
GB Synchronous Area Operational Methodologies

Revision History

V0.1	05.04.2018	NGET proposal for public consultation
V.02	23.07.2018	NGET proposal for public consultation (revised Part_A; Part B texts added)

Disclaimer

This document, provided by NGET, is the draft proposal for the GB Synchronous Area Operational Methodologies in accordance with Article 118 of Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation.

Whereas

This Synchronous Area Operational Methodologies (hereafter referred to as "SAOM") document applies to the Synchronous Area of Great Britain and contains methodology texts listed in Article 118 of Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation (hereafter referred to as "SOGL").

This SAOM document is a proposal for the synchronous area of Great Britain, developed by the ESO (as defined in Article 2.2).

This proposal takes into account the general principles and goals set in:

- a. Regulation (EU) 2017/1485 establishing a guideline on electricity transmission system operation (hereafter referred to as "SOGL Regulation");

SOGL, Part IV, Load Frequency Control & Reserves section, recognises the need for a degree of flexibility to cater for physics of scale in different synchronous areas as well as specific time varying influence of network connectivity and technology in the energy mix in determining how system operators' processes and the reserve provider services meet the system quality criteria. This flexibility is achieved through the development of methodologies.

In accordance with Article 6 (6) of the SOGL, the expected impact of the GB SAOM proposal on the objectives of the SOGL is described below:

- a. This proposal is expected to have a positive impact on determining common operational security requirements and principles by introducing a harmonised framework for frequency control.
- b. This proposal is expected to have a positive impact on determining common interconnected system operational planning principles by establishing common principles for all interconnectors for the limits on the exchange and sharing of FCR, FRR and RR;
- c. This proposal is expected to have a positive impact on determining the common load-frequency control processes and control structures which are defined in this document;
- d. This proposal is expected to have a positive impact on ensuring the conditions for maintaining operational security throughout the Union. It does this at a GB level by establishing the Frequency Targets and Frequency Restoration Control Targets that the ESO must operate to. The proposal contributes to cross-border security by determining how the ESO will determine what limits should be applied to the sharing and exchange of FCR, FRR and RR between the GB Synchronous Area and other Synchronous Areas;
- e. This proposal is expected to have a positive impact on ensuring the conditions for maintaining a frequency quality level of all synchronous areas throughout the Union, since it defines frequency quality standards the ESO must endeavour to maintain, the Basic Structure of control processes and methodologies defining procedures necessary to recover frequency quality when the system is no longer in a normal state;

- f. This proposal is considered to have a positive impact on promoting the coordination of system operation and operational planning through the promotion of sharing and exchange of reserves and ensuring security by setting secure limits to sharing and exchange;
- g. This proposal is considered to make a positive contribution towards ensuring and enhancing the transparency and reliability of information on transmission system operation through the publication of information related to reserve capacity requirements and cross-border reserve sharing and exchange;
- h. This proposal is considered to make a positive contribution towards the efficient operation and development of the electricity transmission system and electricity sector in the Union by promoting effective operation of the load frequency control processes and effective and efficient use of reserves.

SUBMIT THE FOLLOWING SYNCHRONOUS AREA OPERATIONAL METHODOLOGIES PROPOSAL TO THE GB REGULATORY AUTHORITY, OFGEM:

Title 1

General Provisions

Article 1

Subject matter and scope

1. This Synchronous Area Operational Agreement (SAOM) document for Great Britain contains:
 - a. Title 2: Synchronous area operational methodologies Part A.

In accordance with SOGL Article 6(3), the methodologies, conditions and values described in this title are subject to approval by the regulatory authority;

 - i. the dimensioning rules for FCR in accordance with SOGL Article 153
 - ii. the additional properties of the FCR in accordance with SOGL Article 154(2);
 - iii. the frequency quality defining parameters and the frequency quality target parameter in accordance with SOGL Article 127;
 - iv. for the GB synchronous areas, the measures to ensure the recovery of energy reservoirs in accordance with SOGL Article 156(6)(b);
 - v. for the CE and Nordic synchronous areas, the minimum activation period to be ensured by FCR providers in accordance with SOGL Article 156(10);
 - vi. for the CE and Nordic synchronous areas, the assumptions and methodology for a cost-benefit analysis in accordance with SOGL Article 156(11);
 - vii. for synchronous areas other than CE and if applicable, the limits for the exchange of FCR between TSOs in accordance with SOGL Article 163(2);

- viii. for the GB synchronous areas, the methodology to determine the minimum provision of reserve capacity on FCR between synchronous areas, defined in accordance with SOGL Article 174(2)(b);
 - ix. limits on the amount of exchange of FRR between synchronous areas defined in accordance with SOGL Article 176(1) and limits on the amount of sharing of FRR between synchronous areas defined in accordance with SOGL Article 177(1);
 - x. limits on the amount of exchange of RR between synchronous areas defined in accordance with SOGL Article 178(1) and limits on the amount of sharing of RR between synchronous areas defined in accordance with SOGL Article 179(1);
- b. Title 3: Synchronous area operational methodologies, Part B

In accordance with SOGL Article 6(3) these methodologies, conditions and values are not subject to approval by the regulatory authority;

- i. for the Continental Europe ('CE') and Nordic synchronous areas, the frequency restoration control error target parameters for each LFC block in accordance with SOGL Article 128;
- ii. the methodology to assess the risk and the evolution of the risk of exhaustion of FCR of the synchronous area in accordance with SOGL Article 131(2);
- iii. the synchronous area monitor in accordance with SOGL Article 133;
- iv. the calculation of the control program from the netted area AC position with a common ramping period for ACE calculation for a synchronous area with more than one LFC area in accordance with SOGL Article 136;
- v. if applicable, restrictions for the active power output of HVDC interconnectors between synchronous areas in accordance with SOGL Article 137;
- vi. the LFC structure in accordance with SOGL Article 139;
- vii. if applicable, the methodology to reduce the electrical time deviation in accordance with SOGL Article 181;
- viii. whenever the synchronous area is operated by more than one TSO, the specific allocation of responsibilities between TSOs in accordance with SOGL Article 141;
- ix. operational procedures in case of exhausted FCR in accordance with SOGL Article 152(7);
- x. operational procedures to reduce the system frequency deviation to restore the system state to normal state and to limit the risk of entering into the emergency state in accordance with SOGL Article 152(10);
- xi. the roles and responsibilities of the TSOs implementing an imbalance netting process, a cross-border FRR activation process or a cross-border RR activation process in accordance with SOGL Article 149(2);

- xii. requirements concerning the availability, reliability and redundancy of the technical infrastructure in accordance with SOGL Article 151(2);
- xiii. common rules for the operation in normal state and alert state in accordance with SOGL Article 152(6) and the actions referred to in SOGL Article 152(15);
- xiv. the roles and responsibilities of the reserve connecting TSO, the reserve receiving TSO and the affected TSO as regards the exchange of FRR and RR defined in accordance with SOGL Article 165(1);
- xv. the roles and responsibilities of the control capability providing TSO, the control capability receiving TSO and the affected TSO for the sharing of FRR and RR defined in accordance with SOGL Article 166(1);
- xvi. the roles and responsibilities of the reserve connecting TSO, the reserve receiving TSO and the affected TSO for the exchange of reserves between synchronous areas, and of the control capability providing TSO, the control capability receiving TSO and the affected TSO for the sharing of reserves between synchronous areas defined in accordance with Article 171(2);
- xvii. for the GB synchronous areas, the methodology to determine the minimum provision of reserve capacity on FCR in accordance with SOGL Article 174(2)(b);

Article 2

Definitions and interpretation

1. For the purposes of this proposal, the terms used shall have the meaning of the definitions and references included in the SOGL, Article 3.
2. In this document, unless the context requires otherwise:
 - a) the singular indicates the plural and vice versa;
 - b) any reference to legislation, regulations, directive, order, instrument, code or any other enactment shall include any modification, extension or re-enactment of it then in force.
2. The Regulatory Authority, shall be taken to mean OFGEM, the sole competent National Regulatory Authority for these GB specific regulations, unless otherwise specified within the Articles themselves;
3. On 14 September 2017 the GB regulatory authority, OFGEM, published a decision assigning obligations in Article 119 of SOGL to the GB electricity system operator (the "ESO"). As at the date of drafting the entity licensed to perform the role of the ESO is National Grid Electricity Transmission plc. The license to perform the role of the ESO will transfer to National Grid Electricity System Operator Limited on 1 April 2019. As a consequence, on and after 1 April 2019 all references to the ESO in this document will refer to National Grid Electricity System Operator Limited;
4. The NETS SQSS means the National Electricity Transmission Quality of Supply Standards.

5. The methodology for “The determination of LFC Blocks in the Synchronous Area, GB”, is being developed separately in accordance with obligations; that document further clarifies the allocation of the ESO roles within GB according to SOGL 141(2).

Title 2

Synchronous area operational methodologies Part A

Article 3

The dimensioning rules for FCR in accordance with SOGL Article 153

1. The GB ESO may use one or more service to meet the Frequency Containment Reserve dimensioning requirements.
2. The NETS SQSS and Grid Code specify the standards which are used to dimension the GB services used to meet GB Frequency Containment Reserve (FCR) dimensioning requirements.
 - a. The NETS SQSS specifies the requirement to limit the loss of power infeed risk.
 - b. The Grid Code specifies the reserve holding requirement and identifies the specific losses to be covered by the ESO in order to meet the NETS SQSS and SOGL frequency quality standards.
 - c. The NETS SQSS terminology for infeed loss risk is equivalent to the SOGL defined term for the Reference Incident.
3. The ESO shall determine the Frequency Containment Reserve capacity required for the GB synchronous area at least daily and refine this according to changes in system conditions, through to real time.
4. Market parties will be made aware of the FCR capacity that the ESO has determined through publications on the internet in accordance with SOGL Article 187.

Article 4

Additional properties of FCR in accordance with SOGL Article 154(2)

1. All technical properties for GB services, that make up the provision of Frequency Containment Reserves, are specific to those services and no common additional properties are defined here. Individual technical requirements for GB services are published on the internet and used as part of the prequalification process for those GB services.

Article 5

The frequency quality defining parameters and the frequency quality target parameters in accordance with SOGL Article 127

1. The Frequency Quality Defining Parameters and the Frequency Quality Target Parameters shall remain unaltered from those defined in SOGL Annex III, table 1 and table 2 as follows:-
 - i. Table 1 Frequency quality defining parameters of the GB synchronous area are
 - i. standard frequency range ± 200 mHz
 - ii. maximum instantaneous frequency deviation 800 mHz
 - iii. maximum steady-state frequency deviation 500 mHz
 - iv. time to recover frequency 1 minute
 - v. frequency recovery range ± 500 mHz
 - vi. time to restore frequency 15 minutes
 - vii. frequency restoration range not used ± 200 mHz
 - viii. alert state trigger time 10 minutes
 - j. Table 2 Frequency quality target parameters of the GB synchronous areas
 - ix. maximum number of minutes outside the standard frequency range 15,000
3. The ESO shall endeavour to comply with the values for the parameters above and shall verify the fulfilment of the frequency target parameters at least annually.

Article 6

For the GB synchronous areas, measures to ensure the recovery of energy reservoirs in accordance with SOGL Article 156(6)(b)

1. The ESO shall ensure that loss of a providing unit does not endanger operational security by ensuring that the largest connected unit is excluded from those selected when satisfying the need for FCR capacity requirement defined within the FCR dimensioning process.
2. When an FCR providing unit or group trips or can no longer provide an FCR service, the ESO will reallocate the FCR provision to a different FCR unit or FCR Group utilizing operational and commercial information made available by FCR providers.
3. The declared availability of FCR providing units and groups is managed by the FCR providers which reflect the requirement to recover energy reservoirs. Effectively this means that the ESO takes into account the depletion of these reservoirs when procuring FCR.
4. When operating the Frequency Containment Process (FCP) the ESO takes into account depletion of these reservoirs to minimise risk in real time where applicable.

Article 7

For the CE and Nordic synchronous areas, the minimum activation period to be ensured by FCR providers in accordance with SOGL Article 156(10);

1. SOGL Article 156(10) is not applicable to this document.

Article 8

For the CE and Nordic synchronous areas, the assumptions and methodology for a cost-benefit analysis in accordance with SOGL Article 156(11);

SOGL Article 156(9) is not applicable to this document.

Article 9

If applicable, for synchronous areas other than CE, limits for the exchange of FCR between the TSOs within a Synchronous Area, in accordance with SOGL Article 163(2)

1. SOGL Article 163 describes the exchange of FCR within a synchronous area.
2. SOGL Article 163 has no requirements for GB due to its LFC Block structure. The Synchronous Area GB contains a single LFC Area, within a single LFC Block and the ESO is responsible for operating the entire GB electricity system. Therefore, in accordance with Article 163(2) there are no limits for exchanging FCR within the GB Synchronous area.

Article 10

For the GB synchronous areas, the methodology to determine the minimum provision of reserve capacity on FCR in accordance with SOGL Article 174(2)(b);

1. The ESO makes sure there is sufficient FCR capacity in GB to meet the dimensioning rules in Article 3.
2. The minimum amount of FCR capacity provided from within GB is determined as follows: The ESO looks at the overall requirements for FCR as defined by the dimensioning rules as stipulated in paragraph 1, and subtracts the maximum amount of FCR exchange and sharing that could be accommodated from other synchronous areas, as per paragraph 3, to establish the minimum provision of reserve capacity of FCR that must be provided within the GB synchronous area.
3. The ESO determines the limits on the amount of FCR exchange and sharing that could be accommodated from other synchronous areas by considering the following:
 - a. Whether sharing of FCR can be accommodated by the ESO under expected system conditions whilst complying with NETS SQSS;
 - b. The ability to transfer FCR between synchronous areas;

- c. To consider any loss of provision of FCR during a reference incident as defined by SOGL Article 153 (2)(b)(ii);
 - d. Seek minimum cost solution of meeting GB FCR and therein the sharing of FCR, that could be possible subject to meeting points a-c;
 - e. The risk of the probability and impact of FCR short falls that could arise due to exchange and sharing.
4. Market parties will be made aware of the FCR capacity that the ESO has determined through publications on the internet in accordance with SOGL Article 187. The amounts of FCR shared or exchanged with other Synchronous Areas will be published on the internet in accordance with SOGL Article 190.

Article 11

The methodology to determine limits on the amount of exchange of FRR between synchronous areas defined in accordance with SOGL Article 176(1) and the methodology to determine limits on the amount of sharing of FRR between synchronous areas defined in accordance with SOGL Article 177(1)

1. The ESO determines the maximum amount of FRR sharing and exchange that could be accommodated from other synchronous areas by considering the following:
 - a. Whether sharing or exchange of FRR can be accommodated by the ESO under expected system conditions whilst complying with NETS SQSS;
 - b. The ability to transfer FRR between synchronous areas;
 - c. To consider any loss of provision of FRR during a reference incident as defined by SOGL Article 157 (2)(d);
 - d. Seek minimum cost solution of meeting GB FRR and therein the sharing or exchange of FRR, that could be possible subject to meeting points a-c.
 - e. The risk of the probability and impact of FRR short falls that could arise due to sharing.
2. Market parties will be made aware of the FRR capacity that the ESO has determined through publications on the internet in accordance with SOGL Article 188. The amounts of FRR shared or exchanged with other Synchronous Areas will be published on the internet in accordance with SOGL Article 190.

Article 12

The methodology to determine limits on the amount of exchange of RR between synchronous areas defined in accordance with SOGL Article 178(1) and the methodology to determine limits on the amount of sharing of RR between synchronous areas defined in accordance with SOGL Article 179(1).

1. The ESO determines the maximum amount of RR sharing and exchange that could be accommodated from other synchronous areas by considering the following:
 - a. Whether sharing or exchange of RR can be accommodated by the ESO under expected system conditions whilst complying with NETS SQSS;
 - b. The ability to transfer RR between synchronous areas;
 - c. To consider any loss of provision of RR during a reference incident as defined by SOGL Article 160(3)(c);
 - d. Seek minimum cost solution of meeting GB RR and therein the sharing or exchange of FRR, that could be possible subject to meeting points a-c.
 - e. The risk of the probability and impact of RR short falls that could arise due to sharing or exchange.
2. Market parties will be made aware of the RR capacity that the ESO has determined through publications on the internet in accordance with SOGL Article 189. The amounts of RR shared or exchanged with other Synchronous Areas will be published on the internet in accordance with SOGL Article 190.

Title 3

Synchronous area operational methodologies, Part B

Article 13

For the Continental Europe ('CE') and Nordic synchronous areas, the frequency restoration control error target parameters for each LFC Block in accordance with SOGL Article 128(2);

1. SOGL Article 128(2) is not applicable to this document.
2. The FRCE target parameters for the GB LFC Block are defined in SOGL 128(5) & (6) and in SOGL Annex IV, Table as Level 1 FRCE range at 3% and Level 2 FRCE range at 1%.

Article 14

The methodology to assess the risk and the evolution of the risk of exhaustion of FCR of the synchronous area in accordance with SOGL Article 131(2);

1. The GB codes mandate parties to provide the capability to deliver certain Balancing Services and to offer these capabilities to the market as a condition of connecting to the network.
2. As a result of paragraph 1. The ESO can appropriately assess this risk and the evolution of the risk of exhaustion of FCR of the GB synchronous area through records of those parties connected to the network.
3. The ESO manages changes in these connection records and can therefore assess the evolution of risk of exhaustion of FCR of the GB synchronous area.
4. The ESO continually assesses both the needs of the GB electricity system and the availability and capability of FCR providers, taking economic and efficient actions to align the two as required.

Article 15

The synchronous area monitor in accordance with SOGL Article 133;

1. The ESO is the Synchronous Area Monitor for the GB Synchronous Area and will fulfil the frequency reporting and monitoring functions set forth in SOGL Article 133.

Article 16

The calculation of the control program from the netted area AC position with a common ramping period for ACE calculation for a synchronous area with more than one LFC area in accordance with SOGL Article 136;

1. SOGL Article 136 is not applicable to this document.
2. The LF Block Structure has a single LF Block and single LF Area within the Synchronous Area of GB.

Article 17

If applicable, restrictions for the active power output of HVDC interconnectors between synchronous areas in accordance with SOGL Article 137(1);

1. No rules relevant to the combined maximum ramping rates across all interconnectors between pairs of synchronous areas are defined in this document; for rules concerning ramping restrictions applied on an individual interconnector basis refer to the GB LFC Block Operational Methodologies document, Article 3.

Article 18

The LFC structure in accordance with SOGL Article 139;

1. In accordance with Article 139 of the SO GL all TSOs of the Synchronous Area GB hereby define:
 - a. the Process Responsibility Structure; and
 - b. the Process Activation Structure.
2. The GB Process Responsibility Structure is defined as follows
 - a. The current Process Responsibility Structure per Article 141 of the SO GL is defined in the methodology for the determination of LFC blocks in GB.
 - b. The operation of Load-Frequency Control processes is based on operational areas, where every area has their own responsibilities in the LFC structure. The overall body is the Synchronous Area in which frequency and phase are the same for the whole area. The Synchronous Area GB consists of a single LFC Block, this LFC Block consists of a single LFC Area. The LFC Area itself consists of a single Monitoring Area, which also consist of a single Scheduling Areas.
 - c. Each of these operational areas has their own obligations: A Scheduling Area is responsible for the scheduling process in that area. A Monitoring Area has in addition to the scheduling the obligation to calculate and measure the active power interchange in real-time in that area. A LFC Area has the additional obligation to fulfil the Frequency Restoration Quality Target Parameters by using the Frequency Restoration Process. A LFC Block is additionally responsible for the dimensioning of FRR and RR. The Synchronous Area has the obligation to fulfil the Frequency Quality Target Parameters by using the Frequency Containment Process. Within GB all these obligations and processes fall to the single electricity system operator.
 - d. The GB Synchronous Area is demarcated by the point at which power is converted from AC into DC for transfer by HVDC interconnectors.
3. There are no virtual tie-lines utilised within the GB.
 - a. All generation modules and demand facilities are directly connected to the GB electricity system and not via virtual tie-lines; in so-much as there is only a single LFC-Area in GB. No modules outside of the GB area are controlled via this mechanism.
4. In accordance with SOGL Article 140 (1) the mandatory processes are:
 - a. the Frequency Containment Process (FCP);
 - b. the Frequency Restoration Process (FRP), which is a 100% manual Frequency Restoration Process
5. In accordance with SOGL Article 140 (2) the optional processes are:
 - a. the Reserve Replacement Process (RRP);
 - b. the Cross-Border FRR Activation Processes,
 - c. the Cross-Border RR Activation Process

- d. the Time Control Process
6. The following processes types defined in SOGL are not currently part of the GB Process Activation Process:
 - a. the Imbalance Netting Process;
 - b. automatic Frequency Restoration Process (aFRP) as defined in Article 145 (1).
7. The Process Activation Structure of the Synchronous Area GB is implemented in the single GB LFC Area according to the control process in
 - a. The control error, i.e. input, of the FCP is the frequency deviation;
 - b. The mFRP and RRP are manually triggered by the TSO in order to release FCP based on observed or expected imbalances;
8. The Frequency Containment Process (FCP) in the LFC Area GB shall be implemented according to SOGL Article 142.
9. The Frequency Restoration Process (FRP) in the LFC Area GB shall be organised and operated by the ESO in order to bring the GB, Frequency Restoration Control Error (Δf) within the GB frequency recovery range within the GB time to restore frequency, in accordance with SOGL Article 143. The GB FRP is 100% manual. The manual Frequency Restoration Process shall be operated through instructions for manual FRR activation in accordance with SOGL Article 145(5).
10. The Reserve Replacement Process (RRP) in the LFC Area GB shall be organised and operated by the ESO to progressively restore the activated FCR and FRR, in accordance with SOGL Article 144.(1)(c)
11. GB does not operate an aFRP and therefore no properties for a Frequency Restoration Controller are defined.

Article 19

If applicable, the methodology to reduce the electrical time deviation in accordance with SOGL Article 181;

1. Within the GB synchronous area, the ESO controls the electrical system time as specified in the Grid Code.

Article 20

Whenever the synchronous area is operated by more than one TSO, the specific allocation of responsibilities between TSOs in accordance with SOGL Article 141;

1. SOGL Article 141 is not applicable to this document.
2. The GB synchronous area is operated by the ESO alone.

Article 21

Operational procedures in case of exhausted FCR in accordance with SOGL Article 152(7)

1. Ensuring sufficient FCR capacity is available to ESO under commercial arrangements:
 - a. In order to ensure that the sufficient FCR capacity is made available in all timescales to the ESO, the Grid Code defines obligations for certain grid users to
 - i. have the capability to provide FCR services to the ESO, and
 - ii. a requirement to make those FCR services commercially available to the ESO.
 - b. Those reserve services that are critical to ensuring sufficient FCR capacity offering in GB are defined in Grid Code.
2. Procedures performed in control timescales where FCR provision from FCR providers is eroded below the dimensioning requirement:
 - a. The approach to managing active FCR provision by the ESO is such that every endeavour is taken to ensure that requirements and risks relating to FCR exhaustion are managed on a continuous basis. This should ensure that a point of critically reduced or exhausted FCR holding is never reached. Where operational conditions arise that result in depletion of FCR capability, the ESO will:
 - i. Reduce the size of the reference incident so it can be secured with the available FCR.
 - ii. Call on ancillary service provision and put additional units in response mode
 - iii. Call upon emergency restoration of transmission equipment on outage or arm inter-tripping generation to relieve any generation that has been in a transmission congestion
 - iv. If points i to iii above are insufficient or unachievable the ESO will issue the appropriate National Electricity Transmission System Warning and actions as defined in the Grid Code.

Article 22

Operational procedures to reduce the system frequency deviation to restore the system state to normal state and to limit the risk of entering into the emergency state in accordance with SOGL Article 152(10);

1. When the GB electricity system is in an Alert State, due to frequency deviation or depletion of reserves, the ESO will issue the appropriate National Electricity Transmission System Warning and actions as defined in the Grid Code to ensure that system needs and available reserve resources match.

Article 23

The roles and responsibilities of the TSOs implementing an imbalance netting process, a cross-border FRR activation process or a cross-border RR activation process in accordance with SOGL Article 149(2)

1. No Imbalance Netting Process is in place within GB or between GB and other LFC Blocks of other Synchronous Areas.
2. FRR activation processes used by the ESO are defined in interconnector operator protocols and agreed with the ESO in GB, Interconnector Owners, the connecting TSOs and where relevant affected TSOs.
3. RR activation processes used by the ESO are defined in interconnector operator protocols and agreed with the ESO in GB, Interconnector Owners, the connecting TSOs and where relevant affected TSOs.

Article 24

Requirements concerning the availability, reliability and redundancy of the technical infrastructure in accordance with SOGL Article 151(2);

1. All BM participants must ensure that appropriate electronic data communication facilities are in place to permit the submission of data as required by the Grid Code and Relevant Electrical Standards. Requirements for non-BM participants shall be defined by Bilateral agreements. National Grid shall maintain compliance standards as detailed in internal Business Requirements Documents.
2. The minimum requirements for the availability, reliability and redundancy of the technical infrastructure shall be in line with the CNI Architecture Principles. The quality standards shall be in accordance with the GE Standards XA. Availability and redundancy of communication infrastructure shall be in accordance with the National Grid Technical Specification NG TS 3.24.20. Finally, all communication protocols must comply with standard protocols ICCP-1996, IEC101 and GI-74.

Article 25

Common rules for the operation in normal state and alert state in accordance with Article 152(6) and the actions referred to in SOGL Article 152(15);

1. Common rules for normal state as defined by SOGL Article 18 are the general nature of Load, Frequency Control. The SAOM Article 18 defines the general control structures used in a normal state.
2. Common rules for the alert state as defined by SOGL Article 18 are as per SAOM Article 21.

Article 26

For the CE and Nordic synchronous areas, the minimum activation period to be ensured by FCR providers in accordance with SOGL Article 156(10);

1. SOGL Article 156(10) is not applicable to this document.

Article 27

For the CE and Nordic synchronous areas, the assumptions and methodology for a cost-benefit analysis in accordance with SOGL Article 156(11);

1. SOGL Article 156(11) is not applicable to this document.

Article 28

The roles and responsibilities of the reserve connecting TSO, the reserve receiving TSO and the affected TSO as regards the exchange of FRR and RR within a synchronous area defined in accordance with SOGL Article 165(1);

1. SOGL Article 165(1) is not applicable in this document.
2. In the scope of SOGL Article 165 with regards to Exchange of FRR and RR between TSO within a Synchronous Area this Article is not applicable, since the LF Block Structure has a single LF Block and single LF Area within the Synchronous Area of GB.

Article 29

The roles and responsibilities of the control capability providing TSO, the control capability receiving TSO and the affected TSO for the sharing of FRR and RR defined in accordance with SOGL Article 166(1);

1. SOGL Article 166(1) is not applicable to this document.
2. The LF Block Structure has a single LF Block and single LF Area within the Synchronous Area of GB.

Article 30

The roles and responsibilities of the reserve connecting TSO, the reserve receiving TSO and the affected TSO for the exchange of reserves between synchronous areas, and of the control capability providing TSO, the control capability receiving TSO and the affected TSO for the sharing of reserves between synchronous areas defined in accordance with SOGL Article 171(2);

1. Within the GB Synchronous Area, for any reserve exchanged or reserves shared with other areas, the ESO will be the reserve connecting TSO. The ESO will be the TSO which instructs the provision of reserves within GB borders and also agrees to their transfer to

another region via HVDC. Where the ESO is requesting reserves from another area the ESO expects the other area to instruct the necessary reserves, if the other area can accommodate the request given its real time and expected system conditions, to enable provision of that service. Insomuch, the ESO will fulfil the roles specified in the Article title and as defined in SOGL Article 3.

Article 31

The methodology to determine limits on the amount of sharing of FCR between synchronous areas defined in accordance with SOGL Article 174(2).

1. The ESO looks at the overall requirements for FCR as defined by the dimensioning rules and subtracts the maximum amount of FCR sharing that could be accommodated from other synchronous areas, as determined below, to establish the minimum provision of reserve capacity of FCR in the GB synchronous area.
2. Limits on the sharing of FCR between the GB synchronous area and other synchronous areas are determined in the following manner:
 - a. Whether sharing of FCR can be accommodated by the ESO under expected system conditions whilst complying with NETS SQSS;
 - b. The ability to transfer FCR between synchronous areas;
 - c. To consider any loss of provision of FCR during a reference incident as defined by SOGL Article 153 (2)(b)(ii);
 - d. Seek minimum cost solution of meeting GB FCR and therein the exchange of FCR that could be possible subject to meeting points a-c;
 - e. The risk of the probability and impact of FCR short falls that could arise due to sharing.

Title 4

Final Provisions

Article 32

Timescale for implementation

1. The Articles in this SAOM will enter into force 3 months after its approval by the Regulatory Authority (not earlier than 14th June 2019) in line with SOGL Article 118(2).

Article 33

Language

1. The reference language for this SAOM shall be English.