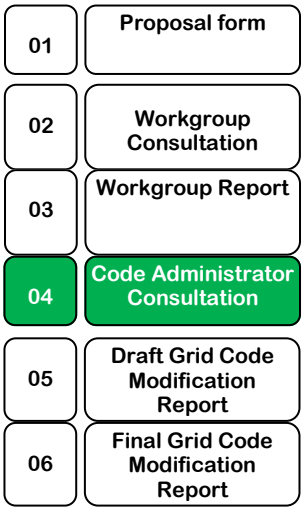
Code Administrator Consultation	At what stage is this document in the process?

GC0127 & GC0128:

Mod Title: EU Code Emergency & Restoration: Requirements resulting from System Defence and Restoration Plans



Purpose of Modification: The European Emergency and Restoration Network Code ("E&R NC") requires the publication of a System Defence Plan and a System Restoration Plan. This Modification seeks to incorporate the obligations on GB Parties arising from the System Defence Plan and the System Restoration Plan into the GB Grid Code that need to be implemented by 18 December 2019. National Grid ESO will notify GB Parties impacted by the implementation of E&R NC and the measures they have to meet. Following such notification GB Parties will have 12 months to implement the measures specified.

The purpose of this document is to consult on GC0127 & GC0128 with Grid Code Parties and other interested industry members. Parties are requested to respond by **5pm on 18 November 2019** to grid.code@nationalgrideso.com using the Code Administrator Consultation Response Pro-forma which can be found via the following link:

https://www.nationalgrideso.com/codes/grid-code/modifications/gc0127-eu-code-emergency-restoration-requirements-resulting-system

Published on: **18 October 2019**

Length of Consultation: **1 month**

Responses by: **18 November 2019**

High Impact:

GC0127: National Grid ESO, Transmission Owners, Generators who have signed a CUSC Contract, HVDC System Owners who have signed a CUSC Contract, DC

	Converter Station Owners who have signed a CUSC Contract, Network Operators, Non-Embedded Customers and Virtual Lead Parties who have signed a CUSC Contract **GC0128:** National Grid ESO, Transmission Owners, Generators who have signed a CUSC Contract, HVDC System Owners who have signed a CUSC Contract, DC Converter Station Owners who have signed a CUSC Contract, Network Operators, Non-Embedded Customers, Providers of Black Start Services and Virtual Lead Parties who have signed a CUSC Contract **Alternative solutions** Three alternatives have been raised. 1) This alternative, if approved by Ofgem would have a high impact on non-cusc parties 2) This alternative, if approved by Ofgem would have an impact on Electricity Storage providers 3) This alternative is a combination of the two alternatives above
	The Workgroup concludes: Workgroup Members unanimously concluded that the Original Proposal facilitates the Grid Code Objectives better than the baseline. Workgroup Members unanimously concluded that WAGCM1, WAGCM2 and WAGCM3 better facilitated the Grid Code Objectives than the baseline. Workgroup Members by majority concluded that the Original was best overall.

Contents

Any questions?

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Timetable

The Code Administrator recommends the following timetable:	
Presented to Panel	25 April 2019
Initial consideration by Workgroup	May 2019
Workgroup Report presented to Panel	10 September 2019
Code Administration Consultation issued to the Industry (1 month)	18 October 2019
Code Administration Consultation closes	18 November 2019
Draft Final Modification Report presented to Panel	20 November 2019
Modification Panel decision	28 November 2019
Final Modification Report issued to the Authority	2 December 2019
Expected Authority Decision	16 December 2019
Decision implemented in Grid Code	17 December 2019

1 About this document

This document is the Code Administrator Consultation that contains the discussion of the Workgroup which formed in May 2019 to develop and assess the proposal, the responses to the Workgroup Consultation which closed on 16 August 2019 and the voting of the Workgroup held on 28 August 2019. GC0127 and GC0128 were amalgamated at the July 2019 Panel meeting. The Panel reviewed the Workgroup Report at their CUSC Panel meeting on 10 September 2019 and agreed that the Workgroup had met its Terms of Reference and that the Workgroup could be discharged.

GC0127 and GC0128 were proposed by National Grid ESO and were submitted to the Grid Code Review Panel for its consideration on 25 April 2019. The Panel decided to send the Proposal to a Workgroup to be developed and assessed against the Grid Code Objectives.

Section 2 (Original Proposal) and Section 3 (Proposer's Solution) are sourced directly from the Proposer and any statements or assertions have not been altered or substantiated/supported or refuted by the Workgroup.

Section 4 of the Workgroup Report contains the Impacts and Other Considerations of the Proposal and the potential solution.

Section 5 of the Workgroup Report contains the discussion by the Workgroup on the Proposal and the potential solution

The Workgroup consulted on this Modification and a total of 6 responses were received. These responses can be viewed in Section 6 of this Report.

Workgroup Conclusions

The Workgroup met on 28 August 2019 and voted on whether the Original and the WAGCM would better facilitate the Grid Code Objectives than the baseline and what option was best overall.

Workgroup Members unanimously concluded that the Original Proposal better facilitates the Grid Code Objectives than the baseline.

Workgroup Members unanimously concluded that WAGCM1, WAGCM2 and WAGCM3 facilitated the Grid Code Objectives better than the baseline.

Workgroup Members by majority concluded that the Original was best overall.

Legal text for alternatives

The Workgroup sought advice from the GCRP around whether to develop the legal text for the alternatives raised. The GCRP recommended that the legal text not be developed and sent a letter to the Authority, dated 12 September 2019, outlining their reasoning. The Authority responded on 24 September 2019 requesting that the legal text be developed ahead of issuing this Code Administrator Consultation. These letters can be located in Annex 7.

The Code Administrator, under Governance Rule 21.5, sought comments from the Workgroup through a webex where all Workgroup members joined, held on the 11 October 2019. The Workgroup commented and developed the legal text for the alternatives which can be found in Annex 4 with the Original proposal legal text.

Terms of Reference

The Grid Code Panel detailed in the Terms of Reference the scope of work for the GC0127 and GC0128 Workgroup and the specific areas that the Workgroup should consider. These are listed in the table below with a reference to where you can locate the information in the Report.

The full Terms of Reference can be found in Annex 1.

Terms of Reference GC0127

Specific Area	Location in the report
Implementation and costs;	Section 2, 3 and 5

Review draft legal text should it have been provided. If legal text is not submitted within the Grid Code Modification Proposal the Workgroup should be instructed to assist in the developing of the legal text;	Annex 4
Consider whether any further Industry experts or stakeholders should be invited to participate within the Workgroup to ensure that all potentially affected stakeholders have the opportunity to be represented in the Workgroup. Demonstrate what has been done to cover this clearly in the report;	Section 5
Confirm when GC0127 requirements would apply to Users	Section 2, 3 & 5
Are there any cross-code impacts?	Section 2, 3 & 5
Consider the impacts on Grid Code Users • whether all types of storage are affected or those classified as SGU's • the load disconnection, frequencies and profiles being used • how to maintain the commercial services that are currently provided • Seek a view from the National Grid ESO in regards to the impact on system inertia	Section 2, 3 & 5
Consider how balancing services will be obtained from Users that do not currently provide them	Section 2, 3 & 5

Terms of Reference GC0128

Specific Area	**Location in the report**
Implementation and costs;	Section 2, 3 & 5
Review draft legal text should it have been provided. If legal text is not submitted within the Grid Code Modification Proposal the Workgroup should be instructed to assist in the developing of the legal text;	Annex 4

Consider whether any further Industry experts or stakeholders should be invited to participate within the Workgroup to ensure that all potentially affected stakeholders have the opportunity to be represented in the Workgroup. Demonstrate what has been done to cover this clearly in the report;	Section 5
Confirm when GC0128 requirements would apply to Users	Section 2, 3 & 5
Are there any cross-code impacts?	Section 2, 3 & 5
Consider the impacts on Grid Code Users	Section 2, 3 & 5
Consider the impact of embedded generation as part of a black start restoration plan	Section 2, 3 & 5
Who can be a frequency leader, and under what circumstances	Section 2, 3 & 5

Acronym Table

Acronym	Meaning
E&R NC	Emergency and Restoration Network Code[1]

[1] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017R2196&from=EN

DCC	Demand Connection Code
HVDC	High Voltage Direct Current
National Grid ESO	National Grid Electricity System Operator
SRP	System Restoration Plan
SDP	System Defence Plan
SGU	Significant Grid User
RfG	Requirements for Generators European Code
SOGL	Electricity Transmission System Operation Guideline 2017/1485
BM	Balancing Mechanism
STC	System Operator Transmission Owner Code

2 Original Proposal

Section 2 (Original Proposal) and Section 3 (Proposer's Solution) are sourced directly from the Proposer and any statements or assertions have not been altered or substantiated/supported or refuted by the Workgroup. Section 5 of the Code Administrator Consultation contains the discussion by the Workgroup on the Proposal and the potential solution.

Defect

The Emergency and Restoration Code Network Code (E&R NC) requires the Electricity System Operator to create a System Defence Plan (SDP) and System Restoration Plan

(SRP), which National Grid ESO produced and consulted on in September 2018. There are also requirements on energy storage units and SGUs in the SDP and SGU's in the SRP that are not currently in the Grid Code, and so the two need to be aligned for transparency.

The SDP and SRP need to be implemented by 18 December 2019 so these modifications will need to be in the Grid Code by the same date.

What

This modification proposes to align E&R NC, the SDP, the SRP and the Grid Code.

Why

This modification needs to progress to ensure the sections of the SDP and SRP that need to be implemented by 18 December 2019 meet those timescales.

These Proposals are two of a number of Proposals which seek to implement relevant provisions of a number of new EU Network Codes/Guidelines which have been introduced in order to enable progress towards a competitive and efficient internal market in electricity. The full set of EU network guidelines and codes are;

- Regulation 2015/1222- Capacity Allocation and Congestion Management (CACM) which entered into force 14 August 2015;
- Regulation 2016/1719 – Forward Capacity Allocation (FCA) which entered into force 17 October 2016;
- Regulation 2016/631- Requirements for Generators (RfG) which entered into force 17 May 2016;
- Regulation 2016/1388 – Demand Connection Code (DCC) which entered into force 7 September 2016;
- Regulation 2016/1447 – High Voltage Direct Current (HVDC) which entered into force 28 September 2016;
- Transmission System Operation Guideline (SOGL) - which entered into force 14 September 2017; and
- Regulation 2017/2196 - Emergency and Restoration (E&R) which entered into force 18 December 2017.

The Regulation establishing a Network Code on Emergency and Restoration entered into force on 18 December 2017. The E&R NC sets out rules relating to the management of the electricity transmission system in the emergency, blackout and restoration states. The main objective of the relevant rules is to bring the system back to the normal state as quickly and efficiently as possible.

How – GC0127

In coordination with Article 15(3) of E&R and section 3.1.5 of the SDP specifies that:

Energy Storage systems taking energy are required to automatically switch to generating mode or where it is not capable of doing this must automatically disconnect before the activation of Low Frequency Demand Disconnection Scheme.

In coordination with Article 21(1b) of E&R, specifies that:

1. In case of absence of control area adequacy in the day-ahead or intraday timeframe, identified pursuant to paragraphs 1 and 2 of Article 107 of Regulation (EU) 2017/1485,

and prior to any potential suspension of market activities pursuant to Article 35, a TSO shall be entitled to request assistance for active power from:

(a) any balancing service provider, which, upon the TSO request, shall change its availability status to make available all its active power, provided it was not already activated through the balancing market, and conforming to its technical constraints;

(b) any SGU connected in its LFC area, which does not already provide a balancing service to the TSO, and which, upon the TSO request, shall make available all its active power, conforming to its technical constraints; and

(c) other TSOs that are in the normal or alert state.

This requirement was also reflected in section 4.6.3 of the updated SDP.

How – GC0128

- Frequency management within a Black Start (Articles 27(4))

Frequency management within a Black Start (Articles 27(4))

Article 27 – Activation of the Re-energisation Procedure

Changes to clarify the requirements on Distribution System Operators (Transmission Owners and Distribution Network Operators) to provide demand, expected duration and risk information during a restoration. It is believed that the Grid Code already covers a number of these requirements although minor updates and points of clarification have been added to the legal text where necessary.

Governance

The Proposer recommended that this modification progresses to a Workgroup to fully understand the consequences of these changes for SGUs and storage providers and to ensure that the technical solution is developed to allow minimum disruption for these parties. The Panel agreed with this recommendation.

Technical Skillsets

Appreciation of the SDP, SRP and E&R.

Reference Documents

Emergency and Restoration Code:

Emergency and Restoration consultation documents (including the System Defence Plan and System Restoration Plan):

Please note that these documents are currently being consulted on by National Grid ESO and can be located at the following link;

https://www.nationalgrideso.com/codes/european-network-codes/meetings/emergency-and-restoration-consultation-open

3 Proposer's Solution

Section 2 (Original Proposal) and Section 3 (Proposer's Solution) are sourced directly from the Proposer and any statements or assertions have not been

altered or substantiated/supported or refuted by the Workgroup. Section 5 of the Code Administrator Consultation contains the discussion by the Workgroup on the Proposal and the potential solution.

Note that the proposed legal text changes being introduced through GC0127 and GC0128 (as put forward by the Proposer) are dependent on the GC0125 proposal.

The Code Administrator Consultation makes reference to both the System Defence Plan and System Restoration Plan which were consulted upon and are both now with Ofgem for approval.[2]

GC0127

System Emergency State

E&R NC Article 13(2)(a)

In addition to the automatically activated schemes of the System Defence Plan, pursuant to point (a) of Article 11(5), each TSO shall activate a procedure of the System Defence Plan when the System is in Emergency State in accordance with the criteria set out in Article 18(3) or Regulation (EU) 2017/1485 and there are no remedial actions available to restore the system to the normal state".

It was noted that as part of System Operator Guideline (SOGL) that this requirement had not been included within Grid Code Working Groups GC0095, GC0106 and GC0114. As such section 2.1.1 and 2.1.2 of the System Defence Plan have been updated to reflect this requirement.

Storage providers

E&R NC Article 15(3) states that:

Prior to the activation of the automatic low frequency demand disconnection scheme, each TSO and DSO identified pursuant to Article 11(4) shall foresee that energy storage units acting as load connected to its system:

(a) automatically switch to generation mode within the time limit and at an active power set-point established by the TSO in the system defence plan; or

(b) when the energy storage unit is not capable of switching within the time limit established by the TSO in the system defence plan, automatically disconnect the energy storage unit acting as load.

This issue was discussed at the Workgroup and System Defence Plan clause 3.1.5 has now been updated to reflect these discussions.

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[2] System Defence Plan dated August 2019 is located at:
https://www.nationalgrideso.com/document/151321/download

System Restoration Plan dated August 2019 is located at:

https://www.nationalgrideso.com/document/151326/download

Terms and Conditions Proposal dated 20 August 2019 is located at:

https://www.nationalgrideso.com/document/151331/download

Under the requirements that are proposed to be introduced through GC0096 (Storage), where Electricity Storage Modules would be treated as being owned by Generators (i.e. a Storage would be treated as a subset of Generation) then in respect of Electricity Storage Modules which are charging, they are required to automatically disconnect in accordance with the requirements of OC6 of the Grid Code before the activation of the Low Frequency Demand Disconnection Scheme. Article 15(3) and Article 15(4) of E&R NC places requirements on energy storage units acting as a load to automatically switch to generation mode during periods of low System Frequency. This action would need to take place between 49.5Hz (the threshold associated with LFSM-U) and 48.8Hz (the threshold associated with the first stage of LFDD). National Grid ESO does not consider the action of automatic switching storage units from load to generation appropriate until further study work has been completed, due to the risk of any unintended consequences, the variable droop rates and the differences in performance between storage technologies. Under the proposed System Defence Plan, National Grid ESO define the cycle time from import to export to be set to a very low value (eg 1µs) so the default option will be for the storage plant to trip under low frequency. The settings will be specified on a case by case basis through the Bilateral Agreement and would be within the range of 49.5Hz – 48.8Hz. This approach would be consistent with that suggested for Storage under the GC0096 proposals, the proposals of the (EU) Grid Connection Stakeholder Committee's Storage Expert Group and the approach adopted for Pumped Storage.

The Proposer does however note two observations. Firstly, the Connection Network Codes (RfG, HVDC and DCC) explicitly exclude storage. Secondly, as a separate GB Modification (outside of the EU Codes) a Workgroup has been established to investigate how the Storage technologies should be treated under the auspices of the GB Grid Code. This modification (GC0096) is nearing its conclusion and expected to be approved into the Grid Code at some time over the Summer/Autumn of 2019. In preparation of the additional text, many of the terms developed as part of the GC0096 proposal have been used as part of this modification. As there is significant overlap between the GC0127 proposals and GC0096 proposals, and noting that GC0096 is still to be approved, the legal text that is relevant to the GC0127 modification (which has been taken from the GC0096 proposals) has been highlighted in blue text.

It is however important to note that E&R NC defines requirements for storage plant to be capable of switching from an importing mode to an exporting mode during periods of low frequency. This issue has not been addressed as part of the GC0096 Workgroup, although as part of this GC0127 modification initial consideration was given to this approach. The initial view of the Proposer was that a capability could be proposed as shown in Figure 1.0 below, however this was soon discounted on the basis of the variation in storage technologies, variable droop rates and unintended system consequences, whilst also noting that similar requirements do not apply to Pumped Storage or HVDC technologies. In addition, a separate (EU) Grid Connection Stakeholder Committee Expert Group was established in the autumn of 2018 to consider how the EU Connection Network Codes could be updated to consider the requirements for Storage. The requirements of Article 15(3) of (EU) Grid Connection Stakeholder Committee which relate to Storage were discussed as part of this Expert Group (https://docstore.entsoe.eu/Documents/Network%20codes%20documents/GC%20ESC/STORAGE/TOP_4_Report_from_EG_STORAGE.pdf) and the same conclusion was reached.

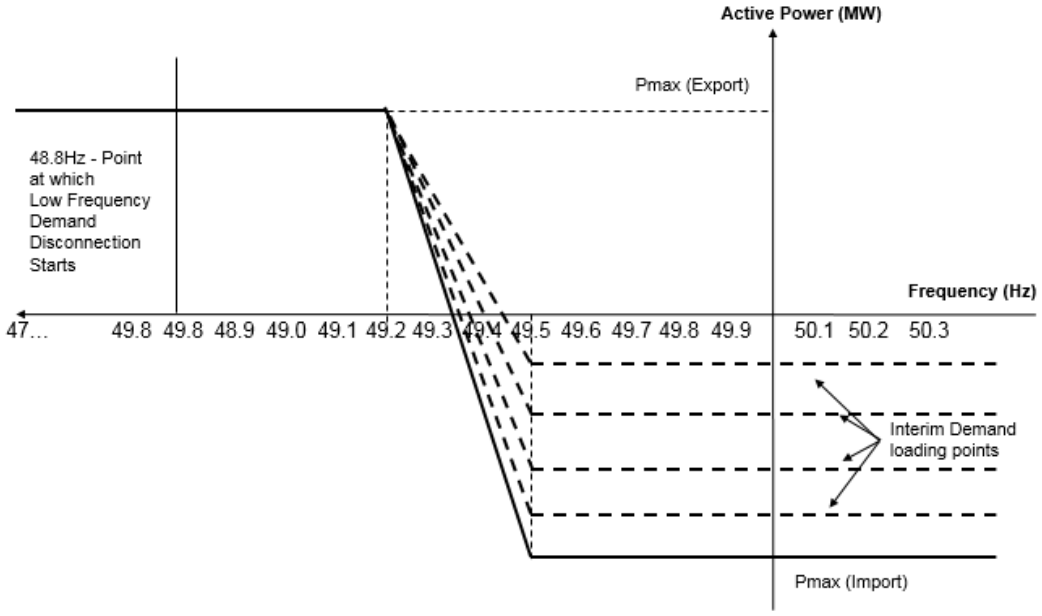

Figure 1.0

As noted above, Article 15(3) E&R NC does state that the TSO shall set the time limit and active power set point for switching from an importing mode of operation to an exporting mode of operation. In GB, by setting the switching time to a short interval (1µs) the default option as defined in Article 15(3)(b) of the E&R NC would be for the automatic disconnection too take place. As GB System Operator, National Grid ESO would not wish all Storage plants to trip at the same time so the specific settings would be included within the Bilateral Agreement which would be consistent with the approach adopted for Pumped Storage.

Active Power Requirements on SGUs

E&R NC Article 21 (1b) states that:

In case of absence of control area adequacy in the day-ahead or intraday timeframe, identified pursuant to paragraphs 1 and 2 of Article 107 of Regulation (EU) 2017/1485, and prior to any potential suspension of market activities pursuant to Article 35, a TSO shall be entitled to request assistance for active power from any SGU connected in its LFC area, which does not already provide a balancing service to the TSO, and which, upon the TSO request, shall make available all its active power, conforming to its technical constraints.

Clause 4.6.3 of SDP has been re-drafted to state:

"Under the EU NCER, the NGESO shall be entitled to request assistance for active power from a CUSC Party which does not already provide a balancing service. For the avoidance of doubt this would not extend to an Embedded Power Station unless the owner of that Power Station (i.e. the Generator) has a CUSC Contract with the NGESO".

The Proposer has since looked at this in further detail and believes the confusion relates to the definition of an SGU in the E&R NC. In GB, the term SGU is not used and clarity is required in how an SGU is defined within the GB arena. This issue is covered

in Section 5 of this report. In considering this issue, the general approach is that an SGU for the purposes of the System Defence Plan would be any GB party who is either a User or a Balancing Mechanism (BM) Participant and therefore bound by the requirements of the Grid Code OC's and BC's. A party who falls outside of this criteria would not be able to be instructed or satisfy the requirements of the System Defence Plan and hence would not be deemed to be a SGU. As such, the Proposer has taken the opportunity to update the System Defence and System Restoration Plan (Appendix B of both documents) so it is clear what an 'SGU', 'Defence Service Provider' and 'Restoration Service Provider' is and how this relates to GB Parties. The intention here is to clearly define which GB Parties would be within the scope of E&R NC.

Compliance Testing for Demand Facilities Providing Demand Side Response (Article 45)

E&R NC states that:

"1. Each defence service provider delivering demand response shall execute a demand modification test, after two consecutive unsuccessful responses in real operation or at least every year, following the methodology laid down in Article 41(1) of Regulation (EU) 2016/1388.

2. Each defence service provider delivering demand response low frequency demand disconnection shall execute a low frequency demand disconnection test within a period to be defined at national level and following the methodology laid down in Article 37(4) of Regulation (EU) 2016/1388 for transmission connected demand facilities or according to a similar methodology defined by the relevant system operator for other demand facilities"

To address this issue, the Demand Response Services Code in the GB Grid Code would be updated, with this Modification, to read:

"DRSC.11.7 Additional Testing requirements for Non-Embedded Customers and CUSC Parties who are also Demand Response Providers

DRSC.11.7.1 ***Non-Embedded Customers*** *and* ***CUSC Parties*** *who are also* ***Demand Response Providers*** *shall be required to execute a demand modification test after two consecutive unsuccessful responses in the operational environment or at least every year as agreed with* ***The Company****.*

DRSC.11.7.2 Each ***Non-Embedded Customer*** *and* ***CUSC Party*** *who are also* ***Demand Response Providers*** *and provide demand response low frequency demand disconnection shall execute a low frequency demand disconnection test at least once every three years".*

For GB, the Low Frequency Demand Disconnection test has been set at once every three years to ensure consistency with the frequency of Black Start testing.

In addition, where a re-test is required under OC5, the Table in OC5.5.4 would also be updated, with this Modification, to include an entry for Demand Response.

Compliance Testing for Low Frequency Demand Disconnection Relays (Article 47)

E&R NC states that:

"Each DSO and TSO shall execute testing on the low frequency demand disconnection relays implemented on its installations, within a period to be defined at national level and following the methodology laid down in Article 37(6) and Article 39(5) of Regulation (EU) 2016/1388".

To address this issue, the European Compliance Processes in the GB Grid Code would be updated, with this Modification, to read:-

"ECC.A.5.4 Low Frequency Relay Testing

…

*ECC.A.5.4.2 Each **Non-Embedded Customer** shall aim to execute testing on its low frequency demand disconnection relays installed within its network and in service at least once every three years, although this may be extended to no more than every five years if considered to be required for operational purposes.*

*ECC.A.5.4.3 Each **Network Operator** and **Relevant Transmission Licensee** shall aim to execute testing on its low frequency demand disconnection relays installed within its network and in service at least once every three years, although this may be extended to no more than every five years if considered to be required for operational purposes.*

For existing installations, the same requirements have already been added to CC.A.5.4.2 and CC.A.5.4.3 of the Grid Code.

GC0128

Frequency management within a Black Start (Article 27(4))

The majority of changes are based on the Frequency Management Procedure in the SRP (section 3.3). The main issue here is that in GB NGSO generally takes on the role as overall co-ordinator of the restoration procedure and is considered to be the 'Frequency Leader'. However, the two Transmission Licensees in Scotland do have a role in frequency management under STCP06-1 (Black Start) and on this basis sections 3.2.1, 3.3.1, 3.3.2 and 3.3.4 of the System Restoration Plan has been updated to reflect this.

Information Exchange (Article 40)

Article 40 of E&R NC refers to information being exchanged during a Emergency, Blackout or Restoration State. The Grid Code already contains provisions for the sharing of information under a whole range of conditions, including Blackouts and Emergencies.

Quick Re-Synchronisation (Article 44(2))

E&R NC states that:

"2. Each restoration service provider which is a power generating module delivering a quick re-synchronisation service shall execute tripping to houseload test after any changes of equipment having an impact on its houseload operation capability, or after two unsuccessful consecutive tripping in real operation, following the methodology laid down in Article 45(6) of Regulation (EU) 2016/631".

To address this issue OC5.7 would be updated, with this Modification, to read:

OC5.7 BLACK START TESTING

OC5.7.1 General

*(a) **The Company** shall require a **Black Start Service Provider** to carry out a **Black Start Test** in order to demonstrate that a **Black Start Station** or **Black Start HVDC System** has a **Black Start Capability**.*

*(i) In the case of a **Generator**, **The Company** shall require a **Generator** with a **Black Start Station** to carry out a test (either a "**Black Start Unit Test** or a **Black Start Station Test**") in order to demonstrate that a **Black Start Station** has a **Black Start Capability**.*

*(ii) In the case of an **HVDC System Owner** or **DC Converter Station Owner**, **The Company** shall require an **HVDC System Owner** or **DC Converter Station Owner** with a **Black Start HVDC System** to carry out a test (a "**Black Start HVDC Test**") on a **HVDC System** or **DC Converter**, in order to demonstrate that a **Black Start HVDC System** has a **Black Start Capability**.*

*(iii) In the case of an **EU Generator**, **The Company** may also require a **Generator** with a **Black Start Station** to carry out a test (a **Quick Resynchronisation Unit Test**) in order to demonstrate that a **Black Start Station** has a **Quick Re-Synchronisation Capability**.*

*(b) Where **The Company** requires a **Black Start Service Provider** to undertake testing, the following requirements shall apply:-*

*(i) Where **The Company** requires a **Generator** with a **Black Start Station** to carry out a **Black Start Unit Test**, on each **Genset,** which has **Black Start Capability**, within such a **Black Start Station**, the **Generator** shall execute such a test at least once every three years. **The Company** shall not require the **Black Start Test Unit** to be carried out on more than one **Genset** at that **Black Start Station** at the same time, and would not, in the absence of exceptional circumstances, expect any of the other **Gensets** at the **Black Start Station** to be directly affected by the **Black Start Unit Test**.*

*(ii) **The Company** may occasionally require the **Generator** to carry out a **Black Start Station Test** at any time (but will not require a **Black Start Station Test** to be carried out more than once in every three calendar years in respect of any particular **Genset** unless it can justify on reasonable grounds the necessity for further tests or unless the further test is a re-test). If successful, this **Black Start Station Test** shall count as a successful **Black Start Unit Test** for the **Genset** used in the test.*

*(iii) **The Company** may require the **HVDC System Owner** or **DC Converter Station Owner** to carry out a **Black Start HVDC Test** at any time (but will not require such a test to be carried out more than once in every three calendar years unless it can justify on reasonable grounds the necessity for further tests or unless the further test is a re-test).*

*(iv) The **Company** may occasionally require the **EU Generator** to carry out a **Quick Re-Synchronisation Test** at any time, but will generally only be required where the **EU Generator** has made a change to its **Plant** and **Apparatus** which has an impact on its **Houseload Operation** or after two unsuccessful tripping **Events** in the operational environment.*

*The above tests will be deemed a success where starting from **Shutdown** is achieved within a time frame specified by **The Company** and which may be agreed in the **Black Start Contract**.*

c) **The Company** may require a **Generator** to carry out a **Black Start Unit Test** at any time (but will not require a **Black Start Unit Test** to be carried out more than once in each calendar year in respect of any particular **Genset** unless it can justify on reasonable grounds the necessity for further tests or unless the further test is a re-test).

(d) When **The Company** wishes a **Black Start Service Provider** to carry out a **Black Start Test**, it shall notify the relevant **Black Start Service Provider** at least 7 days prior to the time of the **Black Start Test** with details of the proposed **Black Start Test**.

……

OC5.7.4 Quick Re-synchronisation Test

*(a) The relevant **Generating Unit** shall be **Synchronised** and **Loaded**;*

*(b) All the **Auxiliary Gas Turbines** and/or **Auxiliary Diesel Engines** in the **Black Start Station** in which that **Generating Unit** is situated, shall be **Shutdown**.*

*(c) The **Generating Unit** shall tripped to house load**.***

*(d) The relevant **Generating Unit** shall be **Synchronised** to the **System** but not **Loaded**, unless the appropriate instruction has been given by **The Company** under **BC2** which would also be in accordance with the requirements of the **Black Start Contract**.*

*In respect of **EU Generators**, the above tests defined in OC5.7.2.3(a) – (e) shall be in accordance with the requirements of ECC.6.3.5.6.*

General Updates applicable to GC0127 and GC0128

As part of the implementation of E&R NC into the GB there are number of elements which are common to both GC0127 and GC0128. In general these refer to requirements such as communication facilities and testing. Whilst the majority of requirements of E&R NC are already generally covered in the Grid Code, a few updates to the Grid Code legal text are proposed to align with the E&R NC. These elements have been introduced following the mapping process which translates the requirements in the E&R NC into the GB framework.

Backup Power Supplies for Communication Systems (Article 48(2))

E&R NC states that:

"Each DSO and SGU identified pursuant to Article 23(4), each TSO and restoration service provider shall test the backup power supply of their communication systems at least every five years".

To address this issue CC.6.5.4.4 and EC.6.5.4.4 of the Grid Code would be updated, with this Modification. As an example and in the case of ECC.6.5.4.4 the additional text included is replicated below with similar text applying for CC.6.5.4.4.

*"ECC.6.5.4.4 Where **Control Telephony** or **System Telephony** is installed, routine testing of such facilities may be required by **The Company** (not normally more than once in any calendar month). The **User** and **The Company** shall use reasonable endeavours to agree a test programme and where **The Company** requests the assistance of the **User** in performing the agreed test programme the **User** shall provide such assistance. **The Company** requires the **EU Code User** to test the backup power supplies feeding its **Control Telephony** facilities at least once every 5 years".*

4 Impacts & Other Considerations

GC0127

Under the proposals for GC0096 (Storage) owners of storage facilities will be treated as if they were Generators. It is therefore suggested that anyone who owns and/or operate storage equipment who are caught by the requirements of the GC0096 proposals would also be affected by this Modification as their equipment would be treated as an SGU. In addition, BM parties (including Aggregators) who are caught by the requirements of the Grid Code, would also be considered to be within the scope of these GC0127 proposals.

GC0128

Black Start Service Providers (a term introduced through the GC0125 proposals) will be affected by this GC0128 modification as will SGUs.

Does this modification impact a Significant Code Review (SCR) or other significant industry change projects, if so, how?

No.

Consumer Impacts

This change will facilitate the implementation of the E&R NC which helps to facilitate a harmonised electricity system as part of the package of European Network Codes, and will help to deliver and facilitate significant benefits to the end consumer by ensuring a coordinated security of supply across GB and Europe.

5 Workgroup discussions prior to issue of Workgroup Consultation

The Workgroup convened on seven occasions between 29 May 2019 and 28 August 2019 to discuss the perceived issue, detail the scope of the proposed defect, devise potential solutions and assess the proposal in terms of the Grid Code Objectives.

The Workgroup discussed a number of the key attributes under GC0127 and GC0128, these discussions are described below. The Workgroup for GC0127 and GC0128 met

and discussed both Modifications due to having the same membership and similar themes in discussion areas. These modifications were amalgamated at the July 2019 Grid Code Review Panel meeting.

Significant Grid Users

Some Workgroup members highlighted that it was difficult for them to understand whether they were or were not a 'SGU' by using the proposed criteria outlined in Appendix A and B of the SDP and SRP respectively and that there should, according to Articles 11(4)(c) and 23(4)(c), have (1) been a list of SGUs produced by National Grid ESO (and submitted to the NRA) for them to check whether they were on it; and (2) the SGUs notified by National Grid ESO (or the DSO, if applicable) of the fact that they meet the criteria and therefore are considered to be a SGU for the purposes of E&R NC in GB.

The Proposer stated that they have updated the System Defence and System Restoration Plan, including Appendix B and the Glossary and Definitions so it is clear in GB what is defined as a Defence Service Provider, Restoration Service Provider and Significant Grid User for the purposes of E&R NC. According to the Proposer Appendix B of both Plans have been updated and this defines what an SGU in GB is considered to be and the measures required. The Proposer advised that it is not practical to provide a list of individual parties but a criteria clearly articulating who would be within the scope of E&R NC. In addition, National Grid ESO will also be notifying those parties, in the near future[3], that they fall within the scope of E&R NC and therefore that they are an SGU. A Workgroup member noted that TSOs in other Member States had provided such a list of SGUs, confidentially, to their NRA and taken steps to comply with the December 2018 deadline for notifying those SGUs accordingly.

Significant Grid Users within scope of GB

The Proposer confirmed that the following would be deemed to be a SGU in GB;

- *Generators who own and operate new and existing Power Generating Modules (i.e. pre-and post RfG) at Large Power Stations or any Generator who owns and operates new and existing Power Generating Modules at a Power Station which is directly connected to the Transmission System or Generator who has a CUSC contract with National Grid ESO;*
- *HVDC System Owners and DC Converter Station Owners who are signatories to the CUSC and required to satisfy the requirements of the Grid Code;*
- *New and Existing Non-Embedded Customers (Transmission Connected Demand Facilities);*
- *New and Existing Transmission Connected Closed Distribution Systems; and*
- *Virtual Lead Parties who have signed a CUSC contract with National Grid ESO.*

[3] National Grid ESO outlined to the Workgroup that they were intending to issue these notifications over the summer of 2019.

It was noted that this was not consistent with what had been published and submitted by National Grid ESO to Ofgem in December 2018. The Proposer does however fully recognise that it is not clear what actually constitutes an SGU, especially as this term has derived itself from within the framework of the EU Network Codes rather than existing terminology which has used within GB. However, Workgroup members noted that there must; for the purposes of compliance and assurance; be absolute clarity of who is (and who, therefore, is not) a SGU for the purposes of the TSOs, DSOs and SGUs to ensure GB compliance with E&R NC, as the legal requirements centre around 'SGUs'.

The Proposer stated to the Workgroup that they are fully committed to clarifying the definition of an SGU, Defence Service Provider and Restoration Service Provider and therefore substantial updates have been made to Appendix A, Appendix B, and the Glossary and Definitions of the SDP and SRP issued on 10th July 2019 for public consultation.

In general, the approach proposed is that Appendix B of the System Defence and System Restoration Plan defines what a SGU in GB is (i.e. a GBSGU). A Defence Service Provider has the same meaning as a SGU in GB and a Restoration Service Provider is a Black Start Service Provider and / or a GB SGU. In addition, the list in Appendix B now includes the measures that are incumbent on GB SGU's.

An extract from the proposed wording in Appendix B of the SRP and SDP is reproduced in Table 1.0 below to give GB stakeholders this clarity.

The Proposer sought Legal advice, however in assessing the E&R NC, in particular Articles 2, 4, 11.4(c) and 23.4(c) (which are reproduced at the end of this section) it has come to the above view on the basis that Articles 11.4(c) and Articles 23.4(c) require the System Defence Plan and System Restoration Plan to provide a list of SGU's responsible for implementing on their installations, the measures that result from the mandatory requirements set out in Regulation (EU) 2016/631 (Requirements for Generators), Regulation (EU) 2016/1388 (Demand Connection Code) and Regulation (EU) 2016/1447 (HVDC Code) or from National Legislation and a list of measures to be implemented by those SGU's. The Proposer firstly notes i) that the requirements of the EU Connection Network Codes only applies to new parties ii) it also considers that there is some scope for defining the list of SGU's through Articles 11.4(c) and Articles 23.4(c) and iii) there would be significant cost to non CUSC Parties and BM Parties, in particular those who are existing, should the SGU cover all permutations and combinations as defined in Article 2. To this end, the Proposer has tried hard to clearly define (though amendments to the System Defence Plan and System Restoration Plan) what an SGU within GB is and how the criteria within Article 2 of E&R NC relates to those parties.

On the other hand, one Workgroup member considered that the definitions of an 'SGU', a 'System Defence Provider' and a 'System Restoration Provider' within E&R NC is, in their view, much wider than that suggested by the Proposer and that this was in order to ensure that the system is secure from events which could endanger the security of the system and, in the event of a blackout, support the speedy restoration of the system and thus electricity supplies to end consumers. The Workgroup member noted, for example, that taking into account National Grid ESO's Interim Report into 9 August 2019 event that limiting System Defence Providers / SGUs to just those parties with a CUSC contract with National Grid ESO would be limiting the ability for National Grid ESO to call upon other providers which were envisaged within E&R NC to be used to

help maintain system security; such as Type B generators (Article 2(2)(b)) and re-dispatchers of power generating modules and demand facilities (Article 2(2)(e)); if a similar emergency situation arose on the system.

Table B1 below (which was prepared by the Proposer and updated 22 August 2019) details which GB Parties would, according to National Grid ESO, be within the scope of E&R NC.

EU Criteria	New or Existing	GB Parties within scope of EU NCER	Measures of the System Defence Plan	Comments
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: PC, ECC, ECP, OC1, OC5, OC6, OC7, OC10, OC12, BC1, BC2, BC3*, DRC 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 Defence Plan.	BC 3* applies to Large Power Stations and directly connected Power Stations. The requirements for LFSM-O are covered in ECC.6.3.7.1.
	Existing	Any Generator who is a GB Code User who has a CUSC Contract with the NGESO	Applicable Grid Code requirements: PC, CC, CP, OC1, OC5, OC6, OC7, OC10, OC12, BC1, BC2, BC3*, DRC Generators with a CUSC Contract would need to comply with the applicable requirements of the Grid Code and in doing so would satisfy one or more measures of the System Defence Plan.	BC 3* applies to Large Power Stations and directly connected Power Stations. The requirements for LFSM-O are covered in ECC.6.3.7.1.

EU Criteria	New or Existing	GB Parties within scope of EU NCER	Measures of the System Defence Plan	Comments
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 NGESO and owns or operates a Type B Power Generating Module	Applicable Grid Code requirements: PC, ECC, ECP, OC1, OC5, OC6, OC7, OC10, OC12, BC1, BC2, BC3*, DRC In satisfying the above Grid Code requirements, Generators with a CUSC Contract who own or operate a Power Station comprising a Type B Power Generating Module would meet one or more of the requirements of the System Defence Plan.	As the Generator has a CUSC contract and obliged to satisfy the requirements of the Grid Code, then such parties would be within the scope of EU NCER. BC 3* applies to Large Power Stations and directly connected Power Stations.
	Existing	Any Generator who is a GB Code User and who has a CUSC Contract with the NGESO	Applicable Grid Code requirements: PC, CC, CP, OC1, OC5, OC6, OC7, OC10, OC12, BC1, BC2, BC3*, DRC In satisfying the above Grid Code requirements, Generators with a CUSC Contract would meet one or more of the requirements of the System Defence Plan.	As the Generator has a CUSC contract and obliged to satisfy the requirements of the Grid Code, then such parties would be within the scope of NCER. BC 3* applies to Large Power Stations and directly connected Power Stations.
Existing and new Transmission-connected demand	New	Any Non-Embedded Customer who is an	Applicable Grid Code requirements: PC, ECC, ECP, DRSC*, OC1, OC5, OC6, OC7, OC10, OC12, BC1, BC2,	BC 3* and the DRSC* would also apply if the Non-Embedded Customer provided Ancillary Services.

EU Criteria	New or Existing	GB Parties within scope of EU NCER	Measures of the System Defence Plan	Comments
facilities		EU Code User and who has a CUSC Contract with the NGESO	BC3*, DRC In satisfying the above Grid Code requirements, Non-Embedded Customers would meet one or more of the requirements of the System Defence Plan.	
	Existing	Any Non-Embedded Customer who is a GB Code User and has a CUSC Contract with the NGESO	Applicable Grid Code requirements: PC, CC, CP, OC1, OC5, OC6, OC7, OC10, OC12, BC1, BC2, BC3*, DRC In satisfying the above Grid Code requirements, Non-Embedded Customers would meet one or more of the requirements of the System Defence Plan.	BC 3 would apply if the Non-Embedded Customer provided Ancillary Services.
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: PC, ECC, ECP, DRSC*, OC1, OC5, OC6, OC7, OC10, OC12, BC1, BC2, BC3*, DRC In satisfying the above Grid Code requirements, Non-Embedded Customers would meet one or more of the requirements of the System Defence Plan.	The Closed Distribution System is considered as a Private Network and not registered as a Network Operator or IDNO. The DRSC and BC3 would apply if the Non-Embedded Customer provided Ancillary Services.

EU Criteria	New or Existing	GB Parties within scope of EU NCER	Measures of the System Defence Plan	Comments
	Existing	Any Non-Embedded Customer who is a GB Code User and which has a CUSC Contract with the NGESO	Applicable Grid Code requirements: PC, CC, CP, OC1, OC5, OC6, OC7, OC10, OC12, BC1, BC2, BC3*, DRC In satisfying the above Grid Code requirements, Non-Embedded Customers would meet one or more of the requirements of the System Defence Plan.	The Closed Distribution System is considered as a Private Network and not registered as a Network Operator or IDNO
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	Virtual Lead Party with a CUSC Contract	(ECC/CC 6.5 only) DRSC*, BC1, BC2, BC3*	In general a Virtual Lead Party with a CUSC Contract will also be a User and in this case they would be caught by the requirements of NCER. Users can fall into different categories and these are detailed above. A Virtual Lead Party with a CUSC Contract who is not defined as a User (such as an Aggregator) will have to satisfy the requirements of BC1 and BC2 and ECC/CC.6.5, and therefore would be considered to meet one or more requirements under the System Defence Plan. A Virtual Lead Party with a CUSC Contract who also satisfies the requirements of the DRSC (ie they offer Ancillary Services and caught by the requirements of DCC (ie EU Code User's) may also have to satisfy the requirements of BC3 but this would depend on the type of Ancillary Service offered.

EU Criteria	New or Existing	GB Parties within scope of EU NCER	Measures of the System Defence Plan	Comments
				In all cases a Virtual Lead Party with a CUSC Contract would be treated as having to meet the requirements of NCER.
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: PC, ECC, ECP, OC1, OC5, OC6, OC7, OC10, OC12, BC1, BC2, BC3*, DRC In satisfying the above Grid Code requirements, HVDC System Owners and Generators in respect of DC Connected Power Park Modules with a CUSC Contract would meet one or more of the requirements of the System Defence Plan.	BC 3* applies to HVDC System Owners. The requirements for LFSM-O for HVDC Systems and DC Connected Power Park Modules are covered in ECC.6.3.7.1.

EU Criteria	New or Existing	GB Parties within scope of EU NCER	Measures of the System Defence Plan	Comments
	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: PC, CC, CP, OC1, OC5, OC6, OC7, OC10, OC12, BC1, BC2, BC3*, DRC In satisfying the above Grid Code requirements, DC Converter Station Owners with a CUSC Contract would meet one or more of the requirements of the System Defence Plan.	BC 3* applies to DC Converter Station Owners

EU Criteria	New or Existing	GB Parties within scope of EU NCER	Measures of the System Defence Plan	Comments
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 NGESO and owns or operates a Type A Power Generating Module. Non Embedded Customers and Virtual Lead Parties with a CUSC Contract in respect of Closed Distribution Systems and Aggregators.	Applicable Grid Code requirements: PC, ECC, ECP, OC1, OC5, OC6, OC7, OC10, OC12, BC1, BC2, BC3*, DRC 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	As the Generator has a CUSC contract and obliged to satisfy the requirements of the Grid Code, then such parties would be within the scope of NCER. BC 3* applies to Large Power Stations and directly connected Power Stations. Type A Power Generating Modules are required to satisfy the requirements of ECC.6.3.7.1 (LFSM-O).

EU Criteria	New or Existing	GB Parties within scope of EU NCER	Measures of the System Defence Plan	Comments
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)	Existing	Any Generator Registered as a GB Code User which has a CUSC Contract with the NGESO and owns or operates a Generating Unit or Power Park Module and is required to satisfy the requirements of the Grid Code Non-Embedded Customers and Virtual Lead Parties with a CUSC Contract in respect of Closed Distribution Systems and Aggregators.	Applicable Grid Code requirements: PC, CC, CP, OC1, OC5, OC6, OC7, OC10, OC12, BC1, BC2, BC3*, DRC In satisfying the above Grid Code requirements, Generators with a CUSC Contract would meet one or more of the requirements of the System Defence Plan.	As the Generator has a CUSC contract and obliged to satisfy the requirements of the Grid Code, then such parties would be within the scope of NCER. BC 3* applies to Large Power Stations and directly connected Power Stations.

EU Criteria	New or Existing	GB Parties within scope of EU NCER	Measures of the System Defence Plan	Comments
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	Virtual Lead Party with a CUSC Contract	BC1, BC2,(ECC/CC.6.5 applies only)	This is a non-mandatory requirement. If a Virtual Lead Party with a CUSC Contract owns or operates a Type A or Type B Power Generating Module, this would fall under the requirements of RfG. They would also need to comply with the requirements of BC1 and BC2 and therefore fall under the scope of NCER. If the party is also a EU Code User, the wider requirements of the Grid Code would apply (ie ECC's ,ECP's and OC's would also apply in which case they would also considered to be within the scope of NCER. If an existing Virtual Lead Party with a CUSC Contract owns or operates a Small Power Station they would need to meet the requirements of BC, BC2 and CC.6.5. They would be treated as being within the scope of NCER. If an Aggregator registered as a Virtual Lead Party with a CUSC Contract has generation and/or demand and required to meet the requirements of the applicable Balancing Codes this would also fall under the requirements of NCER
This Regulation shall apply to energy storage units of a SGU, a defence service provider or	New	Any EU Code Generator which has a CUSC Contract with the NGESO and which owns and operates	Applicable Grid Code requirements: PC, ECC, ECP, OC1, OC5, OC6 (in particular OC6.6) , OC7, OC10, OC12, BC1, BC2, BC3*, DRC	Under the GC0096 proposals, when a Storage Plant is in an importing mode of operation, and the System Frequency falls automatic tripping is required in accordance with the requirements of OC6.6. Within GB, the capability to switch from import to export during low system frequency conditions is not required. Tripping will be initiated prior to the start of Low Frequency Demand Disconnection which

EU Criteria	New or Existing	GB Parties within scope of EU NCER	Measures of the System Defence Plan	Comments
restoration service provider which can be used to balance the system, provided that they are identified as such in the system defence plans restoration plans or service contract.		Electricity Storage Modules would be classified as a Storage User as defined under the GC0096 Grid Code proposals	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.	occurs at 48.8Hz. All the other requirements of the Grid Code apply and therefore Storage Units caught under the proposed requirements of GC0096 would be considered to be within the scope of NCER.
	Existing	Any CUSC Party who owns or operates Storage plant	Applicable Grid Code requirements: PC, CC, CP, OC1, OC5, OC6, OC7, OC10, OC12, BC1, BC2, BC3*, DRC	A CUSC Party owning a Storage plant would be required to satisfy the requirements of the Grid Code and hence would be considered to be within the scope of NCER. The technical requirements applicable to the storage plant including the ability to trip during low system frequencies will be as specified in the Bilateral Agreement.

Table 1.0

In addition, it is also very important to clarify those GB parties who would fall outside the scope of E&R NC and hence those parties who would not be classified as a SGU within GB, and therefore not have to comply with the requirements of E&R NC. These are also clarified in Appendix B of the System Defence and System Restoration Plan and reproduced below.

- *Any Embedded Generator in respect of a Medium or Small Power Station which does not have a CUSC Contract the NGESO[4] including a Licence Exempt Embedded Medium Power Station (LEEMPS)*
- *A Demand Response Provider who does not have a CUSC Contract with the ESO*
- *Any HVDC System Owner or DC Converter Station Owner or Generator who owns and operates an HVDC System or DC Converter Station or Transmission DC Converter or DC Connected Power Park Module which does not have a CUSC Contract or Interconnector Agreement with the ESO*

For the avoidance of doubt, the National Grid ESO, Transmission Licensees and Distribution Network Operators are not classified as Significant Grid Users (SGU) though they are required to satisfy the requirements of the NCER.

Notification

Some Workgroup members; noting the requirements in Articles 12 (3)-(5) and 24 (3)-(5) about notifications being issued by 18 December 2018; stated that they had not been notified by National Grid ESO (or DSO, if applicable) of the fact that they are an SGU in the manner required by the E&R NC. The Proposer stated that, in their view, they had notified SGUs that they were captured by publishing the SDP and the SRP with the criteria outlined in Annex A on the National Grid ESO website. A Workgroup member highlighted that if the E&R NC had meant for this notification action to be completed in this way it would have stated for it to be published on the website as it does in some other areas of the Network Codes and therefore, this was not, in their view, the intent of the word 'notification' in E&R NC. The Workgroup member expanded to state that notification maybe considered by National Grid ESO to be onerous but if this is what is required by EU law this is what should happen or have happened. An example of another notification was highlighted in Article 24(6) (b) in terms of how the SGUs have implemented and maintained the measures required.

The initial view of the Proposer was to publish an Open Letter to fulfil this obligation on National Grid ESO to notify where potential SGUs could themselves self-determine whether they were an SGU. Workgroup members did not feel that this would sufficiently fulfil the National Grid ESO's (or, if relevant, DSO's) obligation to notify. Workgroup members also noted that if they were notified of being an SGU that they would have a further twelve months from the date of the notification to implement their obligations.

It was additionally highlighted that it is not just the Transmission System Operator that is obligated to carry out the notification to SGUs but that the Distribution System Operators also need to carry out some of the notifications to SGUs. Some Workgroup members also discussed that even if they had new obligations outlined in the Grid Code that if they had not been notified, according to E&R NC, that they would not have to comply with

[4] National Grid ESO.

them as a result as the Grid Code changes for E&R NC purposes (as per GC0127 and GC0128) were applicable to SGUs.

The Proposer outlined that as they have a two-stage approach to the implementation of the E&R NC (i.e. those requirements to be in place by 18 December 2019 and those to be in place by 18 December 2022) that there would have to be two notifications to SGUs on any new obligations when they have been fully developed within the Grid Code modifications required.

The Proposer acknowledged there were two issues here. The first was the definition of an SGU which has been clarified through Appendix B of the SDP and SRP issued by National Grid ESO for public consultation on 10th July 2019. The second is how would a GB party who is within the scope of E&R NC be notified that they were an SGU. On the basis that stakeholders considered an Open Letter not to be sufficient at the last meeting, the Proposer agreed to take this issue away and consider a more appropriate solution.

The Proposer subsequently clarified to the Workgroup that they would be sending a notification letter to each SGU, Defence Service Provider and/or Restoration Service Provider as applicable. A Workgroup member questioned whether this would detail all of the measures required to be implemented by the SGU; as per the requirements in Articles 12 (3)-(5) and 24 (3)-(5). The Proposer stated that the revised System Defence and System Restoration Plan included these measures. A Workgroup member stated that they believe that when the E&R NC was drafted that the intention of it was for it to be clear to each SGU what measure(s) they needed to undertake and by when. The Proposer noted that with the proposed approach set out in Appendix A and B of the SDP and SRP that if the party does not have a CUSC contact with the National Grid ESO or they are not a BM Participant, then there would be significant costs for those parties if they were classified as an 'SGU. If non-CUSC or non-BM participating parties were defined as 'SGUs' then the cost of instructing such parties would not be insignificant.

However, a Workgroup member noted that the scope of E&R NC, as set out in Article 2, did extend to Type B (1MW plus) generation and could, as per Article 2(3), extend to Type A (800W plus) generation at both transmission and distribution as well as re-dispatchers of power generating modules and demand facilities. The Workgroup member referred to National Grid ESO's Interim Report into 9 August 2019 event and was concerned, in the context of maintaining system security, that limiting System Defence Providers / SGUs to just those parties with a CUSC contract would be limiting the ability for National Grid ESO to call upon other providers which were envisaged within E&R NC to be used; such as Type B generators (Article 2(2)(b)) and re-dispatchers of power generating modules and demand facilities (Article 2(2)(e)); if a similar emergency situation arose on the system.

In response, the Proposer reiterated their view of the treatment of a SGU, Defence Service Provider and Restoration Service Provider as discussed in the earlier section titled Significant Grid Users in GB. The Proposer is fully aware that a Workgroup member may raise a "potential Alternative" with regard to this Interpretation.

Updates to the System Defence and System Restoration plans following Ofgem approval and link to GC0127 and GC0128

The Proposer highlighted to the Workgroup within their proposed solution for GC0127 and GC0128 that the position outlined does not match what had been published by National Grid ESO in the System Defence Plan and the System Restoration Plan submitted to Ofgem on 18 December 2018. It was noted that Ofgem had; in their letter[5] of 21st June 2019, requested amendments to the two Plans submitted in December 2018 and as a consequence the System Defence Plan and System Restoration Plan had been substantially updated by National Grid ESO and released for consultation[6]. The timetable for these two Plans is as follows:

Stage	Date
Submission of the SDP and SRP to Ofgem	18/12/2018
Request for amendment from Ofgem	w/c 17/06/2019
Electricity System Operator/Transmission System Operator to consult on amendments	Consultation opened on 10 July 2019
Resubmission of the SDP and SRP to Ofgem	By 18/08/2019
Ofgem decision on whether to approve the SDP and SRP	Two months following re-submission – around 18 October 2019

The Workgroup concluded that it would be most efficient and pragmatic to carry out this Workgroup Consultation at the same time as the National Grid ESO July Consultation on the amendments to the SDP and SRP.

Definitions

The Proposer outlined their position with regard to the proposed definitions, for the purposes of GC0127 and GC0128, below;

Definition	Meaning
Defence Service Provider	A Defence Service Provider is a legal entity with a

[5] https://www.ofgem.gov.uk/publications-and-updates/request-amendment-electricity-system-operator-s-proposal-under-eu-emergency-and-restoration-network-code?utm_medium=email&utm_source=dotMailer&utm_campaign=Daily-Alert_21-06-2019&utm_content=Request+for+amendment+to+the+Electricity+System+Operator%e2%80%99s+proposal+under+the+EU+Emergency+and+Restoration+Network+Code&dm_i=1QCB,6CHYE,UWA0T7,P3CJO,1

[6] https://www.nationalgrideso.com/codes/european-network-codes/meetings/emergency-and-restoration-consultation-open

	legal or contractual obligation to provide a service contributing to one or several measures of the System Defence Plan. In GB, a Defence Service Provider has the same meaning as a GB Significant Grid User (GB SGU)
Restoration Service Provider	A restoration service provider refers to "a legal entity with a legal or contractual obligation (including a Black Start Service Provider) to provide a service contributing to one or several measures of the restoration plan". In GB, a Restoration Service Provider is a GB Significant Grid User (GB SGU) and/or a Black Start Service Provider.

GC0127 Article specific discussions

E&R NC Articles covered in this modification:

Article 15(3) Automatic under frequency control
Article 21(1)(b) Assistance for active power
Article 45 Compliance testing
Article 47, Compliance testing of low frequency demand disconnection relays

Article 15(3) and (4) Automatic under frequency control

The Proposer stated that this would be one of the main amendments required to the Grid Code as a result of the SDP. It was noted that there is a requirement for storage units to automatically switch from demand mode to generation mode and that this had not been covered as part of the ongoing modification to the Grid Code on Storage (GC0096). As noted above the Proposer now believes this issue has been addressed through the approach detailed in Section 3 of this document.

A Workgroup member referred to the ESO's Interim Report into 9th August 2019 event and was concerned, in the context of maintaining system security, that circa 1,800MW of existing distribution connected energy storage appeared not to have played a role in system defence in the way envisaged in Article 15(3). The Workgroup member, in their opinion, suggested that if the Article 15(3) requirements had been fully applied to existing

(and, going forward, new) energy storage in GB that some (or all[7]?) of the LFDD activation on 9th August 2019 could possibly have been avoided.

Article 21(1)(b) Assistance for active power

The Workgroup concluded that no extra requirements were needed in the Grid Code as a result of this Article as the Proposer stated this was already required of GB parties caught by the existing requirements of the Grid Code.

Test Plan and Article 43

A Workgroup member questioned where the test plan was, as required in Article 43 (2) of the E&R NC which states that:

"*By 18 December 2019 each TSO shall define a test plan in consultation with the DSOs, the SGUs identified pursuant to Articles 11(4) and 23(4), the defence service providers and the restoration service providers. The test plan shall identify the equipment and capabilities relevant for the system defence plan and the restoration plan that have to be tested*."

The Workgroup member stated that a test plan was required to be developed by National Grid ESO, in consultation with DSOs and SGUs. The Proposer stated that there would be testing requirements outlined for Article 44-47. To address this concern amendments have been proposed to be introduced to the Grid Code (via GC0127 and GG0128) in respect of Articles 44, 45 and 47 as noted above in Section 3. In the view of the Proposer there is no requirement for amendments in respect of Article 46 as these are already covered by the proposals under consideration as part of the GC0125 Modification. However, the Proposer has yet to clarify when the consultation, with affected stakeholders and the wider industry, on the test plan required by Article 43(2) will be undertaken.

Article 47

The Proposer outlined that this was around protection and they required some more information on how this is completed. A Workgroup member took away an action to look into this and provide this to the Workgroup. Additional amendments have also been proposed to be introduced to the Grid Code via GC0127 and GC0128 as noted in Section 3 above as part of this requirement.

Other

[7] The Workgroup member noted that the ESO's Interim Report identified that circa 475MW of storage (broadly equating to the circa 500MW of embedded generation that came off prior to LFDD activation) appeared to have been utilised during the event, but after the LFDD was activated.

A Workgroup member noted that in their view there also need a for a dedicated testing procedure as a result of Article 51 (2) which states that:

"*In addition, where deemed necessary by the TSO for the effectiveness of the restoration plan, each TSO shall execute operational testing of parts of the restoration plan, in coordination with the DSOs identified pursuant to Article 23(4) and the restoration service providers. The TSO shall set out, in consultation with the DSOs and restoration service providers, those operational tests in a dedicated testing procedure.*"

The Workgroup member noted that the testing procedure would need to be prepared in consultation with DSOs and SGUs and that the operational testing would be executed by the TSO after coordination with the DSOs and SGUs. The Workgroup noted this and agreed to develop a solution. The Proposer has added additional commentary to this item in the mapping table noting that internal procedures do exist although agreed that based on the feedback from the GC0127 and GC0128 consultation and further discussions with the ESO Black Start Team, consideration should be given to the preparation of a Test Plan and Test Procedures which will be consulted upon with Stakeholders in the Autumn of 2019.

GC0128 Article specific discussions

Activation of re-energisation procedure Article 27(4)

Frequency leader

It was noted that in respect of Article 27 that the allocation of the functional responsibility of this Article for GB purposes in terms of the re-energisation procedure had been allocated by Ofgem[8] and that this could not be changed. In general, National Grid ESO is responsible for the re-energisation procedure with specific responsibilities defined in STCP 06-1 (Black Start). The Workgroup and the Proposer agree that these responsibilities were not well articulated in the SRP and therefore the Proposer has suggested amendments to sections 3.2.1, 3.3.1, 3.3.2 and 3.3.4 of the Grid Code to clarify the situation.

Is there discrimination and if so how is this justified?

A Workgroup member questioned why, with the GC0127 and GC0128 proposed solutions there were differences in treatment between Types B, C and D generation within the proposed definition of a SGU in the SRP (and SDP). The Workgroup member requested that the Proposer justify as to why Type B, Type C and Type D generator were being treated differently; i.e. with two identical plant, one would be categorised as a SGU (if connected at transmission or embedded with a CUSC contract) and one would not (if connected at distribution but without a CUSC contract).

[8] https://www.ofgem.gov.uk/publications-and-updates/minded-decision-assignment-tso-obligations-under-three-eu-network-codes

It was also noted that Embedded Generation which does not have a CUSC contract or is not a BM Participant (i.e. not part of a Virtual Lead Party with a CUSC contract with the ESO) then it is not impacted by the GC0127 or GC0128 Modifications.

The Proposer clarified that this issue is similar to that raised through Grid Code Consultation GC0106 (*https://www.nationalgrideso.com/codes/grid-code/modifications/gc0106-data-exchange-requirements-accordance-regulation-eu-20171485*) which had resulted in the formation of Grid Code Working Group GC0117 https://www.nationalgrideso.com/codes/grid-code/modifications/gc0117-improving-transparency-and-consistency-access-arrangements GC0117 seeks to review the definitions of Large, Medium and Small Power Stations in the GB so that Generation across GB (based on size) would have to progress through the same connection process and submit the same data required under the Grid Code. There are similar issues with the treatment of GB Generation so far as the implementation of NCER is concerned. However, a Workgroup member noted that GC0117, if applicable (and approved by Ofgem) would only address part of the discriminatory treatment that arose with the proposed solutions for GC0127 and GC0128 and would not, for example, address the difference in treatment for Type B generators. Workgroup members noted that if GC0117 adopted a threshold between Large and Small Power Stations of 10MW this would automatically include Type C and Type D PGMs within the scope of the Grid Code and hence the requirements of GC0127 and GC0128 would apply to them in the longer term. However, it was noted that there was the potential for other solutions or thresholds to be raised by other Workgroup members which may affect the eventual outcome.

GC0096 Energy Storage modification implications on GC0127 and GC0128

The Workgroup noted the recent GCRP decision[9] for GC0096 to be sent back to its Workgroup for further work ahead of being submitted to the Authority for decision. They discussed the fact that as these GC0127 and GC0128 Modifications are for compliance for the E&R NC that they should not be reliant on a decision on another Modification (GC0096)

The Code Administrator and Workgroup decided that the best approach would be to 'pull' the GC0096 proposed definitions and related text that would be required for GC0127 and GC0128 to be implemented into those two Modifications. This is related to Article 15(3) of the E&R NC.

Due to this decision and approach adopted the proposed changes that have been lifted from the proposed GC0096 legal text are highlighted in blue in the draft Legal Text for GC0127 and GC0128. This means that if GC0096 does not get approved by the Authority for any reason, or it is sent back for further work, that GC0127 and GC0128 can be fully implemented.

Storage in the context of GC0127 and GC0128

The Workgroup also discussed whether existing storage parties should be captured by these two Modifications (for the avoidance of doubt, new storage parties would be

[9] The decision was made at the 27 June 2019 Grid Code Review Panel meeting.

captured). The Proposer felt that this should not be the case but also recognised that the E&R NC does apply to both new and existing parties. The updates proposed as part of these two Modifications are generally considered minor. The parties most likely to be affected are those who own and operate existing storage plant with a CUSC contract. Since storage plant is now required to trip when in an import mode of operation and system frequency is low and these conditions are subject to the requirements of the Grid Code (with the individual setpoints detailed in the Bilateral Agreement) it was considered that these requirements are minor. As to the rationale for the treatment of storage this has been clarified in Section 3 above.

A Workgroup member referred to National Grid ESO's Interim Report into 9 August 2019 event and was concerned, in the context of maintaining system security, that circa 1,800MW of existing distribution connected energy storage appeared not to have played a role in system defence in the way envisaged in Article 15(3). The Workgroup member, in their opinion, suggested that if the Article 15(3) requirements had been fully applied to energy storage in GB that some (or all[10]?) of the LFDD activation on 9th August 2019 could possibly have been avoided. Another Workgroup member noted that Article 2(5) refers to ERNC applying to Energy Storage Units of SGUs, Defence Service Providers and Restoration Service Providers rather than to all Energy Storage Units.

Balancing Mechanism Participants

For the avoidance of doubt, BM Participants without a CUSC Contract with National Grid ESO will not be captured by any requirements under GC0127 and GC0128 Original Proposal.

High Priority Significant Grid Users

The Proposer noted that as request by Ofgem in their June 2019 letter the Appendix C of the System Defence Plan and System Restoration Plan have been updated by National Grid ESO in July to now define what a 'High Priority Significant Grid User' is in the context of GB.

The Proposer stated for the purposes of the System Defence Plan a 'High Priority Significant Grid User', as defined in in Appendix C, would be one of the following:

- Generating Units, Power Park Modules and Power Generating Modules at a Power Station directly connected to the National Electricity Transmission System with priority given to Synchronous Generation; or
- Generating Units, Power Park Modules and Power Generating Modules at a Power Station with a Registered Capacity of 100MW or more with priority given to Synchronous Generation.

The Proposer stated for the purposes of the System Restoration Plan a 'High Priority Significant Grid User', as defined in in Appendix C, would be one of the following:

[10] The Workgroup member noted that the ESO's Interim Report identified that circa 475MW of storage (broadly equating to the circa 500MW of embedded generation that came off prior to LFDD activation) appeared to have been utilized during the event, but after the LFDD was activated.

- A Black Start Service Provider; or
- Generating Units, Power Park Modules and Power Generating Modules at a Power Station directly connected to the National Electricity Transmission System with priority given to Synchronous Generation; or
- Generating Units, Power Park Modules and Power Generating Modules at a Power Station with a Registered Capacity of 100MW or more with priority given to Synchronous Generation.

A Workgroup member questioned whether the Electricity Supply Emergency Code (ESEC) priority user list of protected sites would be included as High Priority SGUs. The Proposer confirmed that they were not as they were already covered as part of National Legislation. However, a Workgroup member noted that this was not the case as the relevant National Legislation, in the form of ESEC, deals only with planned rota disconnections and not system emergencies, such as those covered by OC6 of the Grid Code.

It was also confirmed that for the purposes of the SDP and SRP Appendix C approach that there are around a thousand such sites in GB that are considered to be High Priority SGUs. A Workgroup member questioned whether these sites had been contacted by National Grid ESO (or the DSOs) to work in co-ordination with them to understand their needs. National Grid ESO stated that they would consider whether the High Priority SGUs should just cover those sites as per Appendix C of the SDP and SRP respectively or whether this should be extended to all Distribution Connected Generators in which case there would be thousands of parties that would have classified as 'High Priority SGUs; and who would then need to have been contacted to work in co-ordination with National Grid ESO in forming their Restoration and Defence Plans. In relation to this issue National Grid ESO have been in contact with Ofgem after the last Workgroup meeting and the view from Ofgem was that as these sites were already part of National Legislation and there was no need for them to be included in the list of High Priority Significant Grid Users.

IDNOs and Closed Distribution Systems

A Workgroup member stated that their interpretation of the wording in E&R NC Articles 2 and 24 (2) (d) was that there were E&R NC requirements that apply to the IDNOs and Closed Distribution Systems (CDSOs), as well as Type B, Type C and Type D PGMs connected to those systems, who should have been contacted and their needs taken on board by National Grid ESO when developing the SDP and SRP.

The Proposer stated that generators connected to Transmission Connected IDNOs and Transmission Connected Closed Distribution Systems would be within the scope of E&R NC but not those IDNOs or Closed Distribution Systems (or generators connected to those systems) which are connected to the Distribution network, but do not have a CUSC contract with National Grid ESO. This issue is addressed around the treatment of SGUs, Defence Service Providers and Restoration Service Providers as discussed earlier in this section.

Implementation of the restoration plan

In respect of implementation of the restoration plan as described in Article 24, as it pertains to High Priority SGUs, IDNOs and CDSOs, and parties connected at Distribution including Types B, C and D PGMs. A Workgroup member stated that as a result of the discussions in the Workgroup that they would like to raise a potential alternative solution to ensure that GC0128 cover this implementation aspect.

The Workgroup considered this during this Workgroup Consultation, and this was covered later in this report.

Activation instructions

The Workgroup discussed Article 40(1) (b) (i to iv) and it was noted that there was a requirement to have an activation plan for restoration of the system following a black out. They discussed the fact that there was an activation plan outlined in SOGL Article 18 and that this activation plan had not been implemented into the Grid Code. Some Workgroup members stated that they thought it should have been. The Proposer noted this and has amended section 2.1.1 of the System Restoration Plan.

Summary of amendments to the Grid Code as part of GC0127 and GC0128

The Proposer stated that there would be no new major requirements proposed as part of these two Modifications for any Grid Code User to undertake other than those which should already be undertaken as part of their existing Grid Code obligations. This is based on the interpretation of the E&R NC by National Grid ESO as Proposer. The Workgroup did discuss this. One Workgroup member did however have an alternative interpretation and noted that as a result of being classified as an SGU for the purposes of E&RNC that Grid Code Users would then have additional requirements, which stem from E&R NC, that they would be bound to comply with.

Extracts from Articles 2, 4, 11.4(c) and 23.4 (c) of E&R NC

Article 2 of E&R NC States:

1. *This Regulation shall apply to TSOs, DSOs, SGUs, defence service providers, restoration service providers, balance responsible parties, balancing service providers, nominated electricity market operators ('NEMO') and other entities designated to execute market functions pursuant to Commission Regulation (EU) 2015/1222 (1) and to Commission Regulation (EU) 2016/1719 (2)*

2. *In particular, this Regulation shall apply to the following SGUs:*
   - *(a) 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 (3);*
   - *b) 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 SGUs in accordance with Article 11(4) and Article 23(4);*
   - *(c) existing and new transmission-connected demand facilities;*
   - *(d) existing and new transmission connected closed distribution systems;*

(e) providers of re-dispatching of power generating modules or demand facilities by means of aggregation and providers of active power reserve in accordance with Title 8 of Regulation (EU) 2017/1485; and

(f) 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 (1).

3. This Regulation shall apply to 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 or restoration service providers pursuant to Article 4(4).

4. 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 in accordance with Article 4(4).

5. This Regulation shall apply to energy storage units of a SGU, a defence service provider or a restoration service provider, which can be used to balance the system, provided that they are identified as such in the system defence plans, restoration plans or in the relevant service contract.

6. This Regulation shall apply to all transmission systems, distribution systems and interconnections in the Union except transmission systems and distribution systems or parts of the transmission systems and distribution systems of islands of Member States of which the systems are not operated synchronously with Continental Europe, Great Britain, Nordic, Ireland and Northern Ireland or Baltic synchronous area, provided that this non-synchronous operation does not result from a disturbance.

7. In Member States where more than one transmission system operator exists, this Regulation shall apply to all transmission system operators within that Member State. Where a transmission system operator does not have a function relevant to one or more obligations under this Regulation, Member States may provide that the responsibility for complying with those obligations is assigned to one or more different, specific transmission system operators.

8. The TSOs of Lithuania, Latvia and Estonia are, as long as and to the extent that they are operating in a synchronous mode in a synchronous area where not all countries are bound by Union legislation, exempted from the application of Articles 15, 29 and 33, unless otherwise provided for in a cooperation agreement with third country TSOs constituting the basis for their cooperation concerning secure system operation in accordance with Article 10.

Article 4 of E&R NC states

1. *When applying this Regulation, Member States, regulatory authorities, competent entities and system operators shall:*

   (a) apply the principles of proportionality and non-discrimination;

   (b) ensure transparency;

   (c)apply the principle of optimisation between the highest overall efficiency and lowest total costs for all parties involved;

   (d) ensure that TSOs make use of market-based mechanisms as far as is possible to ensure network security and stability;

   (e) respect technical, legal, personal safety and security constraints;

   (f) respect the responsibility assigned to the relevant TSO in order to ensure system security, including as required by national legislation;

   (g) consult with relevant DSOs and take account of potential impacts on their system;

   And

   (h) take into consideration agreed European standards and technical specifications.

2. *Each TSO shall submit the following proposals to the relevant regulatory authority in accordance with Article 37 of Directive 2009/72/EC for approval:*

   (a) the terms and conditions to act as defence service providers on a contractual basis in accordance with paragraph 4;

   (b) the terms and conditions to act as restoration service providers on a contractual basis in accordance with paragraph 4;

   (c) the list of SGUs responsible for implementing on their installations the measures that result from mandatory requirements set out in Regulations (EU) 2016/631, (EU) 2016/1388 and (EU) 2016/1447 and/or from national legislation and the list of the measures to be implemented by these SGUs, identified by the TSOs under Art. 11(4)(c) and 23(4)(c);

   (d) the list of high priority significant grid users referred to in Articles 11(4)(d) and 23(4)(d) or the principles applied to define those and the terms and conditions for disconnecting and re-energising the high priority grid users, unless defined by the national legislation of Member States.

   (e) the rules for suspension and restoration of market activities in accordance with Article 36(1);

   (f) specific rules for imbalance settlement and settlement of balancing energy in case of suspension of market activities, in accordance with Article 39(1);

   (g) the test plan in accordance with Article 43(2).

3. *Where a Member State has so provided, the proposals referred to in points (a) to (d) and (g) of paragraph 2 may be submitted for approval to an entity other than the regulatory authority. Regulatory authorities and entities designated by the Member States pursuant to this paragraph shall decide on the proposals referred to in paragraph 2 within six months from the date of submission by the TSO.*

4. *The terms and conditions to act as defence service provider and as restoration service provider shall be established either in the national legal framework or on a contractual basis. If established on a contractual basis, each TSO shall develop by 18 December 2018 a proposal for the relevant terms and conditions, which shall define at least:*

   (a) the characteristics of the service to be provided;

   (b) the possibility of and conditions for aggregation; and

   (c) for restoration service providers, the target geographical distribution of power sources with black start and island operation capabilities.

5. *By 18 December 2018, each TSO shall notify the regulatory authority or the entity designated by the Member State the system defence plan designed pursuant to Article 11 and the restoration plan designed pursuant to Article 23, or at least the following elements of those plans:*

   (a) the objectives of the system defence plan and the restoration plan, including the phenomena to be managed or the situations to be solved; (b) the conditions triggering the activation of the measures of the system defence plan and the restoration plan;

   (c) the rationale of each measure, explaining how it contributes to the objectives of the system defence plan and the restoration plan, and the party responsible for implementing those measures; and

   (d) the deadlines set out pursuant to Articles 11 and 23 for the implementation of the measures.

6. *Where a TSO is required or permitted under this Regulation to specify, establish or agree on requirements, terms and conditions or methodologies that are not subject to approval in accordance with paragraph 2, Member States may require prior approval by the regulatory authority, the entity designated by the Member State or other competent authorities of the Member States of these requirements, terms and conditions or methodologies.*

7. *If a TSO deems an amendment to the documents, approved in accordance with paragraph 3, to be necessary, the requirements provided for in paragraphs 2 to 5 shall apply to the proposed amendment. TSOs proposing an amendment shall take into account the legitimate expectations, where necessary, of power generating facility owners, demand facility owners and other stakeholders based on the initially specified or agreed requirements or methodologies.*

8. *Any party can complain against a relevant system operator or TSO in relation to that relevant system operator's or TSO's obligations or decisions under this Regulation and may refer the complaint to the regulatory*

authority which, acting as dispute settlement authority, shall issue a decision within two months after receipt of the complaint. That period may be extended by a further two months where additional information is sought by the regulatory authority. That extended period may be further extended with the agreement of the complainant. The regulatory authority's decision shall be binding unless and until overruled on appeal.

Article 11.4(c) E&R NC states

4. In particular, the system defence plan shall include the following elements

(c) a list of the SGUs responsible for implementing on their installations the measures that result from the mandatory requirements set out in Regulation (EU) 2016/631, (EU) 2016/1388 and (EU) 2016/1447 or from national legislation and a list of the measures to be implemented by those SGUs;

Article 23(4)(c) E&R NC states

4. In particular, the restoration plan shall include the following elements:

(c) a list of the SGUs responsible for implementing on their installations the measures that result from mandatory requirements set out in Regulations (EU) 2016/631, (EU) 2016/1388 and (EU) 2016/1447 or from national legislation and a list of the measures to be implemented by those SGUs;

6 Workgroup Consultation Responses summary

The Workgroup consulted on GC0127 and GC0128 for twenty working days closing on 16 August 2019. A total of six responses were received – these are attached to this Code Administrator Consultation. The Workgroup convened on two occasions on 22 and 28 August 2019 to discuss the Workgroup Consultation responses.

At the meeting on 22 August 2019, all the Workgroup Consultation responses were discussed. The key points were as follows:

1) Two responses were fully supportive.

2) As part of the Workgroup Consultation, several comments were received on the minimal approach adopted by National Grid ESO to implement the E&R NC in GB. This approach has been agreed by National Grid ESO's legal team, who have supported a principle based approach and their advice is set out in Annex 5. The rationale for this is to ensure that National Grid ESO has a reasonable chance of satisfying the requirements of the European Emergency & Restoration Network Code by 18 December 2019. National Grid ESO is supportive of extending the remit of GB parties within the scope of the E&R NC. However, this needs careful consideration particularly in respect of the costs to which smaller GB parties could be exposed to. Grid Code Modification GC0117 is currently assessing this issue in respect of data provision and National Grid ESO see no reason why the scope of GC0117 could not be extended to this issue. One Workgroup member disagrees with this advice and their views are set out in Annex 6. Furthermore, the Workgroup Member confirmed that they would be raising alternative proposal(s) to be voted against at the Workgroup meeting on 28 August 2019.

3) Concerns were raised on the approach adopted to the treatment of Storage. Article 15(3) of the NC E&R requires the TSO and DSO to specify the time required for Energy Storage Units acting as load to switch to a generation mode and define the Active Power Setpoint. Where the Energy Storage Unit is not capable of switching within the time limit set by the TSO in the System Defence Plan, the storage unit shall be automatically tripped. This issue was discussed prior to the issue of the Workgroup Consultation and included initial proposals for this capability as noted in section 3. However, it was noted that this would create performance issues for certain types of plant (such as compressed air storage or pumped storage plant in terms of droop rates) but equally concerns of rapid changes resulting in stability issues and potentially unintended consequences. National Grid ESO believe this issue requires proper and detailed assessment through detailed system studies which is also consistent with the view of the Grid Connections European Stakeholder Committee Expert Group on Storage. National Grid ESO also notes that the European Connection Network Codes also exclude requirements to Storage as these modifications are being progressed separately through Grid Code Modification GC0096, which cover the basic requirements such as frequency range and fault ride through. It is however noted that E&R NC does place limited requirements on Storage Units operating from a demand mode to a generating mode during low

frequency events (or trip off). For the avoidance of doubt, the requirements of E&R NC do not include requirements such as frequency range, fault ride through, voltage range etc. In view of this, National Grid ESO propose that the time period to switch from import to export is set to 1µs such that when the frequency falls below 49.5Hz the storage unit is tripped. The exact settings between 49.5Hz – 48.9 Hz would need to be graded to avoid tripping all storage plants at once. However, National Grid ESO is fully committed to investigating this issue further and proposes that this approach is adopted on an interim basis for the purposes of the implementing the E&R NC and then sets up a separate workgroup to investigate this capability going forward.

4) Several comments were received in respect of low frequency demand disconnection. This related to two issues i) the first being doubt over whether the requirements for low frequency demand disconnection in GB meet the requirements of the Annex of the E&R NC in terms of 'total load'/'total demand' and ii) the frequency of testing for low frequency demand disconnection relays which it was noted would apply not only to Distribution Network Operators but also Transmission Licensees who have low frequency demand disconnection relays:

- Under the Annex in the European Emergency and Restoration Code, the low frequency demand disconnection scheme in GB requires 50% of National Demand to be shed. Under Appendix 5 of the Connection Conditions and European Connection Conditions, Tables CC.A.5.5.1a and ECC.A.5.5.1a states that 55% of Demand in England and Wales will be tripped at 48Hz and 40% of Demand will be tripped in Scotland. Since the Demand in Scotland is typically only 10% of National Demand with 90% of demand remaining in England and Wales, this equates to approximately 52 -53% of National Demand and therefore would be complaint with the requirements of the E&R NC;
- With regard to the testing period of testing low frequency demand disconnection relays Article 47 of the E&R NC requires each TSO and DNO to execute testing on its installations within a period to be defined at national level. This was initially set at 3 years to ensure consistency with Generator and HVDC Testing; however, following Workgroup discussion it was agreed, by majority, that this should be set to 3 years although this may be extended to no more than once every five years if considered to be required for operational purposes. The legal text will be updated to reflect this and will also extend the requirement to Transmission Licensees; and
- One Workgroup Member expressed strong views on Low Frequency Demand Disconnection Testing and it was agreed that these comments would be added to the Workgroup Report. These are replicated below:

  "In the context of the discussions around the LFDD testing regime, in my view it should be set as "at least every three years" for the following reasons:

  1) *as this accord with the similar testing for other key stakeholder in ERNC (such as generators in Article 44 and HVDC links in Article 46) so avoids*

discriminatory treatment for LFDD, which like generators and HVDC links are a key component on the system defence regime;

2) *that a cost recovery mechanism, under Article 8 existing, so this is not an undue burden on the parties concerned;*
3) *that the concerns raised in the consultation response ("but with flexibility to extend this period to allow for efficient maintenance planning, outage planning, coordination with work on the same and adjacent circuits etc, provided that there are safeguards") would equally be applicable for generators and HVDC links – so why is there to be no such 'flexibility' for those users?, plus it also give rise to concern that a disjoint in the testing regime means that, everything else being equal, this would be less robust that an "at least every three years" testing regime ; and*
4) *in light of events on 9th August 2019, when the first stage of LFDD was activated, in anger, for the first time in GB for over ten years, I believe that in light of that experience that stakeholders would wish to have a more robust (three year) testing regime (than a less robust, five years, regime) for both LFDD and other system defence elements.*

Notwithstanding the above, we should also ensure with GC01027 that the LFDD arrangements in terms of 'total demand / 'total load' are addressed."

5) The E&R NC requires the preparation of a Test Plan and Test Procedures. National Grid ESO prepared a mapping table which it circulated as part of the Workgroup consultation and is referenced in Annex 2 of this Workgroup Report. As part of this mapping table it was suggested by National Grid ESO that this would be limited to Internal Procedures. A Workgroup member noted that Articles 43 and 51 requires that the Test Plan and Test Procedure are consulted on with stakeholders, something that does not occur with the ESO's Internal Procedures. However, one possible solution being considered by National Grid ESO is the publication of a Test Plan and Test Procedures which would sit alongside the System Defence Plan and System Restoration Plan, which would be prepared by 18 December 2019. National Grid ESO are still considering this approach.

6) Under the E&R NC there is a requirement under Article 12 and 24 of the European Emergency and Restoration Code to notify DNOs and SGU's if they are affected by the E&R NC and the measures they need to implement on their facilities. Once notified they then have 12 months to implement the measures. National Grid ESO initially prepared the System Defence Plan and System Restoration Plan outlining the process it was conducting for implementation of the E&R NC and the measures that affected parties would have to have to meet which at that stage were believed, by National Grid ESO, to be minimal. Workgroup members have since noted that it is not sufficient to rely on a notification placed on a website or an 'open letter' but that any party who is affected by the E&R NC should be formally notified in writing. As a result, National Grid ESO has now prepared a draft letter which it discussed with Workgroup members at the meeting on 22 August 2019. It was suggested that the letter should also contain a profoma so that parties bound by the E&R NC could confirm back to National Grid ESO that the measures they were required to put in place had been implemented, which would need to take place within one year of the notification. The point was however raised that it would not be fully clear what obligations parties, caught by the requirements of the E&R NC, would have to meet until the Grid Code and

STC is finally approved and therefore it is likely that this notification would not take place until December 2019.

7) Following the comments received from the GC0127/GC1028 consultation and the System Defence Plan and System Restoration Plan consultation a number of changes and updates have been made to the Legal Text. These updates are included in Annex 4 of this Workgroup Report.

8) As part of the System Defence and System Restoration Plan consultation a number of respondents advised that the European definitions of Significant Grid User (SGU), Transmission System Operator (TSO) and Distribution System Operator (DSO) were confusing. Noting also that the term SGU as used in the System Operator Guideline is different to that used in the E&R NC it was suggested that only GB terms were used on the basis they would only be interested in who was affected by the E&R NC. However, a Workgroup member noted that in their opinion, the definitions, in the context of E&R NC, were clear and that not using, in particular, 'SGU' would leave affected GB parties confused as to whether they were, or were not, caught by the requirements of the E&R NC. In addition, clarity was sought on how an Interconnector, Onshore Transmission Licensee and Offshore Transmission Licensee should be treated and would they be treated as a TSO as defined under the EU Codes. This issue is addressed in Ofgem's multiple TSO clause table[11]. For the purposes of clarity, National Grid ESO would consider an Interconnector to be treated as a User / Externally Interconnected System Operator and hence in meeting the requirements of amended Grid Code would satisfy the requirements of the E&R NC.

9) A Workgroup member noted that the requirement for the TSO to publish, in real time, the 'state' of the system in terms of it being in a 'normal' / 'alert' / 'emergency' / 'blackout' / 'restoration' state is critical for stakeholders as there are associated obligations that then flow from a change (in the system state) on other stakeholders. Not knowing the system state will impede those other stakeholders from being able to discharge those obligations on them which, everything else being equal, would lead to a less secure / robust system. Therefore, the Workgroup member stated that the GC0127/0128 solution should ensure that the 'system state' situation is made available, in a timely manner, by the TSO to stakeholders.

10) The Workgroup discussed the issue of data submission with regard to Embedded Parties. So far as Storage is concerned, the same principles that apply to Generator data submission under the Grid Code would equally apply to owners of storage plant if this proposal (or GC0096) was approved by the Authority. In summary, a Generator who owns and operates a Embedded Power Station who has a CUSC Contract with National Grid ESO will need to supply data directly to National Grid ESO in

[11] https://www.ofgem.gov.uk/publications-and-updates/minded-decision-assignment-tso-obligations-under-three-eu-network-codes

respect of that Embedded Power Station. Where a Generator does not have a CUSC Contract in respect of that Embedded Power Station, then the Distribution Network Operator would be required to submit the Embedded Generator data to National Grid ESO as required under the Grid Code. The same approach would be adopted in respect of Owners and Operators of Storage Units.

11) **Workgroup Alternatives –** On 28 August 2019, a Workgroup Member presented 3 potential alternatives to the Original Proposal. The Workgroup unanimously agreed to support each of these three potential alternatives and these became formal alternatives (WAGMs 1, 2 and 3 respectively). It was noted that no legal text has been developed for these Workgroup Alternatives, nor will this be developed before the Code Administrator Consultation is issued as this would be a significant undertaking. Workgroup agreed with the Code Administrator's suggestion to follow the approach employed for GC0106 whereby legal text for these alternatives is not prepared by the Code Administrator. However, both Grid Code Review Panel (in accordance with Governance Rule 20.8[12]) and Ofgem (in accordance with Governance Rule 21.5[13]) will need to

[12] **GR.20.8** The terms of reference of a Workgroup must include provision in respect of the following matters:

(a) those areas of a Workgroup's powers or activities which require the prior approval of the Grid Code Review Panel;

(b) the seeking of instructions, clarification or guidance from the Grid Code Review Panel, including on the suspension of a Workgroup Alternative Grid Code Modification(s) during a Significant Code Review Phase;

(c) the timetable for the work to be done by the Workgroup, in accordance with the timetable established pursuant to GR.19.1 (save where GR.19.5 applies); and

(d) the length of any Workgroup Consultation.

In addition, prior to the taking of any steps which would result in the undertaking of a significant amount of work (including the production of draft legal text to modify the Grid Code in order to give effect to a Grid Code Modification Proposal and/or Workgroup Alternative Grid Code Modification(s), with the relevant terms of reference setting out what a significant amount of work would be in any given case), the Workgroup shall seek the views of the Grid Code Review Panel as to whether to proceed with such steps and, in giving its views, the Grid Code Review Panel may consult the Authority in respect thereof.

[13] **GR.21.5** Where the Grid Code Review Panel is of the view that the proposed text to amend the Grid Code for a Grid Code Modification Proposal or Workgroup Alternative Grid Code Modification(s) is not needed in the Grid Code Modification Report, the Grid Code Review Panel shall consult (giving its reasons as to why it is of this view) with the Authority as to whether the Authority would like the Grid Code Modification Report to include the proposed text to amend the Grid Code. If it does not, no text needs to be included. If it does, and no detailed text has yet been prepared, the Code Administrator shall prepare such text to modify the Grid Code in order to give effect to such Grid Code Modification Proposal or Workgroup

agree this before we can issue the Code Administrator Consultation without the legal text for the three WAGCMs.

The Workgroup Alternatives were:

Potential Alternative 1 (this became WAGCM1)

The same as the Original, plus:

"That the scope of GB parties who are required, according to GC0127 and GC0128, to act in the event of a System Defence or System Restoration situation is as broad as the scope of E&R NC as set out in Article 2. The Original, for example, does not extend to Type B generators (Article 2(2)(b)) and re-dispatchers of power generating modules and demand facilities (Article 2(2)(e))".

Potential Alternative 2 (this became WAGCM2)

The same as the Original, plus:

"That the role that existing and new energy storage, in accordance with Article 2(5), can perform ahead of LFDD activation, as set out in Article 15(3) of E&R NC, is reflected in the GC0127 solution".

Potential Alternative 3 (this became WAGCM3)

The same as the Original, plus:

"That the scope of GB parties who are required, according to GC0127 and GC0128, to act in the event of a System Defence or System Restoration situation is as broad as the scope of E&R NC as set out in Article 2. The Original, for example, does not extend to Type B generators (Article 2(2)(b)) and re-dispatchers of power generating modules and demand facilities (Article 2(2)(e)); and

That the role that existing and new energy storage, in accordance with Article 2(5), can perform ahead of LFDD activation, as set out in Article 15(3) of E&R NC, is reflected in the GC0127 solution".

Legal text for alternatives

The Workgroup sought advice from the GCRP around whether to develop the legal text for the alternatives raised. The GCRP recommended that the legal text not be developed and sent a letter to the Authority, dated 12 September 2019, outlining their reasoning. The Authority responded on 23 September 2019 requesting that the legal text be developed ahead of issuing this Code Administrator Consultation. These letters can be located in Annex 7.

Alternative Grid Code Modification(s) and shall seek the conclusions of the relevant Workgroup before consulting those identified in GR.21.2.

The Code Administrator, under Governance Rule 21.5, sought comments from the Workgroup through a webex where all Workgroup members joined, held on the 11 October 2019. The Workgroup commented and developed the legal text for the alternatives which can be found in Annex 4 with the Original proposal legal text.

7 Workgroup Vote

The Workgroup believe that the Terms of Reference have been fulfilled and GC0127 and GC0128 has been fully considered.

The Workgroup met on 28 August 2019 and voted on whether the Original, WAGCM1, WAGCM2 and WAGCM3 would better facilitate the Grid Code Objectives than the baseline and what option was best overall. Workgroup Members unanimously concluded that the Original Proposal and each of WAGCM1, WAGCM2 and WAGCM3 better facilitated the Grid Code Objectives than the baseline

Workgroup Members by majority concluded that the Original was best overall although there was also support for WAGCM3.

Votes are recorded below:

Vote 1: does the original or WAGCM facilitate the objectives better than the Baseline?

Workgroup Member	Better facilitates ACO (a)	Better facilitates ACO (b)?	Better facilitates ACO (c)?	Better facilitates ACO (d)?	Better facilitates ACO (e)?	Overall (Y/N)
Antony Johnson – National Grid ESO						
Original	Yes	Yes	Yes	Yes	Neutral	Yes
WAGCM1	Yes	Yes	Yes	Yes	Neutral	Yes
WAGCM2	Yes	Yes	Yes	Yes	Neutral	Yes
WAGCM3	Yes	Yes	Yes	Yes	Neutral	Yes

Voting statement: The ESO support the original in that it better supports the Grid Code objectives in implementing the European Emergency and Restoration Code. We also recognise that all three alternatives are also better than the baseline for the purposes of implementing the Emergency and Restoration Code, however we do not support any of the Alternatives in favour of the original on the basis that our primary aim is to implement the EU Emergency and Restoration Code by 18 December 2019. If any of the alternatives are adopted, the ESO believes there is a significant risk the EU timelines for compliance would not be met and it would also open the Grid Code framework open to a larger number of smaller parties which would have little time to react in the timescales available. The ESO is open to considering those parties who could be within the scope of the EU Emergency and Restoration Code and the treatment of storage under low system frequency conditions, however the ESO believes these is best addressed through a separate workgroup post implementation of GC0127 and GC0127 in the same way as GC0106, when all parties can consulted and proper analysis of the costs and implications can be fully understood.

Workgroup Member	Better facilitates ACO (a)	Better facilitates ACO (b)?	Better facilitates ACO (c)?	Better facilitates ACO (d)?	Better facilitates ACO (e)?	Overall (Y/N)
Alastair Frew – Drax Power Enterprise Ltd						
Original	Yes	Yes	Yes	Yes	Neutral	Yes
WAGCM1	Yes	Yes	Yes	Yes	Neutral	Yes
WAGCM2	Yes	Yes	Yes	Yes	Neutral	Yes
WAGCM3	Yes	Yes	Yes	Yes	Neutral	Yes
Voting statement: Whilst the original does introduce measures in the Emergency and Restoration code and is hence better than the baseline, it does not implement all the requirements of the ERNC in particular Article 15 (3) which requires Energy Storage Units to reverse power flow where capable. Whilst the Proposer did initially propose a preliminary suggestion it was dropped as they felt it required more detail work and have proposed in the System Defence Plan and in this workgroup that this should be consider in another workgroup latter. Given System Defence Plan has not been approved and it is not clear that legally GB cannot implement this requirement which would have the benefits of adding an additional layer of protection to prevent disconnection in the event of frequency drop, it seem pre-emptive for the Proposer to drop this from their proposal. Hence as WAGCM3 and WAGCM2 both reintroduce article 15(3) which the proposer has dropped these are both better than the Original and out of these two options WAGCM3 is better as it also covers disparities between transmission and distribution connected generators.						

Workgroup Member	Better facilitates ACO (a)	Better facilitates ACO (b)?	Better facilitates ACO (c)?	Better facilitates ACO (d)?	Better facilitates ACO (e)?	Overall (Y/N)
Graeme Vincent – Scottish Power Energy Networks						
Original	Yes	Neutral	Yes	Yes	Neutral	Yes
WAGCM1	Yes	Neutral	Yes	Yes	Neutral	Yes
WAGCM2	Yes	Neutral	Yes	Yes	Neutral	Yes
WAGCM3	Yes	Neutral	Yes	Yes	Neutral	Yes
Voting statement: All of the proposed modifications address requirements which have resulted from the System Defence and System Restoration Plans and the ERNC and can therefore be considered better than the baseline position. It is noted that these latter documents have yet to be approved by Ofgem and therefore a requirement for further amendments may be needed or clarity on application to energy storage (in relation to interpretation and interrelation between ENRC articles 2(5) and 15(3) may be provided following Ofgem's consideration of these revised documents. However, as these modifications (GC0127and GC0128) are seeking 'to incorporate the obligations on GB Parties arising from the [current versions of the] System Defence Plan and System						

Restoration Plan' (and not strictly the ENRC directly) then the original at this moment is the preferred option.

Workgroup Member	Better facilitates ACO (a)	Better facilitates ACO (b)?	Better facilitates ACO (c)?	Better facilitates ACO (d)?	Better facilitates ACO (e)?	Overall (Y/N)
Paul Crolla – Scottish Power						
Original	Yes	Yes	Yes	Yes	Neutral	Yes
WAGCM1	Yes	Yes	Yes	Yes	Neutral	Yes
WAGCM2	Yes	Yes	Yes	Yes	Neutral	Yes
WAGCM3	Yes	Yes	Yes	Yes	Neutral	Yes

Voting statement: The original is better than the base line as it introduces the requirements in the Emergency and Restoration code in a more developed way than the original.

At this time the requirements for energy storage have been included in such a way that is cost efficient at this time, those requirements do need further revision however this requires detailed studies not in-scope of this working group. Until such times as this analysis has been completed then it is better for storage in demand mode to trip off the system during the emergency state than to try and move to generating mode quickly. It could be potentially detrimental to the operation of the system and thus needs analysis before making new code requirements.

In my opinion Type A and type B generators who do not have a contract with National Grid to provide services are not in the scope of this code.

Given that an SGU is a term that has to be translated from EU regulation to GB Grid Code terms and that SGU is open to interpretation Type A and Type B which do not have requirements under the grid code or have a contract with National Grid to provide defence or restoration services are then not 'caught' individually by Article 2(3) and not brought under the requirements of the Grid Code.

Therefore I supported the original proposal as this reflects the intent of the regulation to regulate those SGUs providing services under legalisation (code in GB terms) for by contract for defence and restoration services.

Workgroup Member	Better facilitates ACO (a)	Better facilitates ACO (b)?	Better facilitates ACO (c)?	Better facilitates ACO (d)?	Better facilitates ACO (e)?	Overall (Y/N)
Garth Graham – SSE Generation Ltd						
Original	Yes	Yes	Yes	Yes	Neutral	Yes
WAGCM1	Yes	Yes	Yes	Yes	Neutral	Yes

WAGCM2	Yes	Yes	Yes	Yes	Neutral	Yes
WAGCM3	Yes	Yes	Yes	Yes	Neutral	Yes

Voting statement: The Original introduces most of the measures in the Emergency and Restoration Network Code (but not in terms of which GB parties are within scope or in respect of storage needing to act ahead of LFDD activation). This better facilitates Applicable Objectives (a), (b), (c) and (d), whilst being neutral in terms of (e).

In terms of the scope of GB parties bound to comply with the Emergency and Restoration Network Code requirements, WAGCM1 extends the scope of the GB parties affected; from the limited group of just those with a CUSC contract with the ESO, to all those covered within the scope of the Emergency and Restoration Network Code (Article 2), including, for example, BM participants and Non-BM parties providing ancillary and other services (not under a CUSC contract) to the ESO (which could assist with either System Defence and / or System Restoration, but are excluded from providing such assistance under the Original). Taking account of the ESO's Interim Report into the 9th August 2019 event and the need to maintain a secure system, as well as the Grid Code Applicable Objectives, WAGCM 1 better facilitates Applicable Objectives (a), (b), (c) and (d), whilst being neutral in terms of (e).

In terms of the scope of GB storage facilities bound to comply with the Emergency and Restoration Network Code requirements, WAGCM2 extends the scope of the GB storage parties affected, in terms of compliance with Article 15(3) by acting ahead of LFDD activation. Taking account of the ESO's Interim Report into the 9th August 2019 event and the need to maintain a secure system, as well as the Grid Code Applicable Objectives, WAGCM 2 better facilitates Applicable Objectives (a), (b), (c) and (d), whilst being neutral in terms of (e).

In terms of both the scope of GB parties and storage facilities bound to comply with the Emergency and Restoration Network Code requirements, WAGCM3 extends the scope of the GB parties and storage facilities affected; from the limited group of just those with a CUSC contract with the ESO, to all those covered within the scope of the Emergency and Restoration Network Code (Article 2); including, for example, BM participants and Non-BM parties providing ancillary and other services (not under a CUSC contract) to the ESO (which could assist with either System Defence and / or System Restoration, but are excluded from providing such assistance under the Original); as well as in terms of compliance with Article 15(3) by acting ahead of LFDD activation. Taking account of the ESO's Interim Report into the 9th August 2019 event and the need to maintain a secure system, as well as the Grid Code Applicable Objectives, WAGCM 3 better facilitates Applicable Objectives (a), (b), (c) and (d), whilst being neutral in terms of (e).

Vote 2: Which option is best?

Workgroup Member	BEST Option?
Antony Johnson	**Original**
Alastair Frew	**WAGCM3**
Graeme Vincent	**Original**
Paul Crolla	**Original**
Garth Graham	**WAGCM3**

8 Proposer view on relevant Objectives

Impact of the modification on the Applicable Grid Code Objectives:

Relevant Objective	Identified impact
(a) To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity	Neutral
(b) Facilitating effective competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity);	Neutral
(c) Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole;	Positive (The ability to request assistance from SGUs and incorporating storage into system defence and restoration will allow for additional system security)
(d) To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and	Positive (Discharges the obligations of the Emergency and Restoration code into GB frameworks)
(e) To promote efficiency in the implementation and administration of the Grid Code arrangements	None

9 Implementation

The System Defence Plan and System Restoration Plan must be implemented by 18 December 2019 (2 years after European Emergency and Restoration Code entered into force); therefore this modification must also by implemented by 18 December 2019.

This modification will be implemented 10 working days after Authority decision or by the latest date of 17 December 2019.

National Grid ESO will notify GB Parties impacted by the implementation of the European Emergency and Restoration Code and the measures they have to meet. Following such notification GB Parties will have 12 months to implement the measures specified.

10 Code Administrator Consultation: How to respond

If you wish to respond to this Code Administrator Consultation, please use the response pro-forma which can be found under the 'Industry Consultation' tab via the following link;

https://www.nationalgrideso.com/codes/grid-code/modifications/gc0127-eu-code-emergency-restoration-requirements-resulting-system

Responses are invited to the following questions;

1. Do you believe GC0127 & GC0128 or any of the WAGCMs proposed better facilitate the Grid Code Objectives? Please include your reasoning.

2 Do you support the proposed implementation approach?

3. Do you have any other comments?

Views are invited on the proposals outlined in this consultation, which should be received by **5pm on 18 November 2019**. Please email your formal response to: grid.code@nationalgrideso.com

If you wish to submit a confidential response, please note the following;

Information provided in response to this consultation will be published on National Grid's website unless the response is clearly marked 'Private & Confidential', we will contact you to establish the extent of this confidentiality. A response marked 'Private & Confidential' will be disclosed to the Authority in full by, unless agreed otherwise, will not be shared with the Grid Code Review Panel or the industry and may therefore not influence the debate to the same extent as a non-confidential response.

Please note an automatic confidentiality disclaimer generated by your IT System will not in itself, mean that your response is treated as if it had been marked 'Private & Confidential'

Annex 1 – Terms of Reference

This is the Terms of Reference agreed at the Grid Code Review Panel.

Workgroup Terms of Reference and Membership

TERMS OF REFERENCE FOR GC0127 WORKGROUP

GC0127 – EU Code Emergency & Restoration: Requirements resulting from System Defence Plan

Responsibilities

1. The Workgroup is responsible for assisting the Grid Code Review Panel in the evaluation of Grid Code Modification Proposal **GC0127 – EU Code Emergency & Restoration: Requirements resulting from System Defence Plan** proposed by Rachel Woodbridge Stocks of National Grid Electricity System Operator in April 2019 and presented to the Grid Code Review Panel on 25 April 2019.

2. The proposal must be evaluated to consider whether it better facilitates achievement of the Grid Code Objectives. These can be summarised as follows:

   (i) *To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity;*

   (ii) *To facilitate competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity);*

   (iii) *Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national; and*

   (iv) *To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency. In conducting its business, the Workgroup will at all times endeavour to operate in a manner that is consistent with the Code Administration Code of Practice principles.*

   (v) *To promote efficiency in the implementation and administration of the Grid Code arrangements.*

Scope

3. The Workgroup must consider the issues raised by the Modification Proposal and consider if the proposal identified better facilitates achievement of the Grid Code Objectives.

4. In addition to the overriding requirement of point 3 above, the Workgroup shall consider and report on the following specific issues:
   a) *Implementation and costs;*

b) Review draft legal text should it have been provided. If legal text is not submitted within the Grid Code Modification Proposal the Workgroup should be instructed to assist in the developing of the legal text; and

c) Consider whether any further Industry experts or stakeholders should be invited to participate within the Workgroup to ensure that all potentially affected stakeholders have the opportunity to be represented in the Workgroup. Demonstrate what has been done to cover this clearly in the report

d) Confirm when GC0127 requirements would apply to Users

e) Are there any cross-code impacts?

f) Consider the impacts on Grid Code Users

- *whether all types of storage are affected or those classified as SGU's*
- *the load disconnection, frequencies and profiles being used*
- *how to maintain the commercial services that are currently provided*
- *Seek a view from the NGESO in regards to the impact on system inertia*

g) Consider how balancing services will be obtained from Users that do not currently provide them

5. As per Grid Code GR20.8 (a) and (b) the Workgroup should seek clarification and guidance from the Grid Code Review Panel when appropriate and required.

6. The Workgroup is responsible for the formulation and evaluation of any Workgroup Alternative Grid Code Modifications arising from Group discussions which would, as compared with the Modification Proposal or the current version of the Grid Code, better facilitate achieving the Grid Code Objectives in relation to the issue or defect identified.

7. The Workgroup should become conversant with the definition of Workgroup Alternative Grid Code Modification which appears in the Governance Rules of the Grid Code. The definition entitles the Group and/or an individual member of the Workgroup to put forward a Workgroup Alternative Code Modification proposal if the member(s) genuinely believes the alternative proposal compared with the Modification Proposal or the current version of the Grid Code better facilitates the Grid Code objectives The extent of the support for the Modification Proposal or any Workgroup Alternative Modification (WAGCM) proposal WAGCM arising from the Workgroup's discussions should be clearly described in the final Workgroup Report to the Grid Code Review Panel.

8. Workgroup members should be mindful of efficiency and propose the fewest number of WACM proposals as possible. All new alternative proposals need to be proposed using the Alternative Request Proposal form ensuring a reliable source of information for the Workgroup, Panel, Industry participants and the Authority.

9. All WAGCM proposals should include the Proposer(s)'s details within the final Workgroup report, for the avoidance of doubt this includes WACM proposals which are proposed by the entire Workgroup or subset of members.

10. There is an option for the Workgroup to undertake a period of Consultation in accordance with Grid Code GR. 20.11, if defined within the timetable agreed by the Grid Code Panel. Should the Workgroup determine that they see the benefit in a Workgroup Consultation being issued they can recommend this to the Grid Code Review Panel to consider.

11. Following the Consultation period the Workgroup is required to consider all responses including any Workgroup Consultation Alternative Requests. In undertaking an assessment of any Workgroup Consultation Alternative Request, the Workgroup should consider whether it better facilitates the Grid Code Objectives than the current version of the Grid Code.

12. As appropriate, the Workgroup will be required to undertake any further analysis and update the appropriate sections of the original Modification Proposal and/or WAGCM proposals (Workgroup members cannot amend the original text submitted by the Proposer of the modification) All responses including any Workgroup Consultation Alternative Requests shall be included within the final report including a summary of the Workgroup's deliberations and conclusions. The report should make it clear where and why the Workgroup chairman has exercised their right under the Grid Code to progress a Workgroup Consultation Alternative Request or a WAGCM proposal against the majority views of Workgroup members. It should also be explicitly stated where, under these circumstances, the Workgroup chairman is employed by the same organisation who submitted the Workgroup Consultation Alternative Request.

13. The Workgroup is to submit its final report to the Modifications Panel Secretary for circulation to Panel Members. The final report conclusions will be presented to the Grid Code Review Panel meeting at a Special Grid Code Review Panel meeting in mid September 2019.

Membership

It is recommended that the Workgroup has the following members:

Role	Name	Representing (User nominated)
Chair	Paul Mullen	Code Administrator
Technical Secretary	Chrissie Brown	Code Administrator
Proposer / Workgroup Member*	Tony Johnson	National Grid ESO
Workgroup Member*	Garth Graham	SSE Generation Ltd.
Workgroup Member*	Alastair Frew	Drax Generation Enterprise Ltd
Workgroup Member*	Grant McBeath	SP Energy Networks
Workgroup Member*	Paul Crolla	ScottishPower Renewables
Workgroup Member*	Richard Wilson	UK Power Networks

14. A (*) Workgroup must comprise at least 5 members (who may be Panel Members). The roles identified with an asterisk (*) in the table above contribute toward the required quorum, determined in accordance with paragraph 15 below.

15. The Grid Code Review Panel must agree a number that will be quorum for each Workgroup meeting. The agreed figure for GC0127 is that at least 5 Workgroup members must participate in a meeting for quorum to be met.

16. A vote is to take place by all eligible Workgroup members on the Modification Proposal and each WAGCM proposal and Workgroup Consultation Alternative Request based on their assessment of the Proposal(s) against the Grid Code objectives when compared against the current Grid Code baseline.

    - Do you support the Original or any of the alternative Proposals?
    - Which of the Proposals best facilitates the Grid Code Objectives?

    The Workgroup chairman shall not have a vote, casting or otherwise. The results from the vote and the reasons for such voting shall be recorded in the Workgroup report in as much detail as practicable.

17. It is expected that Workgroup members would only abstain from voting under limited circumstances, for example where a member feels that a proposal has been insufficiently developed. Where a member has such concerns, they should raise these with the Workgroup chairman at the earliest possible opportunity and certainly before the Workgroup vote takes place. Where abstention occurs, the reason should be recorded in the Workgroup report.

18. Workgroup members or their appointed alternate are required to attend a minimum of 50% of the Workgroup meetings to be eligible to participate in the Workgroup vote.

19. The Technical Secretary shall keep an Attendance Record for the Workgroup meetings and circulate the Attendance Record with the Action Notes after each meeting. This will be attached to the final Workgroup report.

20. The Workgroup membership can be amended from time to time by the Grid Code Review Panel and the Chairman of the Workgroup.

Appendix 1 – Indicative Workgroup Timetable

Please see the latest agreed timetable at the front of the modification report.

Workgroup Terms of Reference and Membership

TERMS OF REFERENCE FOR GC0128 WORKGROUP

GC0128 – EU Code Emergency & Restoration: Requirements resulting from System Restoration Plan

Responsibilities

1. The Workgroup is responsible for assisting the Grid Code Review Panel in the evaluation of Grid Code Modification Proposal **GC0128 – EU Code Emergency & Restoration: Requirements resulting from System Restoration Plan** proposed by Rachel Woodbridge Stocks of National Grid Electricity System Operator in April 2019 and presented to the Grid Code Review Panel on 25 April 2019.

2. The proposal must be evaluated to consider whether it better facilitates achievement of the Grid Code Objectives. These can be summarised as follows:

   (i) *To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity;*

   (ii) *To facilitate competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity);*

   (iii) *Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national; and*

   (iv) *To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency. In conducting its business, the Workgroup will at all times endeavour to operate in a manner that is consistent with the Code Administration Code of Practice principles.*

   (v) *To promote efficiency in the implementation and administration of the Grid Code arrangements.*

Scope

3. The Workgroup must consider the issues raised by the Modification Proposal and consider if the proposal identified better facilitates achievement of the Grid Code Objectives.

4. In addition to the overriding requirement of point 3 above, the Workgroup shall consider and report on the following specific issues:
   a) *Implementation and costs;*

b) Review draft legal text should it have been provided. If legal text is not submitted within the Grid Code Modification Proposal the Workgroup should be instructed to assist in the developing of the legal text; and

c) Consider whether any further Industry experts or stakeholders should be invited to participate within the Workgroup to ensure that all potentially affected stakeholders have the opportunity to be represented in the Workgroup. Demonstrate what has been done to cover this clearly in the report

d) Confirm when GC0128 requirements would apply to Users

e) Are there any cross-code impacts?

f) Consider the impacts on Grid Code Users

g) Consider the impact of embedded generation as part of a black start restoration plan

h) who can be a frequency leader, and under what circumstances

5. As per Grid Code GR20.8 (a) and (b) the Workgroup should seek clarification and guidance from the Grid Code Review Panel when appropriate and required.

6. The Workgroup is responsible for the formulation and evaluation of any Workgroup Alternative Grid Code Modifications arising from Group discussions which would, as compared with the Modification Proposal or the current version of the Grid Code, better facilitate achieving the Grid Code Objectives in relation to the issue or defect identified.

7. The Workgroup should become conversant with the definition of Workgroup Alternative Grid Code Modification which appears in the Governance Rules of the Grid Code. The definition entitles the Group and/or an individual member of the Workgroup to put forward a Workgroup Alternative Code Modification proposal if the member(s) genuinely believes the alternative proposal compared with the Modification Proposal or the current version of the Grid Code better facilitates the Grid Code objectives The extent of the support for the Modification Proposal or any Workgroup Alternative Modification (WAGCM) proposal WAGCM arising from the Workgroup's discussions should be clearly described in the final Workgroup Report to the Grid Code Review Panel.

8. Workgroup members should be mindful of efficiency and propose the fewest number of WACM proposals as possible. All new alternative proposals need to be proposed using the Alternative Request Proposal form ensuring a reliable source of information for the Workgroup, Panel, Industry participants and the Authority.

9. All WAGCM proposals should include the Proposer(s)'s details within the final Workgroup report, for the avoidance of doubt this includes WACM proposals which are proposed by the entire Workgroup or subset of members.

10. There is an option for the Workgroup to undertake a period of Consultation in accordance with Grid Code GR. 20.11, if defined within the timetable agreed by the Grid Code Panel. Should the Workgroup determine that they see the benefit in a Workgroup Consultation being issued they can recommend this to the Grid Code Review Panel to consider.

11. Following the Consultation period the Workgroup is required to consider all responses including any Workgroup Consultation Alternative Requests. In undertaking an assessment of any Workgroup Consultation Alternative Request, the Workgroup should consider whether it better facilitates the Grid Code Objectives than the current version of the Grid Code.

12. As appropriate, the Workgroup will be required to undertake any further analysis and update the appropriate sections of the original Modification Proposal and/or WAGCM proposals (Workgroup members cannot amend the original text submitted by the Proposer of the modification) All responses including any Workgroup Consultation Alternative Requests shall be included within the final report including a summary of the Workgroup's deliberations and conclusions. The report should make it clear where and why the Workgroup chairman has exercised their right under the Grid Code to progress a Workgroup Consultation Alternative Request or a WAGCM proposal against the majority views of Workgroup members. It should also be explicitly stated where, under these circumstances, the Workgroup chairman is employed by the same organisation who submitted the Workgroup Consultation Alternative Request.

13. The Workgroup is to submit its final report to the Modifications Panel Secretary for circulation to Panel Members. The final report conclusions will be presented to the Grid Code Review Panel meeting to the Grid Code Review Panel in mid-September.

Membership

It is recommended that the Workgroup has the following members:

Role	Name	Representing (User nominated)
Chair	Paul Mullen	Code Administrator
Technical Secretary	Chrissie Brown	Code Administrator
Proposer / Workgroup Member*	Tony Johnson	National Grid ESO
Workgroup Member*	Garth Graham	SSE Generation Ltd.
Workgroup Member*	Alastair Frew	Drax Generation Enterprise Ltd
Workgroup Member*	Grant McBeath	SP Energy Networks
Workgroup Member*	Paul Crolla	ScottishPower Renewables
Workgroup Member*	Richard Wilson	UK Power Networks

14. A (*) Workgroup must comprise at least 5 members (who may be Panel Members). The roles identified with an asterisk (*) in the table above contribute toward the required quorum, determined in accordance with paragraph 15 below.

15. The Grid Code Review Panel must agree a number that will be quorum for each Workgroup meeting. The agreed figure for GC0128 is that at least 5 Workgroup members must participate in a meeting for quorum to be met.

16. A vote is to take place by all eligible Workgroup members on the Modification Proposal and each WAGCM proposal and Workgroup Consultation Alternative Request based on their assessment of the Proposal(s) against the Grid Code objectives when compared against the current Grid Code baseline.

- Do you support the Original or any of the alternative Proposals?

- Which of the Proposals best facilitates the Grid Code Objectives?

The Workgroup chairman shall not have a vote, casting or otherwise. The results from the vote and the reasons for such voting shall be recorded in the Workgroup report in as much detail as practicable.

17. It is expected that Workgroup members would only abstain from voting under limited circumstances, for example where a member feels that a proposal has been insufficiently developed. Where a member has such concerns, they should raise these with the Workgroup chairman at the earliest possible opportunity and certainly before the Workgroup vote takes place. Where abstention occurs, the reason should be recorded in the Workgroup report.

18. Workgroup members or their appointed alternate are required to attend a minimum of 50% of the Workgroup meetings to be eligible to participate in the Workgroup vote.

19. The Technical Secretary shall keep an Attendance Record for the Workgroup meetings and circulate the Attendance Record with the Action Notes after each meeting. This will be attached to the final Workgroup report.

20. The Workgroup membership can be amended from time to time by the Grid Code Review Panel and the Chairman of the Workgroup.

Appendix 1 – Indicative Workgroup Timetable

Please see the latest timetable approved by the Panel on the front of the modification report.

Annex 2 – Mapping for European Emergency & Restoration Network Code

This has been uploaded separately to the modification area for GC0127 and GC0128. Note that this was produced on 12 July 2019 and has not been updated. National Grid ESO recognise that, in lieu of the discussions, further updates will be required to this mapping table.

Annex 3 – Attendance log

Key

A – Attended

X – Absent

O – Alternate

D – Dial-in

Name	Organisation	Role	29/05/2019	13/06/2019	02/07/2019	03/07/2019	19/07/2019	22/08/2019	28/08/2019

Paul Mullen	Code Administrator, NG Electricity System Operator	Chair	A	A	A	A	X	A	A
Chrissie Brown	Code Administrator, NG Electricity System Operator	Technical Secretary	A	A	A	A	A	X	X
Antony Johnson	National Grid Electricity System Operator	Proposer/ Workgroup member	A	A	A	A	A	A	A
Mark Jones	National Grid Electricity System Operator	Subject matter expert	A	A	A	A	D	X	A
Alastair Frew	Drax Generation Enterprise Ltd	Workgroup member	A	D	A	A	D	D	D
Garth Graham	SSE Generation Limited	Workgroup member	A	D	D	A	D	D	A
Andy Colley	SSE Generation Limited	Alternate Workgroup member	X	D Part meeting	X	A	X	X	X
Paul Crolla	Scottish Power Renewables	Workgroup member	A	A	A	A	D	X	D
Issac Gutierrez	Scottish Power Renewables	Alternate Workgroup member	X	X	X	X	X	O	X
Grant McBeath	SP Energy Networks	Workgroup member	X	X	X	X	D	X	X

Graeme Vincent	SP Energy Networks	Alternate Workgroup member	D	A	A	A	X	D	D
Richard Wilson	UKPN	Workgroup member	X	X	A	X	X	X	X

Annex 4 – Draft legal text Original and alternatives

This is the legal text agreed by the Workgroup and refined following the Workgroup Consultation.

This legal text includes legal text for the Original Proposal, WAGCM1, WAGCM2 and WAGCM3. Please note that the legal text noted as extracts from GC0096 would need to be approved by the Authority as part of this modification should GC0096 not have been approved by the Authority ahead of this modification.

GC0127 / GC0128

LEGAL TEXT – DATED 22 AUGUST 2019

Extracts from GC0096 (Storage) are included in Blue Highlighted Text

Extracts from GC0125 (HVDC Black Start Testing) are included in Green Highlighted Text

Extracts from G&D's

Electricity Storage	The conversion of electrical energy into a form of energy which can be stored, the storing of that energy, and the subsequent reconversion of that energy back into electrical energy.
Electricity Storage Module	Is either one or more **Synchronous Electricity Storage Unit**(s) or **Non-Synchronous Electricity Storage Unit**(s) which could also be part of a **Power Generating Module**. For the avoidance of doubt, **Non-Controllable Electricity Storage Equipment** would not be considered to be classed as an **Electricity Storage Module** or as an **Electricity Storage Unit**.
Non-Synchronous Electricity Storage Module	A **Power Park Module** comprising soley of one or more **Non-Synchronous Electricity Storage Units**.
Quick Resynchronisation Capability	The capability of a **Type C** or **Type D Power Generating Module** as defined in ECC.6.3.5.6. For the avoidance of doubt this requirement only applies to **EU Code Generators** who own or operate a **Type C** or **Type D Power Generating Module**.
Quick Resynchronisation Unit Test	A test undertaken on **Generating Unit** forming part of a **Type C** or **Type D Power Generating Module** as detailed in OC5.7.1 and OC5.7.4 necessary to determine its ability to demonstrate a **Quick Resynchronisation Capability**.
Synchronous Electricity Storage Module	A **Synchronous Power Generating Module** which can convert or re-convert electrical energy from another source of energy such that the frequency of the generated voltage, the rotor speed and the frequency of network voltage are in a constant ratio and thus in synchronism. For the avoidance of doubt a **Synchronous Electricity Storage Module** could comprise of one or more **Synchronous Electricity Storage Units**.
Synchronous Electricity Storage Unit	A **Synchronous Generating Unit** which can supply or absorb electrical energy such that the frequency of the generated voltage, the rotor speed and the frequency of the equipment are in constant ratio and thus in synchronism with the network.

Extracts from CC's

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CC.6.5.4.4 Where **Control Telephony** or **System Telephony** is installed, routine testing of such facilities may be required by **The Company** (not normally more than once in any calendar month). The **GB Code User** and **The Company** shall use reasonable endeavours to agree a test programme and where **The Company** requests the assistance of the **User** in performing the agreed test programme the **User** shall provide such assistance. –**The Company** requires the **GB Code User** to test the backup power supplies feeding its **Control Telephony** facilities at least once every 5 years.

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CC.A.5.4 Low Frequency Relay Testing

CC.A.5.4.1 **Low Frequency Relays** installed and commissioned after 1st January 2007 shall be type tested in accordance with and comply with the functional test requirements for **Frequency Protection** contained in Energy Networks Association Technical Specification 48-6-5 Issue 1 dated 2005 "ENA **Protection** Assessment Functional Test Requirements – Voltage and Frequency **Protection**".

For the avoidance of doubt, **Low Frequency Relays** installed and commissioned before 1st January 2007 shall comply with the version of CC.A.5.1.1 applicable at the time such **Low Frequency Relays** were commissioned.

CC.A.5.4.2 Each **Non-Embedded Customer** shall aim to execute testing on its low frequency demand disconnection relays installed within its network and in service at least once every three years, although this may be extended to no more than every five years if considered to be required for operational purposes.

CC.A.5.4.3 Each **Network Operator** and **Relevant Transmission Licensee** shall aim to execute testing on its low frequency demand disconnection relays installed within its network and in service at least once every three years, although this may be extended to no more than every five years if considered to be required for operational purposes.

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Extracts from ECC's

ECC.1 INTRODUCTION

ECC.1.1 The **European Connection Conditions** ("**ECC**") specify both:

(a) the minimum technical, design and operational criteria which must be complied with by:

(i) any **EU Code User** connected to or seeking connection with the **National Electricity Transmission System**, or

(ii) **EU Generators** or **HVDC System Owners** connected to or seeking connection to a **User's System** which is located in **Great Britain** or **Offshore**, or

(iii) **Network Operators** who are **EU Code Users**

(iv) **Network Operators** who are **GB Code Users** but only in respect of:-

(a) Their obligations in respect of **Embedded Medium Power Stations** not subject to a **Bilateral Agreement** for whom the requirements of ECC.3.1(b)(iii) apply alone; and/or

(b) The requirements of this **ECC** only in relation to each **EU Grid Supply Point**. **Network Operators** in respect of all other **Grid Supply Points** should continue to satisfy the requirements as specified in the **CC**s.

(v) **Non-Embedded Customers** who are **EU Code Users**

(b) the minimum technical, design and operational criteria with which **The Company** will comply in relation to the part of the **National Electricity Transmission System** at the **Connection Site** with **Users**. In the case of any **OTSDUW Plant and Apparatus**, the **ECC** also specify the minimum technical, design and operational criteria which must be complied with by the **User** when undertaking **OTSDUW**.

(c) The requirements of **European Regulation (EU) 2016/631** shall not apply to

(i) **Power Generating Modules** that are installed to provide backup power and operate in parallel with the **Total System** for less than 5 minutes per calendar month while the **System** is in normal state. Parallel operation during maintenance or commissioning of tests of that **Power Generating Module** shall not count towards that five minute limit.

(ii) **Power Generating Modules** connected to the **Transmission System** or **Network Operators System** which are not operated in synchronism with a **Synchronous Area**.

(iii) **Power Generating Modules** that do not have a permanent **Connection Point** or **User System Entry Point** and used by **The Company** to temporarily provide power when normal **System** capacity is partly or completely unavailable.

(iv) **Electricity Storage Modules**.

(d) **Storage Users** are required to comply with the entirety of the **ECC** but are not subject to the requirements of **European Regulation (EU) 2016/631**, **European Regulation (EU) 2016/1388** and **European Regulation EU 2016/1485**. The requirements of the **ECC** shall therefore be enforceable against **Storage Users** under the Grid Code only (and not under any of the aforementioned **European Regulations**) and any derogation sought by a **Storage User** in respect of the **ECC** shall be deemed a derogation from the Grid Code only (and not from the aforementioned **European Regulations**).

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ECC.3.1 The **ECC** applies to **The Company** and to **Users**, which in the **ECC** means:

(a) **EU Generators** (other than those which only have **Embedded Small Power Stations**), including those undertaking **OTSDUW** including **Power Generating Modules**, and **DC Connected Power Park Modules**. For the avoidance of doubt, **Electricity Storage Modules** are included within the definition of **Power Generating Modules** for which the requirements of the **ECC** would be equally applicable.

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ECC.3.6 The requirements of this **ECC** shall apply to **EU Code Users** in respect of **Power Generating Modules** (including **DC Connected Power Park Modules** and **Electricity Storage Modules**) and **HVDC Systems**.

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ECC.6.3 GENERAL POWER GENERATING MODULE, OTSDUW AND HVDC EQUIPMENT REQUIREMENTS

ECC.6.3.1 This section sets out the technical and design criteria and performance requirements for **Power Generating Modules** (which includes **Electricity Storage Modules**) and **HVDC Equipment** (whether directly connected to the **National Electricity Transmission System** or **Embedded**) and (where provided in this section) **OTSDUW Plant and Apparatus** which each **Generator** or **HVDC System Owner** must ensure are complied with in relation to its **Power Generating Modules**, **HVDC Equipment** and **OTSDUW Plant and Apparatus**. References to **Power Generating Modules**), **HVDC Equipment** in this ECC.6.3 should be read accordingly. For the avoidance of doubt, the requirements applicable to **Synchronous Power Generating Modules** also apply to **Synchronous Electricity Storage Modules** and the requirements applicable to **Power Park Modules** apply to **Non-Synchronous Electricity Storage Modules**. In addition, the requirements applicable to **Electricity Storage Modules** also apply irrespective of whether the **Electricity Storage Module** operates in such a mode as to import or export power from the **Total System**.

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ECC.6.3.3 OUTPUT POWER WITH FALLING FREQUENCY

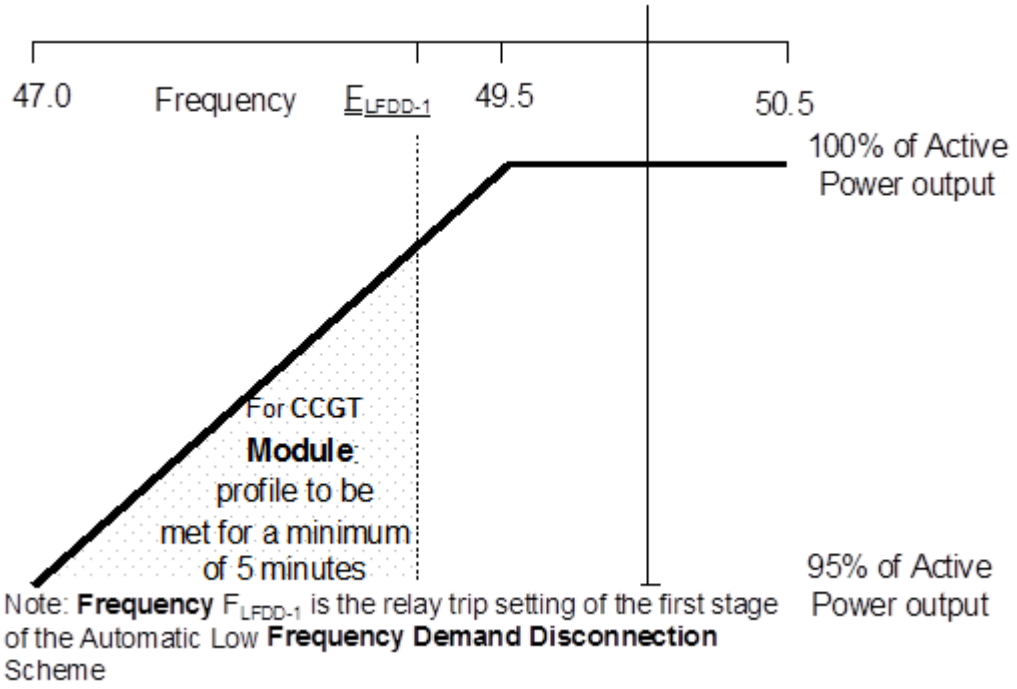
ECC.6.3.3.1 Output power with falling frequency for **Power Generating Modules** and **HVDC Equipment**

ECC.6.3.3.1.1 Each **Power Generating Module** and **HVDC Equipment** must be capable of:

(a) continuously maintaining constant **Active Power** output for **System Frequency** changes within the range 50.5 to 49.5 Hz; and

(b) (subject to the provisions of ECC.6.1.2) maintaining its **Active Power** output at a level not lower than the figure determined by the linear relationship shown in Figure ECC.6.3.3(a) for **System Frequency** changes within the range 49.5 to 47 Hz for all ambient temperatures up to and including 25^0C, such that if the **System Frequency** drops to 47 Hz the **Active Power** output does not decrease by more than 5%. In the case of a **CCGT Module**, the above requirement shall be retained down to the **Low Frequency Relay** trip setting of 48.8 Hz, which reflects the first stage of the Automatic Low **Frequency Demand Disconnection** scheme notified to **Network Operators** under OC6.6.2. For **System Frequency** below that setting, the existing requirement shall be retained for a minimum period of 5 minutes while **System Frequency** remains below that setting, and special measure(s) that may be required to meet this requirement shall be kept in service during this period. After that 5 minutes period, if **System Frequency** remains below that setting, the special measure(s) must be discontinued if there is a materially increased risk of the **Gas Turbine** tripping. The need for special measure(s) is linked to the inherent **Gas Turbine Active Power** output reduction caused by reduced shaft speed due to falling **System Frequency**. Where the need for special measures is identified in order to maintain output in line with the level identified in Figure ECC.6.3.3(a) these measures should be still continued at ambient temperatures above 25^0C maintaining as much of the **Active Power** achievable within the capability of the plant. For the avoidance of doubt, **Generators** in respect of **Pumped Storage Plant** and **Electricity Storage Modules** shall also be required to satisfy the requirements of OC6.6.6.

Figure ECC.6.3.3(a) **Active Power** Output with falling frequency for **Power Generating Modules** and **HVDC Systems** and **Electricity Storage Modules** when operating in an exporting mode of operation



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ECC.6.5.4.4 Where **Control Telephony** or **System Telephony** is installed, routine testing of such facilities may be required by **The Company** (not normally more than once in any calendar month). The **User** and **The Company** shall use reasonable endeavours to agree a test programme and where **The Company** requests the assistance of the **User** in performing the agreed test programme the **User** shall provide such assistance. **The Company** requires the **EU Code User** to test the backup power supplies feeding its **Control Telephony** facilities at least once every 5 years.

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ECC.A.5.4 Low Frequency Relay Testing

ECC.A.5.4.1 **Low Frequency Relays** installed and commissioned after 1st January 2007 shall be type tested in accordance with and comply with the functional test requirements for **Frequency Protection** contained in Energy Networks Association Technical Specification 48-6-5 Issue 1 dated 2005 "ENA **Protection** Assessment Functional Test Requirements – Voltage and Frequency **Protection**".

For the avoidance of doubt, **Low Frequency Relays** installed and commissioned before 1st January 2007 shall comply with the version of CC.A.5.1.1 applicable at the time such **Low Frequency Relays** were commissioned.

ECC.A.5.4.2 Each **Non-Embedded Customer** shall aim to execute testing on its low frequency demand disconnection relays installed within its network and in service at least once every three years, although this may be extended to no more than every five years if considered to be required for operational purposes.

ECC.A.5.4.3 Each **Network Operator** and **Relevant Transmission Licensee** shall aim to execute testing on its low frequency demand disconnection relays installed within its network and in service at least once every three years, although this may be extended to no more than every five years if considered to be required for operational purposes.

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Extracts from Demand Response Services Code (DRSC))

DRSC.1 INTRODUCTION

DRSC.1.1 The **Demand Response Services Code** is concerned with **Demand Response Providers** who contract with **The Company** for the provision of **Ancillary Services**.

DRSC.1.2 **Ancillary Services** are non-mandatory services used by **The Company** in operating the **System**. They are provided by **Demand Response Providers** with payment being dealt with under the terms of the relevant agreement for the **Ancillary Service**.

DRSC.1.3 Where a **Demand Response Provider** is interested in offering an **Ancillary Service** to **The Company**, then further details and additional information of the **Ancillary Services** are available from the Balancing Services section of the **Website**.

DRSC.1.4 Where **The Company** and a **Demand Response Provider** enter into an **Ancillary Services** agreement, it shall be in accordance with **Transmission Licence** condition C16 and the **Standard Contract Terms**.

DRSC 1.5 **The Demand Response Services Code** which would form part of an **Ancillary Services** agreement between a **Demand Response Provider** and **The Company** nd to discharge the obligations under **European Regulation (EU) 2016/1388**. The **Ancillary Services** agreement will include an obligation on the **Demand Response Provider** to satisfy the applicable requirements of this **Demand Response Services Code**.

DRSC.1.6 The **Demand Response Code** applies only to **Demand Response Providers** who have entered into an agreement with **The Company** to provide an **Ancillary Service**. This **Demand Response Services Code** does not apply to **Users** who are not **Demand Response Providers**.

DRSC.1.7 For the avoidance of doubt, **Network Operators** and **Non Embedded Customers** in respect of **EU Grid Supply Points** are required to satisfy the compliance requirements in section DRSC.11 of this code in addition to the **European Compliance Processes** only if they are also a **Demand Response Provider** ~~unless they are also a **Demand Response Provider**~~[A1].

DRSC.2 OBJECTIVE

The objectives of the **DRSC** are to

DRSC.2.1 Ensure the obligations of **European Regulation (EU) 2016/1388** have been discharged; and

DRSC.2.2 Complement the requirements of the **Ancillary Services** agreement between **The Company** and a **Demand Response Provider**; and

DRSC.2.3 Define the minimum technical and compliance requirements **Demand Response Providers** are required to satisfy if they provide a **Demand Response Service** to **The Company** under an **Ancillary Services** agreement.

DRSC.3 SCOPE

DRSC.3.1 The **DRSC** applies to any **Demand Response Provider** who has entered into an agreement to provide **Ancillary Services** with **The Company**.

DRSC.3.2 The **DRSC** does not apply to **Users**, **BM Participants** or other parties ~~who are not~~ unless they are also a **Demand Response Provider**~~s~~.

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DRSC.11.7 Additional Testing requirements for Non-Embedded Customers and CUSC Parties who are also Demand Response Providers

DRSC.11.7.1 **Non-Embedded Customers** and **CUSC Parties** who are also **Demand Response Providers** shall be required to execute a demand modification test after two consecutive

unsuccessful responses in the operational environment or at least every year as agreed with **The Company**.

DRSC.11.7.2 Each **Non-Embedded Customer** and **CUSC Party** who are also **Demand Response Providers** and provide demand response low frequency demand disconnection shall execute a low frequency demand disconnection test at least once every three years.

~~Extracts from European Compliance Processes (ECPs)~~

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Extracts from OC5

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OC5.5.3.3 The **User** is responsible for carrying out the test and retains the responsibility for the safety of personnel and plant during the test.

OC5.5.4 Test And Monitoring Assessment

The criteria must be read in conjunction with the full text under the Grid Code reference. The **BM Unit**, **Power Generating Module**, **CCGT Module**, **Power Park Module** or **Generating Unit** (excluding **Power Park Units**), **HVDC Equipment** and **DC Converters** and **OTSUA** will pass the test the criteria below are met:

Parameter to be Tested		Criteria against which the test results will be assessed by The Company.
Voltage Quality	Harmonic Content	CC.6.1.5(a) or ECC.6.1.5(a) Measured harmonic emissions do not exceed the limits specified in the **Bilateral Agreement** or where no such limits are specified, the relevant planning level specified in G5/4.
	Phase Unbalance	CC.6.1.5(b) or ECC.6.1.5(b), The measured maximum **Phase (Voltage) Unbalance** on the **National Electricity Transmission System** should remain, in England and Wales, below 1% and, in Scotland, below 2% and **Offshore** will be defined in relevant **Bilateral Agreement**. CC.6.1.6 or ECC.6.1.6 In England and Wales, measured infrequent short duration peaks in **Phase (Voltage) Unbalance** should not exceed the maximum value stated in the **Bilateral Agreement**.
	Rapid Voltage Change	CC.6.1.7(a) or ECC.6.1.7(a) The measured Rapid Voltage Change at the **Point of Common Coupling** shall not exceed the Planning Levels specified in CC.6.1.7(a) or ECC 6.1.7.(i)
	Flicker Severity	CC.6.1.7(j) or ECC.6.1.7(j) The measured Flicker Severity at the **Point of Common Coupling** shall not exceed the limits specified in the table of CC.6.1.7(j) or ECC 6.1.7(j).
	Voltage Fluctuation	CC.6.1.8 or ECC.6.1.8 **Offshore**, measured voltage fluctuations at the **Point of Common Coupling** shall not exceed the limits set out in the **Bilateral Agreement**.
Fault Clearance	Fault Clearance Times	CC.6.2.2.2.2(a), CC.6.2.3.1.1(a), ECC.6.2.2.2.2(a), ECC.6.2.3.1.1(a), **Bilateral Agreement**
	Back Up Protection	CC.6.2.2.2.2(b), CC.6.2.3.1.1(b), ECC.6.2.2.2.2(a), ECC.6.2.3.1.1(a), **Bilateral Agreement**
	Circuit Breaker Fail **Protection**	CC.6.2.2.2.2(c), CC.6.2.3.1.1(c), ECC.6.2.2.2.2(c), ECC.6.2.3.1.1(c)

Parameter to be Tested		Criteria against which the test results will be assessed by The Company.
	Reactive Capability	CC.6.3.2 or ECC.6.3.2 (and in the case of CC.6.3.2(e)(iii) and ECC.6.3.2.5 and ECC.6.3.2.6, the **Bilateral Agreement**), CC.6.3.4 or ECC.6.3.4, **Ancillary Services Agreement**. For a test initiated under OC.5.5.1.1 the **Power Generating Module**, **Generating Unit**, **HVDC Equipment**, **DC Converter** or **Power Park Module** or (prior to the **OTSUA Transfer Time**) **OTSUA** will pass the test if it is within ±5% of the reactive capability registered with **The Company** under **OC2**. the duration of the test will be for a period of upto 60 minutes during which period the system voltage at the **Grid Entry Point** for the relevant **Power Generating Module**, **Generating Unit**, **HVDC Equipment**, **DC Converter** or **Power Park Module** or **Interface Point** in the case of **OTSUA** will be maintained by the **Generator** or or **HVDC System Owner**, **DC Converter Station** owner at the voltage specified pursuant to BC2.8 by adjustment of **Reactive Power** on the remaining **Power Generating Module**, **Generating Unit**, **HVDC Equipment**, **DC Converter** or **Power Park Modules** or **OTSUA**, if necessary. Any test performed in respect of an **Embedded Medium Power Station** not subject to a **Bilateral Agreement** or, an **Embedded DC Converter Station** or **Embedded HVDC System** not subject to a **Bilateral Agreement** shall be as confirmed pursuant to OC5.8.3. Measurements of the **Reactive Power** output under steady state conditions should be consistent with Grid Code requirements i.e. fully available within the voltage range ±5% at 400kV, 275kV and 132kV and lower voltages.
Governor / Frequency Control	Primary Secondary and High **Frequency** Response	**Ancillary Services Agreement**, CC.6.3.7 and where applicable CC.A.3 or ECC.6.3.7 and where applicable ECC.A.3. For a test initiated under OC.5.5.1.1 the measured response in MW/Hz is within ±5% of the level of response specified in the **Ancillary Services Agreement** for that **Genset**.
	Stability with Voltage	CC.6.3.4 or ECC.6.3.4

Parameter to be Tested		Criteria against which the test results will be assessed by The Company.
	Governor / Load / **Frequency** Controller **System** Compliance	CC.6.3.6(a), CC.6.3.7, CC.6.3.9, CC8.1, where applicable CC.A.3, BC3.5, BC3.6, BC3.7 or ECC.6.3.6, ECC.6.3.7, ECC.6.3.9, ECC8.1, where applicable ECC.A.3, BC3.5, BC3.6, BC3.7
	Output at Reduced **System Frequency**	CC.6.3.3 or ECC.6.3.3 - For variations in **System Frequency** exceeding 0.1Hz within a period of less than 10 seconds, the **Active Power** output is within ±0.2% of the requirements of CC.6.3.3 or ECC.6.3.3 when monitored at prevailing external air temperatures of up to 25ºC., BC3.5.1
	Fast Start	**Ancillary Services Agreement** requirements
	Black Start	OC5.7
	Excitation/Voltage **Control System**	CC.6.3.6(b), CC.6.3.8, CC.A.6 or CC.A.7 as applicable, BC2.11.2, and the **Bilateral Agreement** or ECC.6.3.6, ECC.6.3.8, ECC.A.6 or ECC.A.7 or ECC.A.8 as applicable
	Fault Ride Through and Fast Fault Current Injection	CC.6.3.15, CC.A.4.A or CC.A.4.B as applicable or ECC.6.3.15, ECC.6.3.16, ECC.A.4. or ECC.A.4EC as applicable
Dynamic Parameters	**Export and Import Limits**, **QPN**, **Joint BM Unit Data** and **Dynamic Parameters**	BC2 The **Export and Import Limits**, **QPN**, **Joint BM Unit Data** and **Dynamic Parameters** under test are within 2½% of the declared value being tested.
	Synchronisation time	BC2.5.2.3 **Synchronisation** takes place within ±5 minutes of the time it should have achieved **Synchronisation**.

Parameter to be Tested		Criteria against which the test results will be assessed by The Company.
	Run-up rates	BC2 Achieves the instructed output and, where applicable, the first and/or second intermediate breakpoints, each within ±3 minutes of the time it should have reached such output and breakpoints from **Synchronisation** (or break point, as the case may be), calculated from the run-up rates in its **Dynamic Parameters**.
	Run-down rates	BC2 Achieves the instructed output and, where applicable, the first and/or second intermediate breakpoints, each within ±5 minutes of the time it should have reached such output and breakpoints from **Synchronisation** (or break point, as the case may be), calculated from the run-up rates in its **Dynamic Parameters**.
	Demand Response	DRSC.11.7 **Non-Embedded Customers**, **Network Operators** and **BM Participants** who are also **Demand Response Providers** shall execute a demand modification test when requested as per DRSC.11.7 to ensure the requirements of the **Ancillary Services** agreement and **Demand Response Services Code** are satisfied.

.....

OC5.7 BLACK START TESTING

OC5.7.1 General

(a) **The Company** shall require a **Black Start Service Provider** to carry out a **Black Start Test** in order to demonstrate that a **Black Start Station** or **Black Start HVDC System** has a **Black Start Capability**.

(i) In the case of a **Generator**, **The Company** shall require a **Generator** with a **Black Start Station** to carry out a test (either a "**Black Start Unit Test** or a **Black Start Station Test**") in order to demonstrate that a **Black Start Station** has a **Black Start Capability**.

(ii) In the case of an **HVDC System Owner** or **DC Converter Station Owner**, **The Company** shall require an **HVDC System Owner** or **DC Converter Station Owner** with a **Black Start HVDC System** to carry out a test (a "**Black Start HVDC Test**") on a **HVDC System** or **DC Converter**, in order to demonstrate that a **Black Start HVDC System** has a **Black Start Capability**.

(iii) In the case of an **EU Generator**, **The Company** may also require a **Generator** with a **Black Start Station** to carry out a test (a **Quick Resynchronisation Unit Test**) in order to demonstrate that a **Black Start Station** has a **Quick Re-Synchronisation Capability**.

(b) Where **The Company** requires a **Black Start Service Provider** to undertake testing, the following requirements shall apply -

(i) Where **The Company** requires a **Generator** with a **Black Start Station** to carry out a **Black Start Unit Test** on each **Genset** which has **Black Start Capability** within such a **Black Start Station**, the **Generator** shall execute such a test at least once every three years. **The Company** shall not require the **Black Start Test Unit** to be carried out on more than one **Genset** at that **Black Start Station** at the same time and would not, in the absence of exceptional circumstances, expect any of the other **Gensets** at the **Black Start Station** to be directly affected by the **Black Start Unit Test**.

(ii) **The Company** may occasionally require the **Generator** to carry out a **Black Start Station Test** at any time (but will not require a **Black Start Station Test** to be carried out more than once in every three calendar years in respect of any particular **Genset** unless it can justify on reasonable grounds the necessity for further tests or unless the further test is a re-test). If successful, this **Black Start Station Test** shall count as a successful **Black Start Unit Test** for the **Genset** used in the test.

(iii) **The Company** may require the **HVDC System Owner** or **DC Converter Station Owner** to carry out a **Black Start HVDC Test** at any time (but will not require such a test to be carried out more than once in every three calendar years unless it can justify on reasonable grounds the necessity for further tests or unless the further test is a re-test).

(iv) The **Company** may occasionally require the **EU Generator** to carry out a **Quick Re-Synchronisation Test** at any time, but will generally only be required where the **EU Generator** has made a change to its **Plant** and **Apparatus** which has an impact on its **Houseload Operation** or after two unsuccessful tripping **Events** in the operational environment.

The above tests will be deemed a success where starting from **Shutdown** is achieved within a time frame specified by **The Company** and which may be agreed in the **Black Start Contract**.

(c) **The Company** may require a **Generator** to carry out a **Black Start Unit Test** at any time (but will not require a **Black Start Unit Test** to be carried out more than once in each calendar year in respect of any particular **Genset** unless it can justify on reasonable grounds the necessity for further tests or unless the further test is a re-test).

(d) When **The Company** wishes a **Black Start Service Provider** to carry out a **Black Start Test**, it shall notify the relevant **Black Start Service Provider** at least 7 days prior to the time of the **Black Start Test** with details of the proposed **Black Start Test**.

~~OC5.7.1 General~~

~~(a) **The Company** may require a **Generator** with a **Black Start Station** to carry out a test (a "**Black Start Test**") on a **Genset** in a **Black Start Station** either while the **Black Start Station** remains connected to an external alternating current electrical supply (a "**BS Unit Test**") or while the **Black Start Station** is disconnected from all external alternating current electrical supplies (a "**BS Station Test**"), in order to demonstrate that a **Black Start Station** has a **Black Start Capability**.~~

……

OC5.7.4 Quick Re-synchronisation Test

(a) The relevant **Generating Unit** shall be **Synchronised** and **Loaded**;

(b) All the **Auxiliary Gas Turbines** and/or **Auxiliary Diesel Engines** in the **Black Start Station** in which that **Generating Unit** is situated, shall be **Shutdown**.

(c) The **Generating Unit** shall tripped to house load.

(d) The relevant **Generating Unit** shall be **Synchronised** to the **System** but not **Loaded**, unless the appropriate instruction has been given by **The Company** under **BC2** which would also be in accordance with the requirements of the **Black Start Contract**.

In respect of **EU Generators**, the above tests defined in OC5.7.2.3(a) – (e) shall be in accordance with the requirements of ECC.6.3.5.6.

.....

Extracts from OC6

.....

OC6.6.2 (d) Each **Network Operator** will notify **The Company** in writing by calendar week 24 each year of the details of the automatic low **Frequency Disconnection** on its **User System**. The information provided should identify, for each **Grid Supply Point** at the date and time of the annual peak of the **National Electricity Transmission System Demand** at **Annual ACS Conditions** (as notified pursuant to OC1.4.2), the frequency settings at which **Demand Disconnection** will be initiated and the amount of **Demand** disconnected at each such setting.

……..

OC6.6.6 (a) **Non-Embedded Customers**, ~~and~~ **Generators** in respect of **Electricity Storage Modules**[J(A2] and **Pumped Storage Generators**, must provide automatic low **Frequency** disconnection, which will be split into discrete blocks.

(b) The number and size of blocks and the associated low **Frequency** settings will be as specified by **The Company** by week 24 each calendar year following discussion with the **Non-Embedded Customers**, **Pumped Storage Generators** and **Generators** in respect of **Electricity Storage Modules** in accordance with the relevant **Bilateral Agreement**.

……..

Extracts from OC9

……..

OC.9.2. OBJECTIVE

The overall objectives of OC9 are:…….

OC9.2.5 To identify and address as far as possible the events and processes necessary to enable the restoration of the **Total System**, 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:

(i) Selectively implement **Local Joint Restoration Plans**

(ii) Expand **Power Islands** to supply **Power Stations**

(iii) Expand and merge **Power Islands** leading to **Total System** energisation

(iv) Selectively reconnect **Demand**

(v) Facilitate and co-ordinate returning the **Total System** back to normal operation

(vi) Resumption of the **Balancing Mechanism** if suspended in accordance with the provisions of the **BSC**.

GC0127/GC0128 WORKGROUP ALTERNATIVE 1

All of the legal text would be new additions to the Grid Code. This legal text would be in addition to the Original proposal legal text.

Extract from Glossary and Definitions

……..

Closed Distribution System	As defined as a **Closed Distribution System** in **European Regulation (EU) 2016/1388**.
Defence Service Provider	As defined as a **Defence Service Provider** in **European Regulation (EU) 2017/2196**.
European Regulation (EU) 2017/2196	**Commission Regulation (EU) 2017/2196** of 24 November 2017 establishing a network code on electricity emergency and restoration.
GB Emergency and Restoration Code (GERC)	That portion of the Grid Code which is identified as the **GB Emergency Restoration Code** being applicable to **GB Emergency Restoration Code Providers**.
GB Emergency Restoration Code Provider	A party who is not a **CUSC Party** as defined in GERC.3.2 of the **GB Emergency and Restoration Code (GERC)**.
Restoration Service Provider	As defined as a **Restoration Service Provider** in **European Regulation (EU) 2017/2196**.
Significant Grid User (SGU)	As defined as an SGU in Article 2 of **European Regulation (EU) 2017/2196**.
System Defence Plan	A document prepared by **The Company** and approved by **The Authority**, as published on its **Website**, outlining how the requirements of the "defence plan" (as provided for in **European Regulation (EU) 2017/2196**) has be implemented within the **GB Synchronous Area**.
System Restoration Plan	A document prepared by **The Company** and approved by **The Authority**, as published on its **Website**, outlining how the requirements of the "restoration plan" (as defined in **European Regulation (EU) 2017/2196**) has be implemented within the **GB Synchronous Area**.

GB EMERGENCY AND RESTORATION CODE
(GERC)

CONTENTS

(This contents page does not form part of the Grid Code)

GERC.1 INTRODUCTION

GERC.1.1 The **GB Emergency and Restoration Code** (**GERC**) is concerned with **GB Emergency and Restoration Code Providers**.

GERC.2 OBJECTIVE

The objectives of the **GERC** are to

GERC.2.1 Ensure the obligations of **European Regulation (EU) 2017/2196** have been discharged; and;

GERC.2.2 Define the minimum requirements **GB Emergency and Restoration Code Providers** are required to satisfy.

GERC.3 SCOPE

GERC.3.1 The **GERC** applies to **GB Emergency and Restoration Code Providers**.

GERC.3.2 A **GB Emergency and Restoration Code Provider** is defined as any one of the following parties who is not a **CUSC Party**:-

(i) Existing and new **Type C** and **Type D Power Generating Modules** as defined in accordance with the criteria set out in Article 5 of **European Regulation (EU) 2016/631**.

(ii) Existing and new **Type B Power Generating Modules** classified as defined in accordance with the criteria set out in Article 5 of **European Regulation (EU) 2016/631**, where they are identified as SGU's in accordance with Article 11(4) of **European Regulation (EU) 2017/2196**.

(iii) Providers of redispatching of **Power Generating Modules** or of a **Demand Facility** by means of aggregation and providers of **Active Power** reserve in accordance with Title 8 of **European Regulation (EU) 2017/1485**.

(iv) 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 **European Regulation (EU) 2016/1447**.

(v) Existing and new **Type A Power Generating Modules** as defined in accordance with the criteria set out in Article 5 of **European Regulation (EU) 2016/631**, to existing and new **Type B Power Generating Modules** other than those referred to in paragraph 2(b) of **European Regulation (EU) 2017/2196**, as well as to existing and new **Demand Facility's**, closed distribution systems and third parties providing demand response where they qualify as **Defence Service Providers** pursuant to Article 4(4) of **European Regulation (EU) 2017/2196**.

(vi) **Type A** and **Type B Power Generating Modules** defined in GERC3.2(viii), **Demand Facility's** and **Closed Distribution Systems** providing a **Demand Response Service** may fulfil the requirements of **European Regulation (EU) 2017/2196** either directly or indirectly through a third party under the terms and conditions set out in accordance with Article 4(4) of **European Regulation (EU) 2017/2196**.

(vii) Energy storage units of an **SGU**, a **Defence Service Provider** or **Restoration Service Provider** which can be used to balance the **System**, provided that they are identified as such in the **System Defence Plan**, **System Restoration Plan** or relevant service contract (including an **Ancillary Services** agreement, if applicable).

GERC.3.2 For the avoidance of doubt the requirements of the **GB Emergency and Restoration Code** do not apply to **CUSC Parties** as they already satisfy the requirements of **European Regulation (EU) 2017/2196** by virtue of their obligation to satisfy the other sections of the **Grid Code**.

GERC.4 REQUIREMENTS

GERC.4.1 All **GB Emergency and Restoration Code Providers** are required to satisfy the relevant requirements of **European Regulation (EU) 2017/2196**.

GERC.4.2 In the case of (GB) **Defence Service Providers** this includes what is set out in the (GB) **System Defence Plan** and the terms and conditions to act as a **Defence Service Provider** proposed by **The Company** and approved by **The Authority**, from time to time, which shall define at least:

(a) the characteristics of the service to be provided and

(b) the possibility of and conditions for aggregation.

GERC.4.3 In the case of (GB) **Restoration Service Providers** this includes what is set out in the (GB) **System Restoration Plan** and the terms and conditions to act as a **Restoration Service Provider** proposed by **The Company** and approved by **The Authority,** from time to time, which shall define at least:

(a) the characteristics of the service to be provided;

(b) the possibility of and conditions for aggregation and

(c) the target geographical distribution of power sources with black start and island operation capabilities.

GC0127/GC0128 WORKGROUP ALTERNATIVE 2

Please note all red text red indicates new additions/amendments as part of the legal text to facilitate WAGCM2. This WAGCM includes the amendments below plus the Original Proposal legal text.

Extract from Glossary and Definitions – New definitions

……

Interim Demand Loading Point	The loading point in MW of an **Electricity Storage Module** between zero and **Maximum Capacity** (import)**.**
Limited Frequency Sensitive Mode – Underfrequency (**LFSM-U**)	An operating mode which is either **Limited Frequency Sensitive Mode – Underfrequency Exporting** (**LFSM-UE**)**;** or **Limited Frequency Sensitive Mode – Underfrequency Importing** (**LFSM-UI**)
Limited Frequency Sensitive Mode – Underfrequency Exporting (**LFSM-UE**)	A **Power Generating Module** (including a **DC Connected Power Park Module**) or **HVDC System** operating in a mode which is exporting energy to the **Total System** which increases its **Active Power** output in response to a fall in **System Frequency** below a certain value.
Limited Frequency Sensitive Mode – Underfrequency Importing (**LFSM-UI**)	An **Electricity Storage Module** operating mode which is importing energy from the **Total System** which decreases **Active Power** import in response to a change in **System Frequency** below a certain value.

Extract from Planning Code – New reference

……

PC.A.5.5.4 Each **Electricity Storage Module Owner** shall provide **Frequency** response curves demonstrating the ability of their **Electricity Storage Modules** to transition from a mode analogous to **Demand** to a mode analogous to generation within 20 seconds in accordance with the requirements of ECC.6.3.7.2.2.

Extract from the CC's

……

CC.3 SCOPE

CC.3.1 The **CC** applies to **The Company** and to **GB Code Users**, which in the **CC** means:

(a) **GB Generators** (other than those which only have **Embedded Small Power Stations**), including those undertaking **OTSDUW**;

(b) **Network Operators**;

(c) **Non-Embedded Customers**;

(d) **DC Converter Station** owners; (e) **BM Participants** and **Externally Interconnected System Operators** in respect of CC.6.5 only; and

(f) **GB Generators** who own and operate **Electricity Storage Modules** for whom only the requirements of CC.6.3.7(g) apply.

.....

CC.6.3.7(g) Limited Frequency Sensitive Mode – Underfrequency importing (LFSM-UI)

(i) **Limited Frequency Sensitive Mode - Underfrequency Importing** (**LFSM - UI**) only applies to **Electricity Storage Modules** which are operating in a mode analogous to **Demand**.

(ii) In the event that the **System Frequency** falls below 49.5Hz, each **Electricity Storage Module**, which is operating in a mode analogous to **Demand**, and which is also capable of reversing operation from an **Interim Demand Loading Point** (including its **Maximum Capacity** (Pmax Import)) to an exporting mode of operation shall be capable of reversing its mode of operation within 20 seconds. The transition from import mode of operation to export mode of operation shall commence linearly and proportionally as soon as practicable and at the very least within at least 500ms from when the **System Frequency** falls below 49.5Hz. During this transition period, the **Electricity Storage Module** is required to remain stable over the entire operating range of the **Electricity Storage Module**.

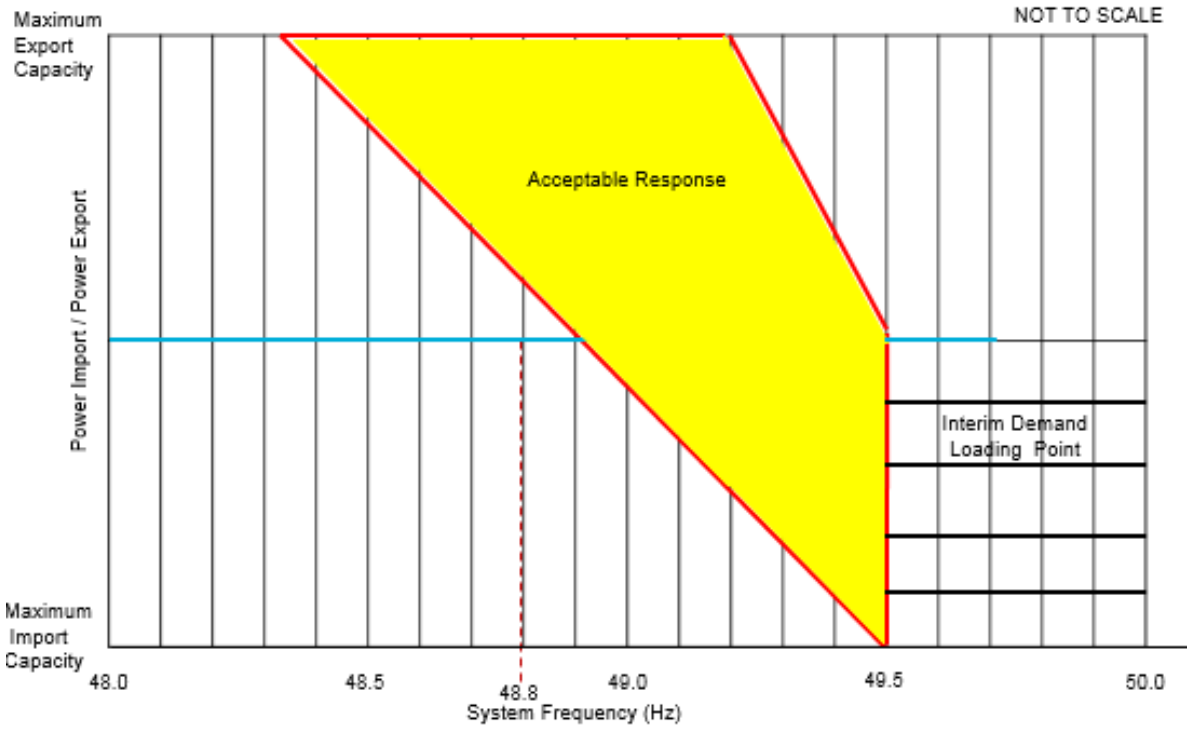

Figure 4a – Required capability of an **Electricity Storage Module** when operating in a mode analogous to **Demand** subject to a **Frequency** deviation of below 49.5Hz.

(iii) Each **Electricity Storage Module** which is capable of meeting the requirements of CC.6.3.7(g), shall also be capable of achieving a frequency response characteristic within the shaded area shown in Figure 4a

(iv) In the event of an **Electricity Storage Module** remaining in a demand mode at or below a **System Frequency** of 48.9Hz or below, each **Electricity Storage Module** shall be expected to trip through the operation of automatic low frequency relays in accordance with the requirements of OC6.6.6.

(v) All **Electricity Storage Modules** which are not capable of reversing their power flow in less than 20 seconds as described in ECC.6.3.7(g)(ii); shall be required to trip when operating in a **Demand** mode and the **System Frequency** is at or below 49.2Hz in accordance with the requirements of OC6.6.6.

(vi) For the avoidance of doubt, the provision of **LFSM - UI** for **Electricity Storage Modules** is not an **Ancillary Service** and would only be required under abnormal **System Frequency** conditions and when the **Electricity Storage Module** is in an operating in a mode analogous to **Demand**.

Extract from ECC's

……

ECC.6.3.7.2 Limited Frequency Sensitive Mode – Underfrequency (LFSM-U)

Limited Frequency Sensitive Mode – Underfrequency (LFSM-U) consists of two operating modes which are **Limited Frequency Sensitive Mode – Underfrequency exporting (LFSM-UE)** whilst they are exporting power into the **Total System**: and **Limited Frequency Sensitive Mode – Underfrequency importing (LFSM-UI)** which applies to **Electricity Storage Modules** whilst they are importing energy from the **Total System**.

ECC.6.3.7.2.1 Limited Frequency Sensitive Mode – Underfrequency exporting (LFSM-UE)

ECC.6.3.7.2.1.1 Each **Type C Power Generating Module** and **Type D Power Generating Module** (including **DC Connected Power Park Modules**) or **HVDC Systems** operating in **Limited Frequency Sensitive Mode** shall be capable of increasing **Active Power** output in response to **System Frequency** when this falls below 49.5Hz. For the avoidance of doubt, the provision of this increase in **Active Power** output is not a mandatory **Ancillary Service** and it is not anticipated **Power Generating Modules** (including **DC Connected Power Park Modules**) or **HVDC Systems** are operated in an inefficient mode to facilitate delivery of **LFSM-UE** response, but any inherent capability (where available) should be made without undue delay. The **Power Generating Module** (including **DC Connected Power Park Modules**) or **HVDC Systems** shall be capable of stable operation during **LFSM-UE** Mode. For example, an **EU Generator** which is operating with no headroom (eg it is operating

at maximum output or is de-loading as part of a run down sequence and has no headroom) would not be required to provide **LFSM-UE**.

ECC.6.3.7.2.1.2

(i) The rate of change of **Active Power** output must be at a minimum a rate of 2 percent of output per 0.1 Hz deviation of **System Frequency** below 49.5Hz (ie a **Droop** of 10%) as shown in Figure ECC.6.3.7.2.1.2 below. This requirement only applies if the **Power Generating Module** has headroom and the ability to increase **Active Power** output. In the case of a **Power Park Module** or **DC Connected Power Park Module** the requirements of Figure ECC.6.3.7.2.1.2 shall be reduced pro-rata to the amount of **Power Park Units** in service and available to generate. For the avoidance of doubt, this would not preclude an **EU Generator** or **HVDC System Owner** from designing their **Power Generating Module** with a lower **Droop** setting, for example between 3 – 5%.

(ii) As much as possible of the proportional increase in **Active Power** output must result from the **Frequency** control device (or speed governor) action and must be achieved for **Frequencies** below 49.5 Hz. The **Power Generating Module** (including **DC Connected Power Park Modules**) or **HVDC Systems** shall be capable of initiating a power **Frequency** response with minimal delay. If the delay exceeds 2 seconds the **EU Generator** or **HVDC System Owner** shall justify the delay, providing technical evidence to **The Company**).

(iii) The actual delivery of **Active Power Frequency Response** in **LFSM-UE** mode shall take into account

The ambient conditions when the response is to be triggered

The operating conditions of the **Power Generating Module** (including **DC Connected Power Park Modules**) or **HVDC Systems** in particular limitations on operation near **Maximum Capacity** or **Maximum HVDC Active Power Transmission Capacity** at low **Frequencies** and the respective impact of ambient conditions as detailed in ECC.6.3.3.

The availability of primary energy sources.

(iv) In **LFSM-UE** Mode, the **Power Generating Module** (including **DC Connected Power Park Modules**) and **HVDC Systems**, shall be capable of providing a power increase up to its **Maximum Capacity** or **Maximum HVDC Active Power Transmission Capacity** (as applicable).

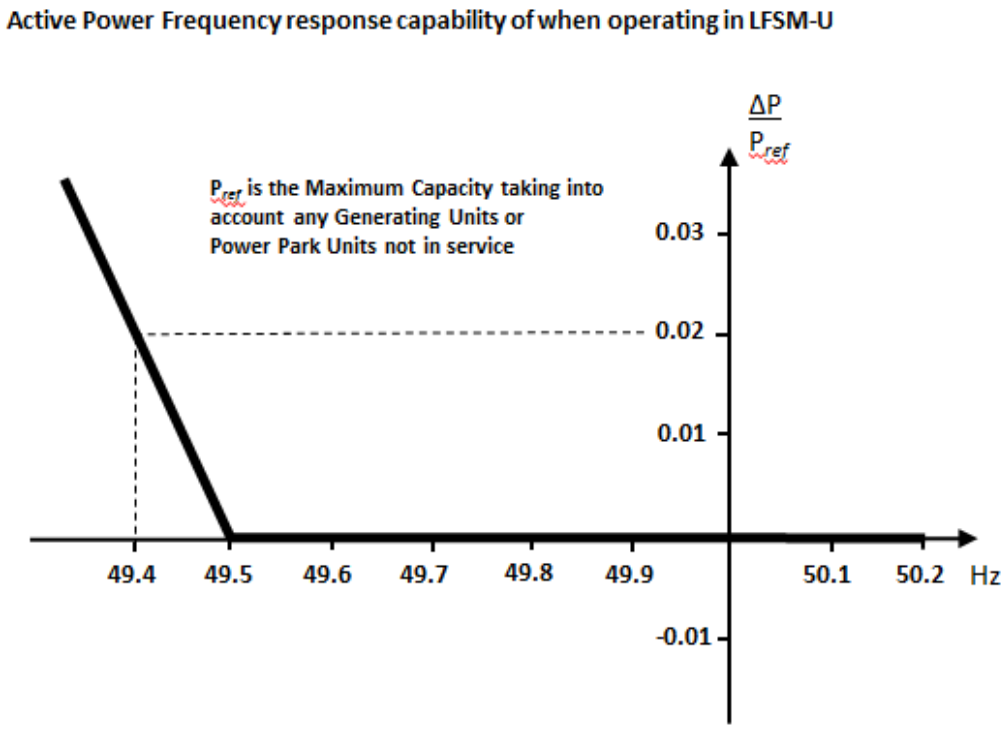

Figure ECC.6.3.7.2.1.2 – Pref is the reference **Active Power** to which ΔP is related and ΔP is the change in **Active Power** output from the **Power Generating Module** (including **DC Connected Power Park Modules**) or **HVDC System**. The **Power Generating Module** (including **DC Connected Power Park Modules** or **HVDC Systems**) has to provide a positive **Active Power** output change with a droop of 10% or less based on Pref.

ECC.6.3.7.2.2 Limited Frequency Sensitive Mode – Underfrequency importing (LFSM-UI)

ECC.6.3.7.2.2.1 **Limited Frequency Sensitive Mode - Underfrequency Importing** (**LFSM - UI**) only applies to **Electricity Storage Modules** which are operating in a mode analogous to **Demand**.

ECC.6.3.7.2.2.2 In the event that the **System Frequency** falls below 49.5Hz, each **Electricity Storage Module**, which is operating in a mode analogous to **Demand** and which is also capable of reversing operation from an **Interim Demand Loading Point** (including its **Maximum Capacity** (Pmax Import)) to an exporting mode of operation shall be capable of reversing its mode of operation within 20 seconds. The transition from import mode of operation to export mode of operation shall commence linearly and proportionally as soon as practicable and at the very least within at least within 500ms from when the **System Frequency** falls below 49.5Hz. During this transition period, the **Electricity Storage Module** is required to remain stable over the entire operating range of the **Electricity Storage Module**.

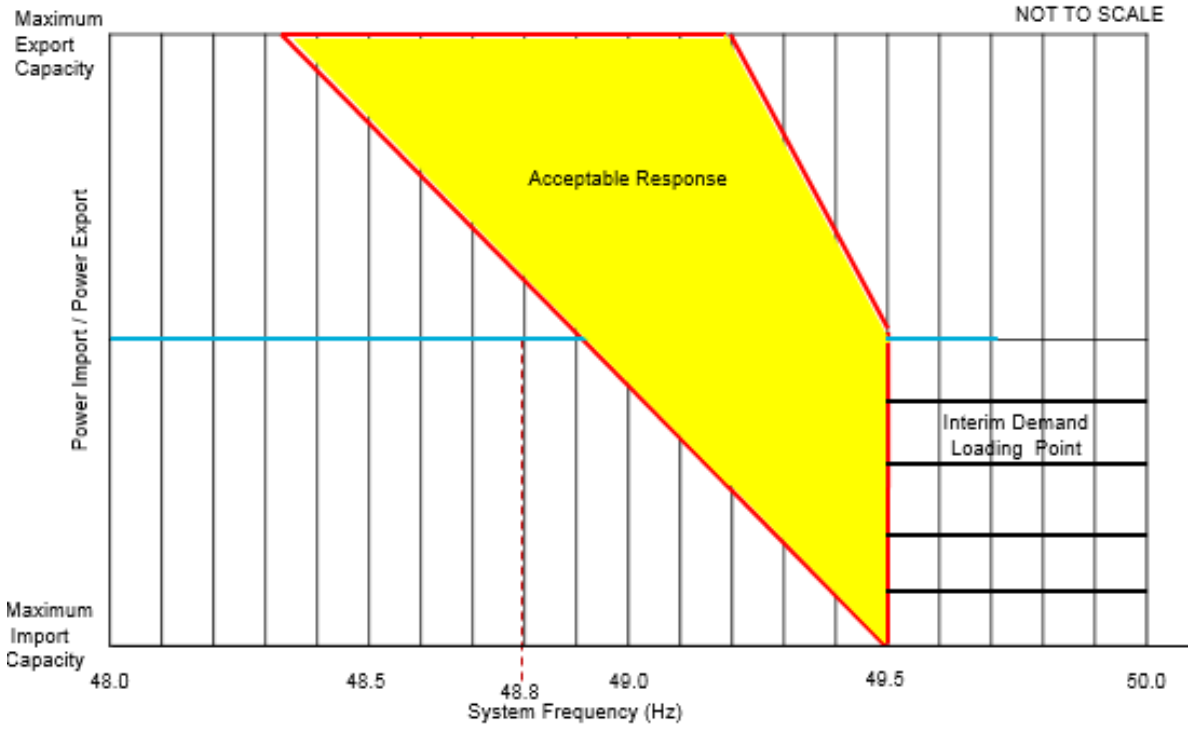

Figure ECC.6.3.7.2.2.2 – Required capability of an **Electricity Storage Module** when operating in a mode analogous to **Demand** subject to a **Frequency** deviation of below 49.5Hz.

ECC.6.3.7.2.2.3 Each **Electricity Storage Module** which is capable of meeting the requirements of ECC.6.3.7.2.2, shall also be capable of achieving a frequency response characteristic within the shaded area shown in Figure ECC.6.3.7.2.2.2.

ECC.6.3.7.2.2.4 In the event of an **Electricity Storage Module** remains in a **Demand** mode at or below a **System Frequency** of 48.9Hz or below, each **Electricity Storage Module** shall be expected to trip through the operation of automatic low frequency relays in accordance with the requirements of OC6.6.6.

ECC.6.3.7.2.2.7 All **Electricity Storage Modules** which are not capable of reversing their power flow in less than 20 seconds as described in ECC.6.3.7.2.2.1 shall be required to trip when operating in a **Demand** mode and the **System Frequency** is at or below 49.2Hz in accordance with the requirements of OC6.6.6.

ECC.6.3.7.2.2.8 For the avoidance of doubt, the provision of **LFSM - UI** for **Electricity Storage Modules** is not an **Ancillary Service** and would only be required under abnormal **System Frequency** conditions and when the **Electricity Storage Module** is in an operating in a mode analogous to **Demand**.

Extracts from Balancing Code 3

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BC3.7.2 Plant In Limited Frequency Sensitive Mode

BC.3.7.2.1 Plant in Limited Frequency Sensitive Mode applicable to GB Code Users

The following requirements are applicable to **GB Code Users** in respect of **Plant** operating in **Limited Frequency Sensitive Mode**. For the avoidance of doubt, these requirements do not apply to **EU Generators** and **HVDC System Owners** for whom the requirements of BC.3.7.2.2 apply.

(a) Each **Synchronised Genset** (or **DC Converter** at a **DC Converter Station**) operating in a **Limited Frequency Sensitive Mode** which is producing **Active Power** is also required to reduce **Active Power** output in response to **System Frequency** when this rises above 50.4 Hz. In the case of **DC Converters** at **DC Converter Stations**, the provisions of BC3.7.7 are also applicable. For the avoidance of doubt, the provision of this reduction in **Active Power** output is not an **Ancillary Service**. Such provision is known as "**Limited High Frequency Response**".

(b) (i) The rate of change of **Active Power** output must be at a minimum rate of 2 per cent of output per 0.1 Hz deviation of **System Frequency** above 50.4 Hz.

(ii) The reduction in **Active Power** output must be continuously and linearly proportional, as far as is practicable, to the excess of **Frequency** above 50.4 Hz and must be provided increasingly with time over the period specified in (iii) below.

(iii) As much as possible of the proportional reduction in **Active Power** output must result from the frequency control device (or speed governor) action and must be achieved within 10 seconds of the time of the **Frequency** increase above 50.4 Hz.

(iv) The residue of the proportional reduction in **Active Power** output which results from automatic action of the **Genset** (or **DC Converter** at a **DC Converter Station**) output control devices other than the frequency control devices (or speed governors) must be achieved within 3 minutes from the time of the Frequency increase above 50.4 Hz.

(v) Any further residue of the proportional reduction which results from non-automatic action initiated by the Generator or DC Converter Station owner shall be initiated within 2 minutes, and achieved within 5 minutes, of the time of the Frequency increase above 50.4 Hz.

(c) Each **GB Code User** in respect of a **Genset** (or **DC Converter** at a **DC Converter Station**) which is providing **Limited High Frequency Response** in accordance with this BC3.7.2 must continue to provide it until the **Frequency** has returned to or below 50.4 Hz or until otherwise instructed by **The Company**.

(d)Each **GB Code User** in respect of an **Electricity Storage Module** is also required to meet the requirements of CC.6.3.7(g)

.....

BC.3.7.2.2 Plant in Limited Frequency Sensitive Mode applicable to EU Code Users

EU Code Users in respect of **Gensets** and **HVDC Systems** are required to operate in **Limited Frequency Sensitive Mode** at all times unless instructed by **The Company** to operate in **Frequency Sensitive Mode**. Where **EU Code Users Gensets** and **HVDC Systems** are required to operate in **Limited Frequency Sensitive Mode** then the requirements of ECC.6.3.7.1 and ECC.6.3.7.2 shall apply. For the avoidance of doubt, the requirements defined in BC.3.7.2.1 do not apply to **New Generators** and **HVDC System Owners**. Each **EU Code User** in respect of an **Electricity Storage Module** is also required to meet the requirements of ECC.6.3.7.2.2.

GC0127/GC0128 WORKGROUP ALTERNATIVE 3

Please note all red text indicates new additions/amendments as part of the legal text to facilitate WAGCM3 (which is a combination of WAGCM1 and WAGCM2). This WAGCM includes the amendments below plus the Original Proposal legal text.

Extract from Glossary and Definitions

……..

Closed Distribution System	As defined as a **Closed Distribution System** in **European Regulation (EU) 2016/1388**.
Defence Service Provider	As defined as a **Defence Service Provider** in **European Regulation (EU) 2017/2196**.
European Regulation (EU) 2017/2196	**Commission Regulation (EU) 2017/2196** of 24 November 2017 establishing a network code on electricity emergency and restoration.
GB Emergency and Restoration Code (GERC)	That portion of the Grid Code which is identified as the **GB Emergency Restoration Code** being applicable to **GB Emergency Restoration Code Providers**.
GB Emergency Restoration Code Provider	A party who is not a **CUSC Party** as defined in GERC.3.2 of the **GB Emergency and Restoration Code (GERC)**.
Interim Demand Loading Point	The loading point in MW of an **Electricity Storage Module** between zero and **Maximum Capacity** (import)**.**
Limited Frequency Sensitive Mode – Underfrequency (LFSM-U)	An operating mode which is either Limited Frequency Sensitive Mode – Underfrequency Exporting (LFSM-UE); or Limited Frequency Sensitive Mode – Underfrequency Importing (LFSM-UI)
Limited Frequency Sensitive Mode – Underfrequency Exporting (LFSM-UE)	A **Power Generating Module** (including a **DC Connected Power Park Module**) or **HVDC System** or operating in a mode which is exporting energy to the **Total System** which increases its **Active Power** output in response to a fall in **System Frequency** below a certain value.
Limited Frequency Sensitive Mode – Underfrequency Importing (LFSM-UI)	An **Electricity Storage Module** operating mode which is importing energy from the **Total System** which decreases **Active Power** import in response to a change in **System Frequency** below a certain value.

Restoration Service Provider	As defined as a **Restoration Service Provider** in **European Regulation (EU) 2017/2196**.
Significant Grid User (SGU)	As defined as an SGU in Article 2 of **European Regulation (EU) 2017/2196**.
System Defence Plan	A document prepared by **The Company** and approved by **The Authority**, as published on its **Website**, outlining how the requirements of the "defence plan" (as provided for in **European Regulation (EU) 2017/2196**) has be implemented within the **GB Synchronous Area**.
System Restoration Plan	A document prepared by **The Company** and approved by **The Authority**, as published on its **Website**, outlining how the requirements of the "restoration plan" (as defined in **European Regulation (EU) 2017/2196**) has be implemented within the **GB Synchronous Area**.

Extract from Planning Code

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PC.A.5.5.4 Each **Electricity Storage Module Owner** and **GB Emergency and Restoration Code Provider** who owns or operates an **Energy Storage Unit** shall provide **Frequency** response curves demonstrating the ability of their **Energy Storage Units** to transition from a mode analogous to **Demand** to a mode analogous to generation within 20 seconds in accordance with the requirements of ECC.6.3.7.2.2.

Extract from the CC's

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CC.3 SCOPE

CC.3.1 The **CC** applies to **The Company** and to **GB Code Users**, which in the **CC** means:

(a) **GB Generators** (other than those which only have **Embedded Small Power Stations**), including those undertaking **OTSDUW**;

(b) **Network Operators**;

(c) **Non-Embedded Customers**;

(d) **DC Converter Station** owners; (e) **BM Participants** and **Externally Interconnected System Operators** in respect of CC.6.5 only; and

(f) **GB Generators** who own and operate **Electricity Storage Modules** for whom only the requirements of CC.6.3.7(g) apply.

.....

CC.6.3.7(g) Limited Frequency Sensitive Mode – Underfrequency importing (LFSM-UI)

(i) **Limited Frequency Sensitive Mode - Underfrequency Importing** (**LFSM - UI**) only applies to **Electricity Storage Modules** which are operating in a mode analogous to **Demand**.

(ii) In the event that the **System Frequency** falls below 49.5Hz, each **Electricity Storage Module**, which is operating in a mode analogous to **Demand**, and which is also capable of reversing operation from an **Interim Demand Loading Point** (including its **Maximum Capacity** (Pmax Import)) to an exporting mode of operation shall be capable of reversing its mode of operation within 20 seconds. The transition from import mode of operation to export mode of operation shall commence linearly and proportionally as soon as practicable and at the very least within at least 500ms from when the **System Frequency** falls below 49.5Hz. During this transition period, the **Electricity Storage Module** is required to remain stable over the entire operating range of the **Electricity Storage Module**.

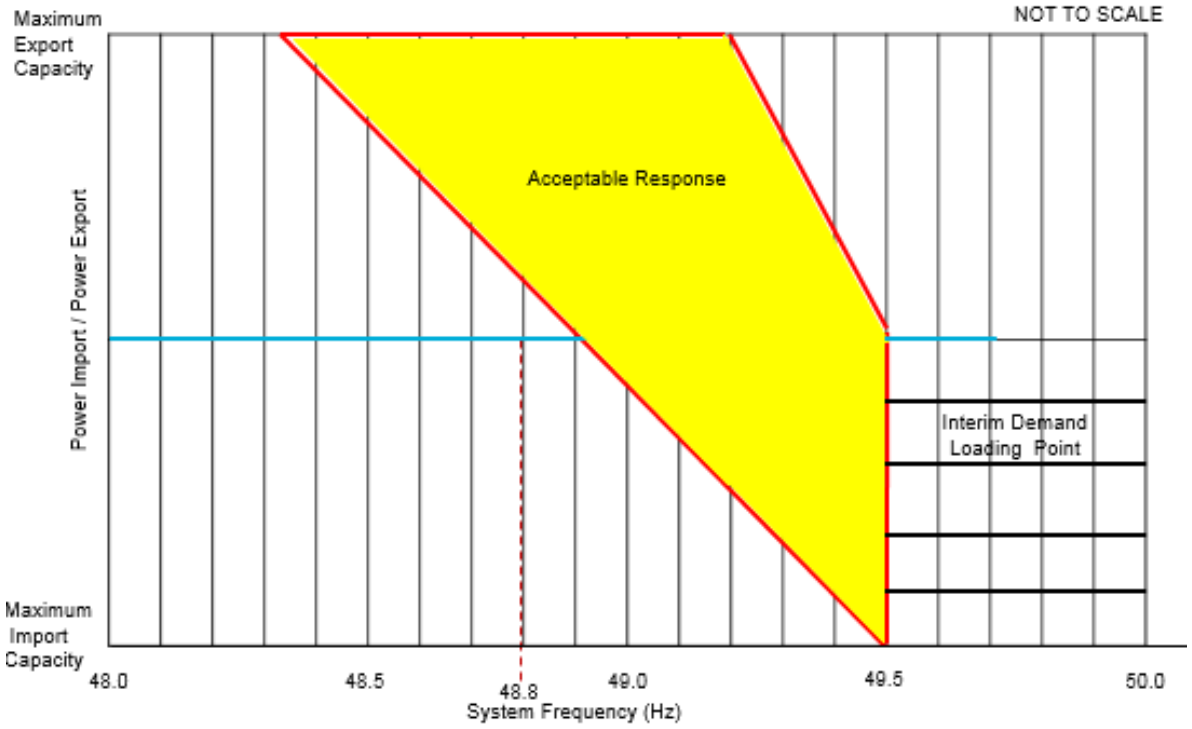

Figure 4a – Required capability of an **Electricity Storage Module** when operating in a mode analogous to **Demand** subject to a **Frequency** deviation of below 49.5Hz.

(iii) Each **Electricity Storage Module** which is capable of meeting the requirements of CC.6.3.7(g), shall also be capable of achieving a frequency response characteristic within the shaded area shown in Figure 4a

(iv) In the event of an **Electricity Storage Module** remaining in a demand mode at or below a **System Frequency** of 48.9Hz or below, each **Electricity Storage Module** shall be expected to trip through the operation of automatic low frequency relays in accordance with the requirements of OC6.6.6.

(v) All **Electricity Storage Modules** which are not capable of reversing their power flow in less than 20 seconds as described in ECC.6.3.7(g)(ii); shall be required to trip when operating in a **Demand** mode and the **System Frequency** is at or below 49.2Hz in accordance with the requirements of OC6.6.6.

(vi) For the avoidance of doubt, the provision of **LFSM - UI** for **Electricity Storage Modules** is not an **Ancillary Service** and would only be required under abnormal **System Frequency** conditions and when the **Electricity Storage Module** is in an operating in a mode analogous to **Demand**.

Extract from ECC's

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ECC.6.3.7.2 Limited Frequency Sensitive Mode – Underfrequency (LFSM-U)

Limited Frequency Sensitive Mode – Underfrequency (LFSM-U) consists of two operating modes which are **Limited Frequency Sensitive Mode – Underfrequency exporting (LFSM-UE)** whilst they are exporting power into the **Total System**: and **Limited Frequency Sensitive Mode – Underfrequency importing (LFSM-UI)** which applies to **Electricity Storage Modules** whilst they are importing energy from the **Total System**.

ECC.6.3.7.2.1 **Limited Frequency Sensitive Mode – Underfrequency Exporting** (LFSM-UE)

ECC.6.3.7.2.1.1 Each **Type C Power Generating Module** and **Type D Power Generating Module** (including **DC Connected Power Park Modules**) or **HVDC Systems** operating in **Limited Frequency Sensitive Mode** shall be capable of increasing **Active Power** output in response to **System Frequency** when this falls below 49.5Hz. For the avoidance of doubt, the provision of this increase in **Active Power** output is not a mandatory **Ancillary Service** and it is not anticipated **Power Generating Modules** (including **DC Connected Power Park Modules**) or **HVDC Systems** are operated in an inefficient mode to facilitate delivery of **LFSM-UE** response, but any inherent capability (where available) should be made without undue delay. The **Power Generating Module** (including **DC Connected Power Park Modules**) or **HVDC Systems** shall be capable of stable operation during **LFSM-UE** Mode. For example, an **EU Generator** which is operating with no headroom (eg it is operating at maximum output or is de-loading as part of a run down sequence and has no headroom) would not be required to provide **LFSM-UE**.

ECC.6.3.7.2.1.2 (i) The rate of change of **Active Power** output must be at a minimum a rate of 2 percent of output per 0.1 Hz deviation of **System Frequency** below 49.5Hz (ie a **Droop** of 10%) as shown in Figure ECC.6.3.7.2.1.2 below. This requirement only

applies if the **Power Generating Module** has headroom and the ability to increase **Active Power** output. In the case of a **Power Park Module** or **DC Connected Power Park Module** the requirements of Figure ECC.6.3.7.2.1.2 shall be reduced pro-rata to the amount of **Power Park Units** in service and available to generate. For the avoidance of doubt, this would not preclude an **EU Generator** or **HVDC System Owner** from designing their **Power Generating Module** with a lower **Droop** setting, for example between 3 – 5%.

(ii) As much as possible of the proportional increase in **Active Power** output must result from the **Frequency** control device (or speed governor) action and must be achieved for **Frequencies** below 49.5 Hz. The **Power Generating Module** (including **DC Connected Power Park Modules**) or **HVDC Systems** shall be capable of initiating a power **Frequency** response with minimal delay. If the delay exceeds 2 seconds the **EU Generator** or **HVDC System Owner** shall justify the delay, providing technical evidence to **The Company**).

(iii) The actual delivery of **Active Power Frequency Response** in **LFSM-UE** mode shall take into account

The ambient conditions when the response is to be triggered

The operating conditions of the **Power Generating Module** (including **DC Connected Power Park Modules**) or **HVDC Systems** in particular limitations on operation near **Maximum Capacity** or **Maximum HVDC Active Power Transmission Capacity** at low **Frequencies** and the respective impact of ambient conditions as detailed in ECC.6.3.3.

The availability of primary energy sources.

(iv) In **LFSM-UE** Mode, the **Power Generating Module** (including **DC Connected Power Park Modules**) and **HVDC Systems**, shall be capable of providing a power increase up to its **Maximum Capacity** or **Maximum HVDC Active Power Transmission Capacity** (as applicable).

Active Power Frequency response capability of when operating in LFSM-U

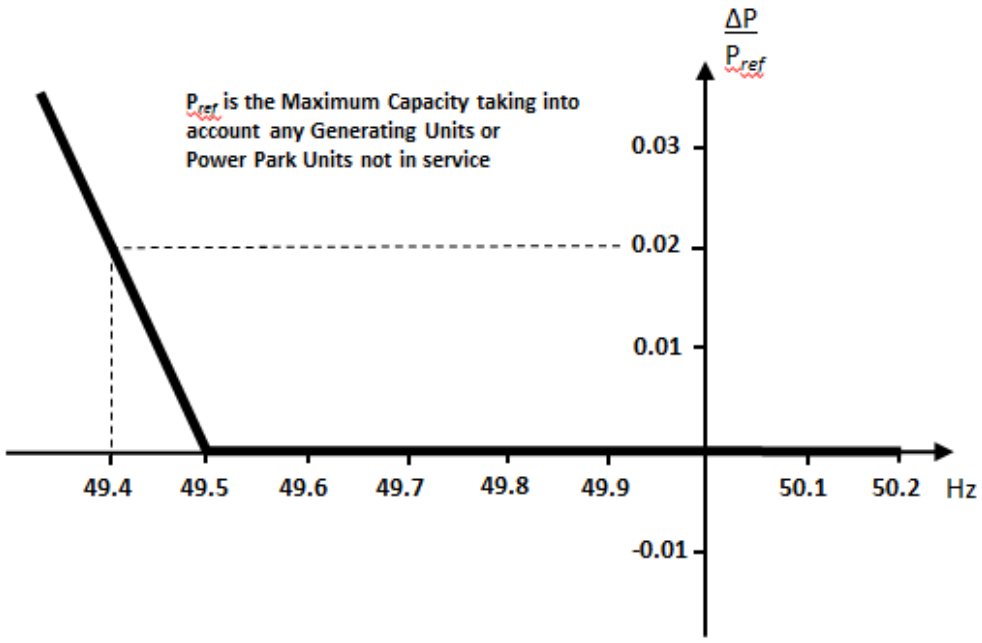

Figure ECC.6.3.7.2.1.2 – Pref is the reference **Active Power** to which ΔP is related and ΔP is the change in **Active Power** output from the **Power Generating Module** (including **DC Connected Power Park Modules**) or **HVDC System**. The **Power Generating Module** (including **DC Connected Power Park Modules** or **HVDC Systems**) has to provide a positive **Active Power** output change with a droop of 10% or less based on Pref.

ECC.6.3.7.2.2 Limited Frequency Sensitive Mode – Underfrequency importing (LFSM-UI)

ECC.6.3.7.2.2.1 **Limited Frequency Sensitive Mode - Underfrequency Importing** (**LFSM - UI**) only applies to **Electricity Storage Modules** and **GB Emergency and Restoration Code Providers** who own and operate energy storage units which are operating in a mode analogous to **Demand**.

ECC.6.3.7.2.2.2 In the event that the **System Frequency** falls below 49.5Hz, each **Electricity Storage Module** and energy storage unit (belonging to a **GB Emergency and Restoration Code Provider**), which is operating in a mode analogous to **Demand** and which is also capable of reversing operation from an **Interim Demand Loading Point** (including its **Maximum Capacity** (Pmax Import)) to an exporting mode of operation shall be capable of reversing its mode of operation within 20 seconds. The transition from import mode of operation to export mode of operation shall commence linearly and proportionally as soon as practicable and at the very least within at least within 500ms from when the **System Frequency** falls below 49.5Hz. During this transition period, the **Electricity Storage Module** or energy storage unit (belonging to a **GB Emergency and Restoration Code Provider)** is required to remain stable over the entire operating range of the **Electricity Storage Module** or energy storage unit.

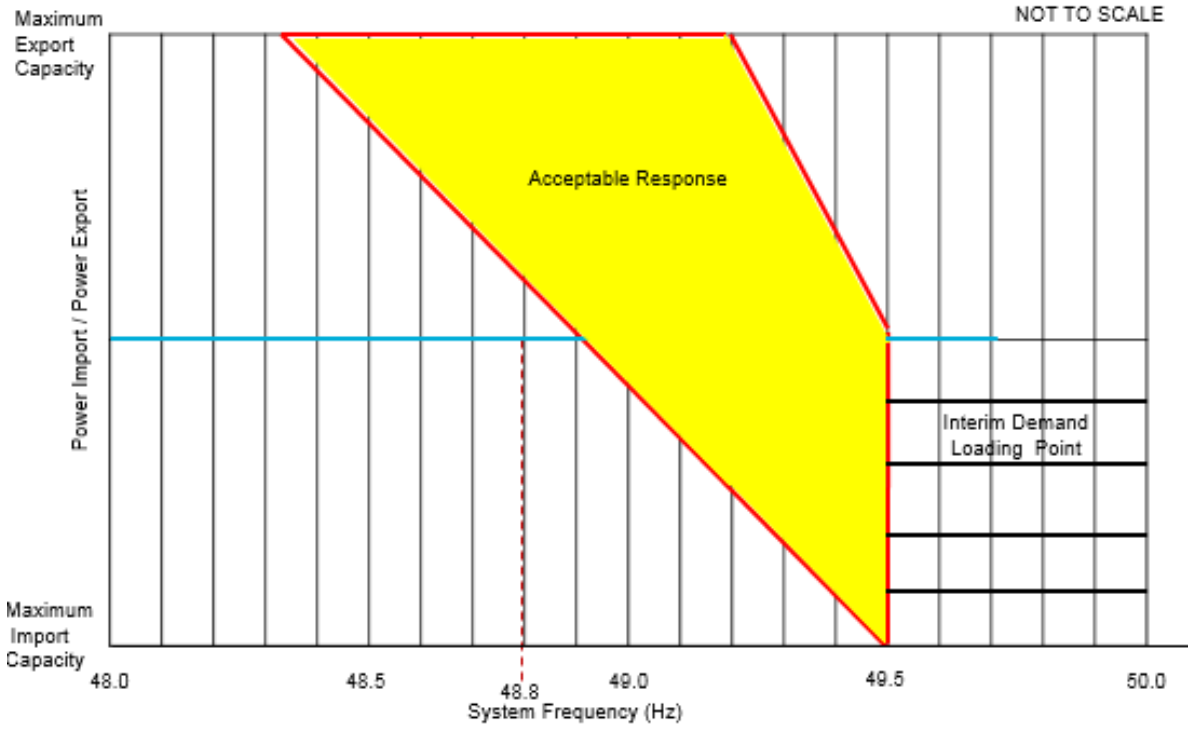

Figure ECC.6.3.7.2.2.2 – Required capability of an **Electricity Storage Module** and/or energy storage unit belonging to a **GB Emergency and Restoration Code Provider** when operating in a mode analogous to **Demand** subject to a **Frequency** deviation of below 49.5Hz.

ECC.6.3.7.2.2.3 Each **Electricity Storage Module** and/or energy storage unit belonging to a **GB Emergency and Restoration Code Provider** which is capable of meeting the requirements of ECC.6.3.7.2.2, shall also be capable of achieving a frequency response characteristic within the shaded area shown in Figure ECC.6.3.7.2.2.2.

ECC.6.3.7.2.2.4 In the event of an **Electricity Storage Module** or energy storage unit belonging to a **GB Emergency and Restoration Code Provider** remains in a **Demand** mode at or below a **System Frequency** of 48.9Hz or below, each **Electricity Storage Module** or energy storage unit belonging to a **GB Emergency and Restoration Code Provide**r shall be expected to trip through the operation of automatic low frequency relays in accordance with the requirements of OC6.6.6.

ECC.6.3.7.2.2.7 All **Electricity Storage Modules** or energy storage units belonging to a GB **Emergency and Restoration Code Provider** which are not capable of reversing their power flow in less than 20 seconds as described in ECC.6.3.7.2.2.1 shall be required to trip when operating in a **Demand** mode and the **System Frequency** is at or below 49.2Hz in accordance with the requirements of OC6.6.6.

ECC.6.3.7.2.2.8 For the avoidance of doubt, the provision of **LFSM - UI** for **Electricity Storage Modules** or energy storage units owned by a **GB Emergency and Restoration Code Provider** is not an **Ancillary Service** and would only be required under abnormal **System Frequency** conditions and when the **Electricity Storage Module** or energy storage unit owned by a **GB Emergency and Restoration Code Provider** is operating in a mode analogous to **Demand**.

Extracts from Balancing Code 3

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BC3.7.2 Plant In Limited Frequency Sensitive Mode

BC.3.7.2.1 Plant in Limited Frequency Sensitive Mode applicable to GB Code Users

The following requirements are applicable to **GB Code Users** in respect of **Plant** operating in **Limited Frequency Sensitive Mode**. For the avoidance of doubt, these requirements do not apply to **EU Generators** and **HVDC System Owners** for whom the requirements of BC.3.7.2.2 apply.

(a) Each **Synchronised Genset** (or **DC Converter** at a **DC Converter Station**) operating in a **Limited Frequency Sensitive Mode** which is producing **Active Power** is also required to reduce **Active Power** output in response to **System Frequency** when this rises above 50.4 Hz. In the case of **DC Converters** at **DC Converter Stations**, the provisions of BC3.7.7 are also applicable. For the avoidance of doubt, the provision of this reduction in **Active Power** output is not an **Ancillary Service**. Such provision is known as "**Limited High Frequency Response**".

(b) (i) The rate of change of **Active Power** output must be at a minimum rate of 2 per cent of output per 0.1 Hz deviation of **System Frequency** above 50.4 Hz.

(ii) The reduction in **Active Power** output must be continuously and linearly proportional, as far as is practicable, to the excess of **Frequency** above 50.4 Hz and must be provided increasingly with time over the period specified in (iii) below.

(iii) As much as possible of the proportional reduction in **Active Power** output must result from the frequency control device (or speed governor) action and must be achieved within 10 seconds of the time of the **Frequency** increase above 50.4 Hz.

(iv) The residue of the proportional reduction in **Active Power** output which results from automatic action of the **Genset** (or **DC Converter** at a **DC Converter Station**) output

control devices other than the frequency control devices (or speed governors) must be achieved within 3 minutes from the time of the Frequency increase above 50.4 Hz.

(v) Any further residue of the proportional reduction which results from non-automatic action initiated by the Generator or DC Converter Station owner shall be initiated within 2 minutes, and achieved within 5 minutes, of the time of the Frequency increase above 50.4 Hz.

(c) Each **GB Code User** in respect of a **Genset** (or **DC Converter** at a **DC Converter Station**) which is providing **Limited High Frequency Response** in accordance with this BC3.7.2 must continue to provide it until the **Frequency** has returned to or below 50.4 Hz or until otherwise instructed by **The Company**.

(d) Each **GB Code User** in respect of an **Electricity Storage Module** is also required to meet the requirements of CC.6.3.7(g)

……

BC.3.7.2.2 Plant in Limited Frequency Sensitive Mode applicable to EU Code Users

EU Code Users in respect of **Gensets** and **HVDC Systems** are required to operate in **Limited Frequency Sensitive Mode** at all times unless instructed by **The Company** to operate in **Frequency Senstive Mode**. Where **EU Code Users Gensets** and **HVDC Systems** are required to operate in **Limited Frequency Senstive Mode** then the requirements of ECC.6.3.7.1 and ECC.6.3.7.2 shall apply. For the avoidance of doubt, the requirements defined in BC.3.7.2.1 do not apply to **New Generators** and **HVDC System Owners**. Each **EU Code User** in respect of an **Electricity Storage Module** and energy storage unit owned by a **GB Emergency and Restoration Code Provider** is also required to meet the requirements of ECC.6.3.7.2.2.

Extracts from GERC – New section

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GB EMERGENCY AND RESTORATION CODE

(GERC)

CONTENTS

(This contents page does not form part of the Grid Code)

GERC.1 INTRODUCTION

GERC.1.1 The **GB Emergency and Restoration Code** (**GERC**) is concerned with **GB Emergency and Restoration Code Providers**.

GERC.2 OBJECTIVE

The objectives of the **GERC** are to

GERC.2.1 Ensure the obligations of **European Regulation (EU) 2017/2196** have been discharged; and;

GERC.2.2 Define the minimum requirements **GB Emergency and Restoration Code Providers** are required to satisfy.

GERC.3 SCOPE

GERC.3.1 The **GERC** applies to **GB Emergency and Restoration Code Providers**.

GERC.3.2 A **GB Emergency and Restoration Code Provider** is defined as any one of the following parties who is not a **CUSC Party**:-

(i) Existing and new **Type C** and **Type D Power Generating Modules** as defined in accordance with the criteria set out in Article 5 of **European Regulation (EU) 2016/631**.

(ii) Existing and new **Type B Power Generating Modules** classified as defined in accordance with the criteria set out in Article 5 of **European Regulation (EU) 2016/631**, where they are identified as SGU's in accordance with Article 11(4) of **European Regulation (EU) 2017/2196**.

(iii) Providers of redispatching of **Power Generating Modules** or of a **Demand Facility** by means of aggregation and providers of **Active Power** reserve in accordance with Title 8 of **European Regulation (EU) 2017/1485**.

(iv) 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 **European Regulation (EU) 2016/1447**.

(v) Existing and new **Type A Power Generating Modules** as defined in accordance with the criteria set out in Article 5 of **European Regulation (EU) 2016/631**, to existing and new **Type B Power Generating Modules** other than those referred to in paragraph 2(b) of **European Regulation (EU) 2017/2196**, as well as to existing and new **Demand Facility's**, closed distribution systems and third parties providing demand response where they qualify as **Defence Service Providers** pursuant to Article 4(4) of **European Regulation (EU) 2017/2196**.

(vi) **Type A** and **Type B Power Generating Modules** defined in GERC3.2(viii), **Demand Facility's** and **Closed Distribution Systems** providing a **Demand Response Service** may fulfil the requirements of **European Regulation (EU) 2017/2196** either directly or indirectly through a third party under the terms and conditions set out in accordance with Article 4(4) of **European Regulation (EU) 2017/2196**.

(vii) Energy storage units of an **SGU**, a **Defence Service Provider** or **Restoration Service Provider** which can be used to balance the **System**, provided that they are identified as such in the **System Defence Plan**, **System Restoration Plan** or relevant service contract (including an **Ancillary Services** agreement, if applicable).

GERC.3.2 For the avoidance of doubt the requirements of the **GB Emergency and Restoration Code** do not apply to **CUSC Parties** as they already satisfy the requirements of **European Regulation (EU) 2017/2196** by virtue of their obligation to satisfy the other sections of the **Grid Code**.

GERC.4 REQUIREMENTS

GERC.4.1 All **GB Emergency and Restoration Code Providers** are required to satisfy the relevant requirements of **European Regulation (EU) 2017/2196** in addition to the requirements **of** ECC.6.3.7.2.2.as applicable to energy storage units.

GERC.4.2 In the case of (GB) **Defence Service Providers** this includes what is set out in the (GB) **System Defence Plan** and the terms and conditions to act as a **Defence Service Provider** proposed by **The Company** and approved by **The Authority**, from time to time, which shall define at least:

(a) the characteristics of the service to be provided and

(b) the possibility of and conditions for aggregation.

GERC.4.3 In the case of (GB) **Restoration Service Providers** this includes what is set out in the (GB) **System Restoration Plan** and the terms and conditions to act as a **Restoration Service Provider** proposed by **The Company** and approved by **The Authority,** from time to time, which shall define at least:

(a) the characteristics of the service to be provided;

(b) the possibility of and conditions for aggregation and

(c) the target geographical distribution of power sources with black start and island operation capabilities.

Annex 5 – National ESO Legal Interpretation of European Emergency and Restoration Code

This is National Grid ESO's Legal interpretation of the approach that ESO have taken implementing the E&R NC.

Network Code on Emergency and Restoration ("NCER")

1. Question for consideration

Does Commission Regulation 2017/2196 establishing a network code on electricity emergency and restoration (**NCER**) (which will be implemented in GB through Grid Code modifications GC0127 and GC0128) permit the exclusion of certain parties (e.g. small generators) from the obligations within this Regulation?

2. Intent of the NCER

As per Article 1, the purpose behind NCER is to ensure Member States have systems and processes in place to safeguard operational security, prevent the propagation or deterioration of an incident to avoid a widespread disturbance and a blackout state and to ensure for the efficient and rapid restoration of the electricity system following an emergency or blackout state.

Throughout the NCER there are also references to the need to ensure that requirements are the most economic and efficient to achieve the intended purpose. In particular, the requirement for Member States to focus on highest overall efficiency and lowest total costs for all parties involved when applying NCER[1] and for included measures to have a minimal impact and be economically efficient[2].

3. The proposed approach

The approach proposed in the System Defence and System Restoration Plans (**Plans**) (and complemented through Grid Code modifications GC0127 and GC0128) to capture parties who have to satisfy Grid Code requirements only (essentially CUSC parties) does appear to reflect the spirit of NCER. In particular:

- Given the costs and timescales we believe would be incurred for smaller parties, it would appear disproportionate to ask them to i) modify their plants or ii) comply with the GB Grid Code process (and the additional requirements this entails) in order to comply with the NCER when it is not clear that this size of plant is essential to preventing a widespread disturbance or blackout or vital to enabling quick restoration in such circumstances. It is also noted that in the longer term the Grid Code modification GC0117 (which seeks to improve transparency and consistency of access arrangements across GB by the creation of a pan-GB commonality of Power Generating Module requirements) could achieve the same objective, and therefore might be a better approach to achieving this objective whilst enabling the NCER to be implemented within GB in a timely manner.

- Focusing the application of NCER to only CUSC parties, i.e. those with contracts with National Grid Electricity System Operator Limited (**NGESO**), ensures there is a direct contractual link to these parties and the means by which to enact the Plans – via contractual instruction. Extending the application of NCER beyond this would require currently non-contracted parties

[1] Article 4(1)(c)
[2] Article 11(6)

to enter into contracts with NGESO, which would be a substantial administrative and time consuming process for all involved.

In our view, provided the proposed approach captures the policy intent behind the NCER, there is an element of flexibility given to Member States regarding their interpretation and implementation of NCER. We believe that the current proposal does reflect the NCER policy intent and is the most economic and efficient solution. A similar approach to interpretation was taken on the code mods for implementation of the System Operator Guideline (Regulation (EU) 2017/1485) through Grid Code Modification GC0106.

We would note that the current interpretation proposed appears sound based on how the network is currently run and the type of generation on the system. As the system develops and evolves, and if the Regulation continues to be applicable, we would recommend a regular review to ensure that the requirements in the Plans and Grid Code continue to reflect the ability to prevent black outs and ensure a quick restoration time. We are aware that Grid Code modification GC0117 already has an established workgroup (following the issues of GC0106) and could be a more efficient way of introducing these arrangements to a wider audience on the basis that the lower thresholds proposed are taken forward.

4. Risk of challenge

We understand that one of the main concerns with the proposed approach is the risk of judicial review challenge, as we have seen in the capacity market. We believe this risk is low as we consider we are working to the intent of NCER, ensuring avoidance of black outs and quick restoration times in the most economic and efficient way. Should we not proceed with the current proposal, the greater risk may be the smaller plant owners challenging the decision to require them to makes these changes at significant cost and minimal benefit to GB and European system more generally.

5. Disclaimer

6. Confidentiality

Annex 6 – Workgroup Member's comments on National Grid ESO's Legal Interpretation of European Emergency and Restoration Code

This is a Workgroup Member's response to National Grid ESO's Legal interpretation of the approach that National Grid ESO have taken implementing the E&R NC.

Network Code on Emergency and Restoration ("NCER")

1. Question for consideration

Does Commission Regulation 2017/2196 establishing a network code on electricity emergency and restoration (NCER) (which will be implemented in GB through Grid Code modifications GC0127 and GC0128) permit the exclusion [it is not just a question of whether ERNC permits such an exclusion, but that if permitted then has that exclusion been justified in terms of (i) non-discrimination in terms of those (CUSC) parties that are not excluded and (ii) that such an exclusion will or will not be detrimental in dealing with a system emergency or system restoration. In terms of (i) I don't think the case for discriminatory treatment of CUSC parties has been made. In terms of (ii) based on the evidence in the Interim Report on the 9th August as regards both the ~500MW of embedded generation and the 472MW (from a total of 1,824MW) of storage I have my doubt that we can say that excluding these plant from the SDP (or SRP) would not be detrimental in terms of dealing with a similar system defence situation – on the contrary, the Interim Report points to the increasing need to involve both embedded generation and storage in the SDP arrangements.] of certain parties (e.g. small generators) from the obligations within this Regulation?

2. Intent of the NCER

As per Article 1, [it is of particular relevance to take into account the recitals when considering the purpose of the Regulation (and not just limit ourselves to Article 1 alone) and I'd highlight in that regard recitals 6 and 7] the purpose behind NCER is to ensure Member States [and more specifically the TSO – NGESO] have systems and processes in place to safeguard operational security, prevent the propagation or deterioration of an incident to avoid a widespread disturbance and a blackout state and to ensure for the efficient and rapid restoration of the electricity system following an emergency or blackout state.

Throughout the NCER there are also references to the need to ensure that requirements are the most economic and efficient to achieve the intended purpose. In particular, the requirement for Member States to focus on highest overall efficiency and lowest total costs for all parties involved when applying NCER1 and for included measures to have a minimal impact and be economically efficient2.

3. The proposed approach

The approach proposed in the System Defence and System Restoration Plans (Plans) (and complemented through Grid Code modifications GC0127 and GC0128) to capture parties who have

to satisfy Grid Code requirements only (essentially CUSC parties) does appear to reflect the spirit of NCER. In particular:

• Given the costs and timescales we believe would be incurred for smaller parties, it would appear disproportionate to ask them to i) modify their plants [is it clear that plant modification, as compared to how it is operate, is required in order to comply with ERNC?] or ii) comply with the GB Grid Code process (and the additional requirements this entails) in order to comply with the NCER when it is not clear that this size of plant is essential to preventing a widespread disturbance [the 9th August event suggests otherwise in terms of the actions of ~500MW of embedded generation] or blackout or vital to enabling quick restoration [the 9th August event suggests otherwise in terms of the actions of embedded generation and storage] in such circumstances. It is also noted that in the longer term the Grid Code modification GC0117 (which seeks to improve transparency and consistency of access arrangements across GB by the creation of a pan-GB commonality of Power Generating Module requirements) could achieve the same objective, and therefore might be a better approach to achieving this objective whilst enabling the NCER to be implemented within GB in a timely manner.

• Focusing the application of NCER to only CUSC parties, i.e. those with contracts with National Grid Electricity System Operator Limited (NGESO), ensures there is a direct contractual link to these parties and the means by which to enact the Plans – via contractual instruction [but ERNC, with its requirement for terms and conditions for System Defence Providers and System Restoration Providers, specifically envisages that such contracts will be put in place for all System Defence Providers (and SR providers) so it is irrelevant, for the purposes of ERNC compliance, to say that there is currently no such contractual arrangement in place with the non CUSC parties]. Extending the application of NCER beyond this would require currently non-contracted parties to enter into contracts with NGESO [but this is specifically catered for in ERNC via requirement for NGESO to have terms and conditions, which have been approved by the NRA (Ofgem)], which would be a substantial administrative and time consuming process for all involved.

In our view, provided the proposed approach captures the policy intent behind the NCER [which is that SGUs, including Type B plant and aggregators as per Article 2 scope, provide their capabilities in terms of system defence or restoration to the TSO and are utilised by the TSO….otherwise why were they included within the scope of the ERNC if not to be utilised?], there is an element of flexibility given to Member States [but not the TSO] regarding their interpretation and implementation of NCER. We believe that the current proposal does reflect the NCER policy intent and is the most economic and efficient solution. A similar approach to interpretation was taken on the code mods for implementation of the System Operator Guideline (Regulation (EU) 2017/1485) through Grid Code Modification GC0106.

We would note that the current interpretation proposed appears sound based on how the network is currently run and the type of generation on the system. As the system develops and evolves, and if [it is not an 'if' situation – ERNC is incorporated into UK law as per the Withdrawal Act] the Regulation continues to be applicable, we would recommend a regular review to ensure that the requirements in the Plans and Grid Code continue to reflect the ability to prevent black outs and

ensure a quick restoration time. We are aware that Grid Code modification GC0117 already has an established workgroup (following the issues of GC0106) and could be a more efficient way of introducing these arrangements to a wider audience on the basis that the lower thresholds proposed are taken forward.

4. Risk of challenge

We understand that one of the main concerns with the proposed approach is the risk of judicial review challenge, as we have seen in the capacity market. We believe this risk is low as we consider we are working to the intent of NCER, ensuring avoidance of black outs and quick restoration times in the most economic and efficient way. Should we not proceed with the current proposal, the greater risk may be the smaller plant owners challenging the decision to require them to makes these changes at significant cost [with associated contractual arrangements] and minimal benefit [in light of the 9th August event it is difficult to accept, at this stage, that it would of 'minimal benefit' given the consumer impacts that arose from that incident] to GB and European system more generally.

5. Disclaimer

6. Confidentiality

Annex 7 – Letter from GCRP to Authority on legal text alternatives and Authority response

National Grid ESO
Faraday House, Gallows Hill
Warwick, CV34 6DA

nationalgridESO

Trisha McAuley OBE
Independent Chair
CUSC & Grid Code Panel

Leonardo Costa
Ofgem
By email

12 September 2019

GC0127/GC0128: EU Code Emergency & Restoration: Requirements resulting from System Defence and Restoration Plans

Workgroup Alternative Grid Code Modifications (WAGCM1, WAGCM2 and WAGCM3)

Dear Leonardo,

The Grid Code Review Panel are writing to consult with you under the following Governance Rule (GR21.5) ahead of issuing GC0127/GC0128 to Code Administrator Consultation following the Workgroup Report being presented to the Grid Code Review Special Panel meeting on 10 September 2019:

GR.21.5 *Where the Grid Code Review Panel is of the view that the proposed text to amend the Grid Code for a Grid Code Modification Proposal or Workgroup Alternative Grid Code Modification(s) is not needed in the Grid Code Modification Report, the Grid Code Review Panel shall consult (giving its reasons as to why it is of this view) with the Authority as to whether the Authority would like the Grid Code Modification Report to include the proposed text to amend the Grid Code. If it does not, no text needs to be included. If it does, and no detailed text has yet been prepared, the Code Administrator shall prepare such text to modify the Grid Code in order to give effect to such Grid Code Modification Proposal or Workgroup Alternative Grid Code Modification(s) and shall seek the conclusions of the relevant Workgroup before consulting those identified in GR.21.2.*

The Grid Code Review Special Panel on 10 September 2019 were specifically asked to agree for this Modification to proceed to Code Administrator Consultation without the legal text for WAGCM1, WAGCM2 and WAGCM3[1] being included. A summary of the discussion that ensued is set out below:

- Some panel members expressed a view that inclusion of legal text will provide greater clarity for industry when responding to the Code Administrator Consultation and for Ofgem when assessing the Final Modification Report. One of these Panel members also expressed a wider concern about not including legal text for Workgroup Alternative Grid Code Modifications;

- Although other panel members sympathised with these views, there was also a recognition that both producing this text and addressing the wider impacts (particularly on smaller generation) that it would have to do to achieve an agreed solution, would be a significant and potentially lengthy piece of work, and the majority of the Grid Code Review Special Panel believed that on balance the bigger risk was non-compliance with the European Emergency & Restoration Network Code ("E&R NC"); and

[1] Please note that WAGCM3 is WAGCM1 and 2 combined

- The Grid Code Review Special Panel agreed by majority that this Modification can proceed to Code Administrator Consultation without the legal text being included for the 3 workgroup alternatives on the basis that the Code Administrator Consultation would provide additional commentary on the basis and general content of the legal text changes that would be needed for each of these workgroup alternatives.

The Workgroup had previously discussed these issues at length and a record of these conversations can be located in the Final Workgroup Report presented to Grid Code Review Special Panel meeting on 10 September 2019. However, I wish to highlight a few of these issues which support the arguments:

- As part of the Workgroup Consultation, several comments were received on the minimal approach adopted by National Grid ESO to implement the E&R NC in GB. This approach has been agreed by National Grid ESO's legal team, who have supported a principle based approach and their advice is set out in Annex 1 of this letter. The rationale for this is to ensure that National Grid ESO has a reasonable chance of satisfying the requirements of the E&R NC by 18 December 2019. National Grid ESO is supportive of extending the remit of GB parties within the scope of the E&R NC. However, this needs careful consideration particularly in respect of the costs to which smaller GB parties could be exposed to. Grid Code Modification GC0117 is currently assessing this issue in respect of data provision and National Grid ESO see no reason why the scope of GC0117 could not be extended to this issue. One Workgroup member disagrees with this advice and their views are set out in Annex 2 of this letter; and
- On 28 August 2019, a Workgroup Member presented 3 potential alternatives to the Original Proposal. The Workgroup unanimously agreed to support each of these three potential alternatives and these became formal alternatives (WAGCMs 1, 2 and 3 respectively). It was noted that no legal text has been developed for these Workgroup Alternatives, nor will this be developed before the Code Administrator Consultation is issued as this would be a significant undertaking. Workgroup agreed with the Code Administrator's suggestion to follow the approach employed for GC0106 whereby legal text for these alternatives is not prepared by the Code Administrator.

Please can you confirm that you do not require the proposed text for the WAGCM1, WAGCM2 and WAGCM3 by 16 September 2019 to allow us to issue the Code Administrator Consultation as soon as reasonably practicable thereafter.

The Grid Code Review Panel would recommend the Authority seek the view of their legal representatives on Annex 1 and 2 and send the Final Modification Report back for development should it be required at that stage but emphasise the compliance deadline of 18 December 2019.

Please note that all documentation for this Modification and the alternatives can be located at the following link, including the Workgroup Report:

https://www.nationalgrideso.com/codes/grid-code/modifications/gc0127-eu-code-emergency-restoration-requirements-resulting-system

https://www.nationalgrideso.com/codes/grid-code/modifications/gc0128-eu-code-emergency-restoration-requirements-resulting-system

Yours sincerely

Trisha McAuley OBE
Independent Chair of the CUSC and Grid Code Panel

Annex 1- National ESO Legal Interpretation of European Emergency and Restoration Code

This is National Grid ESO's Legal interpretation of the approach that ESO have taken implementing the E&R NC.

Annex 2 - Workgroup Member's comments on National Grid ESO's Legal Interpretation of European Emergency and Restoration Code

This is a Workgroup Member's response to National Grid ESO's Legal interpretation of the approach that National Grid ESO have taken implementing the E&R NC.

Making a positive difference
for energy consumers

Trisha McAuley OBE
Independent Chair
CUSC & Grid Code Panel

E-mail: Alastair.Owen@ofgem.gov.uk
24 September 2019

Dear Trisha,

GC0127/GC0128: EU Network Code Emergency & Restoration: Requirements resulting from System Defence and Restoration Plans

I am writing in response to your letter dated 12 September 2019 which details the Grid Code Review Panel's decision to consult with Ofgem under Governance Rule GR21.5 of the Grid Code.

With this letter, the Grid Code Panel has asked the Authority whether it would like the Grid Code Modification Report for the code modifications GC0127/GC0128 to include the proposed legal text associated with WAGCM1, WAGCM2 and WAGCM3. We understand that the Grid Code Panel considers that producing the legal text for the WAGCMs would take a significant amount of time and would potentially lead to the ESO missing the deadline for compliance with the obligations set in the European Network Code on Emergency & Restoration (NC ER).

We have considered the Grid Code Panel concerns, including the risk of non-compliance. At this stage in the process, we cannot fetter our discretion on whether we will conclude that the original or any of the alternative proposals best meet the Grid Code objectives compared to the baseline. In a scenario where we may decide to approve an alternative modification, the risk of non-compliance would be even greater if the legal text for WAGCM1, WAGCM2 and WAGCM3 is not drafted for the code administrator consultation.

We are also of the view that there will be significant benefits for the Grid Code Panel to develop the legal text for consultation with stakeholders, in particular the smaller generation that may or may not be captured by the provisions of the NC ER. This is a valuable opportunity for market participants to provide feedback on the impact of the proposals and for the Grid Code Panel to take the feedback into consideration before submitting it to us.

Therefore, the Authority considers that the proposed legal text for WAGCM1, WAGCM2 and WAGCM3 is required in the Grid Code Modification Report and requests that the Grid Code Panel drafts the legal text for these WAGCMs.

We would also like to stress the importance of initiating code modification processes sufficiently in advance of legal deadlines and that requests under GR21.5 should be used on an exceptional basis. Therefore, it is important that there is enough time for alternative modifications to be raised and for their corresponding legal text to be fully developed ahead of the consultation.

If you have any queries regarding the information contained within this letter, please contact Alastair Owen (Alastair.Owen@ofgem.gov.uk).

Yours Sincerely,

Leonardo Costa
Senior Manager - SO Regulation

The Office of Gas and Electricity Markets
9 Millbank London SW1P 3GE **Tel** 020 7901 7000 **Fax** 020 7901 7066 **www.ofgem.gov.uk**

Annex 8 – Workgroup Consultation responses

Grid Code Workgroup Consultation Response Proforma

GC0127 EU Code Emergency & Restoration: Requirements resulting from System Defence Plan and GC0128 EU Code Emergency & Restoration: Requirements resulting from System Restoration Plan

Industry parties are invited to respond to this consultation expressing their views and supplying the rationale for those views, particularly in respect of any specific questions detailed below.

Please send your responses by **16 August 2019** to christine.brown1@nationalgrideso.com Please note that any responses received after the deadline or sent to a different email address may not receive due consideration by the Workgroup.

Any queries on the content of the consultation should be addressed to Chrissie Brown at christine.brown1@nationalgrideso.com

These responses will be considered by the Workgroup at their next meeting at which members will also consider any Workgroup Consultation Alternative Requests. Where appropriate, the Workgroup will record your response and its consideration of it within the final Workgroup Report which is submitted to the Grid Code Review Panel.

Respondent:	*Antony Johnson* *Telephone Number:- 01926 655466* *E-Mail:- Antony.Johnson@nationalgrideso.com*
Company Name:	*National Grid ESO*
Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries)	*(i) To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity* *(ii) Facilitating effective competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity);* *(iii) Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole;* *(iv) To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and* *(v) To promote efficiency in the implementation and administration of the Grid Code arrangements*

Standard Workgroup consultation questions

Q	Question	Response
1	**Do you believe that GC0127 and GC0128 Original proposal, better facilitates the Grid Code Objectives?**	Yes – in particular (iii) and (iv) in promoting the security of the network (which is the intention of the E&R code), and in complying with European legislation respectively.
2	**Do you support the proposed implementation approach?**	Yes
3	**Do you have any other comments?**	The production of a System Defence Plan and System Restoration Plan, the minor legal text changes reflected through these modifications GC0127/8 and the further code modifications GC0108 and GC0125 which deal with black start testing requirements are all requirements for GB compliance and implementation of the European Emergency and Restoration Code. The approach that has been taken by NGESO in developing this work has been one of only making those changes necessary, as originally advised by Ofgem.
4	**Do you wish to raise a Workgroup Consultation Alternative Request for the Workgroup to consider?**	No

Specific questions for GC0127 & 128

Q	Question	Response
5	Do you think the wording in OC9.2.5 could be improved, if so what do you suggest? Please note that the legal text can be located in Annex 4.	No. The additional wording in OC9.2.5 is for high level clarification purposes only and ensures more effective alignment with the requirements of the European Emergency and Restoration Code. The specific requirements relating to data exchange and information supply are already captured through OC9 and the wider Grid Code processes.

Grid Code Workgroup Consultation Response Proforma

GC0127 EU Code Emergency & Restoration: Requirements resulting from System Defence Plan and GC0128 EU Code Emergency & Restoration: Requirements resulting from System Restoration Plan

Industry parties are invited to respond to this consultation expressing their views and supplying the rationale for those views, particularly in respect of any specific questions detailed below.

Please send your responses by **16 August 2019** to christine.brown1@nationalgrideso.com
Please note that any responses received after the deadline or sent to a different email address may not receive due consideration by the Workgroup.

Any queries on the content of the consultation should be addressed to Chrissie Brown at christine.brown1@nationalgrideso.com

These responses will be considered by the Workgroup at their next meeting at which members will also consider any Workgroup Consultation Alternative Requests. Where appropriate, the Workgroup will record your response and its consideration of it within the final Workgroup Report which is submitted to the Grid Code Review Panel.

Respondent:	*Robert Selbie*
Company Name:	*ElecLink Limited*
Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries)	*To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity* *(b) Facilitating effective competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity);* *(c) Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole;* *(d) To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and* *(e) To promote efficiency in the implementation and administration of the Grid Code arrangements*

Standard Workgroup consultation questions

Q	Question	Response
1	**Do you believe that GC0127 and GC0128 Original proposal, better facilitates the Grid Code Objectives?**	Yes
2	**Do you support the proposed implementation approach?**	Yes

3	**Do you have any other comments?**	As previously highlighted in response to the System Defence Plan (SDP) and System Restoration Plan (SRP) consultations, ElecLink's primary concern is the lack of clarity around the definition of TSO, and the responsibilities that fall onto interconnector TSOs from the SDP and SRP. In GB the assignment of responsibilities placed on TSOs through the NCER is completed by Ofgem. The Ofgem minded-to decision on the assignment of responsibilities describes the requirements per TSO type, specifically noting where obligations are to be placed to ensure GB compliance on the categories of TSO: SO, TO, I/C and OFTO. This clarity is unfortunately not reflected in the E&R SDP and SRP documentation, particularly the System Defence Plan where different terminology is used. When considering the alignment of the Grid Code with the EU network code for Emergency and Restoration (NCER), GC0127 and GC0128 should clarify the requirements for interconnector TSOs. **<u>System Defence Plan</u>** Within the SDP, interconnector TSOs are referred to as HVDC Interconnectors, however where a requirement is on 'All TSOs' it is not clear whether this refers to 'onshore TSOs' or all GB TSOs, including interconnectors TSOs and OFTOs. ElecLink require clarity on this in the System Defence Plan, in order to understand what is required of ElecLink and other interconnectors as certified Transmission System Operators. If the 'All TSOs' obligations in the System Defence Plan apply to ElecLink, we would like to highlight the following points. Paragraph 5.2 of the SDP states that the requirement for critical tools and facilities to be available for 24 hours in case of a local loss of external power is a requirement for the NETSO, onshore TSOs and DSOs. It is unclear whether this is in conflict with the assignment of responsibilities by Ofgem in their minded to decision where this obligation is on all types of TSO. Clarity would be welcomed on this point, as the provision of these communication facilities for interconnector TSOs requires further consideration, including any potential cost recovery arrangements. In the case that these obligations apply to interconnector TSOs we would require further detail on exactly which tools and facilities are covered by SO GL article 24, specific to ElecLink (that is, the precise selection of tools and facilities based on the specific arrangements being put in place between NGESO, ElecLink and RTE). Section 7 of the SDP describes compliance and assurance testing which places requirements on 'Each TSO'. In the case that some or all of these obligations do not apply to interconnector TSOs, we would request that this is made clear in the System Defence Plan. In the case that some or all of these obligations do apply to interconnector TSOs, we would request that this is made clear in the Grid Code. In addition in the case that these are required by ElecLink and other interconnector TSOs, we would request that these provisions are included in the trilateral (including connecting TSOs in other countries) and bilateral arrangements are reflected to include these. Given the differing requirements of the connecting TSO, we would also request that these provisions are considered on a case by case basis and reflect the arrangements in place for each TSO. **Significant Grid Users** Page 15 of the Workgroup consultation report highlights workgroup member concerns regarding the lack of clarity surrounding who is and isn't an SGU in GB. ElecLink would like

Q	Question	Response
		to echo these concerns and welcomes the efforts made by the workgroup to provide greater clarity. ElecLink requests for further clarification for the case that an interconnector TSO is also an SGU. Do the requirements of an SGU also apply, or is it intended to refer to non-TSO HVDC systems for the purposes of connected generation. **System Restoration Plan** Section 2.1 of the SRP describes the process that will take place to enact the restoration plan. It states that the procedures will be activated by the NETSO in coordination with DSOs, SGUs and Restoration Service Providers, as well as stating that the NETSO will coordinate impacted TSOs where these procedures have a significant cross border impact. In the case that an interconnector is not an RSP, we believe that our function as the link between NGESO and the cross-border market means that interconnectors should be explicitly informed on the change of system state, particularly where a market action (halting allocation, for example) is required. GC0127 and GC0128 should clarify the role of interconnector TSOs in this coordination.
4	**Do you wish to raise a Workgroup Consultation Alternative Request for the Workgroup to consider?**	No

Specific questions for GC0127 & 128

Q	Question	Response
5	Do you think the wording in OC9.2.5 could be improved, if so what do you suggest? Please note that the legal text can be located in Annex 4.	No suggestions.
6	A Workgroup member has an alternate interpretation of what of a SGU, SRP, SDP is as part of the modification and is considering raising an alternative solution; what are your views on this?	ElecLink believes NGESO is well placed to determine who is and who isn't an SGU but ElecLink believes NGESO should explicitly notify all SGUs so that parties are aware of their responsibilities.

Q	Question	Response
6	A Workgroup member has an alternate interpretation of what of a SGU, SRP, SDP is as part of the modification and is considering raising an alternative solution; what are your views on this?	We do not agree with the legal interpretation upon which the alternative is based. We have discussed this with NGESO's legal team who agree that the interpretation of the E&R code upon which the GC0127/8 original proposals are based is correct. We believe that this issue is similar in principle to one of the alternatives raised for Grid Code modification GC0106 (Data exchange requirements in accordance with Regulation (EU) 2017/1485 (SOGL)), which sought a wider interpretation of the requirements due to the code beyond the minimum changes specified in the original proposal. In both cases, the alternatives would place additional costs on the industry, especially smaller generators and parties which do not have a CUSC contract, without legal justification. The alternative to GC0106 was rejected by Ofgem in their decision letter on this as it was based on an erroneous legal interpretation. We believe this issue is more appropriately addressed through Grid Code modification proposal GC0117 (Improving transparency and consistency of access arrangements across GB by the creation of a pan-GB commonality of PGM requirements) where the full costs and implications of any change can be assessed, and in which changes not specifically required to comply with European legislation can be introduced. We also have concerns that if this alternative were to proceed, it would interact with the Open Networks work (as identified through GC0117) but more importantly risk delaying implementation of the European Emergency and Restoration Code into the GB Grid Code to the extent that the timeframes as stipulated by the European Commission could not be met causing non-compliance and licence breach. We believe the alternative is based on an incorrect legal interpretation and is not backed up by a legal opinion. We do not believe that the alternative can be considered to be better than the baseline or proposal.

Grid Code Workgroup Consultation Response Proforma

GC0127 EU Code Emergency & Restoration: Requirements resulting from System Defence Plan and GC0128 EU Code Emergency & Restoration: Requirements resulting from System Restoration Plan

Industry parties are invited to respond to this consultation expressing their views and supplying the rationale for those views, particularly in respect of any specific questions detailed below.

Please send your responses by **16 August 2019** to christine.brown1@nationalgrideso.com Please note that any responses received after the deadline or sent to a different email address may not receive due consideration by the Workgroup.

Any queries on the content of the consultation should be addressed to Chrissie Brown at christine.brown1@nationalgrideso.com

These responses will be considered by the Workgroup at their next meeting at which members will also consider any Workgroup Consultation Alternative Requests. Where appropriate, the Workgroup will record your response and its consideration of it within the final Workgroup Report which is submitted to the Grid Code Review Panel.

Respondent:	*Alan Creighton*
Company Name:	*Northern Powergrid*
Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries)	*(a) To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity* *(b) Facilitating effective competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity);* *(c) Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole;* *(d) To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and* *(e) To promote efficiency in the implementation and administration of the Grid Code arrangements*

Standard Workgroup consultation questions

Q	Question	Response
1	**Do you believe that GC0127 and GC0128 Original proposal, better facilitates the Grid Code Objectives?**	Yes
2	**Do you support the proposed implementation approach?**	Yes
3	**Do you have any other comments?**	Detailed comments are embedded in the attached version of the consultation document, however we specifically want to draw out concerns about LFDD testing and E & R Code Mapping: **LFDD testing**. We have concerns about setting a requirement for testing LFDD relays at least once every three years. Following a review of protection maintenance, based on Failure Modes Effects and Critical Analysis (FMECA) and Reliability Centred Maintenance (RCM) principles, the protection maintenance intervals for relevant Northern Powergrid protection relays, which include LFDD relays, was set at a basic frequency of three years but with flexibility to extend this period to allow for efficient maintenance planning, outage planning, co-ordination with work on the same and adjacent circuits etc, provided that there are safeguards. We are of the view that requiring maintenance to be carried out at least every three years will increase operational costs and expose customers to additional risks, for example if planned outages need to be taken to test LFDD relays out of sequence with other protection relays on the same circuit, and are concerned that the Workgroup has not presented any evidence in the report as to why they consider an absolute three year period to be required. The Workgroup should base the required maintenance period on existing best practice; we have suggested three / five years in the text below as it generally aligns with Northern Powergrid practice, although feedback should be sought from other network operators. In addition, although LFDD relays are typically installed at all the relevant sites to allow for flexibility in setting up the overall LFDD scheme, not all relays are actually

Q	Question	Response
		used to deliver LFDD scheme functionality. We think that the requirements should only apply to LFDD relays in service; this aligns with the requirement in E&R which refers to relays that are 'implemented' rather than 'installed'. It is also worth noting that NGET own some LFDD relays in our region, and these should be subject to the same testing regime. We propose that the Grid Code obligation in this regard is revised to be either: C.C.A5.4.2 Each **Network Operator** and the **Relevant Transmission Licensee** shall execute testing on its low frequency demand disconnection relays installed within its network and in service at least once every five years. This would allow the NO / RTL to have a protection policy that would have a basic requirement of a period less than five years, and also permit flexibility for efficient protection maintenance planning. This proposed text also applies the testing requirement for those LFDD relays that are in service. Or C.C.A5.4.2 Each **Network Operator** and the **Relevant Transmission Licensee** shall aim to execute testing on its low frequency demand disconnection relays installed within its network and in service at least once every three years, although this may be extended to no more than once every five years if considered to be required for operational purposes. This would allow the NO / RTL to have a protection policy that would have a basic requirement of three years, but again permit flexibility for efficient protection maintenance planning. This proposed text also applies the testing requirement for those LFDD relays that are in service. Or C.C.A5.4.2 Each **Network Operator** and the **Relevant Transmission Licensee** shall execute testing on its low frequency demand disconnection relays installed within

Q	Question	Response
		its network and in service at an interval agreed bilaterally with NGESO. This would allow the NO / RTL to present evidence to justify its own protection maintenance policy, based for example on its experience of the relays deployed on its network. **E&R mapping** It is important for the Workgroup to demonstrate that all the E&R Articles that need to be complied with and implemented by December 2019 are addressed by GC0127 or GC0128. We note that the title of the modification relates to aligning the Grid Code with the System Defence Plan and System Restoration Plan whereas the objective should be to align with the NC E&R.
4	**Do you wish to raise a Workgroup Consultation Alternative Request for the Workgroup to consider?**	No

Specific questions for GC0127 & 128

Q	Question	Response
5	Do you think the wording in OC9.2.5 could be improved, if so what do you suggest? Please note that the legal text can be located in Annex 4.	As drafted OC9.2.9 just sets out what the scope of OC9 is and it doesn't place any obligations on any party to provide any information. If the intention is to place an obligation on a party to provide specified information, that obligation should be clearly set out in the Grid Code. Some of the new information included in OC9.2.9 e.g. 'Embedded Power Station data where such data is not visible to the Network Operator' and 'Status information' could be difficult and costly to provide; any such new obligation would need to be consulted upon properly.

Q	Question	Response
6	A Workgroup member has an alternate interpretation of what of a SGU, SRP, SDP is as part of the modification and is considering raising an alternative solution; what are your views on this?	Assuming that this relates to the definition / scope of a SGU, System Defence Provider and System Restoration Provider, we are content to be guided by the legal advice that NGESO receive on this subject. We note that although the terms GB SGU, Defence Service Provider and Restoration Service Provider are included in the System Defence Plan and System Restoration Plan, there is currently no proposal to include these definitions into the Grid Code. We agree that, as the System Defence Plan and System Restoration Plan do not place any obligations on any party (as all relevant obligations are in the Grid Code), this approach seems sensible.

Grid Code Workgroup Consultation Response Proforma

GC0127 EU Code Emergency & Restoration: Requirements resulting from System Defence Plan and GC0128 EU Code Emergency & Restoration: Requirements resulting from System Restoration Plan

Industry parties are invited to respond to this consultation expressing their views and supplying the rationale for those views, particularly in respect of any specific questions detailed below.

Please send your responses by **16 August 2019** to christine.brown1@nationalgrideso.com Please note that any responses received after the deadline or sent to a different email address may not receive due consideration by the Workgroup.

Any queries on the content of the consultation should be addressed to Chrissie Brown at christine.brown1@nationalgrideso.com

These responses will be considered by the Workgroup at their next meeting at which members will also consider any Workgroup Consultation Alternative Requests. Where appropriate, the Workgroup will record your response and its consideration of it within the final Workgroup Report which is submitted to the Grid Code Review Panel.

Respondent:	*Paul Crolla* *M: +44 7541 977 109* *pcrolla@scottishpower.com*
Company Name:	*ScottishPower Renewables*
Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries)	*(a) To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity* *(b) Facilitating effective competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity);* *(c) Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole;* *(d) To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and* *(e) To promote efficiency in the implementation and administration of the Grid Code arrangements*

Standard Workgroup consultation questions

Q	Question	Response
1	**Do you believe that GC0127 and GC0128 Original proposal, better facilitates the Grid Code Objectives?**	Yes
2	**Do you support the proposed implementation approach?**	Yes This provides an efficient and good value to the consumer approach to implementation of the code
3	**Do you have any other comments?**	No
4	**Do you wish to raise a Workgroup Consultation Alternative Request for the Workgroup to consider?**	No

Specific questions for GC0127 & 128

Q	Question	Response
5	Do you think the wording in OC9.2.5 could be improved, if so what do you suggest? Please note that the legal text can be located in Annex 4.	Although SPR have previously questioned the position of the information sharing requirements, at this time we do not have a counter proposal and have no further comments on this.
6	A Workgroup member has an alternate interpretation of what of a SGU, SRP, SDP is as part of the modification and is considering raising an alternative solution; what are your views on this?	SPR think it is clear that only those with contracts with National Grid ESO are part of the SGU definition.

Grid Code Workgroup Consultation Response Proforma

GC0127 EU Code Emergency & Restoration: Requirements resulting from System Defence Plan and GC0128 EU Code Emergency & Restoration: Requirements resulting from System Restoration Plan

Industry parties are invited to respond to this consultation expressing their views and supplying the rationale for those views, particularly in respect of any specific questions detailed below.

Please send your responses by **16 August 2019** to christine.brown1@nationalgrideso.com Please note that any responses received after the deadline or sent to a different email address may not receive due consideration by the Workgroup.

Any queries on the content of the consultation should be addressed to Chrissie Brown at christine.brown1@nationalgrideso.com

These responses will be considered by the Workgroup at their next meeting at which members will also consider any Workgroup Consultation Alternative Requests. Where appropriate, the Workgroup will record your response and its consideration of it within the final Workgroup Report which is submitted to the Grid Code Review Panel.

Respondent:	*Graeme Vincent* *graeme.vincent@spenergynetworks.co.uk*
Company Name:	*SP Energy Networks*
Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries)	*(a) To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity* *(b) Facilitating effective competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity);* *(c) Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole;* *(d) To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and* *(e) To promote efficiency in the implementation and administration of the Grid Code arrangements*

Standard Workgroup consultation questions

Q	Question	Response
1	**Do you believe that GC0127 and GC0128 Original proposal, better facilitates the Grid Code Objectives?**	Yes
2	**Do you support the proposed implementation approach?**	Yes
3	**Do you have any other comments?**	Whilst we recognise that the working group has addressed the modification aligning the Grid Code to the requirements of the System Defence and System Restoration Plan, we do think that it would have been more appropriate to align the Grid Code to the requirements arsing from Emergency and Restoration NC as it is not clear that the SDP and SRP reflect fully the NC ER requirements. It is also important to acknowledge that the proposals for LFDD testing will give rise to additional costs and risks to Network Operators. It is acknowledged that the frequency of the testing requirements aligns with the Black Start tests for Generators, however, we believe that further assessment of the risks/costs which may be introduced from an increased testing regime across a wider asset base should be considered given the step change in volumes associated with this testing. Further comments are provided in the attached change marked version of the consultation
4	**Do you wish to raise a Workgroup Consultation Alternative Request for the Workgroup to consider?**	No

Specific questions for GC0127 & 128

Q	Question	Response
5	Do you think the wording in OC9.2.5 could be improved, if so what do you suggest? Please note that the legal text can be located in Annex 4.	*OC9.2.5 as drafted extends the scope of OC9 but does not specifically make any obligation on any party to provide the information.* *If the intention is to require Users to provide the information listed then the obligation to do this should be clearly defined within the Code.*

Q	Question	Response
6	A Workgroup member has an alternate interpretation of what of a SGU, SRP, SDP is as part of the modification and is considering raising an alternative solution; what are your views on this?	Whilst we acknowledge that differing interpretations are possible we believe based on NGESO having sought appropriate legal guidance on the interpretation that the position taken is appropriate. It is noted that SGU is not proposed for inclusion within the Grid code and that this term will be within the SDP and the SRP, as such additional clarity that this applies only to parties which have a CUSC or other NGESO agreement should be made clearer within the drafting.

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Please send your responses by **16 August 2019** to christine.brown1@nationalgrideso.com Please note that any responses received after the deadline or sent to a different email address may not receive due consideration by the Workgroup.

Any queries on the content of the consultation should be addressed to Chrissie Brown at christine.brown1@nationalgrideso.com

These responses will be considered by the Workgroup at their next meeting at which members will also consider any Workgroup Consultation Alternative Requests. Where appropriate, the Workgroup will record your response and its consideration of it within the final Workgroup Report which is submitted to the Grid Code Review Panel.

Respondent:	
Company Name:	*Drax Generation Enerprise Ltd*
Please express your views regarding the Workgroup Consultation, including rationale. (Please include any issues, suggestions or queries)	*(a) To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity* *(b) Facilitating effective competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity);* *(c) Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole;* *(d) To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and* *(e) To promote efficiency in the implementation and administration of the Grid Code arrangements*

Standard Workgroup consultation questions

Q	Question	Response
1	**Do you believe that GC0127 and GC0128 Original proposal, better facilitates the Grid Code Objectives?**	Yes
2	**Do you support the proposed implementation approach?**	Yes

3	**Do you have any other comments?**	**Report Section 3** In section 3 in the Storage Providers section it states that “Under the proposed System Defence Plan, NGESO define the cycle time from import to export to be set to a very low value (e.g. 1µs) so the default option will be for the storage plant to trip under low frequency.” and then uses the very small value of 1µs as a reason the Energy Storage cannot change from Import to Export quickly. There does not appear to be any reason given as why this 1µs value has been chosen which appears to be extremely small and given that rapid fault clearance is considered highly important, but only requires timescales in the order of 140ms, it remains a puzzle as to why the 1µs has been used. Given that the NCER requires Energy Storage transition from import to export provided it is quick enough, is it acceptable for GB to set a very small unrealistic transition time of 1µs and then decide that the transition requirements are not going to apply? **OC5.7.1** The proposed change to the OC5.7.1(a)legal text to add the new “quick re-synchronisation” test is in a section which modification GC0125 is in the process of changing and the proposed text does not fit well within the proposed new structure. It would possibly fit better adding the following sections to the proposed structure:- OC5.7.1(a) (iii) In the case of a **Generator**, The Company may also require a **Generator** with a **Black Start Station** to carry out a test (a “**Quick Resynchronisation Unit Test** ”) in order to demonstrate that a **Black Start Station** has a **Quick Re-synchronisation Capability.** OC5.7.1(b) (iv) **The Company** may occasionally require the **Generator** to carry out a **Quick Re-synchronisation Test** at any time, but will generally only be required where the **Generator** has made a change to its **Plant** and **Apparatus** which has an impact on its **Houseload Operation** or after two unsuccessful tripping **Events** in the operational environment

Q	Question	Response
		OC5.7.4 Quick Re-synchronisation Test (a) The relevant **Generating Unit** shall be **Synchronised** and **Loaded**; (b) All the **Auxiliary Gas Turbines** and/or **Auxiliary Diesel Engines** in the **Black Start Station** in which that **Generating Unit** is situated, shall be **Shutdown**. (c) The **Generating Unit** shall tripped to house load**.** (d) The relevant **Generating Unit** shall be **Synchronised** to the **System** but not **Loaded**, unless the appropriate instruction has been given by **The Company** under **BC2** which would also be in accordance with the requirements of the **Black Start Contract**. In respect of **EU Generators**, the above tests defined in OC5.7.2.3(a) – (e) shall be in accordance with the requirements of ECC.6.3.5.6. There also needs the addition of some more definition such as Quick Re-synchronisation Test and subsequent sections need renumbered. Only question is this actually a Black Start service? **OC5.5.3.3** It is not clear with is whether the User is being expected to make judgements on NETS, and how they can do this. Is it not already covered within OC7.5 and more specifically in OC7.5.8, so is this change actually needed and is it in the correct location.
4	**Do you wish to raise a Workgroup Consultation Alternative Request for the Workgroup to consider?**	No

Specific questions for GC0127 & 128

Q	Question	Response
5	Do you think the wording in OC9.2.5 could be improved, if so what do you suggest? Please note that the legal text can be located in Annex 4.	The proposed wording in OC9.2.5 is vague and it is not clear what it is trying to do? Nor is it clear who it is aimed at and expected to provide data? And finally what data is actually being requested?
6	A Workgroup member has an alternate interpretation of what of a SGU, SRP, SDP is as part of the modification and is considering raising an alternative solution; what are your views on this?	Given that is relates to a System Defence Plan are all generators not required to carryout actions to protect the system should a problem occur.