented [MK3]:** Is there a noun missing from this sentence? AJ Response – Agreed and sentence changed.

As provided for in the EU NCER Article 23, this System Restoration Plan has been designed in consultation with Stakeholders in the GB synchronous area. GB Parties who will be required to comply with the requirements of the EU NCER are detailed in Appendix A of this System Restoration Plan. In general, the EU NCER will apply to the following parties in GB.

- Any Party with a CUSC Contract
- Any Non-CUSC Party with a contract with NGESO to provide a Restoration Service
- Transmission Licensees
- Distribution Network Operators

[1] *Network Code on Emergency and Restoration* http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2017.312.01.0054.01.ENG&toc=OJ:L:2017:312:TOC

~~Ofgem does not need to approve the System Restoration Plan, however, NGESO will notify them of any changes. Therefore, this document is a live document.~~ This Plan is not intended to replace any provisions currently in place in the GB Industry Codes nor to amend the Operational Security Limits[2], it is a summary of how the requirements for System Restoration specified in the EU NCER will be satisfied in GB. ~~Many of t~~The provisions contained within this System Restoration Plan are already described in the GB national codes (e.g. Grid Code, CUSC, STC, BSC, etc.). ~~Where there are new mandatory requirements for GB Parties then these will be included in relevant GB Codes as appropriate~~. For the avoidance of doubt, the mandatory requirements placed on Parties are defined in the industry codes through the industry code governance process and not through this System Restoration Plan. For Non-CUSC Parties who have a contract with NGESO to provide a Restoration Service, a condition of that contract would require them to meet the applicable conditions of the Grid Code and therefore they will fall under the requirements of the EU NCER.

This System Restoration Plan will have an impact on all parties identified in Appendix A who have code obligations referred to in this plan.

In complying with the requirements of the Grid Code, System Operator Transmission Owner Code (STC), Distribution Code and Balancing and Settlement Code (BSC) (as applicable), the National Grid Electricity System Operator (NGESO), Transmission Licensees, Distribution Network Operators ~~(including Independent Distribution Network Operators)~~ and CUSC Parties ~~would be considered to~~ are required to satisfy the requirements of EU NCER. It should be noted that the EU NCER applies both to GB Code Users and EU Code Users as defined in Appendix F of this document.

This System Restoration Plan has been developed taking the following into account:

- The behaviour and capabilities of load and generation
- The specific needs of the high priority SGUs detailed in Appendix B
- The characteristics of the National Electricity Transmission System and Distribution Network Operators (including Independent Distribution Network Operators (IDNO)) systems.
- The ability of Restoration Service Providers (including Black Start Service Providers and Anchor Plant Owners) to contribute to System Restoration, either via a Local Joint Restoration Plan (LJRP) or Distribution Restoration Zone Plan (DRZP).

As part of implementation of the ~~In addition, and as required under the~~ EU NCER, ~~the~~ NGESO ~~has~~will notifi~~ed~~y ~~(in writing, once Ofgem has approved EU NCER all proposals and modifications)~~ those parties who are~~would be~~ within the scope of the NCER and any measures they need to take. These parties are defined in Table A1 of Appendix A of this document and include

[2] *Article 25 System Operations Guideline* *http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2017.220.01.0001.01.ENG*



**Commented [VG4]:** However, it does need to approve the list of SGUs ad High Priority SGUs. AJ Response – I have just deleted this sentence – are we happy with this approach.

**Commented [AMC5]:** Should this text be in the SDP as well for consistenecy AJ Response – Above text removed so should now be consistent.

**Commented [AMC6]:** ..GB Industry Codes…AJ response – Agreed and updated

Alignment with SDP

**Commented [AMC7]:** ..re…AJ Response – Sentence updated but need to make sure I have not missed anything.

**Commented [AMC8]:** All the provisions…..

We've agreed that this plan doesn't create any new obligations AJ Response – updated to ensure consistency with SDP.

**Commented [MK9]:** Presumably we can get rid of these two sentences soon? AJ Response Agreed – Updated to reflect this and also to pick up on Alan's point.

**Commented [AMC10]:** Clarify that there are no new mandatory requirements in the SRP.

I can see that any new ones emerging from a revised E&R would be codified via the normal process AJ Response – Agree – Text updated to address issue.

**Commented [MK11]:** How does this work since they are not included in the Grid Code? How are instructions etc passed to IDNOs? They have signed the CUSC accession agreement – but I don't think they have any CUSC contracts….?? AJ Response – Deleted – as per the SDP comment there is a potential licensing problem here as the ESO do not have contracts with IDNO's unless they are directly connected.

**Commented [AMC12]:** …are…AJ Response – Agree – Text updated

**Commented [MK13]:** Why the uncertainty? AJ Response – Text Updated.

**Commented [AMC14]:** stet

**Commented [AMC15]:** ..are…AJ response - Agree

Transmission Licensees, Network Operators, ~~(including Independent Distribution Network Operators) and~~ CUSC Parties and Non-CUSC Parties who have signed a contract with NGESO to provide one or more services detailed in this System Restoration Plan. ~~The additional measures upon CUSC parties have been will be included through Grid Code modification GC0127 and GC0128 with measures upon Transmission Licensees being developed through updates to the System Operator Transmission Owner Code (STC).~~

**Commented [MK16]:** Won't this be history by the time this is published – so can be deleted? AJ Response – Agree – text updated

# 3 System Restoration Plan

## ~~3~~3.1 Plan Overview

The EU Network Code on Emergency and Restoration (EU NCER) aims to ensure security and continuity of electricity supply across Europe by creating harmonised standards and procedures to be applied in the Emergency, Blackout and Restoration system state(s). This code requires the development of a System Restoration Plan in advance of such an event specifying measures related to information exchange, operational procedures and post-event analysis.

The majority of the requirements in the EU NCER have been retained in GB regulation via the Statutory Instruments (SI 533 2019~~post EU exit~~). Therefore, most of the requirements of the EU NCER will largely apply unchanged.

EU NCER sits alongside the Transmission System Operation Guideline[3] (SOGL) which sets out harmonised rules on system operation and identifies different critical system states (Normal State, Alert State, Emergency State, Blackout State and Restoration State).

This System Restoration Plan consists of the technical and organisational measures necessary for the restoration of the electricity system in Great Britain from a Partial or Total Shutdown to normal steady state conditions, taking into account the capabilities of the GB parties listed in Table 1 of Appendix A of this document and the operational constraints of the Total System.

The main objectives of this plan include:

1. To achieve the Re-Synchronisation of parts of the Total System which have become Out of Synchronism.
2. To ensure that communication routes and arrangements are available to enable representatives of those parties who fall within the scope of the NCER as identified in Appendix A of this System Restoration Plan are authorised to make binding decisions on their behalf and to communicate with each other when this System Restoration Plan is active.
3. To describe the role that in respect of the GB Parties listed in Appendix A may have in the restoration processes as detailed in the relevant De-Synchronised Island Procedures (DIPs), ~~and~~ Local Joint Restoration Plans (LJRPs), Distribution Restoration Zones and Distribution Restoration Zone Plans (DRZPs).
4. To identify and address as far as possible the events and processes necessary to enable the restoration of the Total System in GB to a Normal State, after a Total Shutdown or Partial Shutdown. This is likely to require the following key processes to be implemented, typically, but not necessarily, in the order given below:

[3] *https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017R1485&from=EN*



**Commented [AMC17]:** In the SDR this section is just called Plan Overview

Consistency AJ Response - Updated

**Commented [MK18]:** This needs restructuring into Overview, Activation, Procedures etc. – AJ Response – Agree - We can update the document to include these features.

**Formatted:** Heading 2

**Commented [AMC19]:** Might it help to add references to these? AJ Response – Done

**Commented [MK20]:** Please quote the exact SI reference. AJ Response – Agreed – Done

**Commented [AMC21]:** The implication is that some of the E&R requirements are not included as Retained Law. Are any of these material / ones that stakeholders would want to know about? AJ Response – The SI has now been referenced but to list all the exclusions out would be tricky and I do not believe to be appropriate for this document.

**Commented [VG22]:** Is it Restoration State or just Restoration given all the others have 'State' added. AJ Response - Agreed and updated.

**Commented [VG23]:** Will this be modified as a result of the Electricity System Restoration Standard as it now includes timescales and levels of demand to be restored within these timescales? AJ Response – ESRS is outside the scope of GC0148 – see above comment at top of the document.

**Commented [MK24]:** And DReS? AJ Response – Yes agreed – included in drafting –

- Selectively implement Local Joint Restoration Plans and Distribution Restoration Zone Plans;
- Expand Power Islands to supply non Black Start Power Stations;
- Expand Distribution Restoration Zones either to adjacent Distribution Restoration Zones or Power Islands established through a Local Joint Restoration Plan
- Selectively reconnect demand;
- Expand and merge Power Islands leading to Total System energisation;
- Facilitate and co-ordinate returning the Total System back to normal operation; and
- Resumption of the market arrangements if suspended in accordance with the relevant codes.

## ~~3.1~~3.2 Activation of System Restoration Plan

In Accordance with EU NCER Article 25

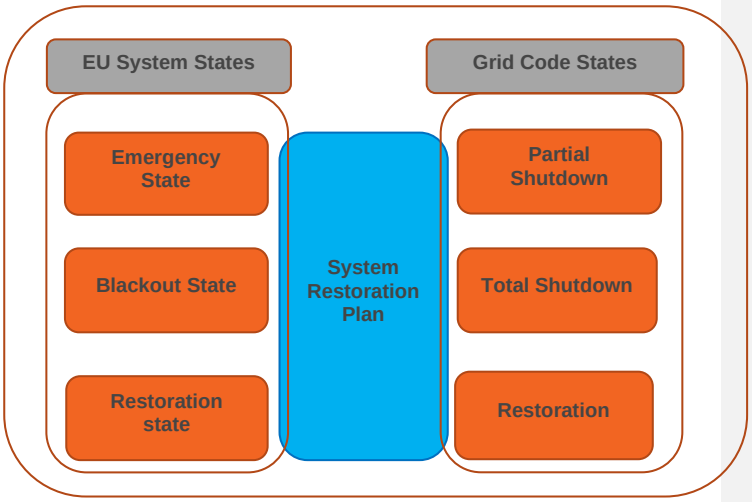
3.1.1 Procedures in this System Restoration Plan can be activated when the System is in an Emergency state and activated procedures of the System Defence Plan have taken place, or will be activated when the System is in the Blackout state.

3.1.2 Procedures in this System Restoration Plan will be activated by the NGESO in coordination with the GB Parties listed in Appendix A of this System Restoration Plan.

3.1.3 All instructions issued by the NGESO under this System Restoration Plan must be executed by each GB party falling under the scope of the NCER (as identified in Appendix A of this System Restoration Plan) without undue delay.

3.1.4 The NGESO will also manage remedial actions that involve actions from other Transmission Licensees and Externally Interconnected System Operators (EISOs). In the case of Distribution Restoration Zones, the Distribution Network Operator will be responsible for running and establishing the Distribution Restoration Zone one an instruction has been issued by NGESO to establish a Distribution Restoration Zone.

3.1.5 The System Restoration Plan can be activated, and remain active, through the Emergency, Blackout and Restoration states as shown below.




3.1.6 Activation of the System Restoration Plan in GB will occur once the NGESO determines and informs the Balancing and Settlement Code Company (BSCCo) that either a Total Shutdown or a Partial Shutdown exists and subsequent Black Start instructions are required for restoration.

3.1.7 Market Suspension (*EU NCER Article 35 part 1*) occurs in GB

- Automatically in the event of a Total Shutdown (in this case the Market Suspension Threshold is not relevant).
- During a Partial Shutdown and in this case the market is only suspended if the Market Suspension Threshold is met. There are three circumstances in which the threshold can be met or deemed to be met.
  - the NGESO determines that the spot time Initial National Demand Out-Turn is equal to or lower than 95% of the baseline forecast (this means that 5% or more of demand has been lost); or
  - No more baseline forecast data is available to the NGESO; or
  - 72 hours have elapsed since the Partial Shutdown commenced
- The conditions under which the Transmission System is deemed to be under an Emergency State and the potential for the Market to then subsequently be suspended are detailed in BC.2.9.8 of the Grid Code.

3.1.8 The trigger threshold for the GB system Blackout State shall be maintained as per the current definition of a Partial or a Total System Shutdown as defined in *Grid Code OC9.4.1*.

# 4 System Restoration Plan Procedures

*Grid Code OC9.4.* documents the procedure of recovery from a Total or Partial Shutdown. This allows for a top-down restoration approach (energisation from Black Start Service Providers including other ~~Transmission Licensees and~~ Externally Interconnected System Operators (EISOs)) and a bottom-up energisation approach (energisation from within Embedded Generation forming either part of a Local Joint Restoration Plan (LJRP) or Distribution Restoration Zone Plans. In the case of a Distribution Restoration Zone, Distribution Network Operators use Restoration Service Providers (including Anchor Plant Owners) to energise and restore demand to parts of their Network independently of the Transmission System.~~a Transmission Licensee's Licensees area~~). ~~In GB, the more common approach is the bottom up approach but this does not prevent elements of a top down approach from also being utilised.~~ In GB both these processes are detailed in OC9 of the Grid Code and DOC9 of the Distribution Code and reflect the processes detailed in the EU NCER as follows:-~~Detailed within this are the specific procedures referenced in EU NCER as:~~

- Re-energisation procedure *(EU NCER Article 26 Section 2)*
- Re-synchronisation procedure *(EU NCER Article 33 Section 4)*
- Frequency management procedure

## 4.1 Re-energisation procedure

**Commented [MK25]:** Needs a bit of a rewrite for DReS. AJ Response – Agree – we need to include Distrbuted Re-Start which we will do.

4.1.1 The *Grid Code OC9.2.~~5~~* identifies the key processes to be implemented in GB to enable the restoration of the Total System following a Total or Partial Shutdown as:

- Selectively implement Local Joint Restoration Plans and Distribution Restoration Zone Plans;
- Expand Power Islands to supply Power Stations and expand Distribution Restoration Zones;
- Selectively reconnect Demand;
- Expand and merge Power Islands leading to Total System energisation;
- Facilitate and co-ordinate returning the Total System back to normal operation; and
- Resumption of the Balancing Mechanism if suspended in accordance with the provisions of the Balancing and Settlement Code (BSC).

4.1.2 In order to deliver this restoration, contractual arrangements for Black Start Service Providers, Restoration Service Providers forming part of a Distribution Restoration Zone (which includes Anchor Plant Owners) and documented restoration plans are in place as permitted through the *Grid Code OC9* provisions.

4.1.3 The bilateral procurement of parties providing a Black Start service provision under a Local Joint Restoration Plan is carried out by the NGESO. For Restoration enabled through a Distribution Restoration Zone, the procurement of Anchor Plant services and top up services is procured through a trilateral contract between NGESO, the relevant Distribution Network Operator and the Restoration Service Provider. In the case of a Black Start Service Provider ~~Following~~ where a commercial contract has been~~being~~ established ~~and commenced~~, the NGESO in coordination with relevant Transmission Licensees, Distribution Network Operators ~~(including Independent Distribution Network Operators (IDNOs)~~ and CUSC Parties create, in line with *Grid Code* *OC9.4.7.7~~12~~*, a Local Joint Restoration Plan (LJRP). In the case of a Distribution Restoration Zone, commercial contracts will be established with Restoration Service Providers (which includes Anchor Plant Owners). These are trilateral agreements between the NGESO, relevant Distribution Network Operator and Restoration Service Provider. With these contracts in place, NGESO in coordination with those Restoration Service Providers, Distribution Network Operators and Transmission Licensees (where relevant) will create, in line with Grid Code OC9.4.7.7

4.1.4 Operation of ~~these~~ LJRPs and DRZPs ~~follows~~are detailed in *Grid Code* *OC9.4.7.7.1 and OC9.4.7.7.2 respectively~~6~~*. Each individual LJRP and DRZP document provides specific details of how individual Restoration Service Providers~~Power Stations~~ are to be started and block loaded to create a stable Power Island. In co-ordination with the NGESO, these plans provide guidance to Transmission Licensees and Distribution Network Operators to assess the status of operational equipment and systems, within a shutdown situation, and identify the organisational and process changes necessary to enable an effective restoration. They also identify the split in responsibilities between the relevant Transmission Licensees and relevant Distribution Network Operators ~~(including Independent Distribution Network Operators)~~, together with the appropriate communication channels.

4.1.5 Any ~~C~~hanges, amendments or ~~and~~ the creation of new LJRPs or DRZP's ~~is~~are detailed in *Grid Code* *OC9.4.7.7~~12~~* including the exercising of these plans.

4.1.6 In the case of restoration through an LJRP ~~stage of restoration,~~ voltage and frequency management is overseen by the NGESO unless delegated to the relevant Transmission Licensee in accordance with the provisions of the STC. ~~Once an additional party (such as a Generator or Distribution Network Operator) is involved in the Power Island the voltage and frequency management control reverts to the NGESO~~. In Scotland alone ~~At this point the~~ NGESO directs the relevant ~~TSO~~transmission licensee to expand the network in line with routes identified in the Skeleton Network. In the case of restoration through a DRZP, voltage and frequency management of the Distributed Restoration Zone is regulated by the Distribution Network Operator and overseen by NGESO. In Scotland, NGESO will instruct

**Commented [J(A26]: Alastair Frew Comment** Surly this is wrong as there are generators and DNO in the LJRPs and to have voltage and frequency there must be a generator involved AJ Response - Text updated to address this issue. We also need to address Distributed Re-Start here.

**Commented [MK27]:** Just Scotland? AJ Response – Agreed – Text updated.

the relevant Transmission Licensee to instruct the relevant Distribution Network Operator to establish a Distribution Restoration Zone as provided for under STCP 06-1.

4.1.7 The Skeleton Network indicates key routes for growing individual power islands, once stable and having developed a level of circuit security, to enable supplies to be given to further GB Parties, other Power Islands and subsequently to create a single, synchronous power system.

4.1.8 During the re-energisation process the resynchronisation and frequency management procedures detailed within this System Restoration Plan are adhered to.

## 4.2 Re-synchronisation procedure

4.2.1 EU NCER Article 33 Section 4 requires the appointment of a resynchronisation leader. For the purpose of GB National Electricity Transmission System restoration, ~~the~~ NGESO takes on the role of resynchronisation leader, as overall coordinator of the restoration procedure unless alternative arrangements are specified (as currently provided for~~exist~~ in Scotland under STCP 06-1 - the System Operator Transmission Owner Code Procedure on Black Start). *Grid Code OC9.5.6* outlines the requirements for the Re-synchronisation of De-Synchronised Islands following a Total or Partial Shutdown where Re-Synchronisation of Power Islands takes place following the establishment of either an LJRPs or DRZPs.

4.2.2 Following any shutdown, the re-energisation procedure requires that several Power Islands are created and expanded with the objective of creating the Skeleton Network to grow to reach available generation and demand. The Skeleton Network is then expanded until all demand, generation and appropriate circuits have been restored. It will, therefore, be necessary to interconnect Power Islands. The complexities and uncertainties of recovery from a Total or Partial Shutdown requires that provisions under this section to be flexible, however, the actions taken when Re-synchronising De-synchronised Islands following any Total Shutdown or Partial Shutdown, will include the following: (a) the provision of supplies to appropriate Power Stations to facilitate their synchronisation as soon as practicable; (b) energisation of a skeletal National Electricity Transmission System; (c) energisation of Distribution Restoration Zones and (d~~e~~) the subsequent strategic restoration of Demand in co-ordination with relevant Distribution Network Operators ~~(including Independent Distribution Network Operators~~.

4.2.3 Re–synchronisation of a Power Island is performed by arming and closing a synchronising breaker at the substation joining both Power Islands. The Power System Synchroniser setting is in place to ensure safe closure of the open circuit breaker which is live on both sides. This is designed to synchronise two electrically separate systems which are

running at slightly different frequencies with the two voltages across the open circuit breaker contacts cyclically passing in and out of phase with each other. This would be equally applicable where a Power Island formed through an LJRP synchronises to a Power Island formed through a DRZP or where two Distribution Restoration Zones are subsequently synchronised together.

4.2.4 The requirement for the Power System Synchroniser is to ensure the phase angle between voltages is practically zero and the voltage magnitudes and difference in frequency or slip is within pre-set limits. Once the synchronisation command has been executed, the Power System Synchroniser circuit breaker will remain armed for a period of time to allow system conditions to be suitably altered (one frequency driven towards the other by issuing Target Frequency instructions to generators within one power island) to allow the synchronising relay to close the selected circuit breaker. Should the conditions not be met, then the instruction will time out and circuit breaker re-selection and execution of the instruction must be repeated.

**Commented [J(A28]:** Assume the principle is the same for Distribution Re-Start

4.2.5 The location of Power System Synchroniser circuit breaker facilities are documented within the relevant TSO's internal procedures and are indicated on NGESO's situational awareness displays at the Electricity National Control Centre. For Distribution Restoration Zones, details of Power System Synchroniser circuit breaker facilities would be included in the DRZP.

**Commented [J(A29]:** Are we comfortable with this statement.

4.2.6 The setting policy for synchronising relays is common across all three onshore TSO areas in GB, and are:

- System synchronising slip 0.125Hz
- System synchronising closing angle 10 degrees~~10deg~~
- Under voltage setting 0.85pu
- Voltage difference limit as specified in CC/ECC6.1.4 of the Grid Code.

**Commented [J(A30]:** What are the settings for DRZ's

4.2.7 During a Total Shutdown or Partial Shutdown and during the subsequent recovery, the (Transmission) Licence Standards may not apply and the Total System may be operated outside normal Voltage and Frequency standards.

4.2.8 In a Total Shutdown and during the subsequent recovery, all instructions issued by the NGESO~~relevant TSO~~ (unless specified otherwise) are deemed to be Emergency Instructions under *BC2.9.2.2 (iii)* and need not be prefixed with the words "This is an Emergency Instruction".

4.2.9 In a Partial Shutdown and during the subsequent recovery, all instructions issued by the NGESO to~~and~~ relevant Transmission Licensees and Distribution Network Operators ~~to~~ and relevant GB Parties (as defined in Table A1 of Appendix A of this document) which are part of an invoked LJRP or DRZP (unless specified otherwise) are deemed to be Emergency Instructions under *BC2.9.2.2(iii)* and need not be prefixed with the words "This is an Emergency Instruction".

## 4.3 Frequency management procedure

4.3.1 EU NCER Section 3 Article 29 requires the appointment of a frequency leader during system restoration when a synchronous area is split in several synchronised regions. For the purpose of GB NETS restoration, ~~the~~ NGESO takes on the role of frequency leader except in situations where it is delegated in Scotland in accordance with STCP-06-1 or in the case of Distribution Restoration Zones where the Distribution Network Operator has this role (under the coordination of NGESO) during the establishment and operation of a Distribution Restoration Zone .

**Commented [MK31]:** Needs updating for DReS – AJ Response – Agree we will do this.

4.3.2 Frequency management during system restoration falls into two phases; i) the LJRP and DRZP phases and ii) the Skeleton Network phase. The NGESO remains the frequency leader in both these phases (except where~~unless~~ the role, as currently provided for in Scotland, has been delegated to another Transmission Licensee as defined under STCP-06-1 or a Distribution Restoration Zone has been established and the role is undertaken by the relevant Network Operator) and both phases can be in force simultaneously as new LJRPs or DRZPs are instructed and form power islands whilst the Skeleton Network is being restored. In Scotland, NGESO delegate the Scottish Transmission Licensee to instruct a Scottish Network Operator to establish and operate a Distribution Restoration Zone.

*4.3.3 Frequency Management during the LJRP and DRZP Phase*

In the case of an ~~During the~~ LJRP and during the LJRP phase, ~~the~~ NGESO will instruct the implementation of required LJRPs and the required Target Frequency. As detailed within the LJRP; demand blocks will be added in line with the requirements of the relevant GB party to establish a power island. The relevant GB Party (for example a Generator or HVDC System Owner) will configure their plant to act in "free governor action" mode to aid in frequency control. During the period when only one GB Party (for example a Power Station or HVDC System Owner) is connected to the Power Island the frequency is controlled by that GB Party in co-ordination with the NGESO, relevant Transmission Licensee and or relevant Distribution Network Operator ~~(including Independent Distribution Network Operators)~~ who will also add or remove demand as the GB Party (eg a Generator or HVDC System Owner) requires to maintain Target Frequency.

During this period, A GB Party (such as a Power Station or HVDC System Owner) will be required to regulate their output in co-ordination with ~~the~~ NGESO and the relevant Transmission Licensee and /or relevant Distribution Network Operator ~~(including an Independent Distribution Network Operator)~~ to the existing and newly connected demand in the Power Island. ~~The~~ NGESO in coordination with the relevant Transmission Licensee and /or relevant Distribution Network

Operator ~~(including~~ will communicate so that demand and generation are matched to maintain (where practicable) the Target Frequency. Demand will be added to the Power Island as more generation becomes available.

In the case of a DZRP and during the DRZP phase, NGESO will instruct the relevant Network Operator to establish a Distribution Restoration Zone in accordance with the Distribution Restoration Zone Plan. The Network Operator will instruct (either manually or with the aid of a Distribution Restoration Zone Controller) Anchor Plant to energise part of the Distribution System and start to restore blocks of demand which may also require the use of top up services from other Restoration Service Providers. During this phase there is a requirement for Anchor Plant and relevant restoration service providers to maintain Target Frequency a detailed within the DRZP. Further demand blocks will be added in line with the requirements of the relevant GB party to establish a power island. The relevant Restoration Service Provider (for example an Anchor Plant Owner) will configure their plant to act in "free governor action" mode to aid in frequency control. During the period when only one Restoration Service Provider (for example an Anchor Plant Owner) is connected to the Power Island the frequency is controlled by that Restoration Service Provider in co-ordination with the relevant Distribution Network Operator who will also add or remove demand as the Restoration Service Provider controls Target Frequency.

During this period, an Restoration Service Provider (eg an Anchor Plant Owner and top up service) will be required to regulate their output in co-ordination with Distribution Network Operator to the existing and newly connected demand in the Power Island. The relevant Distribution Network Operator will communicate so that demand and generation are matched to maintain (where practicable) the Target Frequency. Demand will be added to the Power Island as more generation becomes available.

### 4.3.4 Frequency Management during the Skeleton Network Phase

In the case of a Power Island formed from an LJRP, ~~T~~the Skeleton Network phase begins when a second or subsequent GB Part~~y~~ies ~~(~~as defined in Table A1 of Appendix A) are added to the Power Island. ~~The~~ NGESO in coordination with the relevant Transmission Licensees and Distribution Network Operators ~~(including Independent Distribution Network Operators)~~ may issue new Target Frequency instructions to available Generators, HVDC System Owners, DC Converter Station Owners and Virtual Lead Parties of the size of power blocks required to be added or removed from the Power Island to maintain generation stability.

**Commented [J(A32]: Alastair Frew Comment** It not clear to me in this modern age of digital governors what instructions are going to be given or if it has even been thought about AJ Response – We need to discuss this – I may be missing the point here but even with a digital governor they would still have a setpoint for target frequency.

In the case of a Power Island formed from a DRZP the Skeleton Network Phase begins when that Distribution Restoration Zone is connected to another Power Island which has been established through an LJRP.

Power Islands will be synchronised to each other using suitable system synchroniser circuit breakers with the frequency of each Power Island being controlled by ~~the~~ NGESO in coordination with relevant Transmission Licensees~~(,)~~ . Subsequent Power Island will be synchronised in a similar way.

**Commented [MK33]:** Why is there a bracket and comma here? AJ Response – Agreed – Text Updated.

~~The~~ During this phase NGESO in coordination with the relevant Transmission Licensee will determine power block size to be added or removed from the power island to maintain energy balancing and power island frequency. GB Parties defined in Table A1 of Appendix A of this System Restoration Plan who are capable of suppling ~~Power~~ power to the ~~National Electricity Transmission System~~NETS will be instructed by ~~the~~ NGESO unless delegated through STCP 06-1. All Power Stations who resume operation in a Restoration State will remain in Frequency Sensitive Mode until Normal State is achieved, or instructed otherwise by ~~the~~ NGESO.

# 5 System Restoration to Normal State operation

5.1 In GB, a Black Start restoration will be deemed to be completed according to the rules of the Grid Code and the BSC. In essence, this is as follows:

- If normal market operations have been suspended, then a Black Start restoration will be deemed to be completed when these operations (including the Balancing Mechanism) have resumed – with this point to be determined by the BSC Panel; or

- If normal market operations have not been suspended, then a Black Start restoration will be deemed to be completed when the NGESO determines that the Total System has returned to normal operation.

5.2 *Grid Code* OC9.4.7.12~~9~~ describes the considerations to be made by NGESO before declaring that the Total System could return to normal operation:

- the extent to which the GB NETS is contiguous and energised;
- the integrity and stability of the GB NETS and its ability to operate in accordance with the (Transmission) Licence Standards;

- the impact that returning to a Normal State may have on transmission constraints and the corresponding ability to maximise the Demand connected;
- the volume of Generation or Demand not connected to the GB NETS; and
- the functionality of normal communication systems (i.e. electronic data communication facilities, Control Telephony, etc.).

5.3 Once NGESO deems that sufficient confidence in the Transmission System, connected generation and demand and appropriate systems are in place to return to normal operation, they it will inform the BSCCo of this development.

# 6 System Restoration Plan Implementation

6.1 Article 24 of the EU NCER, provides for the implementation of the **System Restoration Plan.** In order to implement the System Restoration Plan, NGESO has notified those parties (as identified in Appendix A) that in meeting requirements of the Grid Code (as CUSC Parties or those parties which have contracts with NGESO to provide restoration services) they will be bound by the requirements of the EU NCER ~~and required that by the 18 December 2018 the NGESO will notify all GB Parties who are within the scope of the EU NCER. Following approval by Ofgem of the SGU list, NGESO will notify affected parties of the obligations they have to meet in fulfilling the requirements of the NCER. If parties meet the requirements of the Grid Code, they would automatically satisfy these requirements. In December 2018, the NGESO prepared a draft System Defence and System Restoration Plan, and on the basis of minimal change, the NGESO considered this would be sufficient to notify GB parties of the obligations they have to meet. Since publication of these draft documents Stakeholders have requested further clarifications of the parties affected by the NCER but more importantly formal notification of who is within the scope of the NCER and what measures they have to meet. As detailed in section 1 of this System Restoration Plan, tThe NGESO will notify (in writing) those GB Parties (who fall within the criteria listed in Table A1 of Appendix A) that they will fall within the scope of the NCER and the additional measures they have to meet. It is acknowledged that Parties affected by the EU NCER have a year to implement the measures, however, if parties meet the requirements of the Grid Code, they would automatically satisfy these requirements. and now that we are within the 1 year window to the 18 December 2019 there is a risk they may struggle to meet the requirements of the EU NCER and the subsequent Grid Code and STC obligations that are being introduced. That said, the additional measures are minor as proposed in GC0127/128. By already complying with the Grid Code and STC the majority of these measures are already met by GB Parties. Through the Grid Code and STC consultation processes, we will continue to work with Stakeholders on any areas which will cause difficulties for them post the 18th December 2019.~~

~~6.2 This System Restoration Plan will be fully implemented by 18 December 2019.~~

# 7 RESILIENCE MEASURES TO BE IMPLEMENTED BY THE NGESO, TRANSMISSION LICENSEES AND DISTRIBUTION NETWORK OPERATORS (INCLUDING INDEPENDENT DISTRIBUTION NETWORK OPERATORS)

In Accordance with EU NCER Article 11(4)

**Commented [MK34]:** This will be out of date once the letter has gone. AJ Response – Agree – text updated.

**Commented [AMC35]:** Section 2 – AJ Response – Agree – Updated.

**Commented [AMC36]:** Additional to what? Should this refer to the code obligations that they need to comply with? AJ Response –This section needs substantial updates – existing text has been deleted.

**Commented [MK37]:** This unnecessarily repeats the unnecessary text above. AJ Response – Agree – text updated – we will take a thorough review of this once discussed.

**Commented [AMC38]:** Is this still the case? AJ Response – Removed.

**Commented [AMC39]:** Don't parties need to meet the GCode requirements anyway? AJ Response – Yes this text has now been removed – This will be substantially updated in the next iteration.

7~~6~~.1 ~~The~~ NGESO has a list of s~~S~~ubstations (Appendix D) essential for restoration that will be operational in the case of loss of primary power supply for at least 24 hours (EU NCER Article 42) however, due to the sensitivity of this information, it is not possible to share this ~~externally~~externally. This information~~.~~ has been shared with the Authority. In the case of Distribution Restoration Zones, substations critical for restoration would be detailed in the Distribution Restoration Zone Plan.

~~identified in the System Restoration Plan Appendix D as essential for restoration will be operational in case of loss of primary power supply for at least 24 hours (EU NCER Article 42).~~

7~~6~~.2 ~~The~~ NGESO, Onshore Transmission Licensees and Distribution Network Operators ~~(including Independent Distribution Network Operators)~~ must ensure all plant and apparatus, equipment controlling that plant and apparatus and the necessary personnel with the appropriate skill and knowledge to operate and control that plant and apparatus (for example primary electrical plant, control, protection, metering equipment, computer facilities for the secure operation of the power system (including but not limited to SCADA and state estimator functions) and the availability of staff to operate those systems) ~~all critical tools and facilities listed in SOGL Article 24 are~~are designed to remain available for use for at least 24 hours in the case of a loss of external power (EU NCER Article 42). This includes any remote data centres required to sustain the critical tools and facilities.

7~~6~~.3~~2.1~~ Critical tools and facilities for ~~the~~ NGESO, Onshore Transmission Licensees and Distribution Network Operators ~~(including Independent Distribution Network Operators)~~ include but are not limited to:-

- Primary Plant and Apparatus (ie lines, cables, transformers, and switchgear
- Protection, Control and Metering
- Substation telecommunications
- SCADA and Communications Systems
- Backup Power Supplies
- Control room capability including system monitoring, state estimation, load/frequency control, remote plant operating systems, security analysis and communication systems
- Trained and authorised staff

~~Supervisory, Control and Data Acquisition systems (SCADA), protection systems and control telephony.~~

7.~~46~~.2.2 In addition to those listed in 6.2.1, critical tools and facilities for ~~the~~ NGESO will include state estimation applications, facilities for load-frequency control, security analysis and the means to facilitate cross-border market operations.

7.~~56~~.3 ~~The~~ NGESO and onshore Transmission Licensees~~TSOs~~ must also ensure they have at least one geographically separate control room with backup power supplies~~y~~ for at least 24 hours, in case of loss of

**Commented [AMC40]:** It would be good to confirm that the partied that own / operate the substation on the list have been made aware that some of their substations are actually on the list. AJ Response – Agreed – they should be aware of this through LJRP's and DRZP's

**Commented [AMC41]:** …been shared with …. AJ Response – Noted and agreed.

**Commented [MK42]:** We should not make this reference. Where is the reference in GB documents? AJ Response – Yes agree updated.

**Commented [AMC43]:** Are the GCode 148 mods going to confirm which tools and facilities are considered to be critical AJ Response – Agree – See above comment in response to Milke Kay.

**Commented [AMC44]:** Are the GCode 148 mods going to confirm which tools and facilities are considered to be critical – AJ Response – Yes agree – see above response. Under SOGL At 24 covers availability, reliability, and redundancy of Transmission System monitoring including state estimation and load /frequency control, means to operate switchgear and Electrical plant, means to communicate with control rooms etc, tools for operational security analysis and tools necessary to facilitate cross border market operations.

**Commented [AMC45]:** Check section numbering AJ Response – Agree – we will update this when the document has been updated.

**Commented [MK46]:** Where is this defined in the GB documents? AJ response – this obligation is placed upon Transmission Licensees and hence in the STC. Specifically this is covered in STCP 06-4 (Contingency Arrangements)

primary power supply. They must also have a procedure to transfer functions to the Standby Control Room as quickly as possible but in no longer than 3 hours.

Commented [AMC47]: Full stop – AJ Response - Added

# 8 Plan Review

87.1 EU NCER Article 51 requires the NGESO to review the measures of the System Restoration Plan using computer simulation tests to assess effectiveness at least every five years. Such a process will be documented and developed through internal NGESO business procedures.

87.2 The review will cover:

- Simulating the ~~establishment of the~~ Skeleton Network using Black Start Service Providers and Distribution Restoration Zones;
- Demand reconnection process;
- The p~~P~~rocess for resynchronisation of Power Islands; and
- Learning from operational testing as per the testing procedure

Commented [MK48]: The Skeleton Network is defined as a plan – why would you simulate the establishment of a plan? AJ Response – Text updated.

87.3 Operational testing of the System Restoration Plan will be in line with the Assurance and Compliance Testing requirements within the System Defence Plan.

87.4 ~~The~~ NGESO will review the System Restoration Plan to assess its effectiveness at least every five years ~~(evidenced through version control)~~.

Commented [MK49]: Version control is manifestly not evidence of effectiveness of the plan. AJ Response – Version control is an issue that was raised in the SDP and we need to apply the same approach for the SRP. Would suggest reference to version control here is removed.

Commented [AMC50]: See comment in the SDR track changes just document the changes to a document rather than evidence of a 5 year review plan. AJ Response – Agree – see response to Mike Kay.

87.5 ~~The~~ NGESO will also review the relevant measures of the System Restoration Plan in advance of a substantial change to the configuration of the National Electricity Transmission System.

87.6 Any substantive changes identified in the review of the System Restoration Plan will be captured via published updates to this document which would also include comments received from stakeholders as part of the wider consultation process.

Commented [VG51]: But not necessarily subject to consultation with stakeholders? AJ Response – Text updated.

# Appendix A: GB Parties within the scope of the System Restoration Plan

In accordance with EU NCER, Art 2 defines the SGU's who fall within the scope of the European Emergency and Restoration Code. Table A1 defines the EU Criteria and how this translates to which ~~GB~~ Parties parties within GB ~~including which of those parties are included~~ fall within the scope of the EU Emergency and Restoration Code~~. and those which are not.~~

| EU Criteria | New or Existing | List of GB Parties considered to be SGUs for purposes of the System Restoration ~~Defence~~ Plan (GB SGU's) | Measures of the System Restoration ~~Defence~~ Plan |
|---|---|---|---|
| Existing and new Power Generating modules classified as Type C and D in accordance with the criteria set out in Article 5 of Commission Regulation (EU) 2016/631 | New | Any Generator who is an EU Code User who has a CUSC Contract with the NGESO and owns or operates a Type C or Type D Power Generating Module | Applicable Grid Code requirements:<br>ECC6.1.2, ECC.6.1.4, ECC.6.2.2.2, ECC.6.3, ECC.6.5, ECC.8, ECC.A.3, ECC.A.4, ECC.A.6, ECC.A.7, ECC.A.8<br>ECP.A.3, ECP.A.5, ECP.A.6<br>OC5.4, OC5.5, OC5.7 (OC5.7 will only apply if the provider has a black start contract)<br>OC.7.4, OC7.6 (OC7.6 - Scotland and Offshore only)<br>OC9<br>OC10<br>OC12<br>~~BC1.4, BC1.5, BC.1.7, BC1.A.1, BC1.A.2.1~~<br>BC2 (in particular BC.2.9)<br>BC3.3, BC3.4, BC3.5, BC.3.6, BC.3.7,<br>In satisfying the above Grid Code requirements, Generators with a CUSC Contract who own or operate a Type C or Type D Power Generating Module would meet one or more of the requirements of the System Restoration ~~Defence~~ Plan. |
| | | Any Generator who does not have a CUSC Contract (i.e. Embedded) and owns or operates a Power Station comprising one or more Type C or Type D Power Generating Modules | Not applicable.<br>Under the current GB Framework, there is currently no requirement for Non-CUSC Parties who own or operate a Type C or Type D Power Generating Module to contribute to the System Restoration Plan.<br>~~Defence Plan. This however is subject to review and the ESO expect to work with all Stakeholders in the future to consider the approach to including Non-CUSC Parties within the System Defence Plan.~~ |

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**Commented [AMC53]:** In the body of the document NGESO is the term used AJ Response -Agreed and updated

| EU Criteria | New or Existing | List of GB Parties considered to be SGUs for purposes of the System Restoration ~~Defence~~ Plan (GB SGU's) | Measures of the System Restoration ~~Defence~~ Plan |
|---|---|---|---|
| | Existing | Any Generator who is a GB Code User who has a CUSC Contract with the NGESO and owns or operates a Power Station comprising one or more Generating Units or Power Park Modules which i) have a maximum output of greater than 10MW but less than 50MW and connected below 110kV (equivalent to a Type C Power Generating Module) or ii) connected at 110kV or above or has a rated power output of 50MW or above (equivalent to a Type D Power Generating Module) | CC6.1.2, CC.6.1.3, CC.6.1.4, CC.6.2.2.2, CC.6.3, CC.6.5, CC.8, CC.A.3, CC.A.4, CC.A.6, CC.A.7<br>CP.A.3<br>OC5.4, OC5.5, OC5.7 (OC5.7 will only apply if the provider has a black start contract), OC5.A.1, OC.5.A.2, OC5.A.3<br>OC.7.4, OC7.6 (OC7.6 - Scotland and Offshore only)<br>OC9<br>OC10<br>OC12<br>~~BC1.4, BC1.5, BC.1.7, BC1.A.1, BC1.A.2.1~~<br>BC2 (in particular BC.2.9)<br>BC3.3, BC3.4, BC3.5, BC.3.6, BC.3.7,<br>In satisfying the above Grid Code requirements, Generators with a CUSC Contract would meet one or more of the requirements of the System ~~Defence~~ Restoration Plan. |
| | | Any Generator who does not have a CUSC Contract (i.e. Embedded) and owns or operates a Power Station comprising one or more Generating Units or Power Park Modules which i) have a maximum output of greater than 10MW but less than 50MW and connected below 110kV (equivalent to a Type C Power Generating Module) or ii) connected at 110kV or above or has a rated power output of 50MW or above (equivalent to a Type D Power Generating Module) | Not applicable.<br>Under the current GB Framework, there is currently no requirement for Non-CUSC Parties who own and operate a Type C or Type D Power Generating Module to contribute to the System ~~Defence~~ Restoration Plan. This however is subject to review and the NGESO expect to work with all Stakeholders in the future to consider the approach to including Non-CUSC Parties within the System ~~Defence~~ Restoration Plan. |

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| EU Criteria | New or Existing | List of GB Parties considered to be SGUs for purposes of the System Restoration ~~Defence~~ Plan (GB SGU's) | Measures of the System Restoration ~~Defence~~ Plan |
|---|---|---|---|
| Existing and new power generating modules classified as Type B in accordance with the criteria set out in Article 5 of Regulation (EU) 2016/631, where they are identified as SGU's in accordance with Article 11(4) | New | Any Generator who is a EU Code User and has a CUSC Contract with the ESO and owns or operates a Type B Power Generating Module | Applicable Grid Code requirements:<br>ECC.6.1.2, ECC.6.1.4, ECC.6.2.2.2, ECC.6.3, ECC.6.4.3, ECC.6.5, ECC.8, ECC.A.3, ECC.A.4, ECC.A.6, ECC.A.7, ECC.A.8<br>ECP.A.3, ECP.A.5, ECP.A.6<br>OC5.4, OC5.5, OC5.7 (OC5.7 will only apply if the provider has a black start contract)<br>OC.7.4, OC7.6 (OC7.6 - Scotland and Offshore only)<br>OC9<br>OC10<br>OC12<br>~~BC1.4, BC1.5, BC1.7, BC1.A.1, BC1.A.2.1~~<br>BC2 (in particular BC.2.9)<br>BC3.3, BC3.4, BC3.5, BC.3.6, BC.3.7,<br>In satisfying the above Grid Code requirements, Generators with a CUSC Contract who own or operate a Type B Power Generating Module would meet one or more of the requirements of the System ~~Defence~~ Restoration Plan. |
| | | Any Generator who does not have a CUSC Contract (i.e. Embedded) and owns or operates a Power Station comprising one or more Type B Power Generating Modules | Not applicable.<br>Under the current GB Framework, there is currently no requirement for Non-CUSC Parties who own and operate a Type C or Type D Power Generating Module to contribute to the System Restoration ~~Defence~~ Plan. This however is subject to review and the NGESO expect to work with all Stakeholders in the future to consider the approach to including Non-CUSC Parties within the System Restoration ~~Defence~~ Plan. |

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| EU Criteria | New or Existing | List of GB Parties considered to be SGUs for purposes of the System Restoration ~~Defence~~ Plan (GB SGU's) | Measures of the System Restoration ~~Defence~~ Plan |
|---|---|---|---|
| | Existing | Any Generator who is a GB Code User who has a CUSC Contract with the ESO and owns or operates a Power Station comprising one or more Generating Units or Power Park Modules which has a maximum output of greater than 1MW but less than 10MW and connected below 110kV (equivalent to a Type B Power Generating Module) | Applicable Grid Code requirements:<br>CC6.1.2, CC.6.1.3, CC.6.1.4, CC.6.2.2.2, CC.6.3, CC.6.5, CC.8, CC.A.3, CC.A.4, CC.A.6, CC.A.7<br>CP.A.3<br>OC5.4, OC5.5, OC5.7 (OC5.7 will only apply if the provider has a black start contract), OC.5.A.1, OC.5.A.2, OC5.A.3<br>OC.7.4, OC7.6 (OC7.6 - Scotland and Offshore only)<br>OC9<br>OC10<br>OC12<br>~~BC1.4, BC1.5, BC.1.7, BC1.A.1, BC1.A.2.1~~<br>BC2 (in particular BC.2.9)<br>BC3.3, BC3.4, BC3.5, BC.3.6, BC.3.7,<br>In satisfying the above Grid Code requirements, Generators with a CUSC Contract would meet one or more of the requirements of the System Restoration ~~Defence~~ Plan. |
| | | Any Generator who does not have a CUSC Contract (ie Embedded) and owns or operates a Power Station comprising one or more Generating Units or Power Park Modules which have a maximum output of greater than 1MW but less than 10MW and connected below 110kV (equivalent to a Type B Power Generating Module). | Not applicable.<br>Under the current GB Framework, there is currently no requirement for Non-CUSC Parties who own and operate a Type B Power Generating Module to contribute to the System Restoration ~~Defence~~ Plan. This however is subject to review and the NGESO expect to work with all Stakeholders in the future to consider the approach to including Non-CUSC Parties within the System ~~Defence~~ Restoration Plan. |
| Existing and new Transmission-connected demand facilities | New | Any Non-Embedded Customer who is an EU Code User and who has a CUSC Contract with the NGESO. The requirement of the DRSC would also apply but only when the Demand Response Provider is also a CUSC Party. | Applicable Grid Code requirements:<br>ECC6.1.2, ECC.6.1.4, ECC.6.2.3, ECC.6.5..<br>DRSC<br>ECP.A.8 |

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| EU Criteria | New or Existing | List of GB Parties considered to be SGUs for purposes of the System Restoration ~~Defence~~ Plan (GB SGU's) | Measures of the System Restoration ~~Defence~~ Plan |
|---|---|---|---|
| | | | ~~OC1~~<br>OC5.4, OC5.5.4 (only in respect of CUSC Parties who are also Demand Response Providers).<br>, OC6.8<br>OC.7.4, OC7.6 (OC7.6 - Scotland and Offshore only)<br>OC9<br>OC10<br>OC12<br>~~BC1.4, BC1.5, BC.1.7, BC1.A.1, BC1.A.2.1~~<br>BC2 (in particular BC.2.9)<br>In satisfying the above Grid Code requirements, Non-Embedded Customers would meet one or more of the requirements of the System Restoration ~~Defence~~ Plan.<br>All Transmission Connected Demand Facilities would have to be BM and CUSC Parties and hence satisfy the requirements of the Emergency and Restoration Code. There is no concept of an Embedded Non-Embedded Customer. |
| | Existing | Any Non-Embedded Customer who is a GB Code User and has a CUSC Contract with the ESO | Applicable Grid Code requirements:<br>CC6.1.2, CC.6.1.3, CC.6.1.4, CC.6.2.3, CC.6.5, .<br>~~OC1~~<br>OC5.4, OC5.5.4 (only in respect of CUSC Parties who are also Demand Response Providers).<br>OC6.8<br>OC.7.4, OC7.6 (OC7.6 - Scotland and Offshore only)<br>OC9<br>OC10<br>OC12<br>~~BC1.4, BC1.5, BC.1.7, BC1.A.1, BC1.A.2.1~~<br>BC2 (in particular BC.2.9) |

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| EU Criteria | New or Existing | List of GB Parties considered to be SGUs for purposes of the System Restoration ~~Defence~~ Plan (GB SGU's) | Measures of the System Restoration ~~Defence~~ Plan |
|---|---|---|---|
| | | | In satisfying the above Grid Code requirements, Non-Embedded Customers would meet one or more of the requirements of the System Restoration ~~Defence~~ Plan.<br>All Transmission Connected Demand Facilities would have to be BM and CUSC Parties and hence satisfy the requirements of the Emergency and Restoration Code. There is no concept of an Embedded Non-Embedded Customer. |
| Existing and new Transmission Connected Closed Distribution Systems | New | Any Non-Embedded Customer who is an EU Code User and who has a CUSC Contract with the NGESO | Applicable Grid Code requirements:<br>ECC6.1.2, ECC.6.1.4, ECC.6.2.3, ECC.6.5.<br>DRSC<br>ECP.A.8<br>~~OC1~~<br>OC5.4, OC5.5.4 (only in respect of CUSC Parties who are also Demand Response Providers).<br>OC6.8<br>OC.7.4, OC7.6 (OC7.6 - Scotland and Offshore only)<br>OC9<br>OC10<br>OC12<br>~~BC1.4, BC1.5, BC.1.7, BC1.A.1, BC1.A.2.1~~<br>BC2 (in particular BC.2.9)<br>BC3<br>In satisfying the above Grid Code requirements, Non-Embedded Customers (which would include a Closed Distribution System), would meet one or more of the requirements of the System Restoration ~~Defence~~ Plan.<br>All Transmission Connected Closed Distribution Systems would have to be BM and CUSC Parties and hence satisfy the requirements of the Emergency and Restoration Code. There is no concept of a Transmission Connected Non CUSC Party |

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| EU Criteria | New or Existing | List of GB Parties considered to be SGUs for purposes of the System Restoration ~~Defence~~ Plan (GB SGU's) | Measures of the System Restoration ~~Defence~~ Plan |
|---|---|---|---|
| | Existing | Any Non-Embedded Customer who is a GB Code User and which has a CUSC Contract with the NGESO | Applicable Grid Code requirements:<br>CC6.1.2, CC.6.1.3, CC.6.1.4, CC.6.2.3, CC.6.5.<br>~~OC1~~<br>OC5.4, OC5.5.4 (only in respect of CUSC Parties who are also Demand Response Providers).<br>OC6.8<br>OC.7.4, OC7.6 (OC7.6 - Scotland and Offshore only)<br>OC9<br>OC10<br>OC12<br>~~BC1.4, BC1.5, BC.1.7, BC1.A.1, BC1.A.2.1~~<br>BC2 (in particular BC.2.9)<br>In satisfying the above Grid Code requirements, Non-Embedded Customers would meet one or more of the requirements of the System Restoration ~~Defence~~ Plan.<br>All Transmission Connected Demand Facilities would have to be BM and CUSC Parties (which would include Closed Distribution Systems) and hence satisfy the requirements of the Emergency and Restoration Code. There is no concept of an Embedded Non-Embedded Customer. |

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| EU Criteria | New or Existing | List of GB Parties considered to be SGUs for purposes of the System Restoration ~~Defence~~ Plan (GB SGU's) | Measures of the System Restoration ~~Defence~~ Plan |
|---|---|---|---|
| Providers of redispatching of power generating modules or demand facilities by means of aggregation and providers of active power reserve in accordance with Title 8 of Regulation 2017/1485 | New & Existing | BM Participants including Virtual Lead Parties. | ECC/CC 6.5 only<br>DRSC if they are providing Demand Response Services and their equipment was purchased on or after 7 September 2018 and connected to the System on or after 18 August 2019.<br>~~BC1.4, BC1.5, BC.1.7, BC1.A.1, BC1.A.2.1~~<br>BC2 (in particular BC.2.9)<br>BC3.3, BC3.4, BC3.5, BC.3.6, BC.3.7 (As applicable but biased towards Generator who are registered as Gensets). |
| Existing and new high voltage direct current (HVDC) Systems and direct current connected Power Park Modules in accordance with the criteria set out in Article 4(1) of commission Regulation (EU) 2016/1447 | New | HVDC System Owners and Generators in respect of Transmission DC Converters and/or DC Connected Power Park Modules who are EU Code Users and have a CUSC Contract with the NGESO | Applicable Grid Code requirements:<br>ECC6.1.2, ECC.6.1.4, ECC.6.2.2.2, ECC.6.3, ECC.6.5, ECC.8, ECC.A.3, ECC.A.4, ECC.A.6, ECC.A.7, ECC.A.8<br>ECP.A.3, ECP.A.7<br>OC5.4, OC5.5, OC5.7 (OC5.7 will only apply if the provider has a black start contract)<br>OC.7.4, OC7.6 (OC7.6 - Scotland and Offshore only)<br>OC9<br>OC10<br>OC12<br>~~BC1.4, BC1.5, BC.1.7, BC1.A.1, BC1.A.2.1~~<br>BC2 (in particular BC.2.9)<br>BC3.3, BC3.4, BC3.5, BC.3.6, BC.3.7,<br>In satisfying the above Grid Code requirements, HVDC System Owners with a CUSC Contract who own or operate an HVDC System. DC Power Park Modules would need to satisfy |

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| EU Criteria | New or Existing | List of GB Parties considered to be SGUs for purposes of the System Restoration ~~Defence~~ Plan (GB SGU's) | Measures of the System Restoration ~~Defence~~ Plan |
|---|---|---|---|
| | | | the same Grid Code requirements as those applicable to new Type C and Type D Power Generating Modules listed in the first row of this table. |
| | | Any HVDC System Owner who does not have a CUSC Contract would not be required to satisfy the requirements of the EU Emergency and Restoration Code. | Not applicable.<br>Under the current GB Framework, there is currently no requirement for Non-CUSC Parties who own or operate a DC Converter Station to contribute to the System Restoration ~~Defence~~ Plan. An HVDC System does have a specific meaning within the scope of the Grid Code and would therefore be within the scope of EU NCER. This however is subject to review and the NGESO expect to work with all Stakeholders in the future to consider the approach to including Non-CUSC Parties within the System Restoration ~~Defence~~ Plan. |
| | Existing | DC Converter Station Owners and Generators in respect of Transmission DC Converters who are GB Code Users and have a CUSC Contract with the NGESO | Applicable Grid Code requirements:<br>CC6.1.2, CC.6.1.3, CC.6.1.4, CC.6.2.2.2, CC.6.3, CC.6.5, CC.8, CC.A.3, ECC.A.4, CC.A.6, CC.A.7, CC.A.8<br>CP.A.3<br>OC5.4, OC5.5, OC5.7 (OC5.7 will only apply if the provider has a black start contract), OC5.A.4<br>OC.7.4, OC7.6 (OC7.6 - Scotland and Offshore only)<br>OC9<br>OC10<br>OC12<br>~~BC1.4, BC1.5, BC.1.7, BC1.A.1, BC1.A.2.1~~<br>BC2 (in particular BC.2.9)<br>BC3.3, BC3.4, BC3.5, BC.3.6, BC.3.7, |

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| EU Criteria | New or Existing | List of GB Parties considered to be SGUs for purposes of the System Restoration ~~Defence~~ Plan (GB SGU's) | Measures of the System Restoration ~~Defence~~ Plan |
|---|---|---|---|
| | | | In satisfying the above Grid Code requirements, DC Converter Station Owners with a CUSC Contract who own or operate a DC Converter Station would be required to satisfy the requirements of EU NCER. DC Power Park Modules would need to satisfy the same Grid Code requirements as those applicable to Existing Generators listed in the second row of this table. |

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| EU Criteria | New or Existing | List of GB Parties considered to be SGUs for purposes of the System Restoration ~~Defence~~ Plan (GB SGU's) | Measures of the System Restoration ~~Defence~~ Plan |
|---|---|---|---|
| ~~Existing and new Type A Power Generating Modules in accordance with the criteria set out in Article 5 of Regulation (EU) 2016/631, to existing and new Type B Power Generating Modules other than those referred to in paragraph 2(b), as well as to existing and new demand facilities, closed distribution systems and third parties providing demand response where they qualify as defence service providers pursuant to Article 4(4)~~ | ~~New~~ | ~~Any Generator who is an EU Code User and has a CUSC Contract with the ESO and owns or operates a Type A Power Generating Module.~~<br><br>~~Non-Embedded Customers and BM Participants in respect of Closed Distribution Systems and Aggregators.~~ | ~~Applicable Grid Code requirements:~~<br>~~ECC6.1.2, ECC.6.1.4, ECC.6.2.2.2, ECC.6.3, ECC.6.5, ECC.8, ECC.A.3, ECC.A.4, ECC.A.6, ECC.A.7, ECC.A.8~~<br>~~DRSC if they are also providing Demand Response Services and their equipment was purchased on or after 7 September 2019 and connected to the System on or after 18 August 2019.~~<br>~~ECP.A.3, ECP.A.5, ECP.A.6~~<br>~~OC5.4, OC5.5~~<br>~~OC.7.4, OC7.6 (OC7.6 - Scotland and Offshore only)~~<br>~~OC9~~<br>~~OC10~~<br>~~OC12~~<br>~~BC1.4, BC1.5, BC.1.7, BC1.A.1, BC1.A.2.1~~<br>~~BC2 (in particular BC.2.9)~~<br>~~BC3.3, BC3.4, BC3.5, BC.3.6, BC.3.7,~~<br>~~In satisfying the above Grid Code requirements, Generators with a CUSC Contract who own or operate a Power Station comprising a Type A Power Generating Module would meet one or more of the requirements of the System Defence Plan in the same way as a Generator who owns or operates a Type B Power Generating Module. Note that a Generator in respect of a Type A Power Generating Module will have to meet those requirements of the Grid Code as applicable to Type A Power Generating Modules. However, where a Generator in respect of a Small Power Station comprises Type A Power Generating Modules, then the requirements on Small Power Stations are less onerous than those of Large Power Stations but this does not exclude those specific requirements applicable to Type A Power Generating Modules. The requirements will also vary if the Type A Power Generating Module is Embedded or Directly Connected.~~ |

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| EU Criteria | New or Existing | List of GB Parties considered to be SGUs for purposes of the System Restoration ~~Defence~~ Plan (GB SGU's) | Measures of the System Restoration ~~Defence~~ Plan |
|---|---|---|---|
| | | ~~Any Generator who does not have a CUSC Contract (i.e. Embedded) and owns or operates a Power Station comprising one or more Type A Power Generating Modules.~~ | ~~Not applicable.~~<br>~~Under the current GB Framework, there is currently no requirement for Non-CUSC Parties who own or operate a Type A Power Generating Module to contribute to the System Defence Plan. This however is subject to review and the ESO expect to work with all Stakeholders in the future to consider the approach to including Non-CUSC Parties within the System Defence Plan.~~ |
| ~~Existing and new Type A Power Generating Modules in accordance with the criteria set out in Article 5 of Regulation (EU) 2016/631, to existing and new Type B Power Generating Modules other than those referred to in paragraph 2(b), as well as to existing and new demand facilities, closed distribution systems and third~~ | ~~Existing~~ | ~~Any Generator who is a GB Code User who has a CUSC Contract with the ESO and owns or operates a Power Station comprising one or more Generating Units or Power Park Modules which has a maximum output of greater than 400W but less than 1MW and connected below 110kV (equivalent to a Type A Power Generating Module).~~<br><br>~~Non-Embedded Customers and BM Participants in respect of Closed Distribution Systems and Aggregators.~~ | ~~Applicable Grid Code requirements:~~<br>~~CC6.1.2, CC.6.1.3, CC.6.1.4, CC.6.2.2.2, CC.6.3, CC.6.5, CC.8, CC.A.3, CC.A.4, CC.A.6, CC.A.7~~<br>~~DRSC if they are also providing Demand Response Services and their equipment was purchased on or after 7 September 2019 and connected to the System on or after 18 August 2019.~~<br>~~CP.A.3~~<br>~~OC5.4, OC5.5, OC5.A.1, OC.5.A.2, OC5.A.3.~~<br>~~OC.7.4, OC7.6 (OC7.6 – Scotland and Offshore only)~~<br>~~OC9~~<br>~~OC10~~<br>~~OC12~~<br>~~BC1.4, BC1.5, BC.1.7, BC1.A.1, BC1.A.2.1~~<br>~~BC2 (in particular BC.2.9)~~<br>~~BC3.3, BC3.4, BC3.5, BC.3.6, BC.3.7,~~<br>~~In satisfying the above Grid Code requirements, Generators with a CUSC Contract who own or operate a Power Station comprising a Type A Power Generating Module would meet one or more of the requirements of the System Defence Plan in the same way as a Generator who owns or operates a Type~~ |

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| EU Criteria | New or Existing | List of GB Parties considered to be SGUs for purposes of the System Restoration ~~Defence~~ Plan (GB SGU's) | Measures of the System Restoration ~~Defence~~ Plan |
|---|---|---|---|
| ~~parties providing demand response where they qualify as defence service providers pursuant to Article 4(4)~~ | | | ~~B Power Generating Module. Note that a Generator in respect of a Type A Power Generating Module will have to meet those requirements of the Grid Code as applicable to Type A Power Generating Modules. However, where a Generator in respect of a Small Power Station comprises Type A Power Generating Modules, then the requirements on Small Power Stations are less onerous than those of Large Power Stations but this does not exclude those specific requirements applicable to Type A Power Generating Modules. The requirements will also vary if the Type A Power Generating Module is Embedded or Directly Connected.~~ |
| | | ~~Any Generator who does not have a CUSC Contract (ie Embedded) and owns or operates a Power Station comprising one or more Generating Units or Power Park Modules which have a maximum output of greater than 400W but less than 1MW and connected below 110kV (equivalent to a Type A Power Generating Module).~~ | ~~Not applicable.~~<br>~~Under the current GB Framework, there is currently no requirement for Non-CUSC Parties who own or operate a Type A Power Generating Module to contribute to the System Defence Plan. This however is subject to review and the ESO expect to work with all Stakeholders in the future to consider the approach to including Non-CUSC Parties within the System Defence Plan.~~ |

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| EU Criteria | New or Existing | List of GB Parties considered to be SGUs for purposes of the System Restoration ~~Defence~~ Plan (GB SGU's) | Measures of the System Restoration ~~Defence~~ Plan |
|---|---|---|---|
| Type A and Type B Power Generating Modules referred to in paragraph 3, demand facilities and closed distribution systems providing demand response may fulfil the requirements of this Regulation either directly or indirectly through a third party under the terms and conditions set out in accordance with Article 4(4) | New and Existing | BM Participants including Virtual Lead Parties | ECC.ECC.6.5<br>BC1, BC2, (ECC/CC.6.5 applies only) |
| This Regulation shall apply to energy storage units of a SGU, a defence service provider or restoration service provider which can be used to balance the system, | New | Any EU Code Generator which has a CUSC Contract with the NGESO and which owns and operates Electricity Storage Modules would be classified as a Storage User as defined under the ~~GC0096~~ Grid Code proposals | Applicable Grid Code requirements when acting as a Generator in an exporting mode of operation:<br>ECC6.1.2, ECC.6.1.4, ECC.6.2.2.2, ECC.6.3, ECC.6.5, ECC.8, ECC.A.3, ECC.A.4, ECC.A.6, ECC.A.7<br>ECP.A.3, ECP.A.5, ECP.A.6<br>OC5.4, OC5.5, OC5.7 (OC5.7 will only apply if the provider has a black start contract)<br>OC.7.4, OC7.6 (OC7.6 - Scotland and Offshore only)<br>OC9<br>OC10 |

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**Commented [AMC54]:** Now part of GCode AJ Response – Agreed and updated.

| EU Criteria | New or Existing | List of GB Parties considered to be SGUs for purposes of the System Restoration ~~Defence~~ Plan (GB SGU's) | Measures of the System Restoration ~~Defence~~ Plan |
|---|---|---|---|
| provided that they are identified as such in the system defence plans restoration plans or service contract. | | | OC12<br>~~BC1.4, BC1.5, BC.1.7, BC1.A.1, BC1.A.2.1~~<br>BC2 (in particular BC.2.9)<br>BC3.3, BC3.4, BC3.5, BC.3.6, BC.3.7,<br>Under the GC0096 proposals, Electricity Storage Modules are treated in the same way as Power Generating Modules. Generators who have a CUSC Contract with the NGESO who own and/or operate Electricity Storage Modules would therefore be within the scope of NCER. |
| | ~~Existing~~ | ~~Any CUSC Party who owns or operates Storage plant~~ | ~~Applicable Grid Code requirements when acting as a Generator in an exporting mode of operation:~~<br>~~CC6.1.2, CC.6.1.3, CC.6.1.4, CC.6.2.2.2, CC.6.3, CC.6.5, CC.8, CC.A.3, CC.A.4, CC.A.6, CC.A.7~~<br>~~CP.A.3~~<br>~~OC5.4, OC5.5, OC5.A.1, OC.5.A.2, OC5.A.3.~~<br>~~OC.7.4, OC7.6 (OC7.6 - Scotland and Offshore only)~~<br>~~OC9~~<br>~~OC10~~<br>~~OC12~~<br>~~BC1.4, BC1.5, BC.1.7, BC1.A.1, BC1.A.2.1~~<br>~~BC2 (in particular BC.2.9)~~<br>~~BC3.3, BC3.4, BC3.5, BC.3.6, BC.3.7,~~<br>~~In general, the requirements on Storage are the same as those on Generators. However, as Storage is comparatively new, and the requirements on storage are only being introduced through GC0096, Existing Generators caught by the requirements of the Bilateral Connection Agreement would have to satisfy the requirements of the Grid Code as listed above.~~ |

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| EU Criteria | New or Existing | List of GB Parties considered to be SGUs for purposes of the System Restoration ~~Defence~~ Plan (GB SGU's) | Measures of the System Restoration ~~Defence~~ Plan |
|---|---|---|---|
| Restoraiton Service Provider with a legal contract to provide a Restoration service | New | Any non CUSC party which has a contract with NGESO is to provide a Restoation Service would need to satisfy the appropriate requirements of the Grid Code through a contractual mechanism. | Applicable Grid Code requirements as defined contractually:<br>ECC6.1.2, ECC.6.1.4, ECC.6.2.2.2, ECC.6.3, ECC.6.5, ECC.8, ECC.A.3, ECC.A.4, ECC.A.6, ECC.A.7<br>ECP.A.3, ECP.A.5, ECP.A.6<br>OC5.4, OC5.5, OC5.7<br>OC.7.4, OC7.6 (OC7.6 - Scotland and Offshore only)<br>OC 9<br>OC10<br>OC12<br>BC1.4, BC1.5, BC.1.7, BC1.A.1, BC1.A.2.1<br>BC2 (in particular BC.2.9)<br>BC3.3, BC3.4, BC3.5, BC.3.6, BC.3.7, |
| Restoraiton Service Provider with a legal contract to provide a Restoration service | Existing | Any non CUSC party which is to provide a Restoration service would need to satisfy the appropriate requirements of the Grid Code through a contractual mechanism. | Applicable Grid Code requirements as defined contractually:<br>CC6.1.2, CC.6.1.3, CC.6.1.4, CC.6.2.2.2, CC.6.3, CC.6.5, CC.8, CC.A.3, CC.A.4, CC.A.6, CC.A.7<br>CP.A.3<br>OC5.4, OC5.5, OC5.A.1, OC.5.A.2, OC5.A.3, OC5.7<br>OC.7.4, OC7.6 (OC7.6 - Scotland and Offshore only)<br>OC9<br>OC10<br>OC12<br>BC1.4, BC1.5, BC.1.7, BC1.A.1, BC1.A.2.1<br>BC2 (in particular BC.2.9)<br>BC3.3, BC3.4, BC3.5, BC.3.6, BC.3.7,<br>. |

Table A1- GB Parties within the Scope of EU NCER

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~~CUSC Parties, Application of the Grid Code and the relationship with the Emergency and Restoration Code~~

GB parties falling within the remit of the EU NCER

In GB, those parties who would fall under the requirements of the EU NCER would be:-

- CUSC Parties; and
- Non-CUSC Parties who have a contractual agreement with NG ESO to provide one or more measures of this System Defence Plan.

The Connection and Use of System Code

The Connection and Use of System Code (CUSC) defines the arrangements for parties connecting to or using the Transmission System including but not limited to, issues such as connection, charging, Mandatory Ancillary Services and Balancing Services.

It is a Mandatory requirement for any party (such as a Generator, HVDC System Owner, Network Operator, Non-Embedded Customer, Aggregator) which: -

- Is directly connected to the Transmission System
- Owns or operates a Large Power Station (a Large Power Station is defined in the Grid Code)
- Owns or operates an HVDC System and whose Connection Point is at 110kV or above
- Owns or operates a DC Converter Station and the Installation has a rating of 50MW or more.
- Applies for Transmission Entry Capacity
- Is a Licensed Supplier
- Wishes to participate in the Balancing Mechanism
- Owns or operates a Large Power Station and that Large Power Station comprises one or more Electricity Storage Modules

To ~~sign~~ accede to the CUSC and have an Agreement with ~~National Grid~~ NGESO. A condition of signing the CUSC will necessitate the need for that Party to also meet the applicable requirements of the Grid Code. ~~In satisfying the requirements of the Grid Code, and through the amendments being introduced through Grid Code modification GC0127 and GC0128, A~~any one of these parties (in satisfying the requirements of the Grid Code) will satisfy the requirements of EU NCER.

**Commented [AMC55]:** Needs updating AJ response – Agreed and updated.

GB parties falling within the remit of the EU NCER

In GB, those parties who would fall under the requirements of the EU NCER would be:-

- CUSC Parties; and

Non-CUSC Parties who have a contractual agreement with NG ESO to provide one or more measures of this System Defence Plan.

Non-CUSC Parties

~~For the avoidance of doubt, a~~ A non CUSC Party would include one of the following categories, unless that Party has opted to sign the CUSC:

A Generator ~~which~~ who owns or operates a Licence Exempt Embedded Medium Power Station (LEEMPS)

A Generator ~~which~~ who owns or operates an Embedded Small Power Station

A Demand Response Provider who may have a commercial contract with ~~National Grid~~ NGESO to provide Commercial Ancillary Services but has not signed the CUSC.

A HVDC System Owner who owns and operates an HVDC System and that HVDC System in Embedded and has a Connection Point below 110kV and has not signed the CUSC.

An DC Converter Station Owner who owns and operates a DC Converter Station and that DC Converter Station is not connected to the Transmission System and has a rating of less than 50MW and has not signed the CUSC.

A Generator ~~which~~ who owns or operates an Electricity Storage Module and that Electricity Storage Module is part of an Embedded Medium Power Station or Embedded Small Power Station and that Generator has not signed the CUSC.

~~ESO Interpretation~~

~~The ESO considers for the implementation of the EU NCER, only CUSC Parties need to be within the scope of the EU NCER. We believe that this is an appropriate position based on the Legal Advice received. For the avoidance of doubt, any Party which does not have a CUSC Contract with the NGESO would not be required to satisfy the requirements of NCER but that would not preclude them from forming part an LJRP with the relevant Distribution Network Operator or Independent Distribution Network Operator.~~

~~For the avoidance of doubt, the NGESO and Transmission Licensees are required to satisfy the requirements of the EU NCER.~~

~~In complying with the requirements of the Grid Code, System Operator Transmission Owner Code (STC) and Distribution Code (as applicable), the NGESO, Transmission Licensees, Distribution Network Operators (including Independent Distribution Network Operators) and CUSC Parties would satisfy the requirements of EU NCER.~~

**Commented [AMC56]:** Equivalent text is retained in the SDP - AJ Response – Deleted

# Appendix B: High Priority SGUs & Terms of Re-energisation

Within GB, a High Priority Significant Grid User is classified as:

A Black Start Service Provider

A Large Power Station connected directly to the National Electricity Transmission System: or

An Embedded Large Power Station

An Anchor Plant Owner who is party to a Distribution Restoration Zone Plan

For the purposes of this Appendix, the terms “Embedded” and “Large Power Station” have the same definition as that defined in the Grid Code

# Appendix C: Current Restoration Plans & Black Start Service Providers

Due to the sensitive information held within these plans, these have been lodged with the Authority. The details would be included in a Local Joint Restoration Plan and Distribution Restoration Zone Plan.

**Commented [AMC57]:** It would be goof to confirm that those parties involved have been involved in the development and know about these plans where they affect them. AJ Response – They would be part of an LJRP or DRZP so that should already have taken place.

**Commented [MK58]:** Would it not be better to remove these files from the document? AJ Response – We can do. To be discussed in Workgroup.

~~**England and Wales Restoration Diagram**~~

2018 03 E&W - Restoration Diagram DRAFT 04 - Strictly Confidential.pdf

~~**Scotland Restoration Diagram**~~

Scotland - New Restoration Diagram 2018-09-17 - Strictly Confidential.pdf

~~**Contracted Restoration Service Providers**~~

Black Start Providers v1 - Strictly Confidential.pdf

# Appendix D: Substations Essential for Restoration Plan Procedures

Due to the sensitive information held within these plans, these have been lodged with the Authority. Details of which would be covered by the Local Joint Restoration Plan or Distribution Restoration Zone Plan

**Commented [AMC59]:** See earlier comment AJ Response – See above

~~**Substations included in Local Joint Restoration Plans, 400kV to 132kV.**~~

Black Start LJRP Substations List v1 - Strictly Confidential.pdf

~~**Substations included in Skeleton Network Phase 1 Plans, 400kV – 132kV**~~

Black Start Skeleton Network Substations List v1 - Strictly Confidential.pdf

# Appendix E: List of Transmission Licensees and Distribution Network Operators (including Independent Distribution Network Operators responsible for Implementing System Restoration Plan Measures

A list of Transmission Licensees, Distribution Network Operators and Independent Distribution Network Operators (IDNOs) are available from Ofgem's website which is available from the following link.

https://www.ofgem.gov.uk/system/files/docs/2019/08/electricity_registered_or_service_addresses_new.pdf

All parties on this list are responsible for ensuring they are able to enact their System Restoration Plan responsibilities.

# Appendix F: Glossary

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| Balancing Mechanism | The mechanism for the making and acceptance of offers and bids pursuant to the arrangements contained in the Balancing and Settlement Code. |
| Balancing Mechanism Participant | A person who is responsible for and controls one or more BM Units or where a Bilateral Agreement specifies that a User is required to be treated as a BM Participant for the purposes of the Grid Code. For the avoidance of doubt, it does not imply that they must be active in the Balancing Mechanism. |
| Black Start Service Provider | A **User** with a legal or contractual obligation to provide a service contributing to one or several measures of the **System Restoration Plan**. |
| BEIS | Her Majesty's Government Department for Business, Energy and Industrial Strategy. |
| CUSC Contract | As defined in the Grid Code is "One or more of the following agreements as envisaged in Standard Condition C1 of The Company's Transmission Licence: (a) the CUSC Framework Agreement;<br>(b) a Bilateral Agreement;<br>(c) a Construction Agreement<br>or a variation to an existing Bilateral Agreement and/or Construction Agreement; |
| Defence Service | A capability as detailed in this System Defence Plan as required from a CUSC Party, as a condition of that party meeting the requirements of the Grid Code or a capability provided by a party which has a contract with NGESO to provide a Defence Service. A Defence Service is one or more capabilities detailed in this System Defence Plan. |
| Defence Service Provider | A User with a legal or contractual obligation to provide a service contributing to one or several measures of the System Defence Plan or a party with a contract to meet one or more measures of the System Defence Plan. |
| Distribution Network Operator | A person with a User System directly connected to the National Electricity Transmission System to which Customers and/or Power Stations (not forming part of the User System) are connected, acting in its capacity as an operator of the User System, but shall not include a person acting in the capacity of an Externally Interconnected System Operator or a Generator in respect of OTSUA. For the avoidance of doubt an Independent Network Operator (IDNO) is considered to have the same meaning and obligations as a Distribution Network Operator. |
| EU Code User | A User who is any of the following: -<br>(a) A Generator in respect of a Power Generating Module (excluding a DC |

**Commented [J(A60]:** As per the System Defence Plan we will need to check the definitions to ensure they reflect current Grid Code practice.

**Commented [AMC61]:** Worth checking the references to EU codes as well following GC0149 AJ Response – Agree – we can do this.

**Commented [VG62]:** And that it accommodates non-CUSC parties – AJ Response – The current solution is that Non-CUSC parties would have a contract with the ESO and hence bound by the requirements of E&R. System Restoration is probably easier that System Defence but one for discussion.

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| | | Connected Power Park Module) or OTSDUA (in respect of an AC Offshore Transmission System) whose Main Plant and Apparatus is connected to the System on or after 27 April 2019 and who concluded Purchase Contracts for its Main Plant and Apparatus on or after 17 May 2018 |
| | (b) | A Generator in respect of any Type C or Type D Power Generating Module which is the subject of a Substantial Modification which is effective on or after 27 April 2019. |
| | (c) | A Generator in respect of any DC Connected Power Park Module whose Main Plant and Apparatus is connected to the System on or after 8 September 2019 and who had concluded Purchase Contracts for its Main Plant and Apparatus on or after 28 September 2018. |
| | (d) | A Generator in respect of any DC Connected Power Park Module which is the subject of a Substantial Modification which is effective on or after 8 September 2019. |
| | (e) | An HVDC System Owner or OTSDUA (in respect of a DC Offshore Transmission System including a Transmission DC Converter) whose Main Plant and Apparatus is connected to the System on or after 8 September 2019 and who had concluded Purchase Contracts for its Main Plant and Apparatus on or after 28 September 2018. |
| | (f) | An HVDC System Owner or OTSDUA (in respect of a DC Offshore Transmission System including a Transmission DC Converter) whose HVDC System or DC Offshore Transmission System including a Transmission DC Converter) is the subject of a Substantial Modification on or after 8 September 2019. |
| | (g) | A User which the Authority has determined should be considered as an EU Code User. |

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| | (h) A Network Operator whose entire distribution System was first connected to the National Electricity Transmission System on or after 18 August 2019 and who had placed Purchase Contracts for its Main Plant and Apparatus in respect of its entire distribution System on or after 7 September 2018. For the avoidance of doubt, a Network Operator will be an EU Code User if its entire distribution System is connected to the National Electricity Transmission System at EU Grid Supply Points only.<br>(i) A Non Embedded Customer whose Main Plant and Apparatus at each EU Grid Supply Point was first connected to the National Electricity Transmission System on or after 18 August 2019 and who had placed Purchase Contracts for its Main Plant and Apparatus at each EU Grid Supply Point on or after 7 September 2018 or is the subject of a Substantial Modification on or after 18 August 2019.<br>(j) A Storage User in respect of an Electricity Storage Module whose Main Plant and Apparatus is connected to the System on or after 20 May~~XXXX~~ 2020 and who concluded Purchase Contracts for its Main Plant and Apparatus on or after 20 May~~XXXX~~ 2019. ~~*(Dates are a consequence of GC0096 modification)*~~ |
| EU Generator | A Generator or OTSDUA who is also an EU Code User. |
| European Regulation (EU) 2016/631 | Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a Network Code on Requirements of Generators |
| European Regulation (EU) 2016/1388 | Commission Regulation (EU) 2016/1388 of 17 August 2016 establishing a Network Code on Demand Connection |
| European Regulation (EU) 2016/1447 | Commission Regulation (EU) 2016/1447 of 26 August 2016 establishing a network code on requirements for Grid Connection of High Voltage Direct Current Systems and Direct Current-connected Power Park Modules |
| European Regulation (EU) 2017/1485 | Commission Regulation (EU) 2017/1485 establishing a guideline on electricity transmission system operation |

| | |
|---|---|
| European Regulation (EU) 2017/2195 | Commission Regulation (EU) 2017/2195 of 17 December 2017 establishing a guideline on electricity balancing |
| Externally Interconnected System Operator or EISO | Is defined in the Grid Code as "A person who operates an External System which is connected to the National Electricity Transmission System or a User System by an External Interconnection". |
| Frequency Sensitive Mode | A Genset, or Type C Power Generating Module or Type D Power Generating Module or DC Connected Power Park Module or HVDC System operating mode which will result in Active Power output changing, in response to a change in System Frequency, in a direction which assists in the recovery to Target Frequency, by operating so as to provide Primary Response and/or Secondary Response and/or High Frequency Response. |
| GB Code User | A User in respect of:-<br>(a) A Generator or OTSDUA whose Main Plant and Apparatus is connected to the System before 27 April 2019, or who had concluded Purchase Contracts for its Main Plant and Apparatus before 17 May 2018, or whose Plant and Apparatus is not the subject of a Substantial Modification which is effective on or after 27 April 2019; or<br>(b) A DC Converter Station owner whose Main Plant and Apparatus is connected to the System before 8 September 2019, or who had concluded Purchase Contracts for its Main Plant and Apparatus before 28 September 2018, or whose Plant and Apparatus is not the subject of a Substantial Modification which is effective on or after 8 September 2019; or<br>(c) A Non Embedded Customer whose Main Plant and Apparatus was connected to the National Electricity Transmission System at a GB Grid Supply Point before 18 August 2019 or who had placed Purchase Contracts for its Main Plant and Apparatus before 7 September 2018 or that Non Embedded Customer is not the subject of a Substantial Modification which is effective on or after 18 August 2019.2018.~~,~~or |

| | |
|---|---|
| | (d) A Network Operator whose entire distribution System was connected to the National Electricity Transmission System at one or more GB Grid Supply Points before 18 August 2019 or who had placed Purchase Contracts for its Main Plant and Apparatus in respect of its entire distribution System before 7 September 2018 or its entire distribution System is not the subject of a Substantial Modification which is effective on or after 18 August 2019. For the avoidance of doubt, a Network Operator would still be classed as a GB Code User where its entire distribution System was connected to the National Electricity Transmission System at one or more GB Grid Supply Points, even where that entire distribution System may have one or more EU Grid Supply Points but still comprises of GB Grid Supply Points. |
| GB Generator | As defined in the Grid Code is "A Generator, or OTSDUA, who is also a GB Code User" |
| GB Synchronous Area | As defined in the Grid Code is "The AC power System in Great Britain which connects Users, Relevant Transmission Licensees whose AC Plant and Apparatus is considered to operate in synchronism with each other at each Connection Point or User System Entry Point and at the same System Frequency". |
| HVDC System | An electrical power system which transfers energy in the form of high voltage direct current between two or more alternating current (AC) buses and comprises at least two HVDC Converter Stations with DC Transmission lines or cables between the HVDC Converter Stations. |
| Local Joint Restoration Plan | As defined in the Grid Code is "A plan produced under OC9.4.7.12 of the Grid Code detailing the agreed method and procedure by which a Genset at a Black Start Station (possibly with other Gensets at that Black Start Station) will energise part of the Total System and meet complementary blocks of local Demand so as to form a Power Island. In Scotland, the plan may also: cover more than one Black Start Station; include Gensets other than those at a Black Start Station and cover the creation of one or more Power Islands". |

| | |
|---|---|
| GB NETS | Great Britain National Electricity Transmission System |
| National Electricity Transmission System Security and Quality of Supply Standards or NETS SQSS | The National Electricity Transmission System Security and Quality of Supply Standard as published on The National Grid ESO Website:<br><br>https://www.nationalgrideso.com/codes/security-and-quality-supply-standards?code-documents |
| NGESO | The National Electricity Transmission System Operator is responsible for operating the Onshore Transmission System and, where owned by Offshore Transmission Licensees, Offshore Transmission Systems. The ~~NG~~NGESO for Great Britain is currently National Grid Electricity System Operator. |
| Non-Embedded Customer | A Customer in Great Britain, except for a Network Operator acting in its capacity as such, receiving electricity direct from the Onshore Transmission System irrespective of from whom it is supplied. |
| Partial Shutdown | A Partial Shutdown is the same as a Total Shutdown except that all generation has ceased in a separate part of the Total System and there is no electricity supply from External Interconnections or other parts of the Total System to that part of the Total System. Therefore, that part of the Total System is shutdown with the result that it is not possible for that part of the Total System to begin to function again without TSOs directions relating to a Black Start. |
| Power Generating Module | Either a Synchronous Power-Generating Module or a Power Park Module owned or operated by an EU Generator or a GB Generator. |
| Power Island | One or more Power Stations, together with complementary local demand. |
| Power System Synchroniser | Equipment which synchronises two electrically separate synchronous areas together to create one synchronous area. |
| Restoration Service | A capability as detailed in the System Restoration Plan as required from a CUSC Party, as a condition of that party meeting the requirements of the Grid Code or a capability provided by a party which has a contract with NGESO to provide a Restoration Service. A Restoration Service is one or more capabilities detailed in the System Restoration Plan. |
| Restoration Service Provider | A User with a legal or contractual obligation to provide a service contributing to one or several |

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| | measures of the System Restoration Plan or a party with a contract to meet one or more measures of the System Restoration Plan. |
| Skeleton Network | The detailed restoration plan for restoring a skeletal GB NETS |
| System Operator Transmission Owner Code or STC | The System Operator Transmission Owner Code as published on The National Grid ESO Website:<br><br>https://www.nationalgrideso.com/codes/system-operator-transmission-owner-code?code-documents |
| Target Frequency | That Frequency determined by The Company, in its reasonable opinion, as the desired operating Frequency of the Total System or Power Island. This will normally be 50.00Hz plus or minus 0.05Hz, except in exceptional circumstances as determined by The Company, in its reasonable opinion when this may be 49.90 or 50.10Hz. An example of exceptional circumstances may be difficulties caused in operating the System during disputes affecting fuel supplies. |
| Total System | The National Electricity Transmission System and all User Systems in the National Electricity Transmission System Operator Area. |
| Total Shutdown | A Total Shutdown is the situation existing when all generation has ceased and there is no electricity supply from External Interconnections. Therefore, the Total System has shutdown with the result that it is not possible for the Total System to begin to function again without TSO's directions relating to a Black Start. |
| TSO | A Transmission System Operator is a natural or legal person responsible for operating, ensuring the maintenance of and, if necessary, developing the transmission system in a given area and, where applicable, its interconnections with other systems, and for ensuring the long-term ability of the system to meet reasonable demands for the transmission of electricity. |
| Type C Power Generating Module | A Power-Generating Module with a Grid Entry Point or User System Entry Point below 110 kV and a Maximum Capacity of 10 MW or greater but less than 50 MW. |
| Type D Power Generating Module | A Power-Generating Module:<br>with a Grid Entry Point or User System Entry Point at, or greater than, 110 kV; or<br>with a Grid Entry Point or User System Entry Point below 110 kV and with Maximum Capacity of 50 MW or greater. |

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| Unacceptable Frequency Conditions | These are conditions defined in the NETS SQSS where:<br>i) the steady state frequency falls outside the statutory limits of 49.5Hz to 50.5Hz; or<br>ii) ii) a transient frequency deviation on the MITS persists outside the above statutory limits and does not recover to within 49.5Hz to 50.5Hz within 60 seconds. Transient frequency deviations outside the limits of 49.5Hz and 50.5Hz shall only occur at intervals which ought to reasonably be considered as infrequent. In order to avoid the occurrence of Unacceptable Frequency Conditions: a) The minimum level of loss of power infeed risk which is covered over long periods operationally by frequency response to avoid frequency deviations below 49.5Hz or above 50.5Hz will be the actual loss of power infeed risk present at connections planned in accordance with the normal infeed loss risk criteria;<br><br>b) The minimum level of loss of power infeed risk which is covered over long periods operationally by frequency response to avoid frequency deviations below 49.5Hz or above 50.5Hz for more than 60 seconds will be the actual loss of power infeed risk present at connections planned in accordance with the infrequent infeed loss risk criteria. It is not possible to be prescriptive with regard to the type of secured event which could lead to transient deviations since this will depend on the extant frequency response characteristics of the system which NGESO adjust from time to time to meet the security and quality requirements of this Standard. |

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