Operational Agreements for Ireland and Northern Ireland Synchronous Area

Schedule 2: LFC Block Operational Agreement (LBCBOA)

July 2024

For Consultation 2.0

Version Control

Revision	Date	Comment
0.1	Oct 2018	First version of the LFCBOA[1] document submitted to regulators for approval following public consultation from 08/10/2018 to 08/11/2018
1.0	Nov 2019	The version of the LFCBOA document submitted to CRU by EirGrid and SONI after a public consultation from 15/07/2019 to 14/08/2019 following a Request for Amendment from the CRU and UR[2]
1.1	Sept 2022	Version of the document published on the on EirGrid and SONI website following CRU[3] and Utility Regulator[4] Decision on the Title 2 methodologies
2.0	July 2024	Current version of the document published for public consultation

[1] https://cms.eirgrid.ie/sites/default/files/publications/LFC-Block-Proposal-Submission-for-Ireland-and-Northern-Ireland-V1.0.pdf

[2] https://www.uregni.gov.uk/publications/request-amendment-tso-proposal-saoa-and-lfcboa-agreements

[3] CRU19140a Joint Decision to approve Operational Agreements (SAOA and LFCBOA) between EirGrid and SONI for Ireland and Northern Ireland

[4] https://www.uregni.gov.uk/publications/approval-sonis-submission-amended-synchronous-area-operational-agreement-load

Disclaimer

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Contents

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 System Operator Northern Ireland (hereafter referred to as "SONI") regarding a LFCBOA document for IE/NI.

2. This LFCBOA recognises the general principles and goals established in SOGL 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(1) and SOGL Article 6(3)(e). 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(1) but not mentioned in SOGL Article 6 or SOGL Article 11. These requirements are neither subject to regulatory approval nor public consultation; and

2. Any modification of Title 2 Articles requires public consultation in accordance with SOGL Article 11 and approval by the regulatory authorities of Ireland and Northern Ireland.

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[5] and SONI[6] Grid Codes.
FRR – Frequency Restoration Reserve	At present includes Tertiary Operating Reserve 1 (TOR1) and Tertiary Operating Reserve 2 (TOR2) as defined in the EirGrid and SONI Grid Codes. With

[5] EirGrid Grid Code
[6] SONI Grid Code

	ongoing implementation of Network Codes, in particular Electricity Balancing, future refinements are possible to ensure alignment with Network Codes.
mFRR – Manual Frequency Restoration Reserves	Means FRR with manual activation.
aFRR – Automatic Freque Restoration Reserves	Means FRR that can be activated by an automatic control device. aFRR activated by a load frequency controller are at present not used in the IE/NI synchronous area. This is subject to a cost benefit analysis being carried as required by SOGL (Article 145(2)).
RR – Replacement Reserve	At present includes Replacement Reserve (RR) as defined in the EirGrid and SONI Grid Codes. With ongoing implementation of Network Codes, in particular Electricity Balancing, future refinements are possible to ensure alignment with Network Codes.
Dimensioning incident forthe purpose of dimensioning FRR	In IE/NI this is typically referred to as the imbalance that may arise from the loss of the largest single infeed (or outfeed) when determining the requirements for reserve scheduling.
Reserve providing unit	Any provider that has the technical capability to provide reserves, FCR (POR, SOR), FRR (TOR1, TOR2) and RR, having met the applicable Network Code requirements including the additional properties specified in article 4 of the SAOA and having successfully completed the required performance tests.

Demand Unit	In the LFCBOA we are only referring to a subset of Demand Units which are defined as Demand Side Units in the EirGrid and SONI Grid Codes and in the ESBN and NIEN Distribution Codes. The definition of a Demand Side Unit is;An Individual Demand Site or Aggregated Demand Site with a Demand Side Unit MW Capacity of at least 4 MW. The Demand Side Unit shall be subject to Central Dispatch. With the implementation of the Demand Connection Code and the HVDC Connection Code future refinements are possible.
Cross border sharing and exchange of reserves categories FCR, FRR and RR.	'exchange of reserves' means the possibility of a TSO to access reserve capacity connected to another LFC area, LFC block, or synchronous area to fulfil its reserve requirements resulting from its own reserve dimensioning process of either FCR, FRR or RR and where that reserve capacity is exclusively for that TSO, and is not taken into account by any other TSO to fulfil its reserve requirements resulting from their respective reserve dimensioning processes; 'sharing of reserves' means a mechanism in which more than one TSO takes the same reserve capacity, being FCR, FRR or RR, into account to fulfil their respective reserve requirements resulting from their reserve dimensioning processes.

Table 1 Definitions

In this LFCBOA central dispatch refers to: The process of Scheduling and issuing Dispatch Instructions directly to a Control Facility by the TSO. All Dispatchable PPMs, Interconnectors, Pumped Storage Plant Demand, Energy Storage Power Station Demand, Demand Side Units, and Aggregated Generating Units of 4 MW or more are subject to Central Dispatch. In relation to all other Generation Units, the thresholds at which they are subject to central dispatch are those that at present apply in the EirGrid and SONI grid codes glossaries, where the thresholds are specified. It is envisioned that with ongoing implementation of the Network Codes future refinements maybe required to ensure alignment with the Network Codes.

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. 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 point 2 below in order to prevent the IE/NI LFC Block from entering into or remaining in an emergency state. The reasons for applying this restriction shall be transparent.

2. The maximum aggregated ramping rate for all HVDC interconnectors connecting the synchronous area IE/NI to other synchronous areas is 15 MW/min. The ramp rate on EWIC, Moyle and Greenlink is 5 MW/min each. If one (or more) interconnector(s) are on outage, the ramp rate on the in-service interconnector(s) may be increased up to 15 MW/min. This will be agreed between EirGrid and SONI based on system conditions

3. The ramp rate restrictions shall not apply for the cross border activation of FCR, FRR and RR.

4. Central dispatch is utilised in synchronous area IE/NI removing the need for the TSOs to specify additional limitations on ramping periods, ramping rates, and ramping start times of centrally dispatched Generators, Pumped Storage Plant Demand, Energy Storage Power Station Demand, Demand Side Units, and Aggregated Generating Units.

5. The process for the calculation of the Operational Constraint Update is available on the SEM-O website[7]. An extract of the process map and process steps is also available in Appendix 1.

6. To determine restrictions on the maximum ramping rates for HVDC interconnectors EirGrid and SONI will undertake system frequency stability studies. The scenarios for the studies will cover a range of and rates of change of system demand, renewable generation output and generation unit output.

7. Based on an analysis of the outputs of the power system frequency stability studies, EirGrid and SONI will decide if the ramp rate limit needs amending.

8. A provisional operating policy will be developed to reflect the new limit, respecting the requirements of SOGL Article 56. The provisional operating policy will contain the operating rules, including:

[7] https://www.sem-o.com/documents/general-publications/BP_SO_02.2_System_Constraints_Calculation.pdf

a. Action to be taken for any change from normal system behaviour;

b. Actions to be taken in the event of system faults;

c. Recording any change from normal system behaviour;

d. When the trial should be suspended (system testing, weather alerts, system alerts, loss of critical IT or communications equipment).

9. During the period of operation under the provisional operating policy actual real time data will be compared to the study outputs for verification of the accuracy of the study tool.

10. Following conclusion of the period of operation under the provisional operating policy a review of the results will be carried out, the outcome of which will be a decision by EirGrid and SONI as to whether the new limit on the maximum ramping rates for HVDC interconnectors will be put forward for approval to become "official" operating policy.

Article 4 The FRR dimensioning rules in accordance with SOGL Article 157(1) and 157(2)

1. EirGrid and SONI do not operate an aFRR process; consequently all FRR in the load frequency control block is mFRR (manual).

2. EirGrid and SONI shall jointly determine the reserve capacity for FRR, which will be 100% of the dimensioning incident in the positive and negative directions. The dimensioning incident will be the largest single infeed or outfeed.

3. EirGrid and SONI will dimension FRR on a day-ahead basis in both the positive and negative directions. At present negative reserve is not disaggregated. To ensure compliance with the requirements of the SOGL negative reserves will have to be split into FCR, FRR and RR. This will form part of the on-going review of the negative reserve policy. This required reserve will be updated both day ahead and in-day based on more accurate demand forecasts, renewable forecasts, interconnector schedule information and both active power and reserve availability declarations.

4. EirGrid and SONI have a geographical limitation on the distribution of FRR. The present values of the limits are shown in the following table. This geographical limit has been determined on an experiential basis following the reconnection of the North-South tie line.

	EirGrid	SONI
07:00 – 24:00	155 MW	50 MW
24:00 – 07:00	150 MW	50 MW

Table 2 Limits

5. To assess the risk of non-delivery of FRR shared between synchronous areas:

    a. Each TSO connected to a HVDC interconnector shall exchange information relating to operations and/or events on the HVDC interconnector, either transmission system, or other parties connected to these systems that have an effect on either transmission system or EWIC itself;

    b. The availability of arming the FRR service is assumed unless real time transfers prevent this or the service has been specifically withdrawn; and

    c. Arming or disarming the service will be agreed between the control capability providing TSO and the control capability receiving TSO.

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

1. The frequency restoration control error for EirGrid and SONI is the frequency deviation. The 1-minute average of the FRCE is more applicable to synchronous areas where Area Control Error is the FRCE. For the IE/NI synchronous area, where EirGrid and SONI control based on frequency and frequency deviation, system security will be extremely compromised if the TSOs have to wait for the 1-minute average of the frequency deviation to be calculated over the 15 minutes time to restore frequency before taking action to return the frequency to within the standard frequency range. EirGrid and SONI will use the actual frequency deviation instead of the 1-minute average and will act as soon as possible rather than wait for 15 minutes.

2. EirGrid and SONI will initiate the relevant actions from those listed in point 3 below, to endeavour to reduce the FRCE prior to violating the level 2 FRCE range, equal to or larger than 500 mHz, in paragraph 12 of Article 152 of the SOGL.

3. On the identification of any violation of the level 2 FRCE range, equal to or larger than 500 mHz, in paragraph 12 of Article 152 of the SOGL, coordinated actions will be implemented. As central dispatch is utilised in synchronous area IE/NI EirGrid and SONI will begin re-dispatching centrally dispatched generation, pump storage plant, energy storage power stations, aggregated generating units and demand side units before the frequency deviation exceeds the level 2 FRCE range. This re-dispatching will respect priority dispatch. Based on the expected demand and renewable electricity generation trajectories, the increase or reduction in MW required and the time required to start units EirGrid and SONI may synchronise or desynchronise centrally dispatched generation, pump storage plant, energy storage power stations, aggregated generating units or demand side units. The following coordinated actions will be implemented, the lead monitoring TSO at the time will initiate actions a, b and e, consult the other TSO on actions c and d and initiate discussion on actions f, g, h and i:

a. Issuing set points, via the wind dispatch tool in the energy management system, to reduce curtailment of wind generation to increase active power production to reduce the frequency deviation;

b. Issuing instructions to either increase or decrease active power production or consumption of centrally dispatched generation, pump storage plant, energy storage power stations, aggregated generating units or demand side units to reduce the frequency deviation;

c. Issuing instructions to synchronise centrally dispatched generation, pump storage plant, energy storage power stations, aggregated generating units or demand side units to provide additional options to either increase active power production or decrease consumption to reduce the frequency deviation;

d. Issuing instructions to desynchronise centrally dispatched generation, pump storage plant, energy storage power stations, aggregated generating units or demand side units to provide additional options to either decrease active power production or increase consumption to reduce the frequency deviation;

e. Issue set points, via the wind dispatch tool in the energy management system, to curtail wind generation to decrease active power production to reduce the frequency deviation.

f. Requesting an emergency assistance on a HVDC interconnector to change the active power flowing on the HVDC interconnector, to reduce the frequency deviation;

g. Issuing a HVDC interconnector emergency instruction, to change the active power flowing on the HVDC interconnector towards zero, to reduce the frequency deviation;

h. Enabling of special protection schemes to reduce the active power output or trip generation;

i. Planned demand control to reduce frequency deviation;

j. High frequency tripping of wind generation to reduce frequency deviation; and

k. Under-frequency load shedding to reduce frequency deviation.

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. The frequency restoration control error for EirGrid and SONI is the frequency deviation. The 1-minute average of the FRCE is more applicable to synchronous areas where Area Control

Error is the FRCE. For the IE/NI synchronous area, where EirGrid and SONI control based on frequency and frequency deviation, system security will be extremely compromised if the TSOs have to wait for the 1-minute average of the frequency deviation to be calculated over the 15 minutes time to restore frequency before taking action to return the frequency to within the standard frequency range. EirGrid and SONI will use the actual frequency deviation instead of the 1-minute average and will act as soon as possible rather than wait for 15 minutes.

2. EirGrid and SONI will initiate the relevant actions from those listed in point 3 below, to endeavour to reduce the FRCE prior to violating the level 2 FRCE range, equal to or larger than 500 mHz, in paragraph 12 of Article 152 of the SOGL.

3. On the identification of any violation of the level 2 FRCE range, equal to or larger than 500 mHz, in paragraph 12 of Article 152 of the SOGL, coordinated actions will be implemented. As central dispatch is utilised in synchronous area IE/NI EirGrid and SONI will begin re-dispatching centrally dispatched generation, pump storage plant, energy storage power stations, aggregated generating units and demand side units before the frequency deviation exceeds the level 2 FRCE range. This re-dispatching will respect priority dispatch. Based on the expected demand and renewable electricity generation trajectories, the increase or reduction in MW required and the time required to start units EirGrid and SONI may synchronise or desynchronise centrally dispatched generation, pump storage plant, energy storage power stations, aggregated generating units or demand side units. The lead monitoring TSO at the time will initiate actions a, b and e, coordinate with the other TSO on actions c and d and in coordination with the other TSO initiate discussion on action f:

    a. Issuing set points, via the wind dispatch tool in the energy management system, to reduce curtailment of wind generation to increase active power production to reduce the frequency;

    b. Issuing instructions to either increase or decrease active power production or consumption of centrally dispatched generation, pump storage plant, energy storage power stations, aggregated generating units or demand side units to reduce the frequency deviation;

    c. Issuing instructions to synchronise centrally dispatched generation, pump storage plant, energy storage power stations, aggregated generating units or demand side units to provide additional options to either increase active power production or decrease consumption to reduce the frequency deviation;

    d. Issuing instructions to desynchronise centrally dispatched generation, pump storage plant, energy storage power stations, aggregated generating units or demand side units to provide additional options to either decrease active power production or increase consumption to reduce the frequency deviation;

e. Issue set points, via the wind dispatch tool in the energy management system, to curtail wind generation to increase active power production to reduce the frequency deviation; and

f. Enabling of special protection schemes to reduce the active power output or trip generation to reduce frequency deviation.

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 in 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 acting in conjunction with each other from a load frequency control and reserves perspective, will dimension FRR and RR capacity to ensure there are appropriate reserves to ensure that the LFC block FRCE target parameters are achieved.
2. EirGrid and SONI consider the total requirements for FRR and RR in IE and NI as defined by the FRR dimensioning rules. The TSOs publish the FRR requirements within the Operating Reserve Requirements section of the Operational Constraints Update. The TSOs publish the RR requirements within the System Constraints section of the Operational Constraints Update.
3. EirGrid and SONI utilise scheduling and dispatch optimisation software which respects the FRR and RR dimensioning rules.
4. The required FRR and RR are initially scheduled for each half hour on a day ahead basis, subject to the limitations imposed by tie line operational constraints. This required reserve is updated both day-ahead and in-day based on more accurate demand, renewable and interconnector schedule information. FRR sharing with the GB synchronous area shall also be included within this optimisation process.
5. The optimisation of FRR shall be based on the declared availability, technical parameters and commercial offers submitted to EirGrid and SONI by market participants in respect of their FRR providing units. Provision of FRR and RR shall respect the minimum jurisdictional limits for FRR and RR as detailed in the Operational Constraints Update
6. To ensure compliance with the FRR and RR dimensioning rules EirGrid and SONI will:

a. Monitor the FRR and RR declarations of reserve providers and the energy levels of energy limited FRR and RR providers to maintain awareness of the real time availability of FRR and RR;
b. Continually monitor the required and actual FRR using the energy management system. The energy management system provides both visual and audible reserve shortage indications;
c. Each TSO shall exchange information relating to operations and/or events on each HVDC interconnector, either transmission system, or other parties connected to these systems that have an effect on ability of the HVDC interconnectors to provide FRR; and
d. Monitor the output of the dynamic stability assessment tool to ensure system frequency stability is maintained in real time.

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

EirGrid and SONI are not proposing any additional requirements to those already listed in SAOA, Title 3, Article 20.

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

1. The EirGrid and SONI grid codes, and the ESB Networks and NIE Networks distribution codes require certain generators connected to the transmission system and distribution system to provide FRR and RR. It is expected that under the network codes increased capabilities from small scale providers will be available to be considered.
2. The required FRR is initially scheduled for each half hour on a day-ahead basis. This required reserve is updated both day-ahead and in-day based on more accurate demand, renewable and interconnector schedule information.
3. EirGrid and SONI will monitor the declared availabilities of centrally dispatched generation, pump storage plant, energy storage power stations, aggregated generating units and demand side units to maintain awareness of the real time availability of RR.
4. EirGrid and SONI will monitor the availability of and the FRR and RR declarations of reserve providers and the energy levels of energy limited FRR and RR providers to maintain awareness of the real time availability of FRR and RR.
5. Each TSO shall exchange information relating to operations and/or events on each HVDC interconnector, either transmission system, or other parties connected to these systems that have an effect on ability of the HVDC interconnectors to provide FRR.

6. Issue Alerts both local and using the ENTSO-E Awareness System (Market Operations, CRU and UR are to be informed for Amber Alert) (alerts may be jurisdictional due to tie-line limitations:
    a. Local Alerts
        i. Amber Alert signal should be initiated by EirGrid or SONI when the System enters an alert state that is characterised by:

            Total system availability + Any additional tie line flow from IE or NI + Flow on Interconnector (Moyle/EWIC/Greenlink) - Peak Demand < Largest Infeed or
    b. ENTSO-E awareness system
        i. The Alert state should be initiated when the TSO's reserve capacity is reduced by more than 20% for longer than 30 minutes and there are no means to compensate for that reduction in real time system operation (article 18(2)(b)).
        ii. The Alert state should be initiated when the frequency enters the alert area as outlined in the illustration below in Figure 1, as defined in Article 18 of SOGL.

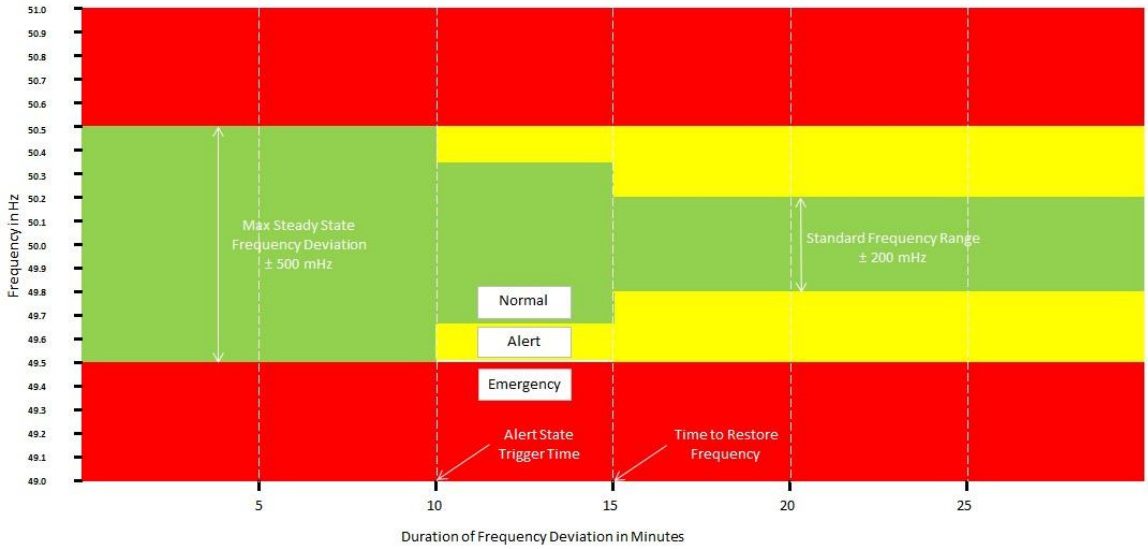


Figure 1 System States

7. In the case of exhausted FRR and RR EirGrid and SONI will make use of but may not be limited to the following:
    a. Redispatching centrally dispatched generators, pump storage plant, energy storage power stations, aggregated generating units and / or demand side units to increase reserve provision;
    b. Reduce the size of the dimensioning incident to reduce the reserve requirement;
    c. Synchronise additional units to increase reserve provision;
    d. Curtail or uncurtail wind to allow for increased reserve provision;

e. Recall generators from outage;
f. Recall transmission system elements from outage to reduce congestion;
g. If possible request generation and / or demand side units to maximise their output;
h. Issue HVDC emergency assistance and / or emergency instruction;
i. Enter Emergency State;
j. Decide on the requirement to issue a public appeal to reduce demand; and
k. Invoke planned demand control.

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

1. EirGrid and SONI acting in conjunction with each other consider the overall RR requirement for the IE/NI synchronous area. Due to the existing north south tie line operational constraint, EirGrid maintains a minimum level of RR in Ireland and SONI maintains a minimum level of RR in Northern Ireland. The present values of the limits are published in the Operational Constraints Update[8] as part of the Active Northern Ireland Constraints table and the Active Ireland Constraints table.

2. The RR dimension rule is to ensure that there are adequate replacement reserves to restore the required amount of the FCR and the required amount of FRR in the positive direction.

3. At present negative reserve is not disaggregated. To ensure compliance with the requirements of the SOGL negative reserves will have to be split into FCR, FRR and RR. This will form part of the on-going review of the negative reserve policy.

4. At present the Cross Border Balancing and Coordinated Third Party trading processes to enable sharing or exchange of RR require more than the 20 minutes full activation time of RR to complete. For this reason EirGrid and SONI at present apply a zero limit for sharing or exchange of RR as there is no exchange or sharing of replacement reserve between synchronous areas IE/NI and GB. With the implementation of the Electricity Balancing Guideline the RR trading processes will have to be modified to provide the ability to share and exchange RR.

[8] Latest update is at Library section on www.eirgridgroup.com or https://www.sem-o.com/publications/general-publications/

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)

1. EirGrid and SONI consider the total requirements for FRR and RR in Ireland and Northern Ireland as defined by the dimensioning rules. The TSOs publish the FRR requirements within the Operating Reserve Requirements section of the Operational Constraints Update. The present values of the RR requirements are published in the Operational Constraints Update as part of the Active Northern Ireland Constraints table and the Active Ireland Constraints table. EirGrid and SONI utilise scheduling and dispatch optimisation software to regularly calculate the most economic allocation of FRR within the synchronous area subject to the limitations imposed by tie line operational constraints and frequency response availability and limits on the DC interconnectors. FRR sharing with the GB synchronous area shall also be included within this optimisation process.

2. EirGrid and SONI act in conjunction with each other to ensure the secure operation of the IE/NI synchronous area from a load frequency control and reserves perspective. Both EirGrid and SONI shall continually maintain the ability to monitor, dispatch and schedule on an individual monitoring area and all-island synchronous area level.

3. At any one time when operating on an all-island basis either EirGrid or SONI will be nominated as the lead monitor.

4. Both EirGrid and SONI will continually monitor the FRCE (frequency deviation) and the available FRR. The lead monitor at that time will ensure compliance with the FRR dimensioning rules and when required activate the FRR process by issuing dispatch instructions. In the scheduling timeframe the non-lead monitor TSO will utilise the scheduling and dispatch optimisation software to determine the required FRR up to the end of the current day and when the market data is available up to the end of the next day.

5. Both EirGrid and SONI will continually monitor the available RR. The lead monitor at that time will ensure compliance with the RR dimensioning rules and when required activate the RR process by issuing dispatch instructions. In the scheduling timeframe the non-lead monitor TSO will ensure that the scheduling and dispatch optimisation software schedules the required RR.

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

1. To manage the severe risk of insufficient FRR and RR the EirGrid and SONI acting in conjunction will make use of but may not be limited to the following:
    a. Recall generators from outage;
    b. Recall transmission system elements from outage to reduce congestion;
    c. Place the Distribution Control Centres on alert for demand control;
    d. Issue Emergency State both local and using the ENTSO-E Awareness System (Market Operations, CRU and UR are to be informed);
    e. Decide on the need for a public appeal for load reduction;
    f. Implement planned demand control – decide on type; and
    g. Review situation for following days and advise Distribution Control Centres if rota demand control will be required.

Article 14 Requirements for FRR availability and control quality in accordance with SOGL Article 158(2) and requirements for RR availability in accordance with SOGL Article 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 the active power output of reserve providers.
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. Reserve providers performance will be assessed for frequency events where the frequency falls below 49.7 Hz. Performance is assessed on the reserve provider's ability to meet expected response.
4. However, it should be noted that additional criteria may be identified as part of the EBGL and these will be confirmed in due course.
5. 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. As the IE/NI synchronous area consists of only one LFC Area and LFC block the exchange of FRR and/or RR with other LFC blocks within the synchronous area is not applicable.

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

1. As the IE/NI synchronous area consists of only one LFC block the sharing of FRR and/or RR with other LFC blocks within the synchronous area is not applicable.

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. EirGrid and SONI do not at present share RR with GB. Cross-border RR activation is not used at present as the Cross Border Balancing and Coordinated Third Party trading processes to enable activation of RR require more than the 20 minutes full activation time of RR to complete. With the implementation of the Electricity Balancing Guideline the RR trading processes will have to be modified.
2. When static frequency response is triggered for a low frequency on either EWIC or Moyle the existing transfer is increased by an agreed maximum MW value. When the frequency limited/sensitive response is triggered on either EWIC, Greenlink or Moyle the existing transfer is increased up to an agreed maximum MW value depending on the frequency deviation. If these additional MW flow from 5 to 15 seconds it is classed as POR. If this flow continues from 15 to 90 seconds it is classed as SOR. If it continues from 90 seconds to 5 minutes it is classed as TOR1 and from 5 to 20 minutes TOR2. The interconnector flow should be ramping back to schedule within 30 minutes.
3. At present cross border FCR sharing must be armed to enable EirGrid and SONI participate in a cross border FRR sharing process with synchronous area GB. There are no other affected TSOs. The process has the following roles and responsibilities:

    a. The ability for each TSO to provide static frequency response will be assumed available to be armed unless real time transfers prevent this or the service has been specifically withdrawn.

b. For EWIC arming and disarming of the Static Frequency Response service using the Emergency Power Control functionality or the Frequency Control - Sensitive Mode will be agreed by both NGESO and EirGrid via a telephone conversation and confirmed using the appropriate template. EirGrid will inform SONI and then set the emergency power control accordingly.

c. For Moyle arming and disarming of the static frequency response service using the Emergency Power functionality or the Frequency Limit Control will be agreed by NGESO and SONI via a telephone conversation and confirmed using the appropriated template. SONI will inform EirGrid and then set the Emergency Power accordingly.

d. For Greenlink, arming and disarming of the Frequency Control - Sensitive Mode will be agreed by both NGESO and EirGrid via a telephone conversation and confirmed using the appropriate template. EirGrid will inform SONI and then set frequency control accordingly.

e. If the static FRR service is triggered the post event commercial process to account for the energy transfer for EWIC will be initiated by EirGrid if the static frequency response has been triggered by the IE/NI frequency. The commercial process for Moyle will be initiated by SONI if the static frequency response has been triggered by the IE/NI frequency.

f. If the static FRR service is triggered by NGESO on EWIC, Greenlink or Moyle the post event commercial process to account for the energy transfer will be initiated by NGESO.

g. If the Frequency Control - Sensitive Mode on EWIC or Greenlink or the Frequency Limit Control on Moyle is triggered the post event commercial process to account for EWIC or Greenlink will be initiated by EirGrid if the frequency response has been triggered by the IE/NI frequency. The commercial process for Moyle will be initiated by SONI if the frequency response has been triggered by the IE/NI frequency.

h. The TSO who triggered the emergency power transfer will initiate the process to return to schedule within 30 minutes by contacting the TSO who provided the additional energy indicating their intention to return to schedule. EirGrid and SONI will inform each other of the intention to return to schedule on EWIC/Greenlink and Moyle respectively. At the agreed return to schedule time EirGrid will set EWIC and Greenlink to return to schedule. At the agreed return to schedule time SONI will set Moyle to return to schedule.

i. Each TSO shall exchange information relating to operations and/or events on each HVDC interconnector, either transmission system, or other parties connected to these systems that have an effect on either transmission system or the HVDC interconnectors themselves.

TITLE 4 Final Provisions

Article 18 Timescale for implementation

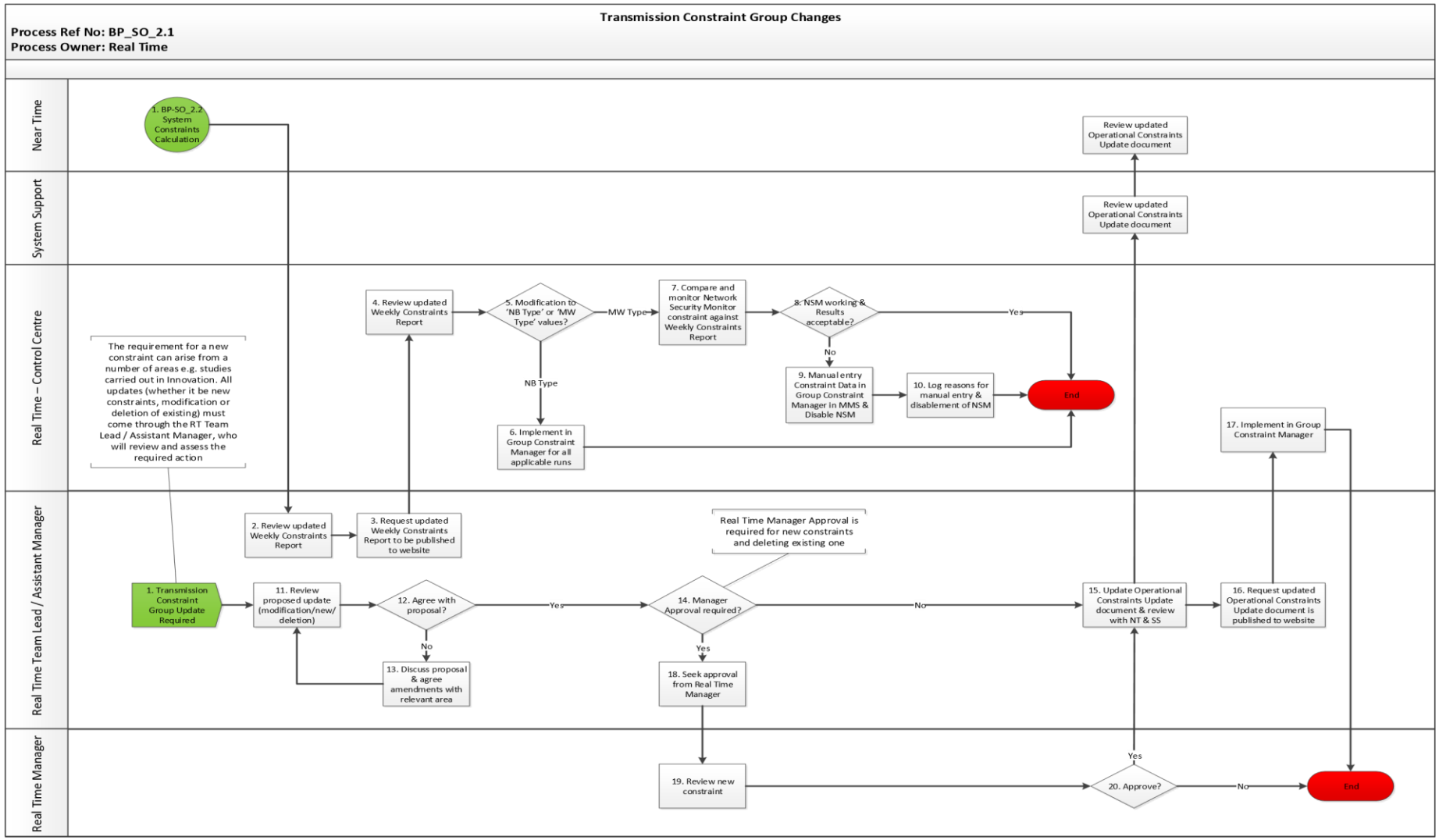
1. The LFCBOA will enter into force three months after the approval of the methodologies & conditions contained in Title 2 by the National Regulatory Authorities of Ireland and Northern Ireland, in accordance with SOGL Article 119(2).
2. EirGrid and SONI shall share the contents of the LFCBOA with the National Regulatory Authorities of Ireland and Northern Ireland in accordance with SOGL Article 184(3).

Article 19 Language

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

Appendix 1 – Operational Constraints process

EIRGRID SONI


Transmission Constraint Group Changes
Process Ref No: BP_SO_2.1
Process Owner: Real Time
Near Time
System Support
Real Time – Control Centre
Real Time Team Lead / Assistant Manager
Real Time Manager
1. BP-SO_2.2 System Constraints Calculation
Review updated Operational Constraints Update document
Review updated Operational Constraints Update document
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
4. Review updated Weekly Constraints Report
5. Modification to 'NB Type' or 'MW Type' values?
MW Type
7. Compare and monitor Network Security Monitor constraint against Weekly Constraints Report
8. NSM working & Results acceptable?
Yes
No
NB Type
9. Manual entry Constraint Data in Group Constraint Manager in MMS & Disable NSM
10. Log reasons for manual entry & disablement of NSM
End
6. Implement in Group Constraint Manager for all applicable runs
17. Implement in Group Constraint Manager
2. Review updated Weekly Constraints Report
3. Request updated Weekly Constraints Report to be published to website
Real Time Manager Approval is required for new constraints and deleting existing one
1. Transmission Constraint Group Update Required
11. Review proposed update (modification/new/ deletion)
12. Agree with proposal?
Yes
14. Manager Approval required?
No
15. Update Operational Constraints Update document & review with NT & SS
16. Request updated Operational Constraints Update document is published to website
No
13. Discuss proposal & agree amendments with relevant area
Yes
18. Seek approval from Real Time Manager
19. Review new constraint
Yes
20. Approve?
No
End

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 Manager	N/A	As required	N/A
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?	Is the update a modification to a 'NB Type' or a 'MW Type'? - • '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. If it is to a 'NB Type' go to step 6. If it is to a 'MW Type' go to step 7.	Real Time – Control Centre	N/A	As required	N/A

#	Step	Step Description	Responsible Role	Outputs	Indicative Timing/ Frequency	System
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 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.	Real Time – Control Centre	GCM updated	As required	Group Constraints Manager (MMS)
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 step 13.	Real Time Team Lead/Assistant Manager	N/A	As required	N/A
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
#	**Step**	**Step Description**	**Responsible Role**	**Outputs**	**Indicative Timing/ Frequency**	**System**
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 Operational Constraints Update document is published to website	The updated Operational Constraints Update document is then published to EirGrid and SONI websites.	Real Time Team Lead/Assistant Manager	Operational Constraints Update document updated and published	As required	Website
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 the required approval.	Real Time Manager	N/A	As required	Email