

LFC Block Operational Agreement Ireland and Northern Ireland

For submission: 20/12/2018

Notice

This document, provided by EirGrid and SONI, is the draft for the submission of the proposal for the IE/NI LFC Block Operational Agreement in accordance with Article 119 of Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation.



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Introduction

This LFC Block Operational Agreement (hereafter referred to as “LFCBOA”) document applies to the Block of Ireland (IE) and Northern Ireland (NI) and contains the Agreement required by Article 119 of Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation (hereafter referred to as “SOGL”).

This LFCBOA is implemented in IE and NI taking into account:

Whereas

1. This proposal was jointly developed by EirGrid and SONI regarding a LFCBOA document for IE/NI.
2. This LFCBA recognises the general principles and goals established in Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation as well as Commission Regulation (EU) 2015/1222 establishing a guideline on capacity allocation and congestion management (hereafter referred to as “CACM”), and Regulation (EC) No 714/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity (hereafter referred to as “Regulation (EC) No 714/2009”). SOGL aims to safeguard operational security, frequency quality and the efficient use of the interconnected system and resources.
3. SOGL, Part IV, entitled Load Frequency Control & Reserves recognises that relatively small synchronous areas such as in IE/NI require operational flexibility when compared with larger synchronous areas such as continental Europe as well as specific time varying influence of network connectivity and technology in the energy mix in determining how system operators’ processes and reserve services meet the system quality criteria. This flexibility is achieved through the development of agreements and methodologies.
4. According to Article 6 (6) of the SOGL, the expected impact of the IE/NI LFCBOA proposal on the objectives of the SOGL shall be described. It is presented below. The obligations described in the LFCBOA are intended to assist TSOs in IE/NI to deliver the objectives of the SOGL. In particular the LFCBOA serves the objective of ensuring the conditions for maintaining a frequency quality level for the synchronous area IE/NI; for determining common load-frequency control processes and control structures within IE/NI; ensuring conditions for maintaining operational security; the publication of IE/NI methodologies and specific values in the common language of SOGL; promoting transparency and reliability of information on transmission system operation; facilitating greater cross-border cooperation and the efficient operation of the electricity transmission system in the Union.
5. Furthermore, the methodologies contained in this LFCBOA proposal shall ensure application of the principles of proportionality and non-discrimination; transparency; optimisation between the highest overall efficiency and lowest total costs for all industry stakeholders and consumers; and use of market-based mechanisms as far as possible, to promote frequency quality and operational security.

6. In conclusion, the methodologies contained in this LFCBOA proposal shall contribute to the general objectives of the SOGL to the benefit of all TSOs, the Agency, regulatory authorities, market participants and the end consumers.

TITLE 1 General Provisions

Article 1 Subject matter and scope

1. This LFCBOA for Ireland and Northern Ireland contains:
 - a. Title 2: Those requirements referenced in both SOGL Article 119 and SOGL Article 6(3). These requirements are subject to approval by the regulatory authorities for Ireland and Northern Ireland and public consultation from Article 11.
 - b. Title 3: Those requirements referenced in SOGL Article 119 but not mentioned in SOGL Article 6 or SOGL Article 11. These requirements are not subject to either regulatory approval or public consultation.

Article 2 Definitions and interpretation

1. For the purposes of this proposal, the terms used shall have the meaning of the definitions included in Article 3 of SOGL, Article 2 of CACM and the other items of legislation referenced therein.
2. EirGrid and SONI may use existing definitions, terminology and understandings to deliver the requirements of the SOGL within this LFCBOA as detailed in Table 1.

Terminology used in the System Operations Guideline (SOGL)	Interpretation based on terms normally used by EirGrid and SONI
FCR – Frequency Containment Reserve	Shall include Primary Operating Reserve (POR) and Secondary Operating Reserve (SOR) as defined in the EirGrid and SONI Grid Codes .
FRR – Frequency Restoration Reserve	Shall include Tertiary Operating Reserve 1 (TOR1) and Tertiary Operating Reserve 2 (TOR2) as defined the EirGrid and SONI Grid Codes ⁴⁵
aFRR – Automatic Frequency	Automatic Generator Control (AGC) as defined in

⁴ [SONI Grid Code](#),

⁵ [EirGrid Grid Code](#)

Restoration Reserves	the EirGrid Grid Code
RR – Replacement Reserve	Shall include Replacement Reserve (RR) as defined in the EirGrid and SONI Grid Codes
PGM - Power Generating Module	Shall mean the Grid Code definition ‘Generating Unit’ as defined in the EirGrid and SONI Grid Codes
Demand Unit	Shall mean the Grid Code definition ‘Demand Side Unit (DSU)’ as defined in the EirGrid and SONI Grid Codes
Cross border sharing and exchange of reserves categories FCR, FRR and RR.	<p>The Interconnector Operating Protocols (IOP)⁶ make reference to a number of reserve services which are available to the TSOs:</p> <ul style="list-style-type: none"> • These existing arrangements describe the current explicit services enabling the TSO’s to share reserves across HVDC interconnectors. These services are not intended to preclude alternative methods of sharing or exchanging reserves between IE/NI and LFC Blocks in other synchronous areas • Static response may be used for cross-border sharing of FCR and FRR between the IE/NI synchronous area and the GB synchronous area.
FCR, FRR and RR providing units	Grid Code defines the requirements for the provision of POR, SOR and TOR by certain Grid Code Users in respect of their generating units and demand side units. In addition to those Grid Code requirements, reserve service the DS3 System Services contracts currently awarded to reserve providers define additional reserve categories such as Fast Frequency Response.

Table 1 - SOGL Interpretation

⁶ The IOP is *Commercial in Confidence*. Nonetheless, information relevant to this SAOA is reproduced in this SAOA or included in the Operational Constraints update

TITLE 2

Methodologies, Conditions and Values jointly developed by EirGrid and SONI to satisfy the needs of the SOGL within the LFCBOA for IE/NI, which are subject to regulatory authority approval

Article 3 Ramping restrictions for active power output in accordance with SOGL Article 137(3) and (4)

1. The maximum aggregate ramp rate of interconnectors between IE/NI and other synchronous areas shall be provided in the Operational Constraints Update⁷.
2. EirGrid and SONI may modify these ramping restrictions by agreement with TSOs in other synchronous areas and the relevant interconnector asset owner.
3. EirGrid and SONI acting prudently may restrict the aggregate ramp rates of all interconnectors between IE/NI and another synchronous area to a level that is below the level detailed in the Operational Constraints Update in order to prevent the IE/NI LFC Block from entering into or remaining in an emergency state.
4. At the time of writing (December 2018), the aggregated ramp rate for the HVDC interconnectors was 10MW/min.
5. The process for the calculation of the Operational Constraint Update is available on the SEM-O website at https://www.sem-o.com/documents/BP_SO_2.2_System_Constraints_Calculation.pdf. An extract of the process map and process steps is also available in Appendix 1.

Article 4 The FRR dimensioning rules in accordance with SOGL Article 157(1)

1. The respective TSO licences granted by the regulatory authorities in Ireland and Northern Ireland oblige EirGrid and SONI to ensure that sufficient SEM generation is scheduled and dispatched, including a reserve of SEM generation to provide a security margin, in order to meet the forecasted demand. EirGrid and SONI shall discharge this obligation based on the availability declarations, technical parameters, physical notifications and commercial offers submitted under Scheduling and Dispatch Code of the EirGrid and SONI Grid Codes. EirGrid

⁷[Operational Constraints September Update](#). Latest update is at [Library section](#)

and SONI shall use a shared power system optimisation application to optimise the scheduling of available generation units and demand units.

- a. EirGrid and SONI shall jointly determine the reserve capacity for FRR, which will be 100% of the largest single infeed and largest single outfeed, required for the IE/NI synchronous area at least daily according to system conditions, and if necessary, refine this requirement from day ahead through to real time.

Article 5 Coordination actions aiming to reduce the Frequency Restoration Control Error as defined in SOGL Article 152(14)

1. ON the identification of any violation of the limits in paragraph 12 of Article 152 of the SOGL, coordinated actions will be implemented. These may include but may not be limited to:
 - a. Redispatching generation / DSU;
 - b. Synchronise / desynchronise units;
 - c. Curtailing wind generation;
 - d. HVDC emergency assistance and emergency instruction;

Article 6 Measures to reduce the Frequency Restoration Control Error (FRCE) by requiring changes in the active power production or consumption of power generating modules and demand units in accordance with SOGL Article 152(16).

1. EirGrid and SONI acting as a single system operator shall act in conjunction in the delivery of their respective obligations in accordance with the provisions of the respective TSO licences.
 - a. EirGrid TSO Licence Condition 1(9)
 - b. SONI TSO Licence Condition 1(7)
2. Measures to reduce FRCE in IE/NI are defined in the System Operator Agreement⁸, and the EirGrid and SONI Grid Codes as indicated below:
 - a. EirGrid Grid Code – Operating Code OC4.3
 - b. SONI Grid Code – Scheduling and Dispatch Code 3
3. These may include but may not be limited to:

⁸ [System Operator Agreement](#)

- a. Redispatching generation / DSU;
- b. Synchronise / desynchronise units;
- c. Curtailing wind generation;
- d. HVDC emergency assistance and emergency instruction;
- e. Use of special protection schemes to run back or trip generation;
- f. High frequency tripping of wind generation;
- g. Under-frequency load shedding.

TITLE 3

Methodologies, Conditions and Values jointly developed by EirGrid and SONI within LFCBOA for IE/NI to meet the requirements of the SOGL but not requiring regulatory authority approval

Article 7 LFC block monitor in accordance with SOGL Article 134

1. EirGrid shall undertake the role of LFC block monitor and discharge the obligations described in SOGL Article 134. In the event that EirGrid is unable to fulfil these obligations, SONI will undertake the duties of LFC block monitor by coordination with EirGrid. This activity shall be conducted with the cooperation of both EirGrid and SONI.

Article 8 Allocation of responsibilities in accordance with SOGL Article 141(9)

1. EirGrid and SONI shall cooperate and jointly endeavour to fulfil the FRCE target parameters pursuant to SOGL Article 128. This approach shall recognise the requirements of EirGrid and SONI to cooperate in the operation of the all-island transmission network as required by the respective TSO licences.
2. EirGrid and SONI shall be jointly and equally responsible for compliance with the FRR dimensioning rules in accordance with SOGL 157 and the RR dimensioning rules in accordance with SOGL Article 60. These obligations shall be discharged by the cooperation of EirGrid and SONI.
3. It is important to note that while EirGrid and SONI together act as single system operator for the IE/NI synchronous area, but the responsibility for the operational security for each jurisdiction remains with the respective TSO.

Article 9 Additional requirements for the availability, reliability and redundancy of technical infrastructure defined in accordance with SOGL Article 151(3)

1. In terms of availability, the Energy Management System (EMS) was designed for high availability with a KPI of 99.95%, in both the Oval and Castlereaugh control centres with backup sites and data concentrators.. Dual enabled/hot standby application servers are used for core EMS application and remote communication servers with dual comms media, dual power feeds, dual UPS, dual storage area networks, etc.
2. There are three key areas in terms of communication as detailed below:
 - a. Inter-site:

The inter-site communication network is a ring network spanning the four sites, A black-start capable point-to-point communication network between Oval and Castlereaugh is available if the ring network is unavailable.
 - b. RTU:

In Ireland independent routes from substation RTUs to both Oval and the backupsites where feasible. Where not feasible, the Oval circuit is switchable to the backup sites, e.g. a satellite circuit to a remote windfarm.
In Northern Ireland, each RTU circuit is switchable from Castlereaugh to the backup sites.
 - c. Inter-control centre:

Redundant circuit for inter-site communication between EirGrid and DSO SCADA systems.

Article 10 Operational procedures to be applied in the case of exhausted FRR and RR in accordance with SOGL Article 152(8)

1. The operational procedures to be deployed in the case of exhausted FRR and RR in accordance with SOGL Article 152(8) defined for use in synchronous area IE/NI will be published by EirGrid and SONI on March 29th 2019.

Article 11 RR dimensioning rules in accordance with SOGL Article 160(2)

1. The RR dimension rule is to ensure that there are adequate replacement reserves to restore 100 % of the FCR and FRR in both the positive and negative direction.

Article 12 Allocation of TSO responsibilities associated with FRR dimensioning in accordance with SOGL Article 157(3) and RR dimensioning in accordance with SOGL Article 160(6)

Recognising that:

1. FRR and RR dimensioning is an integral aspect of the SEM scheduling process,

2. the respective TSO licenses require EirGrid and SONI to cooperate in the scheduling and operation of SEM generation,

The associated TSO responsibilities shall apply equally to both EirGrid and SONI and shall be discharged in conjunction as required by the respective TSO licences, i.e.:

- a. EirGrid TSO Licence Condition 1(9)
 - b. SONI TSO Licence Condition 1(7)
3. It is important to note that while EirGrid and SONI together act as single system operator for the IE/NI synchronous area, but the responsibility for the operational security for each jurisdiction remains with the respective TSO.

Article 13 Escalation procedure for managing severe risk of insufficient FRR or RR in accordance with SOGL Articles 157(4) and 160(7)

1. The escalation procedure for managing severe risk of insufficient FRR or RR will be published by EirGrid and SONI on March 29th 2019.

Article 14 Requirements for FRR availability and control quality in accordance with SOGL Articles 158(2) and 161(2)

1. FRR availability shall be assessed by EirGrid and SONI using the data submitted as required under the Scheduling and Dispatch Code SDC of the EirGrid Grid Code and SONI Grid Code, specifically the availability declarations, technical parameters and physical notifications. For SEM, FRR availability encompasses SOR and TOR.
2. FRR control quality shall be monitored in accordance with the EirGrid Grid Code (OC10) and SONI Grid Code (OC11). These Grid Code sections deal with investigation and monitoring by the TSOs when dispatchable units may have failed to comply with dispatch instructions such as reserve activation. In addition, all units who wish to qualify for system service contracts must undergo performance testing.
3. The FRR / RR control quality is based on the requirements defined in the Grid Code and pre-qualification criteria. However, it should be noted that additional criteria may be identified as part of the EBGL and these will be confirmed in due course.
4. Reserves must be available whenever a reserve providing unit is not dispatched to 100% of availability. Alternatively, reserve providing units are required to be available to provide reserves as per their contractual requirements.

Article 15 TSO roles and responsibilities for the exchange of FRR and/or RR in accordance with SOGL Article 165(6)

1. Neither EirGrid nor SONI currently have agreements to exchange FRR or RR with TSOs outside the IE/NI LFC Block.
2. If EirGrid enters into an exchange agreement for FRR or RR with a TSO in another LFC Block, EirGrid shall advise SONI of the roles and responsibilities they have undertaken as the reserve connecting TSO, reserve receiving TSO and/or the affected TSO.
3. If SONI enters into an exchange agreement for FRR or RR with a TSO in another LFC Block, SONI shall advise EirGrid of the roles and responsibilities they have undertaken as the reserve connecting TSO, reserve receiving TSO and/or the affected TSO.
4. EirGrid and SONI shall jointly review the potential impact of the proposed exchange agreement for FRR or RR in order to ensure that both TSOs are not prevented from complying with the jurisdictional elements of the FRR or RR dimensioning rules as amended from time to time in the Operational Constraints Update.

Article 16 TSO roles and responsibilities for the sharing of FRR and/or RR in accordance with SOGL Article 166(7)

1. The scheduling of SEM generation is undertaken as a joint task as required by the respective TSO licences granted to EirGrid and SONI. The TSO licences require EirGrid and SONI to schedule SEM generation to securely operate the all-island transmission system in an economic manner to meet all-island demand, including the scheduling of sufficient reserves to manage unplanned outages and demand forecasting errors. As a result of this approach, FRR/RR will be shared within the IE/NI LFC Block on an economic basis, subject to the limitations imposed by tie-line restrictions and the Operational Constraints Update. Each TSO is responsible for dispatching generation within its own control area. This includes the dispatching of SEM generation in one control area to provide FRR/RR to that same control area and the dispatching of SEM generation to share FRR/RR with the other control area.

Article 17 Roles and the responsibilities of the control capability providing TSO, the control capability receiving TSO and of the affected TSO for the sharing of FRR and RR between synchronous areas in accordance with Article 175(2).

1. Proposals for roles and the responsibilities of the control capability providing TSO, the control capability receiving TSO and of the affected TSO for the sharing of FRR and RR

between synchronous areas in accordance with Article 175(2) will be published by EirGrid and SONI on March 29th 2019.

TITLE 4 Final Provisions

Article 18 Timescale for implementation

1. The LFCBOA will enter into force 3 months after its approval by the National Regulatory Authorities of Ireland and Northern Ireland, (not earlier than 14th June 2019) in line with SOGL Article 119(2).

Article 19 Language

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

Appendix 1 – Operational Constraints process



Process Steps:

#	Step	Step Description	Responsible Role	Outputs	Indicative Timing/Frequency	System
1	Trigger: Constraint Update Required/System Constraints Calculation	The trigger for this process may be the Near Time process of 'System Constraints Calculation' or an update to a permanent constraint following analysis. The requirement for a new constraint can arise from a number of areas e.g. studies carried out in Innovation. All updates (whether it be new constraints, modification or deletion of existing) must come through the RT Team Lead/Assistant Manager, who will review and assess the required action. If it is triggered following 'Systems Constraints Calculation' process go to step 2. If it is based from other studies go to step 11.	Real Time Team Lead/Assistant Manager/Near Time	N/A	Weekly and ad hoc as required	N/A
2	Review updated Weekly Constraints Report	Real Time Team Lead/Assistant Manager will review the Weekly Constraints Report.	Real Time Team Lead/Assistant	N/A	As required	N/A

#	Step	Step Description	Responsible Role	Outputs	Indicative Timing/Frequency	System
			Manager			
3	Request updated Weekly Constraints Report to be published to the website	Real Time Team Lead/Assistant Manager will request that the updated Weekly Constraints Report to be published to the TSO area of the I-SEM website.	Real Time Team Lead/Assistant Manager	N/A	As required	N/A
4	Review updated Weekly Constraints Report	Review the updated Weekly Constraints Report to identify any amendments or updates that need to be applied to the scheduling runs.	Real Time – Control Centre	N/A	As required	N/A
5	Modification to ‘NB Type’ or ‘MW Type’ values?	<p>Is the update a modification to a ‘NB Type’ or a ‘MW Type’? -</p> <ul style="list-style-type: none"> • ‘NB Type’ refers to number of units, e.g. 1, 2 or 3 and just requires a unit to be ON to satisfy the constraint. • ‘MW Type’ is a range that a unit or a group of units must be between to satisfy the constraint. E.g. 600 MW > X < 800 MW. <p>If it is to a ‘NB Type’ go to step 6. If it is to a ‘MW Type’ go to step</p>	Real Time – Control Centre	N/A	As required	N/A

#	Step	Step Description	Responsible Role	Outputs	Indicative Timing/Frequency	System
		7.				
6	Implement in Group Constraints Manager for all applicable runs	Implement changes from Weekly Constraints Report in Group Constraints Manager in MMS for all relevant scheduling runs (LTS, RTC, and RTD). Once this step has been completed the process ends and no further action is required.	Real Time – Control Centre	GCM updated	As required	Group Constraints Manager (MMS)
7	Compare and monitor Network Security Monitor constraint against Weekly Constraints Report	Compare and monitor Network Security Monitor constraint against Weekly Constraints Report to ensure that MW values are within the correct range.	Real Time – Control Centre	N/A	As required	Network Security Monitor (MMS)
8	NSM working & Results acceptable?	Are the results acceptable & Network Security Monitor working as expected? If yes, the process ends and no further action is required. If no go to step 9.	Real Time – Control Centre	N/A	As required	Network Security Monitor (MMS)
9	Manual Entry of Constraint Data in Group Constraints Manager in MMS & Disable NSM	If the results from the comparison are not acceptable and the Network Security Monitor is not performing as expected, the Real Time User will	Real Time – Control Centre	GCM updated	As required	Group Constraints Manager (MMS)

#	Step	Step Description	Responsible Role	Outputs	Indicative Timing/Frequency	System
		have to manually enter the constraint into MMS via the Group Constraints Manager functionality. The process ends once this step is complete and no further action is required.				
10	Log reasons for manual entry & disablement of Network Security Monitor	If the constraint has been entered manually and Network Security Monitor disabled, the reasons for this must be logged for future reference.	Real Time – Control Centre	GCM updated	As required	All Island Contact Centre Log
11	Review proposed update (modification/new/deletion)	If the proposed update has come from analysis performed outside of the System Constraints Calculation process, the Real Time Team Lead/Assistant Manager will review the proposal before making any operational updates.	Real Time Team Lead/Assistant Manager	N/A	As required	N/A
12	Agree with proposal?	If the Real Time Team Lead/Assistant Manager agrees with the proposal, go to step 14. If they do not agree with it or have follow-up questions go to	Real Time Team Lead/Assistant Manager	N/A	As required	N/A

#	Step	Step Description	Responsible Role	Outputs	Indicative Timing/Frequency	System
		step 13.				
13	Discuss proposal & agree amendments with relevant area	Real Time Team Lead/Assistant Manager should discuss the proposal with the relevant team proposing the change, e.g. Innovation and make amendments, if required.	Real Time Team Lead/Assistant Manager	N/A	As required	N/A
14	Manager Approval required?	If the Real Time Team Lead/Assistant Manager is satisfied with the proposed change, they need to assess if Real Time Manager approval for the change. Manager approval is required for new constraints and deletion of existing ones. If Manager approval is required go to step 18. If it is not required go to step 15.	Real Time Team Lead/Assistant Manager	N/A	As required	N/A
15	Update Operational Constraints Update document & review with Near Time & System Support	As part of updating the Operational Constraints Update document, Real Time will seek Near Time and System Support to review updates being made at an operational level.	Real Time Team Lead/Assistant Manager	N/A	As required (no more than weekly)	N/A
16	Request updated	The updated Operational	Real Time	Operational	As required	Website

#	Step	Step Description	Responsible Role	Outputs	Indicative Timing/Frequency	System
	Operational Constraints Update document is published to website	Constraints Update document is then published to EirGrid and SONI websites.	Team Lead/Assistant Manager	Constraints Update document updated and published		
17	Implement in Group Constraint Manager	Control Centre staff implements the changes in Group Constraints Manager in MMS once they have been approved by the Real Time Management for all scheduling runs.	Real Time – Control Centre	GCM updated	As required	Group Constraints Manager (MMS)
18	Seek approval from Real Time Manager	If the request is for a new constraint, then approval from the Real Time Manager is required. Real Time Team Lead/Assistant Manager should contact Real Time Manager and request approval.	Real Time Manager	Approval requested	As required	Email
19	Review new constraint	Review new constraint request, assess and approve, if satisfied.	Real Time Manager	N/A	As required	Email
20	Approve?	If the Real Time Manager approves the modification request go to step 15. If not, the process ends and modification cannot be implemented without	Real Time Manager	N/A	As required	Email

#	Step	Step Description	Responsible Role	Outputs	Indicative Timing/ Frequency	System
		the required approval.				