

Grid Code Alternative Form

GC0156 Alternative Request 1:

Combined Grid Code/Distribution Code Workgroup - Implementation of Electricity System Restoration Standard

Overview:

This proposed alternative solution includes most of the legal text changes proposed in the Original Modification Proposal except for the parts which retrospectively require;

- 1) existing Generators to modify their plant to be capable of starting their plant in existing cold start timescale following a Total or Partial Shutdown;
- 2) firstly, the Company and finally the Authority to individually assess each Generators request to be derogated against these requirements.

This proposed alternative solution will require existing Generators to provide more detailed information on the current capabilities of their Plant and Apparatus to return to service following a Total or Partial Shutdown. This information can then be used by the ESO to assess the existing capabilities against the Electricity System Restoration Standard (ESRS) and then to enter into commercial contracts with suitable Anchor & Top Generators to fill any short fall in capability, as required by article 4 paragraph 1(d) of Commission Regulation 2017/2196 a network code on electricity emergency and restoration Code as adopted in UK law.

Proposer: Alastair Frew, Drax

Contents

- What is the proposed alternative solution?
- What is the difference between this and the Original Proposal
- What is the impact of this change?
- When will the change take place?
- Acronyms, key terms and reference material
- Appendix 1 Draft Proposed legal changes from Original Modification Proposal

What is the proposed alternative solution?

This proposed alternative solution includes most of the legal text changes proposed in the Original Modification Proposal except for the parts which retrospectively require;

- 1) existing Generators to modify their plant to be capable of starting their plant in existing cold start timescale following a Total or Partial Shutdown;
- 2) firstly the Company and finally the Authority to individually assess each Generators request to be derogated against these requirements.

It is questionable whether most plants can actually achieve their quoted cold start times following a total loss of site power, without carryout significant modification, given that with a total power loss, systems which are not normally shutdown will now additionally need restarting inevitably extending the start times. Whilst the extent of plant modification required will vary dependent on the current site arrangements, we believe this could be very significant Capex and Opex expenditure for most Generators, especially for sites which do not have site based operational staff. However, it should also be noted that even sites with operational staff are resourced to operate the site efficiently under 'normal' conditions. It is highly likely that additional specialised resources will be required by the majority of generators to assess the abnormal conditions which are most likely to have occurred during a system collapse.

To date the Proposer of the Original Modification Proposal has not demonstrated the extent of the current shortfall in capability to achieve ESRS, nor how they expect the Generators to meet these retrospective requirements. To this end we believe it would be better to require that all Generators provide more detailed information on their current plant capabilities, which the ESO can then assess against the ESRS requirements and get a better understanding of and communicate any shortfall. Within the Original Modification Proposal there are arrangements where Generators can enter into commercial contracts where they modify their Plant to become both Anchor and Top Up Generators which are required to have faster guaranteed starting capabilities. We believe that this commercial arrangement is the most cost-effective way of making the required resources and capability is available, rather than mandating that all plants make retrospective changes which may be difficult, costly and might even be surplus to requirements. It should also be noted that Commission Regulation 2017/2196 a network code on electricity emergency and restoration as adopted in UK law in article 4 paragraph 1(d) does require that the System Operator shall "*ensure that TSOs make use of market-based mechanisms as far as is possible to ensure network security and stability*" and it is not clear that this is being achieved by the Original Modification Proposal.

Similarly, it is not clear firstly how The Company or finally the Authority is going to assess the derogation requests, even if these derogation requests are legally permitted. Unlike, other Commission Regulations relating to electricity, Commission Regulation 2017/2196 does not contain any articles on an approved derogation process, so it is not clear that parties can apply for derogations. However, article 5 paragraph 2(g) does say “*where one or more of the parties refuse the action proposed by the TSO within the set deadline, the TSO shall refer the action proposed to the relevant authority for decision, together with a justification of the rationale and objectives of the action proposed by the TSO and of the assessment and position of the parties;*”. This could be considered to be a derogation process. Whilst the Original proposal has been weakened to now firstly include a review by the Company before a derogation request goes to the Authority, when asked the Proposer indicated it was still their view that most existing Generators would be expected to retrospectively comply. Hence most Generators are still likely to end up applying to the Authority.

Draft legal text changes for this Proposed Alternative Modification Proposal from Original Modification Proposal are detailed in appendix 1 based on the current version of the Original legal text.

What is the difference between this and the Original Proposal?

In general, this Alternative Modification Proposal will have the same effect as the Original Modification Proposal by re-enforcing system restoration arrangements.

It will not retrospectively require existing Generators to modify their plant to achieve existing cold start time following loss of site supplies, nor required new Generators to add any resilience to be able to start within cold start times. (Note this alternative modification proposal does not affect the proposed 72 hours communications resilience proposed in modification GC0148, which would still apply if GC0148 is approved).

It will require the ESO to procure all ESRS fast start services commercially using Anchor & Top-up services contracts.

All Generators will be required to submit additional information on their site capabilities to assist the ESO with restoration planning.

Given there are no retrospective aspects it is not envisaged there is a need for derogation requests to go the Authority.

What is the impact of this change?

Proposer's Assessment against Grid Code Objectives	
Relevant Objective	Identified impact
(a) To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity	Positive
(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
(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
(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
(e) To promote efficiency in the implementation and administration of the Grid Code arrangements	Neutral

When will this change take place?

Implementation date:

As per the Original Proposal

Implementation approach:

As per the Original Proposal.

Acronyms, key terms and reference material

Acronym / key term	Meaning
ESO	Electricity System Operator
ESRS	Electricity System Restoration Standard

Reference material:

None

Appendix 1 Draft Proposed legal changes from Original Modification Proposal

The current legal text proposed in the original modification for Operating Codes 1, 2, 5 & 9 and balancing codes 2 & 4 will be included in this potential alternative unchanged.

Connection Conditions (CC) will include all the proposed legal text changes as per the original modification with the following changes, note not all the original changes are shown here. (Black text baseline, blue text proposed original text and red text alternative text).

CC.6.2.2.6 Control Schemes and Settings

CC.6.2.2.6.1 The schemes and settings of the different control devices on a **Generating Unit, Power Park Module** or **DC Converter** that are necessary for **Transmission System** stability and for taking emergency action shall be agreed with **The Company** in coordination with the **Relevant Transmission Licensee** and the **GB Generator** or **DC Converter** owner.

CC.6.2.2.6.2 **Restoration Contractors** shall have the ability to switch from alternative control schemes and settings on their **Plant** and **Apparatus** whilst remaining in service if they are required to satisfy their obligations of a **Restoration Plan**. Changes to any control schemes and settings shall be agreed between **The Company** and/or **Relevant Transmission Licensee** and/or **Network Operator** as part of developing a **Restoration Plan**.

CC.6.2.2.6.3 When requested **Generators** and **DC Converter** owners shall advise **The Company** of the capability of operating their **Generating Units** or **Power Park Modules** or **DC Converters**, with alternative control schemes and settings during the early stages of **System Restoration** whilst in **Power Island** operation. If there is a suitable capability, **The Company** and the **User** shall agree on how it shall be used and kept available.

CC.6.2.2.6.24 Subject to the requirements of CC.6.2.2.6.42 & 3 any changes to the schemes and settings, defined in CC.6.2.2.6.42 & 3, of the different control devices of the **Generating Unit** or **Power Park Module** or **Restoration Contractor's Plant** and **Apparatus** or **DC Converter** shall be coordinated and agreed between, the **Relevant Transmission Licensee**, the **GB Generator**, **Restoration Contractors** and **DC Converter** owner.

...

CC.7.11 Obligations on and Assurance from **The Company**, **GB Code Users** and **Restoration Contractors** during **Total Shutdown** and **Partial Shutdown** conditions

CC.7.11.1 In respect of **The Company**, its **Apparatus** shall be designed such that it can safely shutdown and does not pose a risk to personnel or **Apparatus** in the event of a total loss of supply.

CC.7.11.2 All **GB Code Users** and **Restoration Contractors** shall ensure their **Plant** and **Apparatus** can safely shut down and does not pose a risk to **Plant** and/or personnel in the event of a total loss of supplies at a **GB Code User's Site(s)** or **Restoration Contractor's site** be it caused by a **Total Shutdown**, **Partial Shutdown** or such other event.

CC.7.11.3 ~~In satisfying this requirement,~~ **Generators**, **DC Converter** owners who are not and **Restoration Contractors** shall provide ~~be able to demonstrate to **The Company** that in the event supplies were to be lost to their **Site**, then on the restoration of supplies,~~ in relation to an event where supplies are lost to their **Site**, an estimate of the time they expect their **Plant** can be made operational and begin to operate ~~in at least the same way and as quickly as would be expected for a cold start~~ following restoration of supplies to their **Site** ~~a **Total System Shutdown** or **Partial System Shutdown**~~ in accordance with the data submitted in PC.A.5.7 in accordance with the Week 24 process. To improve the accuracy of the estimated operational timescales **Generators**, **DC Converter** owners who are not **Restoration Contractors** shall prepare a plan detailing how the site will be re-energised and returned to

operation, which they will and start to submit to **The Company** as part of their year 2025 Week 24 submission on schedule 16. ~~For GB Code Users where they believe this requirement is cost prohibitive or technically impossible, such GB Code Users shall discuss the issue with The Company, and The Company shall inform The Authority of the details agreed. Where such an issue cannot be agreed by The Company following all reasonable attempts or where the capability provided by the GB Code User cannot be agreed by The Company as being sufficient after examining all reasonable alternative solutions through the Compliance Processes, the GB Code User may apply for a derogation from the Grid Code.~~

- CC.7.11.34 The requirements of ECC.7.11.1 and ECC.7.11.2 shall apply for a period of total loss of supplies to **The Company's** operational sites or an **GB Code User's Site** or **Restoration Contractor's** site of up to 72 hours. ~~GB Code Users and Restoration Service Contractors~~ shall confirm to **The Company** that the total loss of supplies to their **Site** for a period of up to 72 hours shall not result in damage to **Plant** and **Apparatus** such that it would then be unable to run upon restoration of site supplies. ~~The estimated restart times for GB Code User's~~ shall be as per the schedule submitted in CC.7.11.3.
- CC.7.11.4.5 **Network Operators** shall ensure that in coordination with **The Company** and relevant **Transmission Licensees**, they have the capability to switch **Demand** at sufficient speed to support **The Company** in satisfying the requirements of the **Electricity System Restoration Standard**. This requirement assumes:
- the successful implementation of **Restoration Plans**,
 - the successful delivery of the obligations of **Restoration Contractors** who are parties to these plans; and
 - the further requirements of OC9.

European Connection Conditions (ECC) will include all the proposed legal text changes as per the original modification with the following changes, again note all the proposed changes in the original are not shown here. (Note black text baseline, blue text proposed original text and red text alternative text.

ECC.6.2.2.7 Control Schemes and Settings

- ECC.6.2.2.7.1 The schemes and settings of the different control devices on the **Power Generating Module** and **HVDC Equipment** that are necessary for **Transmission System** stability and for taking emergency action shall be agreed with **The Company** in coordination with the **Relevant Transmission Licensee** and the **EU Generator** or **HVDC System Owner**.
- ECC.6.2.2.7.2 **Restoration Contractors** shall have the ability to switch from alternative control schemes and settings on their **Plant** and **Apparatus** whilst remaining in service if they are required to satisfy their obligations of a **Restoration Plan**. Changes to any control schemes and settings shall be agreed between **The Company** and/or **Relevant Transmission Licensee** and/or **Network Operator** as part of developing a **Restoration Plan** which shall be in accordance with the requirements of ECC.6.2.2.6.
- ECC.6.2.2.7.3 When requested **Power Generating Modules** and **HVDC Equipment** owners shall advise **The Company** of the capability of operating their **Power Generating Modules** or **HVDC Equipment**, with alternative control schemes and settings during the early stages of **System Restoration** whilst in **Power Island** operation. If there is a suitable capability, **The Company** and the **User** shall agree on how it shall be used and kept available.
- ECC.6.2.2.7.24 Subject to the requirements of ECC.6.2.2.7.42 & 3 any changes to the schemes and settings, defined in ECC.6.2.2.7.42 & 3, of the different control devices of the **Power Generating Module** or **Restoration Contractor** or **HVDC Equipment** shall be coordinated and agreed between, the **Relevant Transmission Licensee**, the **EU Generator**, **Restoration Contractor** and **HVDC System Owner**.

...

ECC.7.11 Obligations on and Assurance from The Company, EU Code Users and Restoration Contractors during Total Shutdown and Partial Shutdown conditions

ECC.7.11.1 In respect of **The Company**, its **Apparatus** shall be designed such that it can safely shutdown and does not pose a risk to personnel or **Apparatus** in the event of a total loss of supply.

ECC.7.11.2 All **EU Code Users** and **Restoration Contractors** shall ensure their **Plant** and **Apparatus** can safely shut down and does not pose a risk to **Plant** and/or personnel in the event of a total loss of supplies at a **EU Code User's Site(s)** or **Restoration Contractor's** site be it caused by a **Total Shutdown**, **Partial Shutdown** or such other event.

~~ECC.7.11.3 In satisfying this requirement, **Generators**, and **HVDC System Owners** who are not and **Restoration Contractors** shall provide be able to demonstrate to **The Company** that in the event supplies were to be lost to their **Site**, then on the restoration of supplies, in relation to an event where supplies are lost to their **Site**, an estimate of the time they expect their **Plant** can be made operational and begin to operate in at least the same way and as quickly as would be expected for a cold start following restoration of supplies to their **Site** a **Total System Shutdown** or **Partial System Shutdown** in accordance with the data submitted in PCA.5.7 in accordance with the Week 24 process. To improve the accuracy of the estimated operational timescales **Generator** and **HVDC System Owners** who are not **Restoration Contractors** shall prepare a plan detailing how the site will be re-energised and returned to operation, which they will and start to submit to **The Company** as part of their year 2025 Week 24 submission on schedule 16. For **EU Code Users** where they believe this requirement is cost prohibitive or technically impossible, such **EU Code Users** shall discuss the issue with **The Company**, and **The Company** shall inform **The Authority** of the details agreed. Where such an issue cannot be agreed by **The Company** following all reasonable attempts or where the capability provided by the **EU Code User** cannot be agreed by **The Company** as being sufficient after examining all reasonable alternative solutions through the Compliance Processes, the **EU Code User** may apply for a derogation from the **Grid Code**.~~

~~ECC.7.11.34~~ The requirements of ECC.7.11.1 and ECC.7.11.2 shall apply for a period of total loss of supplies to **The Company's** operational sites or an **EU Code User's Site** or **Restoration Contractor's** site of up to 72 hours. ~~**EU Code Users** and **Restoration Service Providers**~~ shall confirm to **The Company** that the total loss of supplies to their **Site** for a period of up to 72 hours shall not result in damage to **Plant** and **Apparatus** such that it would then be unable to run upon restoration of site supplies. ~~The estimated restart times for **EU Code User's** shall be as per the schedule submitted in ECC.7.11.3.~~

ECC.7.11.4 **Network Operators** shall ensure that in coordination with **The Company** and relevant **Transmission Licensees**, they have the capability to switch **Demand** at sufficient speed to support **The Company** in satisfying the requirements of the **Electricity System Restoration Standard**. This requirement assumes:

- the successful implementation of **Restoration Plans**;
- the successful delivery of the obligations of **Restoration Contractors** who are parties to these plans; and
- the further requirements of OC9.

Glossary and Definitions (G&D) will include all the proposed legal text changes as per the original modification with the following changes to the definition of **Top Up Restoration Capability**, again note all

the proposed changes in the original are not shown here. (Black text baseline, blue text proposed original text and red text alternative text.

Top Up Restoration Capability

Top Up Restoration Capability	<p>The ability of a Restoration Contractor's Plant to Start-Up from Shutdown and to be Synchronised and remain Synchronised to a part of the Total System upon instruction from The Company or Relevant Transmission Licensee (in Scotland) or relevant Network Operator, within a defined time period, pursuant to the terms of the Top Up Restoration Contract, once external electrical power supplies are restored to that Restoration Contractor's site. In the case of a Local Joint Restoration Plan, an instruction from The Company or Transmission Licensee in Scotland to a Restoration Contractor in respect of their Top Up Restoration Plant would generally be issued immediately after an instruction to an Anchor Restoration Contractor with the Top Up Capability expected to be delivered consecutively after external power supplies had been restored to the Top Up Restoration Contractors site. In the case of a Distribution Restoration Zone Plan, an instruction from a Network Operator to a Restoration Contractor in respect of their Top Up Restoration Plant would generally be issued immediately after an instruction to an Anchor Restoration Contractor with the Top Up Capability expected to be delivered consecutively after external power supplies had been restored to the Top Up Restoration Contractors site. For the avoidance of doubt a Restoration Contractor with a Top Up Restoration Capability shall have sufficient Auxiliary Energy Supplies to be capable of delivering the service they have agreed to supply as soon as their Connection Point or User System Entry Point is energised.</p>
--------------------------------------	--

Planning Code (PC) will include all the proposed legal text changes as per the original modification with the following changes, again note all the proposed changes in the original are not shown here. (Black text baseline, blue text proposed original text and red text alternative text.

PC.A.5.7 **System Restoration Black Start** Related Information

PC.A.5.7.1 Data identified under this section PC.A.5.7.1 must be submitted as required under PC.A.1.2. This information may also be requested by **The Company** during **System Restoration Black Start** and should be provided by **Generators**, **HVDC System Owners** and **DC Converter Station Owners** where reasonably possible. For the avoidance of doubt, **Generators** in this section PC.A.5.7.1 means **each Generator in respect of their BM Unit at any directly connected Power Station or Large Power Station (excluding Generators in respect of Embedded Medium Power Stations and Embedded Small Power Stations).**

The data items/text in (a) and (b) below must be supplied, by each **Generator and HVDC System Owner** and **DC Converter Station owner** to **The Company**. In the case of **Generators**, the data supplied should be with respect to each **BM Unit at any directly connected Power Station or Large Power Station** .For the avoidance of doubt, the data required under PC.A.5.7 (a) and (b) below, i) does not need to be supplied in respect of **Restoration Contractor's Plant** and ii), only needs to be supplied in respect of **each BM Unit at a Large Power Station or any directly connected Power Station** and does not need to include **Generating Unit** data;

- (a) The expected time for each **BM Unit** to be **Synchronised** following a **Total Shutdown** or **Partial Shutdown**. The assessment should include the **Power Station's** or **HVDC System's** or **DC Converter Station's** ability to re-synchronise all **BM Units**, if all were running immediately prior to the **Total Shutdown** or **Partial Shutdown** once auxiliary supplies have been restored, or supplies have been restored to the **User's Site** where the **Plant** was running immediately prior to the **Shutdown** and at time intervals of 12 hours, 24 hours, 36 hours, 48 hours and 72 hours prior. Additionally this should ~~detail-highlight~~ any specific issues (i.e. those that would have an impact on the **BM Unit's** time to be **Synchronised**) ~~such a site resilience, resources and others~~ that may arise, as time progresses without external supplies being restored or the availability of primary fuel supplies ~~such as gas supplies, coal stocks or water levels~~. In submitting this data, **Generators**, **HVDC System Owners** and **DC Converter Station** owners should also be aware of the requirements in CC.7.11 or ECC.7.11.
- (b) **Block Loading Capability**. This should be provided in either graphical or tabular format showing the estimated block loading capability from 0MW to **Registered Capacity** and the time between each incremental step. Any particular **Active Power** loading points at which the **BM Unit** should be operated until further changes in output can be accommodated should also be identified. The data of each **BM Unit** should be provided for the condition of a **Generating Unit** (which ~~is considered as a 'hot' unit~~ was running immediately prior to the **Shutdown**) and at time intervals of 12 hours, 24 hours, 36 hours, 48 hours and 72 hours prior ~~a cold unit (having not operated for 48 hours or more prior to the Shutdown)~~. In the case of an **HVDC System** or **DC Converter Station**, data should be provided when the **HVDC System** or **DC Converter Station** (which was running immediately prior to the **Shutdown**) and at time intervals of 12 hours, 24 hours, 36 hours, 48 hours and 72 hours prior to the **HVDC System** or **DC Converter Station** had been **Shutdown**. ~~has been operating immediately prior to the Total Shutdown or Partial Shutdown and equally when the HVDC System or DC Converter Station has been Shutdown for a period of 48 hours or more~~. The block loading assessment should be done against a frequency variation of ~~479.5Hz – 520.5Hz~~.

Data Registration Code (DRC) will include all the proposed legal text changes as per the original modification with the following changes to schedule 16 on the next pages, again note all the proposed changes in the original are not shown here. (Black text baseline, blue text proposed original text and red text alternative text).

No information collated under this Schedule will be transferred to the **Relevant Transmission Licensees****SCHEDULE 16 – SYSTEM RESTORATION INFORMATION****PAGE 1 OF 6****PART I****SYSTEM RESTORATION INFORMATION (EXCLUDING THOSE PARTICIPATING IN DISTRIBUTION RESTORATION ZONES)**

The following data/text items are required from each **Generator** for each **BM Unit** at a **Large Power Station** as detailed in PC.A.5.7. Data is not required for **Restoration Contractor's Plant and Apparatus** or **Electricity Storage Modules** which have short cycle times. The data should be provided in accordance with PC.A.1.2 and also, where possible, upon request from **The Company** during a **System Restoration**. For **Restoration Contractors** who are party to a **Distribution Restoration Zone Plan**, the data submitted should be supplied as part of Schedule 6 of this **Data Registration Code**.

Data Description (PC.A.5.7.1) (■ CUSC Contract)	Units	Data Category
Site name	Text	
Location	Text	
Identity and size of all BMUs at this location	MW	
Are there personnel on site 24 hours a day?	Yes/No	
If yes what is the minimum number of personnel on site at any time?		
Is the site controlled from this location?	Yes/No	
If not where is the Control Point ?	Text	
Does the Control Point for this site control any other sites?	Yes/No	
How many sites does the control point cover and what is the total power of all these sites?		

No information collated under this Schedule will be transferred to the **Relevant Transmission Licensees**

SCHEDULE 16 – SYSTEM RESTORATION INFORMATION

PAGE 2 OF 6

PART I

SYSTEM RESTORATION INFORMATION (EXCLUDING THOSE PARTICIPATING IN DISTRIBUTION RESTORATION ZONES)

The following data/text items are required from each **Generator** for each **BM Unit** at a **Large Power Station** as detailed in PC.A.5.7. Data is not required for **Restoration Contractor's Plant and Apparatus** or **Electricity Storage Modules** which have short cycle times. The data should be provided in accordance with PC.A.1.2 and also, where possible, upon request from **The Company** during a **System Restoration**. For **Restoration Contractors** who are party to a **Distribution Restoration Zone Plan**, the data submitted should be supplied as part of Schedule 6 of this **Data Registration Code**.

Data Description (PC.A.5.7.1) (■ CUSC Contract)	Units	Data Category
Site Electrical Supplies and Electrical Resilience		
Main Site		
Site Connection Points for BMUs & Station transformers	Text	
Does the site have any internal back-up power supplies	Yes/No	
If yes please give details of type, power and duration site can be maintained.	Hours	
What is the time duration the site can be maintained in a state of readiness without external power supplies?	Hours	
What is the time duration the site communication equipment can be maintained in service without external power supplies?	Hours	
Control Point		
Where is the Control Point electrical supply connection? Is it onsite via site connection or other please give details and MPAN as required	Text	
Does the Control Point have any internal back-up power supplies	Yes/No	
If yes please give details of type, power and duration site can be maintained.	Hours	
What is the time duration the Control Point can continue to operate without external power supplies?	Hours	

What is the time duration the Control Point communications equipment can be maintained in service without external power supplies?	Hours	
What is the time duration the Control Point to Site operating capability communications equipment can be maintained in service without external power supplies?	Hours	
Other Auxiliary site Electrical supplies		
Are there any other locations with other electrical power supplies which are operated by the User which are required for the site to operated eg remote intakes at hydro power station, gas take-off points, CW pumphouses	Yes/No	
Where are the electrical supply connections to these other sites? Is it onsite via site connection or other please give details and MPAN as required	Text	
Do these other sites have any internal back-up power supplies	Yes/No	
If yes please give details of type, power and duration site can be maintained.	Hours	
Other Third Party Supplies which the site needs to operate		
Are there any other substances being supplied to site by a third party which if they were not being provided would restrict the site's ability to restart and remain in service, eg water?	Yes/No	
How long can the site operate without these supplies being restored?	Hours	

SCHEDULE 16 – SYSTEM RESTORATION INFORMATION

PAGE 3 OF 6

PART I

SYSTEM RESTORATION INFORMATION (EXCLUDING THOSE PARTICIPATING IN DISTRIBUTION RESTORATION ZONES)

The following data/text items are required from each **Generator** for each **BM Unit** at a **Large Power Station** as detailed in PC.A.5.7. Data is not required for **Restoration Contractor's Plant and Apparatus** or **Electricity Storage Modules** which have short cycle times. The data should be provided in accordance with PC.A.1.2 and also, where possible, upon request from **The Company** during a **System Restoration**. For **Restoration Contractors** who are party to a **Distribution Restoration Zone Plan**, the data submitted should be supplied as part of Schedule 6 of this **Data Registration Code**.

Data Description (PC.A.5.7.1) (■ CUSC Contract)	Units	Data Category
Primary Fuel Type & Storage		
Gas Is there any gas stored on-site or is it completely dependent on the gas mains supply, if there is fuel estimated minimum and maximum generation capacity in MWhrs?	MWhrs	
Oil What are the minimum and maximum oil storage levels in terms of estimated generation capacity in MWhrs?	MWhrs	
Coal What are the minimum and maximum coal storage levels in terms of estimated generation capacity in MWhrs?	MWhrs	
Biomass What are the minimum and maximum biomass storage levels in terms of estimated generation capacity in MWhrs?	MWhrs	
Hydro Is the site run of river or is there on-site water storage, and what is the estimated minimum and maximum generation capacity in MWhrs?	MWhrs	
Battery What are the minimum and maximum battery storage levels in terms of estimated generation capacity in MWhrs?	MWhrs	
Wind		

Other	MWhrs	
-------	-------	--

SCHEDULE 16 – SYSTEM RESTORATION INFORMATION**PAGE 4 OF 6****PART I****SYSTEM RESTORATION INFORMATION (EXCLUDING THOSE PARTICIPATING IN DISTRIBUTION RESTORATION ZONES)**

The following data/text items are required from each **Generator** for each **BM Unit** at a **Large Power Station** as detailed in PC.A.5.7. Data is not required for **Restoration Contractor's Plant and Apparatus** or **Electricity Storage Modules** which have short cycle times. The data should be provided in accordance with PC.A.1.2 and also, where possible, upon request from **The Company** during a **System Restoration**. For **Restoration Contractors** who are party to a **Distribution Restoration Zone Plan**, the data submitted should be supplied as part of Schedule 6 of this **Data Registration Code**.

Data Description (PC.A.5.7.1) (■ CUSC Contract)	Units	Data Category
Protection and Electrical Switching		
Main Plant		
Site Connection Points for BMUs & Station transformers	Text	
How is all the electrical protection reset and does it require to be carried out locally or remotely?	Text	
What are the procedures for resetting protection and who is authorised to reset protection and are they on-site?	Text	
Are there any mechanical protection devices such as overspeed devices and do these need to be reset locally?	Text	
Auxiliary Plant		
How is all the electrical protection on the auxiliary plant reset and does it require to be carried out locally or remotely?	Text	
Electrical Switching		
Who carries out the electrical switching on-site your employees or contractors?	Text	
Are there staff on this site authorised for electrical switching?	Text	
If authorised personnel are not normally on site what are the arrangements to get them to site?	Text	

SCHEDULE 16 – SYSTEM RESTORATION INFORMATION

PAGE 5 OF 6

PART I

SYSTEM RESTORATION INFORMATION (EXCLUDING THOSE PARTICIPATING IN DISTRIBUTION RESTORATION ZONES)

The following data/text items are required from each **Generator** for each **BM Unit** at a **Large Power Station** as detailed in PC.A.5.7. Data is not required for **Restoration Contractor's Plant and Apparatus** or **Electricity Storage Modules** which have short cycle times. The data should be provided in accordance with PC.A.1.2 and also, where possible, upon request from **The Company** during a **System Restoration**. For **Restoration Contractors** who are party to a **Distribution Restoration Zone Plan**, the data submitted should be supplied as part of Schedule 6 of this **Data Registration Code**.

Data Description (PC.A.5.7.1) (■ CUSC Contract)	Units	Data Category
Assuming all BM Units were running immediately prior to the Total Shutdown or Partial Shutdown and in the event of loss of all external power supplies, provide the following information:		
From loss of external site supplies what is the estimated time for this site to be ready to be re-energised?	Hours	
Expected time for the first and subsequent BM Units to be Synchronised , at time intervals of 12 hours, 24 hours, 36 hours, 48 hours and 72 hours from the restoration of external power supplies, assuming external power supplies are not available at the User's Site for up to 2472hrs	Hours Tabular or Graphical	DPD II
Describe any likely issues that would have a significant impact on a BM Units time to be Synchronised arising as a direct consequence of the inherent design or operational practice of the HVDC System or DC Converter Station and/or BM Unit , e.g. time from a Total Shutdown or Partial Shutdown at which batteries would be discharged. or the availability of primary fuel.	Text	DPD II
Block Loading Capability:		
Provide estimated Block Loading Capability from 0MW to Registered Capacity and the time between each incremental step of each BM Unit based on the unit being 'hot' (run prior to shutdown) and also 'cold' (not run for 48hrs or more prior to the shutdown). was running immediately prior to the Shutdown and at time intervals of 12 hours, 24 hours, 36 hours, 48 hours and 72 hours after the BM Unit had been Shutdown . The Block Loading Capability should be valid for a frequency deviation of 49.5Hz – 50.5Hz. The data should identify any required 'hold' points.	Tabular or Graphical	DPD II

SCHEDULE 16 – SYSTEM RESTORATION INFORMATION

PAGE 6 OF 6

PART II

SYSTEM RESTORATION INFORMATION (EXCLUDING THOSE PARTICIPATING IN DISTRIBUTION RESTORATION ZONES)

The following data/text items are required from each **HVDC System Owner** or **DC Converter Station Owner** for each **HVDC System** and **DC Converter** as detailed in PC.A.5.7. Data is not required for **Restoration Service Providers Plant and Apparatus**. The data should be provided in accordance with PC.A.1.2 and also, where possible, upon request from **The Company** during a **System Restoration**.

Data Description (PC.A.5.7.1) (■ CUSC Contract)	Units	Data Category
Assuming all BM Units were running immediately prior to the Total Shutdown or Partial Shutdown and in the event of loss of all external power supplies, provide the following information:		
a) Expected time for the first and subsequent BM Units to be Synchronised , at time intervals of 12 hours, 24 hours, 36 hours, 48 hours and 72 hours from the restoration of external power supplies, assuming external power supplies are not available at the User's Site for up to 72hrs	Tabular or Graphical	DPD II
b) Describe any likely issues that would have a significant impact on a BM Units time to be Synchronised arising as a direct consequence of the inherent design or operational practice of the HVDC System or DC Converter Station and/or BM Unit , e.g. time from a Total Shutdown or Partial Shutdown at which batteries would be discharged.	Text	DPD II
Block Loading Capability:		
) Provide estimated incremental Active Power steps, from no load to Rated MW and the time between each incremental step which an HVDC System or DC Converter Station can instantaneously supply without causing it to trip or go outside the Frequency range of 47.5Hz – 52Hz (or an otherwise agreed Frequency range). The time between each incremental step shall also be provided. In addition data should be provided from 0MW to Registered Capacity of each BM Unit based on the HVDC System or DC Converter Station being (not run for 48hrs or more prior to the shutdown) or run immediately before the Partial Shutdown or Total Shutdown . was running immediately prior to the Shutdown) and at time intervals of 12 hours, 24 hours, 36 hours, 48 hours and 72 hours after the BM Unit had been Shutdown .	Tabular or Graphical	DPD II

The data supplied should be valid for a Frequency deviation of 49.5Hz – 50.5Hz and should identify any required 'hold' points.		
Governor Setting Information		
From 2025 onwards, Restoration Contractors, Generators, HVDC System Owners and DC Converter owners, shall supply the governor setting information in accordance with the applicable requirements of CC.6.3.7(g), (h) and (i) or ECC.6.3.7.3.8.		DPD II

SCHEDULE 16 – SYSTEM RESTORATION INFORMATION

PAGE 1 OF 1

PART III

DISTRIBUTION RESTORATION ZONE INFORMATION (PC.A.5.7.2 – DPD)		
Where a Network Operator has a Distribution Restoration Zone Plan in place, the following data specified shall be submitted by Network Operators, Restoration Service Providers party to a Distribution Restoration Zone Plan . Restoration Service Providers shall, where reasonably practicable, submit the relevant information to the Network Operator who shall then supply that information to The Company .		
Data Description (PC.A.5.7.2)	Units	Data Category
The expected time for each Restoration Contractor's Plant to connect to the Network Operator's System following a Total Shutdown or Partial Shutdown . The assessment should include the Restoration Contractor's ability to reconnect or re-synchronise all their Plant , to the Total System at time intervals of 12 hours, 24 hours, 36 hours, 48 hours and 72 hours from the restoration of external power supplies.		
Additionally, the data and supporting text should highlight any specific issues (eg those that would affect the time before which the Restoration Service Provider's Plant could be energised) that may arise as time progresses from Shutdown without external supplies being restored or the availability of primary fuel supplies.	Tabular or Graphical	DPD II
Block Loading Capability		
Provide estimated Block Loading Capability from 0MW to Registered Capacity and the time between each incremental step of each Restoration Service Provider's Plant and Apparatus was running immediately prior to the Shutdown and at time intervals of 12 hours, 24 hours, 36 hours, 48 hours and 72 hours after the BM Unit had been Shutdown . The data should identify any required 'hold' points.	Tabular or Graphical	DPD II
Governor Setting Information		

From 2025 onwards, Restoration Contractors, Generators, HVDC System Owners and DC Converter owners, shall supply the governor setting information in accordance with the applicable requirements of CC.6.3.7(g), (h) and (i) or ECC.6.3.7.3.8.		DPD II
--	--	--------

SCHEDULE 16 – SYSTEM RESTORATION INFORMATION

PAGE 1 OF 1

PART IV

All **Users** and **Restoration Contractors** are required to confirm annually they comply with the applicable requirements of OC5.7. In the case of **Generators, HVDC System Owners, DC Converter owners, Non-Embedded Customers**, and **Network Operators** this confirmation shall be provided in their Week 24 submission.

Assurance Activity	Grid Code Reference	Parties Involved	Frequency of Assurance Activity	The Company Witness required	Date of test result submission/visit	Annual Statement of Compliance (Y/N)
System Restoration Power Island Review	OC9.4.7.6.1 OC5.7.4(iv)	Relevant Transmission Licensees, Network Operators and The Company	Every 3 years	Not Applicable		
System Restoration Power Island availability assessment	OC9.4.7.6.1 OC5.7.4(iv)	Relevant Transmission Licensees, Network Operators and The Company	Yearly	Not Applicable		
Remote Synchronisation Test - TO/DNO	OC5.7.2.1(g) OC5.7.2.3 (d)	Relevant Transmission Licensees, relevant Network Operators, Restoration Contractors and The Company	Every 3 years	No		
Low Frequency Demand Disconnection Relay test	<u>CC.A.5.4.3 /</u> <u>ECC.A.5.4.3</u>	Relevant Transmission Licences, relevant Network Operators, Non-Embedded	Every 3 years although this may be extended to no more than every five years if considered to be required	No		

		Customers and The Company	<u>for operational purposes</u>			
Anchor Restoration Contractor test	OC5.7.2.1 /OC5.7.2.2 / OC5.7.2.3	Relevant Transmission Licensees, Network Operators, Anchor Restoration Contractors and The Company	Every 3 years	Yes		
Top Up Restoration Contractor test	OC.5.7.2.4	Relevant Transmission Licensees, Network Operators, Top Up Restoration Contractors and The Company	Every 3 years	Yes		
Resilience to Partial Shutdown or Total Shutdown of Restoration Contractor	OC9.4.7.6.2 OC5.7.4.2(iv)	Restoration Contractors and The Company	Yearly	No		
Quick Resynchronisation Unit Test	OC5.7.2.5	EU Generators in respect of Type C and Type D Power Generating Modules, relevant Network Operators and The Company	Yearly	Yes		
Distribution Restoration Zone Control System test	OC5.7.2.6 Electrical Standard - Distribution Restoration Zone Control System High Level	Network Operators, Restoration Contractors and The Company	Every 3 years	Yes		

	Functional Specification					
Dead Line Charge test	OC5.7.2.1(g)(a) OC5.7.2.3(d)(a)	Transmission Licensees, relevant Network Operators Anchor Restoration Contractors and The Company	Every 3 years	Yes		
Remote Synchronisation test -Restoration Contractor	OC5.7.2.1(g)(b) OC5.7.2.3(d)(b)	Relevant Transmission Licensees, relevant Network Operators, Restoration Contractors and The Company	Every 3 years	Yes		
Assurance Visits	OC5.7.4 OC5.7.5	The Company, Relevant Transmission Licensees, relevant Network Operators to visit Restoration Contractors	Every 3 years	Yes		
Voice Systems Resilience test or equivalent	OC5.7.4.2(vi)	CUSC Parties, relevant Network Operators, Relevant Transmission Licensees Restoration Contractors and The Company	Yearly	No		
Critical Tools and Facilities Control Systems Resilience	OC5.7.2.6 OC5.7.4.2(iii) OC5.7.4.2(ix)	CUSC Parties, relevant Network Operators,	Yearly	No		

Demonstration – Power Resilience including power resilience demonstration & Connectivity and Alarm event handling	OC5.7.4.3 CC.7.10 ECC.7.10	Relevant Transmission Licensees, Restoration Contractors and The Company				
Control Systems Resilience Demonstration – Diagram & Topology	OC5.7.2.6 OC.5.7.4.2(iii) OC5.7.4.2(ix)	CUSC Parties, relevant Network Operators, Relevant Transmission Licensees, Restoration Contractors and The Company	Yearly	No		
Cyber-Security	CC.7.10.6 ECC.7.10.6 OC.5.7.4.2(iii) OC5.7.4.2(x)	CUSC Parties, relevant Network Operators, Relevant Transmission Licensees, Restoration Contractors and The Company	Yearly	No		
Telephony Services test per month as per CC/ECC.6.5.4.	CC.6.5.1 – CC.6.5.5 ECC.6.5.1 – ECC.6.5.5 OC.5.7.4.2(vi) OC5.7.4.2(xi) OC5.7.4.2(xii)	CUSC Parties, relevant Network Operators, relevant Transmission Licensees, Restoration Contractors and The Company	Yearly	No		
Resilience to Partial Shutdown	OC5.7.4 OC5.7.5	CUSC Parties and The Company	Yearly	No		

or Total Shutdown of CUSC Parties						
Restoration Procedure Review	OC9.4.7.6.2 OC5.7.4.2(iv)	The Company, Relevant Transmission Licensees, relevant Network Operators, CUSC Parties and Restoration Contractors	Every 3 years	Not Applicable		
LJRP & DRZP Reviews	OC9.4.7.6 OC5.7.4.2(iv)	The Company, Network Operators, Transmission Licensees and Restoration Plan signatories	Every 3 years	Not Applicable		
Awareness Training for Restoration Contractor and CUSC Parties	OC9.4.7.6.2 OC5.7.4	The Company, relevant Network Operators, Transmission Licensees, CUSC Parties and Restoration Contractors	Every 3 years	Not Applicable		
Cross Industry Training	OC9.4.7.6.2 OC5.7.4	The Company, Network Operators, Transmission Licensees, CUSC Parties and Restoration Contractors	Every 3 years	Not Applicable		