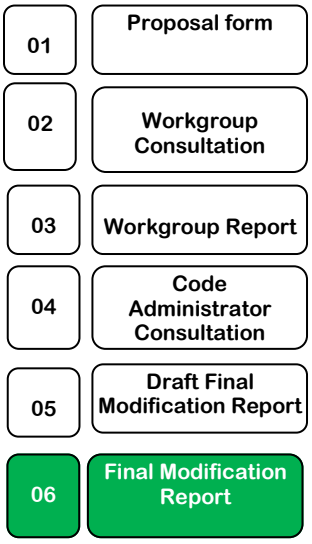
Stage 6. Final Modification Report	At what stage is this document in the process?

GC0125

Mod Title: EU Code Emergency & Restoration: Black Start testing requirements for Interconnectors, HVDC System Owners and Owners of Transmission DC Converters



Purpose of Modification: This modification seeks to align the GB Grid Code with the European Emergency and Restoration Code, specifically in relation to Black Start testing for Interconnectors.

This Final Modification Report has been prepared in accordance with the terms of the Grid code. An electronic version of this document and all other GC0125 related documentation can be found on the National Grid ESO website via the following link:

https://www.nationalgrideso.com/codes/grid-code/modifications/gc0125-eu-code-emergency-restoration-black-start-testing-requirements

At the Grid Code Review Panel meeting on 29 October 2019, the Panel members by majority recommended that both the GC0125 Original and WAGCM1 better facilitated the Grid Code objectives than the Baseline. Of the 8 votes, 5 thought the Original was the best option and 3 thought WAGCM1 was the best option.

The purpose of this document is to assist the Authority in making its determination on whether to implement GC0125.

High Impact: Electricity System Operator (ESO), external Transmission System Operators (TSOs), Interconnectors wishing to provide Black Start.

The Workgroup concludes:

Workgroup Members agreed by majority that the Original proposal facilitates the Grid Code Objectives better than the baseline. One Workgroup Alternative Grid Code Modification (WAGCM) was proposed.

Contents

Timetable

The Code Administrator recommends the following expedited timetable:

Initial consideration by Workgroup	May 2019
Workgroup Consultation	21 June 2019
Modification concluded by Workgroup	7 August 2019
Workgroup Report presented to Panel	29 August 2019
Code Administration Consultation Report issued to	6 September

Any questions?

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the Industry	2019
Draft Final Modification Report presented to Panel	21 October 2019
Modification Panel recommendation	29 October 2019
Final Modification Report issued to the Authority	12 November 2019
Authority decision	13 December 2019
Decision implemented into the Grid Code	17 December 2019

1 About this document

This document is the Final Modification Report 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 12 July 2019 and the voting of the Workgroup that was held on 07 August 2019.

The Grid Code Panel reviewed the Workgroup Report at their Panel meeting on 29 August 2019 and agreed that the Workgroup had met its Terms of Reference and that the Workgroup could be discharged. This document also contains the responses received from the Code Administrator Consultation which closed on 27 September 2019.

GC0125 was proposed by National Grid ESO and was submitted to the Grid Code Review Panel for its consideration on 20 March 2019. The Panel decided to send the Proposal to a Workgroup to be developed and assessed against the Grid Code Objectives.

GC0125 aims to align the GB Grid Code with the European Emergency and Restoration Code, specifically in relation to Black Start testing for Interconnectors. The Workgroup consulted on this Modification and a total of four responses were received. These responses can be viewed in Annex 4 of this Report.

Workgroup Conclusions

At the final Workgroup meeting, Workgroup members voted on the Original proposal and WAGCM1. Workgroup members agreed by majority that the Original Proposal better facilitated the Grid Code objectives.

Code Administrator Consultation Responses

Two responses were received to the Code Administrator Consultation. A summary of the responses can be found in Section 13 of this document and the full response can be found in Annex 6. One respondent agreed that the proposal better facilitates the Grid Code objectives, but the other respondent thought that WAGCM1 better facilitates the Grid Code objectives.

Grid Code Review Panel Views

At the Grid Code Review Panel meeting on 29 October 2019, the Panel members by majority recommended that both the GC0125 Original and WAGCM1 better facilitated

the Grid Code objectives than the Baseline. Of the 8 votes, 5 thought the Original was the best option and 3 thought WAGCM1 was the best option

This Final Modification Report has been prepared in accordance with the terms of the Grid Code. An electronic copy can be found on the National Grid ESO website:

https://www.nationalgrideso.com/codes/grid-code/modifications/gc0125-eu-code-emergency-restoration-black-start-testing-requirements

2 Terms of Reference

The Grid Code Panel detailed in the Terms of Reference the scope of work for the GC0125 Workgroup and the specific areas that the Workgroup should consider.

The table below details these specific areas and where the Workgroup have covered them or will cover them post Workgroup Consultation.

The full Terms of Reference can be found in Annex 2.

Terms of Reference

Specific Area	Location in the report
Implementation and costs;	Page 11.
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 5 and Workgroup discussions section 8.
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;	Following the first workgroup, members and the Code Administrator sought to source further membership. Further Interconnector members joined following this.
Introduce Black start testing requirements as a result of E&R;	Workgroup discussions section 8.
To introduce interconnectors as a source of Black start;	Workgroup discussions section 8.
Review all current Black start references for suitability; and	Workgroup discussions section 8.
Ensure all Black start providers are treated equally as far as practical in the scope of E&R	Workgroup discussions section 8.

Acronym Table

Acronym	Meaning
E&R NC	Emergency and Restoration Network Code[1]
HVDC	High Voltage Direct Current
NGESO	National Grid Electricity System Operator

3 Original Proposal

Section 3 (Original Proposal) and **Section 4 (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.

Defect

The Grid Code doesn't currently include black start testing requirements for interconnectors and HVDC Systems nor does it have provisions to allow HVDC System to provide such services, whereas the Emergency and Restoration Network Code (E&R NC) does. Therefore, the Grid Code needs to be aligned to the European Network Code to reflect these requirements.

What

The Grid Code currently has testing requirements for generators choosing to provide a black start service, which were aligned to E&R as a result of GC0108. This was approved by Ofgem on 21st November 2018. E&R also sets out testing requirements for interconnectors and HVDC Systems offering Black Start but these are not currently specified in the Grid Code. This modification seeks to add these requirements to facilitate alignment with E&R.

Why

The requirements need to be added to the Grid Code to reflect the testing requirements that will be necessary as of 18th December 2019.

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

How

This modification proposes to align the testing requirements set out in the E&R with GB frameworks by adding the requirements in OC.5.7 of the Operating Code within the Grid Code. The current Grid Code is written with respect to the provision of Black Start Services from Generators only. This modification is required to introduce Black Start Services from HVDC Systems. The Workgroup discussed the likely impact of other parties providing Black Start Services in the future which could be made up from other technologies. The opportunity has therefore been taken to introduce the term of a Black Start Service Provider which will address the defect and also provide future proofing to other Black Start technologies in the future.

It will be specified that High Voltage Direct Current systems delivering a black start service will be required to execute a black start capability test at least every three years and will detail how this needs to be done.

Governance

Justification for Normal Procedure to apply

The Proposer requested that normal Governance procedures should apply as there will be a material impact on interconnectors who wish to deliver a black start service in future.

There is no need for this modification to be treated as urgent as the requirements do not need to be in the Grid Code before 18th December 2019.

Requested Next Steps

This modification should:

- be assessed by a Workgroup

Following the feedback received for modification **GC0108 EU Code: Emergency & Restoration: Black Start Testing requirement** and given that this modification is slightly more complex given that the requirements are new and do not currently exist in the Grid Code, we believe a workgroup should help to develop the final solution.

The Grid Code Review Panel decided that this modification should follow the standard route by forming a Workgroup and the modification being submitted to the Authority for decision.

Why Change?

This Proposal is one 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. Some EU Network Guidelines are still in development and these may in due course require a review of the solutions developed for the Codes that come into force beforehand. The full set of EU network guidelines are:

- Regulation 2015/1222- Capacity Allocation and Congestion Management (CACM) which came into force 14 August 2015
- Regulation 2016/1719 – Forward Capacity Allocation (FCA) which came into force 17 October 2016

- Regulation 2016/631- Requirements for Generators (RfG) which came into force 17 May 2016
- Regulation 2016/1388 – Demand Connection Code (DCC) which came into force 7 September 2016
- Regulation 2016/1447 – High Voltage Direct Current (HVDC) which came into force 28 September 2016
- Transmission System Operation Guideline (SOGL) - which came into force 14 September 2017
- Regulation 2017/2196 - Emergency and Restoration (E&R) which came into force 18 December 2018.

The Regulation establishing an E&R came into force on 18 December 2017. The E&R 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.

Code Specific Matters

Technical Skillsets

Understanding of black start arrangements

Reference Documents

Emergency and Restoration Code:

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

GC0108 Report:

https://www.nationalgrideso.com/codes/grid-code/modifications/gc0108-eu-code-emergency-restoration-black-start-testing-requirement

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

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

4 Proposers Solution

Section 3 (Original Proposal) and **Section 4 (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.

E&R Article 46:

Each restoration service provider which is an HVDC system delivering a black start service shall execute a black start capability test, at least every three years.

HVDC Article 71(11):

With regard to the black start test, if applicable:

(a) the HVDC system shall demonstrate its technical capability to energise the busbar of the remote AC substation to which it is connected, within a time frame specified by the relevant TSO, according to Article 37(2);

(b) the test shall be carried out while the HVDC system starts from shut down;

(c) the test shall be deemed passed, provided that the following conditions are cumulatively fulfilled:

(i) the HVDC system has demonstrated being able to energise the busbar of the remote AC-substation to which it is connected;

(ii) the HVDC system operates from a stable operating point at agreed capacity, according to the procedure of Article 37(3).

Both the requirements from E&R and the methodology described in HVDC will need to be incorporated into the Grid Code.

Please note that the Proposers full solution is discussed in the Workgroup discussions section (Section 8) and the legal text can be found in Annex 8. The Proposer has taken on feedback from all Workgroup members, Generators and Interconnectors in forming their solution.

5 Impacts & Other Considerations

Interconnectors, HVDC System Owners and owners of Transmission DC Converters wishing to deliver a black start service to NGESO will be affected by GC0125 as this will define how they must demonstrate compliance for this service and how often these tests will need to be completed. It should be noted that black start is not a mandatory service and so interconnectors, HVDC System Owners and owners of Transmission DC Converters not wishing to offer this service will not be affected by GC0125.

NGESO need to assess the implications of the Emergency and Restoration Network Code (E&R NC) in terms this Grid Code modification (GC0125) and the wider Black Start testing arrangements.

The E&R NC applies to new and existing Owners of HVDC Systems. The three Connection Network Codes, (RfG, HVDC and DCC) apply only for new[2] plant, and as such when these codes where implemented into the (GB) Grid Code, the specific requirements for *HVDC Systems* were defined in the European Connection Conditions of the Grid Code. In the case of existing HVDC plant owners who are termed *DC Converter Station Owners*, this picks up the technical requirements in the Connection Conditions of the Grid Code rather than the European Connection Conditions. Since the E&R NC applies to both new and existing *HVDC Owners*, then the proposed legal drafting for GC0125 has been updated to refer to both *HVDC Systems* and *DC Converter Stations*. In addition, reference has also been made to *Transmission DC Converters* which are new or existing HVDC installations which form part of an *Offshore Transmission System*.

[2] Or, in a limited set of circumstances, to an existing plant where that plant substantially modifies – see Article 4 of the relevant Connection Network Code for further details.

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 EU Emergency & Restoration Network Code which helps to facilitate a harmonised electricity system as part of the package of European Network Codes, and will help to deliver and facilitate a significant benefit to the end consumer by ensuring a coordinated security of supply across GB and Europe.

6 Legal Text

Legal text document can be found in Annex 5.

7 Cost Impacts

Code administration costs	
Resource costs	**£7,260** - 4 Workgroup meetings **£250** - Catering
Total Code Administrator costs	**£7,510**

Industry costs (Standard GC)	
Resource costs	**£25,410** - 4 Workgroup meetings **£5,445** - 2 Consultations • 4 Workgroup meetings • 7 Workgroup members • 1.5 man days effort per meeting • 1.5 man days effort per consultation response • 3 consultation respondents
Total Industry Costs	**£38,365**

8 Workgroup discussions

The Workgroup convened four times to discuss the issue, detail the scope of the proposed defect, devise potential solutions, assess the proposal in terms of the Grid Code Objectives and review the responses to the Workgroup Consultation.

The Workgroup discussed a number of the key attributes under GC0125 and these discussions are described below.

Testing frequency, synchronisation and consistency

The Proposer of GC0125 explained to the Workgroup that this modification has been raised to ensure that the requirements outlined in the E&R NC for HVDC systems are implemented into the Grid Code. They outlined that there were two potential ways forward with regards to the legal text. This would either be (a) to create a new section for Interconnectors, HVDC systems and Transmission DC Converters or (b) to integrate the requirements in line with the current Generator Grid Code requirements.

The Workgroup discussed this. A Workgroup member from an interconnector party stated that ideally, they would like there to be a separate section whilst another Workgroup member stated that it would be of benefit to go through each clause of the legal text for Generators and assess whether it should be applicable for HVDC systems and added that this was part of the agreed Terms of Reference. This would then ensure consistency in drafting of the legal text. A Workgroup member also noted that treating Generators and HVDC systems in the same way; in terms of the provision of Black Start in GB; would avoid discrimination in treatment between Restoration Service Providers[3] (as this was not permitted according to E&R NC) as well as ensuring the most robust approach for the restoration of the whole system. The Workgroup agreed that this would be the best way to proceed. The Proposer stated that they wanted to ensure the legal text is as simple and easy to digest as possible whilst ensuring that the requirements are consistent between all Black Start providers where possible when considering the requirements as part of the E&R NC.

The Workgroup went onto discuss whether the compliance testing was to also include synchronisation and not just the energisation of the busbar. An example used by the Proposer when explaining Black Start testing was that if you had a car and needed to know whether it would be able to run in certain circumstances you wouldn't simply ensure it started, you would also test whether it could run by attempting to complete a reasonable journey. This means fully testing the Black Start capability of the plant which, as other Workgroup members noted, was what all other Black Start providers in GB had to do (as currently codified in the Grid Code).

The Workgroup noted that there were some definitions that would not be relevant for HVDC such as 'shutdown'. The Proposer took an action to review and amend these definitions which became part of the second iteration of the proposed legal text.

A Workgroup member asked how often the compliance tests for HVDC systems would be carried out. The Proposer took an action to look into and clarify whether the tests

[3] Defined in Article 3(2) of E&R NC as "'restoration service provider' means a legal entity with a legal or contractual obligation to provide a service contributing to one or several measures of the restoration plan".

would be required to be carried out every three years or longer (such as eight years). A Workgroup member stated that if this is every three years that this would in their view be difficult for NGESO to complete. A Workgroup member stated that they thought that the testing of the energisation of the busbar would be every three years and the full test conducted every eight years (which included synchronisation) as part of the Local Joint Restoration Plan. However, another Workgroup member noted that if there was to be such an approach to the timing of compliance testing for Black Start providers, it would have to be over the same timeframes for all Black Start providers (HVDC Systems and Generators) in order to avoid discrimination as well as to ensure robust testing of the whole Black Start capability (in the form of Local Joint Restoration Plans).

Black Start Standard –1 April 2020

The Workgroup noted that it is currently being proposed by BEIS and Ofgem that there will be a new Black Start Standard (applicable to a number of stakeholders) which could possibly be in place from 1 April 2020. The Workgroup discussed the fact that this may mean further amendments to the requirements on interconnectors, HVDC System Owners and Transmission DC Converter Station Owners in the future and that it was important that they were aware that these may change following the implementation of this modification (should it be approved by the Authority). The Workgroup decided that the best course of action was to note this given the fact that the draft of the proposed Black Start Standard document is not currently in the public domain for them to discuss. It was recognised that Interconnector parties, HVDC System Owners and Transmission DC Converter Station Owners had not been involved in these discussions and a Workgroup member from an Interconnector owner has now contacted relevant people within NGESO to ascertain how such parties can get involved.

Black Start Procurement Methodology and Strategy

A Workgroup member noted that if there was an inconsistency between the E&R NC requirements and the GB Black Start procurement methodology and strategy, then the Black Start procurement methodology and strategy will need to be amended to comply with EU law; i.e. E&R NC.

Notice ahead of testing

Under the current Grid Code (OC5.7.1(e), NGESO is only required to provide seven days' notice to Black Start Providers for carrying out Black Start testing. A Workgroup member enquired as to whether this is what happens in practice or whether it is just for emergency situations and would ideally prefer a longer notice period. During the first Workgroup meeting the Proposer took an action to look into this and clarify.

The Proposer confirmed that the obligation to undertake Black Start tests should be undertaken in a reasonable, efficient and proportionate way is required by the E&R NC. The Proposer outlined that a three-year assurance plan is provided to the Authority and that from 2020 Black Start testing will be integrated into the year ahead Transmission Planning process. The Proposer went on to confirm that a significant amount of preparatory work is generally required in order to prepare for a Black Start test which will require early engagement with the Black Start Provider. This would generally require engagement and discussion approximately three months ahead of the testing

date. It was noted that as part of the preparatory work the testing dates would be discussed as part this phase with the formal paperwork being issued seven working days before the actual test date once all of the information has been collected (test plan, transmission and commercial knowledge etc.). The Workgroup went onto discuss whether the most reasonable, efficient and proportionate time for holding such a test would be during planned outages. It was noted that this could be the most efficient time but also that there was an increased risk of uncertainty due to the risk of planned outages overrunning and the complexity of a having such an outage running at the same time as a Black Start test, with each item having its own associated uncertainties. It was also concluded that this would be different on a case to case basis. The Proposer explained that the seven day advance notice period for each test was as defined in the Legal text and would not be amended; but this was on the premise that extensive pre-work would be required prior to the formal notification of the test.

Cross modification considerations

It was noted by the Workgroup that there were two Articles in the Emergency & Restoration Network Code that could lead to further amendments to the requirements on HVDC Systems (in addition to other Black Start Providers). These were the following;

Article 43 (2)

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.

Article 51

Compliance testing and periodic review of the restoration plan

1. Each TSO shall review the measures of its restoration plan using computer simulation tests, using data from the DSOs identified pursuant to Article 23(4) and the restoration service providers, at least every five years. The TSO shall define these simulation tests in a dedicated testing procedure covering at least:

(a) the energising restoration path from restoration service providers with black start or island operation capabilities;

(b) the supply of power generating modules main auxiliaries;

(c) the demand reconnection process; and

(d) the process for resynchronisation of networks in island operation. L 312/82 EN Official Journal of the European Union 28.11.2017 2.

2.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.

3. Each TSO shall review its restoration plan to assess its effectiveness, at least every five years.

4. Each TSO shall review the relevant measures of its restoration plan in accordance with paragraph 1 and review their effectiveness before any substantial change in the configuration of the grid.

5. When the TSO identifies the need to adapt the restoration plan, it shall amend its restoration plan and implement these amendments in accordance with points (c) and (d) of Article 4(2) and Articles 23 and 24.

As part of the Workgroup discussions, it was noted that Articles 43(2) and 51 (as replicated above) appear to apply to all Black Start Providers (not just HVDC Systems) and it was queried if these Articles should be included within the scope of GC0125. The Proposer took an action to clarify whether these two Articles would be addressed as part of this GC0125 modification or in the System Defence Plan and System Restoration Plan related Grid Code Modifications GC0127[4] and GC0128[5] respectively

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

which, like GC0125, was proposed by NGESO. It was noted that should it be covered in this GC0125 modification, then there are a number of stakeholders who could be impacted who are not currently Workgroup members. The Proposer's view is that these Articles would be better addressed as part of other Grid Code Modifications (GC0127 and GC0128). It was also noted by the Workgroup that Interconnectors, HVDC System Owners and Transmission DC Converter Owners should be aware that these two Articles from the E&R NC will be addressed in terms of the GB Grid Code definitions. Following the initial Workgroup meeting, the Proposer confirmed that Article 43 and 51 as outlined above would be covered under GC0127 and GC0128.

The Workgroup agreed that they would be mindful of any other related modifications that were ongoing to ensure no overlap in legal text requirements and duplication of work.

Definition of Black Start Contract

As part of the Workgroup discussion, one Workgroup member suggested that the Grid Code proposed definition of '*Black Start Contract*' should be updated to reflect the E&R NC Article 4 (2) (b), which requires the terms and conditions that will be applicable to restoration service providers to be approved by the NRA (after being proposed by the TSO). In GB, the TSO is NGESO and the NRA is Ofgem. Therefore, the Workgroup member suggested additional wording (shown as the red text below) to reflect the legal position.

Black Start Contract	An agreement; between a **Generator** or an **HVDC System Owner** and **The Company** under which the **Generator** or an **HVDC System Owner** or a **DC Converter Station Owner** provides **Black Start Capability** and other associated services; in accordance with the terms and conditions to act as restoration service provider on a contractual basis approved by the Authority in accordance with Article 4 (2) (b) and (4).or as amended in accordance with Article 4(7), of Regulation (EU) 2017/2196.

The Proposer currently assessed this additional text internally with its Contracts and Legal team and the view of the Proposer is that the additional text should be removed on the basis that it could lead to contractual terms and conditions needing to use the Grid Code process which does not retain the current contractual flexibility or tender approach which is currently adopted in GB. The Workgroup member noted that compliance with the European law (as set out in E&R NC) would take legal precedence over any current national regulatory requirements. As a result, the current GB 'contractual flexibility' approach may not be compatible, going forward, with the harmonisation and standardised approach to contracting for restoration service providers required by E&R NC. In addition, Grid Code consultations GC0125, GC0127

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

and GC0128 are subject to a detailed mapping process to ensure that the requirements of the E&R NC are mapped into the appropriate GB Documentation.

Other Definitions

As part of this GC0125 modification, a number of other definitions have also been included in the draft Legal text which also relate to the wider context of implementation of E&R NC which are expected to be required in Grid Code Consultations GC0127 and GC0128. These include the definitions of "*Defence Service Provider*", "*Restoration Service Provider*", "*System Defence Plan*" and "*System Restoration Plan*".

For the definitions of *System Defence Provider* and *System Restoration Provider*, the Proposer initially suggested the definition included the terms *User* and *Demand Response Provider*. One Workgroup member was concerned that the proposed GC0125 definitions of *System Defence Provider* and *System Restoration Provider* appeared to be different to the same terms that are defined in the E&R NC and highlighted that if such an inconsistency prevailed it could give rise to legal confusion – although as EU law prevails, the E&R NC would prevail over any Grid Code definitions. The Proposer agreed to amend the draft legal text and this has been completed. As part of the discussions, one Workgroup member suggested the term *Demand Response Provider* may not be relevant. The Proposer has since re-evaluated these definitions and taken the decision to remove *Demand Response Provider* from the proposed definitions for GC0125.

Why are there differences between the requirements on HVDC systems when compared to that of Generators?

The Workgroup noted that in the draft legal text for GC0125 that there are some cases in the European Connection Conditions (for example ECC.6.3.5) where the proposed GC0125 requirements for Black Start were different between Generators and HVDC Systems parties. The Proposer advised that this was correct as the requirements for Black Start as codified in EU Regulation 2016/631 Requirements for Generators is different to that in EU Regulation 2016/1447 HVDC, and that these differences had simply been mapped across to the GB Grid Code as part of the implementation of the European Connection Network Codes.

Future aspirations for our Codes

A Workgroup member noted that the ideal way forward would be to be technology neutral when drafting requirements for situations such as Black Start, suggesting NGESO would have a requirement which would be the same regardless of the technology providing it. The Workgroup noted that this is an ideal aspiration but would be out of scope of this GC0125 modification.

Block loading capability

To ensure consistency between Generation and HVDC Systems, the data required from Generators includes the requirements for *Block Load Capability*. This is effectively the incremental *Active Power* steps from no load to Rated MW which a Generator can instantaneously supply without causing it to trip or go outside the frequency range 47.5Hz – 52Hz.

This data is required for Generation as provided for under PC.A.5.7 of the Grid Code and reflected in the Schedule 16 of the Data Registration Code (DRC). To reflect

consistent and equitable treatment between Generation and HVDC Systems, similar requirements have been added to HVDC Systems with amendments being made to PC.A.5.7 and DRC Schedule 16 in the proposed legal text for GC0125. In practice, HVDC Systems tend to have a continuous active power ramping capability rather than block load increments, however the GB Grid Code has been updated to ensure equitable treatment between HVDC Systems and generation.

Demand Response Providers in the early stages of Black Start

One Workgroup member noted that it could be unclear as to how a Demand Response Provider would be used within a Black Start situation. The Proposer has since re-evaluated the legal text and taken the view that it would be appropriate to remove the term "Demand Response Provider" from the definition of "Defence Service Provider" or "Restoration Service Provider" on the basis that they would not be obligated to satisfy the full requirements of the Grid Code and they are only required to satisfy those conditions of their Commercial Contract which may not necessarily extend to the measures of the E&R NC. However, another Workgroup member noted that if the Demand Response Provider was providing a restoration service (that is providing a service contributing to one or several measures of the System Restoration Plan) to NGESO then that would be covered by the requirements of the E&R NC. In general terms if a Demand Response Provider was considered to be a Restoration Service Provider it would be treated as a User under the Grid Code and therefore caught by the requirements of the Operation and Balancing Codes.

Post Workgroup Consultation discussions

The Workgroup met on the 18 July 2019 to discuss the four Workgroup Consultation responses received and summaries in Section 6.

The Workgroup discussed the legal text questions and amendments and the legal text has since been revised.

A Workgroup member formally raised their potential alternative on Black Start Contracts. The legal text is the same as the Proposal from the ESO other than one definition amendment as follows;

Black Start Contract	An agreement; between a **Generator** or an **HVDC System Owner** and **The Company** under which the **Generator** or an **HVDC System Owner** or a **DC Converter Station Owner** provides **Black Start Capability** and other associated services; in accordance with the terms and conditions to act as restoration service provider on a contractual basis approved by the Authority in accordance with Article 4 (2) (b) and (4).or as amended in accordance with Article 4(7), of Regulation (EU) 2017/2196.

The Workgroup all agreed that this definition amendment should be submitted to the Authority for a decision as it is better than what we have in the Grid Code today when comparing to the baseline and reviewing the Grid Code objectives. This was formally made WAGCM1.

9 Workgroup Consultation summary

Four responses were received to the Workgroup Consultation which closed on the 12 July 2019. Consultation respondents were largely supportive of the modification other than one respondent who stated that the ESO, as Proposer were not fulfilling their obligations to fully implement the E&R NC. This is with reference to the alternative that has been raised and the wording around the Black Start Contract. Table 1 below summaries the four responses received. The Chair of GC0125 sought feedback from the members that are interconnectors and did not respond to the consultation; they stated that they were content with the work that had been completed to date and that they had the opportunity to feed in within meetings and therefore did not feel a need to respond formally to the Workgroup Consultation.

Table 1: Workgroup Consultation Responses

Response from	Q1: Do you believe that GC0125 Original proposal, better facilitates the Grid Code Objectives?	Q2: Do you support the proposed implementation approach?	Q3: Do you have any other comments?	Q4: Do you wish to raise a Workgroup Consultation Alternative request for the Workgroup to consider?
Northern Power Grid	Yes, the proposal provides a level playing field for parties providing black start services	Yes	No, just legal text comments	No
Scottish Power Energy Networks	Yes, subject to achieving clarification on the comments noted below.	Yes	What is the meaning of 'HVDC achieving a stable operating point at an agreed capacity as agreed with the Company'? Is this related to capability to operate at a specific transfer, if yes, how can this be tested?	No
SSE Generation Ltd	In our view GC0125 fails to better achieve Applicable Objective (d) as it fails to fully implement all the legal requirements set out in ERNC.	The proposed implementation approach is not clear – is it ten Working Days after an Authority decision (like similar Grid Code Modifications) or some other date? Given this we cannot at this stage support an unknown implementation	Noting the discussion on page 13 of the consultation, we are concerned that NGESO appears to want to contract for Black Start and other related Restoration services in a way that does not apply the Article	No

Response from	Q1: Do you believe that GC0125 Original proposal, better facilitates the Grid Code Objectives?	Q2: Do you support the proposed implementation approach?	Q3: Do you have any other comments?	Q4: Do you wish to raise a Workgroup Consultation Alternative request for the Workgroup to consider?
		approach.	4(2)(b) terms and conditions for Restoration Service Providers that is required by the ERNC. We remind NGESO that they need to fully comply with the requirements within ERNC that apply to them (noting, for example, that to date they have failed to meet some of those requirements by the deadlines set out within ERNC).**Please note that this respondent has raised an alternative as a Workgroup member.**	
Drax Generation Enterprise Ltd	Yes	Yes, as this now implements changes to allow HVDC systems to be providers of Black Start services and going forward makes it easier in future for other parties to provide such services with minimum code changes.	No	No

Response from	Q5. Do you believe the Black Start testing requirements set out in the draft legal text at OC5.7.1(a) – (e) accurately reflects the testing requirements and adequately distinguishes the obligations between Black Start Power Stations and Black Start HVDC Systems acknowledging that there are differences between them on the basis of their technology. Please provide your rationale bearing in mind a power station could be made up of a number of Black Start Generating Units whereas as Black Start HVDC System would apply to each HVDC System.
Northern Power Grid	Yes, subject to the comments in response to question 6.
Scottish Power Energy Networks	Not answered.
SSE Generation Ltd	It is not clear to us how interconnectors will be involved in the Local Joint Restoration Plans. We are concerned that contracted Black Start interconnector providers maybe treated differently to Black Start Generation providers in terms of the services, such as block loading, they are required within the LJRPs to achieve which could be detrimental to the restoration of electricity supplies in GB in the event of a Black Start event.
Drax Generation Enterprise Ltd	Yes as Generators and HVDC are both required to carry out 3 yearly tests.

The Consultation also sought feedback on the proposed legal text that was included. There were a number of comments received. Each response was discussed and addressed within the revised legal text and respondents that were not part of the Workgroup were contacted to ensure they were also content with the amendments as a response to their Consultation feedback.

10 Workgroup Vote

The Workgroup believe that the Terms of Reference have been fulfilled and GC0125 has been fully considered.

The Workgroup met on 07 August 2019 and voted on whether the Original and WAGCM1 would better facilitate the Grid Code Objectives than the baseline and what option was best overall. At the Workgroup meeting held 18 July 2019, the Workgroup agreed to support the proposed alternative put forward which became Workgroup Alternative Grid Code Modification one (WAGCM1).

The Workgroup voted against the Grid Code Objectives for the Original Proposal and WAGCM1. The Workgroup voted and the Workgroup concluded, by majority, that the Original Proposal is the best option. One Workgroup member believed that WACGM1 is best.

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

Workgroup Member	Better facilitates AGCO (i)	Better facilitates AGCO (ii)?	Better facilitates AGCO (iii)?	Better facilitates AGCO (vi)?	Better facilitates AGCO (v)?	Overall (Y/N)
Antony Johnson, National Grid ESO						
Original	Y	Y	Y	Y	-	Y
WAGCM1	N	N	Y	Y	-	N

Voting Statement:

We support the original in implementing the requirements of the EU Emergency and Restoration Code in respect of HVDC Black Start Testing. We also believe the proposals provide a better basis for access to Black Start Providers other than Generators which will increase competition and reduce prices benefiting the end consumer.

Overall, we do not support the Alternative on the basis that it could lead to the contractual terms and conditions for Black Start services needing to use the Grid Code modification process. The ESO believes that there is value in the greater flexibility of being able to maintain Terms & Conditions outside the codes and that there is in any case still a direct route for approval by Ofgem through the Standard Contract Terms process. Further, the ESO does not believe that the EU Emergency and Restoration Code contains provisions for Black Start Contracts to be subject to the GB Grid Code Governance Process as the

only area in which harmonisation is sought is in the testing requirements.

Garth Graham, SSE Generation Ltd						
Original	Y	Y	Y	N	-	N
WAGCM1	Y	Y	Y	Y	-	Y

Voting Statement:

Both Original and Alternative proposals are an improvement compared to current Baseline for AGCO (i), (ii) and (iii); as it will facilitate additional technology providers to be able to provide restoration services to the System Operator, thus improving security of supply and increasing competition to procure service at the most efficient price for GB consumers.

The original proposal however, fails to fully implement all of the legal requirements of the E&RNC, specifically Article 4 (2) (b), which requires the terms and conditions that will be applicable to restoration providers to be submitted by the TSO and approved by the NRA.

Compliance with European Law, as set out in the E&RNC, takes legal precedence over any current national regulatory requirements. As a result, the current GB 'contractual flexibility' approach may not be compatible, going forward, with the harmonisation and standardised approach to contracting for restoration service providers required by E&RNC.

On the basis that it may not comply fully with European Law, the original therefore does not fully facilitate AGCO (iv).

Implementing an incomplete legal solution that may risk legal challenge and market disruption in the future (for example, successful legal challenge of GB Capacity Market regulations and its consequences), outweighs the positive aspects of the original proposal, so overall the original does not better facilitate the AGCOs.

WAGCM1 addresses the omission referenced above, and therefore does better facilitate AGCO (iv). Combined with the other positive aspects of the modification, WAGCM1 does better facilitate the AGCOs overall.

Robert Selbie, ElecLink Limited						
Original	Y	Y	Y	Y	-	Y
WAGCM1	Y	Y	Y	Y	-	Y

Voting Statement: Both versions implement EU law and now will allow HVDC systems to

provide blackstart services.						
Abdi Osman, IFA2						
Original	Y	Y	Y	Y	-	Y
WAGCM1	Y	Y	Y	Y	-	Y
Voting Statement: No voting statement provided by the Workgroup member.						
Alastair Frew, Drax Enterprise Ltd						
Original	Y	Y	Y	Y	-	Y
WAGCM1	Y	Y	Y	Y	-	Y
Voting Statement: Both versions implement EU law and now will allow HVDC systems to provide blackstart services.						

Vote 2– *Which option is the best? (Baseline, Proposer solution (Original Proposal) or WAGCM1*

Workgroup Member	BEST Option?
Antony Johnson	Original
Garth Graham	WAGCM1
Russell Smalley	Not present
Robert Selbie	Original
Abdi Osman	Original
Alastair Frew	Original
Nigel Wood	Not present

11 Proposers 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	Positive - 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);	Positive - Specifying these requirements will make it easier for interconnectors to offer black start as a service, thereby opening up the market to more participants and increasing competition.
(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 - Encouraging more black start providers will allow for additional system security should a black start event ever occur.
(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

12 Implementation

National Grid ESO is required to have implemented the System Restoration Plan[6] by 18th December 2019; therefore this GC0125 modification needs to have been approved and implemented by this deadline.

This modification should be implemented 10 working days following a decision from the Authority or no later than 17 December 2019.

13 Code Administrator Consultation: Responses

The Code Administrator Consultation was issued on 6 September 2019 for 15 working days, with a closing date of 27 September 2019.

Two responses were received to the Code Administrator Consultation and are detailed in the table below.

[6] And the System Defence Plan, which is not part of this GC0125 proposal (as it is addressed via a separate Grid Code proposal, GC0127).

Response from	Q1: Do you believe that GC0125 better facilitates the Applicable Grid Code Objectives? Please include your reasoning.	Q2: Do you support the proposed implementation approach? If not, please provide reasoning why.	Q3: Do you have any other comments?
Drax Generation Enterprise Ltd	Yes as it implements EU law and also now enables Interconnectors to provide Blackstart services.	Yes	No

SSE Generation Ltd.	Original Overall the Original proposal does **not** better facilitate the Applicable Grid Code Objectives. This is because the Original fails to implement the requirement in E&R NC for a harmonised and legally compliant approach to the terms and conditions to act as a restoration service provider in GB. As noted on page 14 of this consultation the Original 'retains the current contractual *flexibility* or tender approach which is currently adopted in GB'. It does not reflect that the GB contractual arrangements, for restoration service providers, are now subject to the E&R NC requirements which sit, in law, above the GB framework and this does not accord with the '*flexibility'* in contractual or tendering arrangements that the Original perpetuates. Furthermore, with the Original, all these *flexible* terms and conditions for GB restoration service	We note the comments in Section 10 as regards Implementation and we are mindful that a number of E&R NC requirements on the TSO (such as those regarding the notification of SGUs by the TSO by 18th December 2018) have still to be completed. We also note that given the deficiencies in the TSO's E&R NC submissions in respect of the System Defence Plan, the System Restoration Plan, the terms and conditions for system defence providers and system restoration providers etc., that it is not clear to us at this time that	We are surprised and very concerned that the TSO has chosen not to adopt the straightforward legal text changes set out in the WACM within its Original proposal. We would urge the members of the GCRP and the Authority to take a moment to look at the simple difference in the legal text (between the WACM and the Original) which, in totality, is as shown below in red: "…in accordance with the terms and conditions to act as restoration service provider on a contractual basis approved by the Authority in accordance with Article 4 (2) (b) and (4).or as amended in accordance with Article 4(7), of Regulation (EU) 2017/2196." It is a legal requirement, according to the two parts of Article 4 referenced in the WACM legal text (which we reproduce in blue text below) that this be done by the TSO – we have underlined the 'shall' in the quote from the relevant parts of Article 4 below to highlight that these are obligations on the TSO (and not, as the Original proposal does, apply an 'optionality' or '*flexibility*' to the TSO performing these tasks). By not incorporating the WACM legal text changes into the Original the TSO is clearly putting into effect its preferred '*flexibility*' approach to the terms and conditions for GB restoration service providers (which E&R NC does not legally permit).

	providers are not subject to either public consultation or NRA approval, which is non-compliant with the E&R NC requirements (in Articles 4 and 7). As the European Commission has identified; in their Impact Assessment[7] into the Network Codes documentation; there are significant detrimental impacts on end consumers in applying a non-harmonised ('*flexible*') approach to the terms and conditions for the services required by the E&R NC including in the case of GC0125, restoration service providers. This, for example, the Commission noted leads to a less competitive market (which is not better in terms of Applicable Objectives (b) and (c)). WACM Overall the WACM proposal does **better** facilitate the Applicable Grid Code Objectives. In terms of (a) it is better because it permits the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity as it complies with	the 18th December 2019 deadline is achievable in any event.	However, for those GB restoration service providers who contract on the TSO's '*flexibility*' basis there is the real risk that those terms and conditions, by being incompatible with the legal requirements in E&R NC, are invalid. In addition, we are not certain that the TSO would be permitted to seek to recover or the NRA would be able to approve the recovery, by the TSO, of any costs in accordance with Article 8 of E&R NC that the TSO has incurred in procuring restoration services from GB providers on the basis of terms and conditions that were not in accordance with the requirements of E&R NC. Furthermore, we note that the NRA does not have the power under E&R NC to derogate the TSO from their obligations, set out in the E&R NC, including in terms of the TSO having to comply with the requirements in Article 4 etc., regarding the GB terms and conditions for restoration service providers (which pertains to the Original and WACM). [Article 4] (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: …. (b) the terms and conditions to act as restoration service

[7] Available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52016SC0410

	the E&R NC, the Recitals of which address these items. In terms of (b) it is better because in specifying these requirements it will make it easier for interconnectors to offer black start as a restoration service, thereby opening up the market to more participants and increasing competition in a compliant contractual way that ensures a level playing field and does not (as the Original does) distort competition. In terms of (c) it is better because by encouraging more restoration service providers it will allow for additional system security should a black start/restoration event ever occur. In terms of (d) it is better because it discharges the obligations of the Emergency and Restoration Network Code to have harmonised terms and conditions for restoration service providers in GB frameworks that have been publicly consulted upon and subject to NRA approval.		providers on a contractual basis in accordance with paragraph 4; …. [paragraph] 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.” [emphasis added] [Article] 4 (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.”

14 Grid Code Review Panel Views

At the Grid Code Review Panel meeting on 25 October 2019, the Panel carried out recommendation vote against the Applicable Grid Code Objectives.

The Panel members by majority recommended that both the GC0125 Original and WACM1 better facilitated the Grid Code Objectives than the Baseline. Of the 8 votes, 5 thought the Original was the best option and 3 thought WACM1 was the best option.

For reference the Applicable Grid Code Objectives are:

(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.

Vote 1: ***Does the Original facilitate the objectives better than the Baseline?***

Panel Member: Alastair Frew

	Better facilitates ACO (a)	Better facilitates ACO (b)?	Better facilitates ACO (c)?	Better facilitates ACO (d)?	Better facilitates ACO (e)?	Overall (Y/N)
Original	Yes	Yes	Yes	Yes	Neutral	Yes
WAGCM1	Yes	Yes	Yes	Yes	Neutral	Yes
	Voting Statement					
Both versions implement EU law and now will allow HVDC systems to provide blackstart services. Do not see the need to add contract requirements into the Grid Code as this is not the place to put these requirements.						

Panel Member: Christopher Smith

	Better facilitates ACO (a)	Better facilitates ACO (b)?	Better facilitates ACO (c)?	Better facilitates ACO (d)?	Better facilitates ACO (e)?	Overall (Y/N)
Original	Yes	Yes	Yes	Yes	Neutral	Yes
WAGCM1	Yes	Yes	Yes	Yes	Neutral	Yes
	Voting Statement					
Whilst both original & WACM1 improve on the baseline I would vote with the Original. I don't agree that T&C's should be encased in the Grid Code.						

Panel Member: Damian Jackman

	Better facilitates ACO (a)	Better facilitates ACO (b)?	Better facilitates ACO (c)?	Better facilitates ACO (d)?	Better facilitates ACO (e)?	Overall (Y/N)
Original	Yes	No	Yes	No	Neutral	No
WAGCM1	Yes	Yes	Yes	Yes	Neutral	Yes
	Voting Statement					
The original proposal does not appear to fulfil the legal requirements of Articles 4 & 7 of the Emergency and Restoration Code. This leaves open the possibility of future legal challenge regarding black start contracts and permits the ESO to develop its own non-harmonised terms and conditions which avoid scrutiny from either the wider industry or the Regulator, thereby leading to a less competitive market.						

Panel Member: Joe Underwood

	Better facilitates ACO (a)	Better facilitates ACO (b)?	Better facilitates ACO (c)?	Better facilitates ACO (d)?	Better facilitates ACO (e)?	Overall (Y/N)
Original	Yes	Yes	Yes	Yes	Neutral	Yes
WAGCM1	Yes	Yes	Yes	Yes	Neutral	Yes
	Voting Statement					
Both versions will allow for the full implementation of the EU Code E&R. The Alternative (WAGCM1) facilitates the Applicable Code Objectives slightly better than the Original as it better reflects the EU E&R Code.						

Panel Member: Robert Longden

	Better facilitates ACO (a)	Better facilitates ACO (b)?	Better facilitates ACO (c)?	Better facilitates ACO (d)?	Better facilitates ACO (e)?	Overall (Y/N)
Original	Yes	No	Yes	No	Neutral	Yes
WAGCM1	Yes	Yes	Yes	Yes	Neutral	Yes
	Voting Statement					
Although both the Original and WACM1 represent an improvement over the Baseline, the original does not fully implement all of the requirements of the European Emergency and Restoration Code. Therefore, WAGM1 is the preferred option.						

Panel Member: Rob Wilson

	Better facilitates ACO (a)	Better facilitates ACO (b)?	Better facilitates ACO (c)?	Better facilitates ACO (d)?	Better facilitates ACO (e)?	Overall (Y/N)
Original	Yes	Yes	Yes	Yes	Neutral	Yes
WAGCM1	No	No	No	No	Neutral	No
	Voting Statement					
In basis this is a very simple modification that extends existing Grid Code conditions for the provision of black start services by generators to interconnectors. It also extends the requirements (already progressed under GC0108 for generators) to align compliance testing requirements with those set out in the Emergency & Restoration European Network Code. Noting that any provision of black start services in GB is on a voluntary basis, the original is a minimum solution maintaining flexibility; WAGCM1 removes this flexibility by requiring any terms and conditions for restoration service providers to be approved by the authority. This is not a simple or minor change. Similar points to this have been discussed in the implementation of other European Network Code requirements and were not supported in decisions made by the Authority (for example, GC0104 and GC0114, alternatives to both of which required Authority approval of standard contract terms). Legal advice on this point supporting the original was discussed in the workgroup and is provided as part of the final report. No contrary legal advice has been received supporting the WAGCM.						

Panel Member: Richard Woodward (Alternate to Ross McGhin)

	Better facilitates	Better facilitates	Better facilitates	Better facilitates	Better facilitates	Overall (Y/N)

	ACO (a)	ACO (b)?	ACO (c)?	ACO (d)?	ACO (e)?	
Original	Yes	Yes	Yes	Yes	Neutral	Yes
WAGCM1	Yes	Yes	Yes	Yes	Neutral	Yes
	Voting Statement					
Both proposals are an improvement from the baseline; we believe the original applies the necessary changes more proportionately.						

Panel Member: Graeme Vincent (Alternate to Steve Cox)

	Better facilitates ACO (a)	Better facilitates ACO (b)?	Better facilitates ACO (c)?	Better facilitates ACO (d)?	Better facilitates ACO (e)?	Overall (Y/N)
Original	Yes	Yes	Yes	Yes	Neutral	Yes
WAGCM1	Yes	Yes	Yes	Yes	Neutral	Yes
	Voting Statement					
Both versions of the legal [text] implement the requirements arising from Regulation (EU) 2017/2196 (network code on electricity emergency and restoration) and will allow HVDC systems to provide blackstart services.						

At the Grid Code Review Panel meeting on 29 October 2019, the Panel Members by majority recommended that the Original (8 out of 9 votes) and WAGCM1 (8 out of 9 votes) better facilitated the Grid Code objectives than the baseline.

Vote 2 – *Which option is the best?*

The Grid Code Review Panel members also identified their best option and there were 5 votes for the Original and 3 votes for WAGCM1.

Panel Member	BEST Option?
Alastair Frew	Original
Christopher Smith	Original
Damian Jackman	WAGCM1
Joe Underwood	WAGCM1
Robert Longden	WAGCM1

Rob Wilson	Original
Richard Woodward (Alternate to Ross McGhin)	Original
Graeme Vincent (Alternate to Alan Creighton)	Original

Note that 1 Panel Member (Guy Nicholson) abstained from voting.

Annex 1 – Extracts from European Network Codes

Emergency & Restoration Code

Article 46

Compliance testing of HVDC capabilities

Each restoration service provider which is an HVDC system delivering a black start service shall execute a black start capability test, at least every three years, following the methodology laid down in Article 70(11) of Regulation (EU) 2016/1447.

HVDC

Article 71

Compliance testing for HVDC systems

11. With regard to the black start test, if applicable:

(a) the HVDC system shall demonstrate its technical capability to energise the busbar of the remote AC substation to which it is connected, within a time frame specified by the relevant TSO, according to Article 37(2);

(b) the test shall be carried out while the HVDC system starts from shut down;

(c) the test shall be deemed passed, provided that the following conditions are cumulatively fulfilled:

(i) the HVDC system has demonstrated being able to energise the busbar of the remote AC-substation to which it is connected;

(ii) the HVDC system operates from a stable operating point at agreed capacity, according to the procedure of Article 37(3).

Article 37

Black start

1. The relevant TSO may obtain a quote for black start capability from an HVDC system owner.

2. An HVDC system with black start capability shall be able, in case one converter station is energised, to energise the busbar of the AC-substation to which another

converter station is connected, within a timeframe after shut down of the HVDC system determined by the relevant TSOs. The HVDC system shall be able to synchronise within the frequency limits set out in Article 11 and within the voltage limits specified by the relevant TSO or as provided for in Article 18, where applicable. Wider frequency and voltage ranges can be specified by the relevant TSO where needed in order to restore system security.

3. The relevant TSO and the HVDC system owner shall agree on the capacity and availability of the black start capability and the operational procedure.

Annex 2 – Terms of Reference

Annex 3 – Attendance log

Key

A – Attended

X – Absent

O – Alternate

D – Dial-in

Name	Organisation	Role	09/05/2019 (informal meeting)	03/06/2019 (Meeting 1)	13/06/2019 (Meeting 2)	18/07/2019 (Meeting 3)	07/08/2019 (Meeting 4)
Paul Mullen	Code Administrator, NG Electricity System Operator	Chair	A	A	A	x	x
Chrissie Brown	Code Administrator, NG Electricity System Operator	Technical Secretary & Chair last two meetings	A	A	A	A	A
Antony Johnson/Rachel Wood-bridge Stocks	National Grid Electricity System Operator	Proposer/Workgroup member	A	A	A	A	A
Mark Jones	National Grid Electricity System Operator	Subject matter expert	X	A	X	x	D
Alastair Frew	Drax Generation Enterprise Ltd	Workgroup member	D	D	D	D	D
Garth Graham	SSE Generation Limited	Workgroup member	D	D part meeting	D	A	X
Andy Colley	SSE Generation Limited	Alternate Workgroup member	X	D part meeting	D part meeting	X	D
Russell Smalley	Viking Link	Workgroup member	A	A	A	A	X
Nigel Wood	Nemolink Limited	Workgroup member	X	D	D	A	X

Abdi Osman	NG Ventures (IFA2)	Workgroup member	X	A	A	A	D
Rob Selbie	ElecLink Limited	Workgroup member	X	D	D	D	D

Annex 4 – Workgroup Consultation responses

This Annex sets out the four responses that were received as part of the Workgroup Consultation which closed on the 12 July 2019.

Annex 5 – Final legal text

This legal text has been revised following feedback received during the Workgroup Consultation.

Annex 6 – Code Administration Consultation Responses

This Annex sets out the two responses that were received as part of the Code Administrator Consultation which closed on the 27 September 2019.

