



An Coimisiún  
um Rialáil Fóntas  
**Commission for  
Regulation of Utilities**

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**Commission for Regulation of Utilities**

## Decision to not approve and seek amendments to the documents submitted by EirGrid under EU Regulation 2017/ 2196 Emergency Restoration;

- a) Terms and conditions to act as a defence service provider and a restoration service provider**
- b) Significant Grid Users Ireland**
- c) Rules for suspension and restoration of markets during emergency states and Specific rules for imbalance and settlement and settlement of balancing energy in case of suspension of market activities for Ireland**

### Decision Paper

<b>Reference:</b>	CRU19110	<b>Date Published:</b>	02/09/2019	<b>Closing Date:</b>	XX/XX/XXX
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## **CRU Mission Statement**

The CRU's mission is to protect the public interest in Water, Energy and Energy Safety.

The CRU is guided by four strategic priorities that sit alongside the core activities we undertake to deliver on the public interest. These are:

- Deliver sustainable low-carbon solutions with well-regulated markets and networks
- Ensure compliance and accountability through best regulatory practice
- Develop effective communications to support customers and the regulatory process
- Foster and maintain a high-performance culture and organisation to achieve our vision

## **Customer Impact Statement**

The Emergency Restoration Network Code aims to establish across the EU, a set of common, minimum requirements and principles for the actions of key electricity network users and operators when the electricity system is in either an emergency, blackout or restoration state. A secure supply of electricity is important to consumers, the economy and society, and the scale of the changes requested in this decision paper underlines the CRU's focus on this area.

## Executive Summary

This document provides detail on the Commission for Regulation of Utilities (**CRU's**) decision to request amendments to the documents submitted by EirGrid on 18 December 2018 as required by the Network Code on Electricity Emergency Restoration EU Regulation 2017/2196.

The EU Network Codes, including the Emergency Restoration Network Code (**ER NC**), aim to harmonise electricity system operations and markets across EU, and increase visibility of the processes and procedures utilised in order to achieve such harmonisation.

While this paper details reasons not to approve documents submitted by EirGrid with regard to the ER NC, the CRU acknowledges that the TSO and DSO have existing processes in place for emergency response including emergency restoration, and that these processes are regularly tested. This paper focuses on harmonising the existing arrangements with the pan European requirements of the ER NC. The ER NC provides detailed guidelines for the purposes of safeguarding operational security, and lays down requirements on

- (a) the management by TSOs of the emergency, blackout and restoration states;
- (b) the coordination of system operation across the Union in the emergency, blackout and restoration states;
- (c) the simulations and tests to guarantee a reliable, efficient and fast restoration of the interconnected transmission systems to the normal state from the emergency or blackout states;
- (d) the tools and facilities needed to guarantee a reliable, efficient and fast restoration of the interconnected transmission systems to the normal state from the emergency or blackout states.

The ER NC requires TSOs, DSOs and Significant Grid Users (parties connected to transmission and distribution networks that can impact operations or provide services) to meet certain standards regarding operations, tools and facilities and planning for and during emergency, blackout and restoration states. The EU Network Codes define 5 states of operation across all Member States; normal, alert, emergency, blackout, restoration.

EirGrid, as the Transmission System Operator (**TSO**) is obliged by the ERNC to develop (and consult upon items a-d) the following documents in advance of submission to the CRU on December 18th, 2018;

- a) The terms and conditions to act as defence service providers on a contractual basis (*the service providers/units that are contracted by the TSO to provide system support services during an emergency state*)
- b) The terms and conditions to act as restoration service providers on a contractual basis (*the service providers/units contracted to provide black start, or system support services during the restoration of the system following a partial or total blackout*)
- c) The rules for suspension and restoration of market activities in line with Article 26(1) of ERNC (*should certain market activities be suspended during an emergency, blackout or restoration state*)

- d) Specific rules for imbalance settlement and balancing energy in case of suspension of market activities in accordance with Article (39) (*what are the appropriate pricing and settlement rules if a suspension of market activities occurs during emergency or restoration states*)
- e) The list of significant grid users (**SGU**) responsible for implementation of measures related to the system defence plan and the system restoration plan for Ireland, and the measures to be implemented (*SGUs in Ireland can range from generation units of >100kW, demand side units and transmission connected demand facilities*)
- f) Design of the System Defence Plan for Ireland (*detailed plan and procedures regarding system operations during an emergency state to avoid total blackout*)
- g) Design of the System Restoration plan for Ireland (*detailed plan and procedures regarding the restoration of the system from a partial blackout or total blackout*)

ESB Networks as the Distribution System Operator (**DSO**), is also involved in the execution of the requirements of the Emergency Restoration Code, and there is therefore a need for collaboration and detailed engagement between the two system operators to ensure a cohesive and holistic design of the terms and conditions and procedures is achieved.

The TSO grouped the documents slightly differently and following consultation on items (a, b, d and e) submitted the following proposals to the CRU;

- a) Terms and conditions to act as a defence service provider and a restoration service provider
- b) Rules for suspension and restoration of markets during emergency states and Specific rules for imbalance and settlement and settlement of balancing energy in case of suspension of market activities for Ireland
- c) List of Significant grid users Ireland (the TSO stated there are no High priority grid users so did not provide a list)
- d) Design of the System Defence Plan
- e) Design of the System Restoration Plan

All of the submitted documents provide useful transparency into how the TSO and DSO propose to operate the system during alert, emergency, blackout and restoration states.

The CRU has engaged with the TSO and DSO since the submission of the proposals in December 2018, and this document outlines the areas we wish to see amended within the three documents to enable approval. We have also outlined informal comments to the System Defence plan and System Restoration plan, as these two documents are critically important in terms of secure system operation and appropriate procurement of defence and restoration services.

As all of the submitted documents provide useful transparency into how the TSO and DSO operate the system during alert, emergency, blackout and restoration states, the CRU considers it is important that the TSO and DSO address our requested amendments in full to ensure that service

providers have a clear understanding of the obligations posed upon them by the system operators, and to understand possible opportunities for provision of restoration and defence service provision.

The amendments require the need for a further consultation by the TSO and DSO, to ensure full transparency for stakeholders. Therefore, the CRU outlines in this document the need to conduct a 4 week consultation on the amended proposals, and places a requirement on the TSO to submit the amended proposals within 4 months of the publication of this document.

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## Glossary of Terms and Abbreviations

Abbreviation or Term	Definition or Meaning
<b>ER NC</b>	Emergency Restoration Network Code EU Regulation 2017/2196
<b>SOGL</b>	System Operation Guideline EU Regulation 2017/1485
<b>EUNC</b>	European Network Codes and Guidelines
<b>TSO</b>	Transmission System Operator (EirGrid)
<b>DSO</b>	Distribution System Operator (ESB Networks)
<b>SGU</b>	Significant Grid User
<b>CACM</b>	Capacity Allocation and Congestion Management EU Regulation 2016/1222
<b>FCA</b>	Forward Capacity Allocation EU Regulation 2016
<b>IE</b>	Ireland
<b>NI</b>	Northern Ireland
<b>LFC</b>	Load Frequency Control
<b>NEMO</b>	Nominated Electricity Market Operator (SEMOpX)

<b>SEM</b>	Single Electricity Market of Ireland and Northern Ireland
<b>SRP</b>	System Restoration Plan
<b>SDP</b>	System Defence Plan

# 1. Introduction

The [Emergency Restoration Network Code \(“ERNC”\)](#) is one of a suite of European Network Codes and Guidelines that require harmonised and common methods of electricity system operation, planning and market design to achieve a fully-functioning and interconnected internal energy market to ensure security of supply and that all consumers can benefit fully from competitive markets across the EU.

The Emergency Restoration Network Code (**ER NC**) aims to establish a set of common minimum requirements and principles for the procedures and actions of Transmission System Operators (**TSOs**), Significant Grid Users (**SGUs**) and Distribution System Operators (**DSOs**) when an electricity system is in either an emergency, blackout or restoration state. The ERNC links closely to a number of the other EU Network Codes, in particular the;

- System Operation Guideline (**SOGL**) EU Regulation 2017/1485;
- Requirements for Generators (**RfG**) EU Regulation 2016/631;
- Demand Connection Code (**DCC**) EU Regulation 2016/1388; and,
- High Voltage Direct Current (**HVDC**) EU Regulation 2016 /1447.

EirGrid, as the Transmission System Operator (**TSO**) is obliged by the ERNC to develop (and consult upon items a-d) the following documents in advance of submission to the CRU on December 18th, 2018;

- a) The terms and conditions to act as defence service providers on a contractual basis (*the service providers/units that are contracted by the TSO to provide system support services during an emergency state*)
- b) The terms and conditions to act as restoration service providers on a contractual basis (*the service providers/units contracted to provide black start, or system support services during the restoration of the system following a partial or total blackout*)
- c) The rules for suspension and restoration of market activities in line with Article 26(1) of ERNC (*should certain market activities be suspended during an emergency, blackout or restoration state*)
- d) Specific rules for imbalance settlement and balancing energy in case of suspension of market activities in accordance with Article (39) (*what are the appropriate pricing and settlement rules if a suspension of market activities occurs during emergency or restoration states*)
- e) The list of significant grid users (**SGU**) responsible for implementation of measures related to the system defence plan and the system restoration plan for Ireland, and the measures to be implemented (*SGUs in Ireland can range from generation units of >100kW, demand side units and transmission connected demand facilities*)
- f) Design of the System Defence Plan for Ireland (*detailed plan and procedures regarding system operations during an emergency state to avoid total blackout*)
- g) Design of the System Restoration plan for Ireland (*detailed plan and procedures regarding*

*the restoration of the system from a partial blackout or total blackout)*

ESB Networks as the Distribution System Operator (**DSO**), is also involved in the execution of the requirements of the Emergency Restoration Code, and there is therefore a need for collaboration and detailed engagement between the two system operators to ensure a cohesive and holistic design of the terms and conditions and procedures is achieved.

The TSO grouped the documents slightly differently and following consultation on items (a, b, d and e) submitted the following proposals to the CRU on December 18<sup>th</sup> 2018;

- a) Terms and conditions to act as a defence service provider and a restoration service provider
- b) Rules for suspension and restoration of markets during emergency states and Specific rules for imbalance and settlement and settlement of balancing energy in case of suspension of market activities for Ireland
- c) List of Significant grid users Ireland (the TSO stated there are no High priority grid users so did not provide a list)
- d) Design of the System Defence Plan
- e) Design of the System Restoration Plan

The CRU has undertaken a thorough analysis of the documents submitted against the requirements of the ER NC. The documents submitted by the TSO in many instances do not contain sufficient detail to meet the requirements of the ER NC. This document outlines the CRU's detailed considerations on the requirements of ER NC and our decision to request amendments to the submitted documents that would enable future approval.

## 1.1 Related Documents

The following are documents that are related to the Emergency Restoration proposals and provide background to this document. Interested stakeholders are advised that it may be helpful to be review the content of these documents to fully understand the amendments requested by the CRU in relation to the ER proposals. While not all of these documents set out requirements specifically on the TSO, such as the Trading and Settlement Code which applies to the Market Operator, these have fed into the CRU's considerations of the submitted documents.

- CRU [Decision](#) and UR [Decision](#) on the Determination of the Load Frequency Control (LFC) Block
- CRU [Request for Amendment](#) to the Synchronous Area Operational Agreement and the Load Frequency Control Block agreement
- System Operator [Agreement](#) between SONI and EirGrid
- The EirGrid TSO [licence](#)
- EirGrid Grid [Code](#)
- ESBN Distribution [Code](#)

- Trading and Settlement [Code](#)
- System Operator Agreement between SONI and EirGrid
- SEMO Note on inter- area flow constraint
- SI445/2000 Internal Market in Electricity Regulation

The ER NC interacts with numerous other EU Network Codes/Guidelines;

- System Operation [Guideline](#) (SOGL) EU Regulation 2017/1485 - which aims to create common requirements for real time operations
- Requirements for Generators (RfG) EU [Regulation](#) 2016/631- which outlines frequency and voltage ranges for generators to comply with during operation
- Demand Connection Code (DCC) EU [Regulation](#) 2016/1388 - which outlines frequency and voltage ranges for demand connections to comply with during operation
- High Voltage Direct Current (HVDC) EU [Regulation](#) 2016 /1447- which outlines frequency and voltage ranges for HVDC connections to comply with during operation
- Electricity Balancing Guideline (EBGL) EU [Regulation](#) 2017/2195 – which outlines imbalance settlement and pricing of balancing energy principles
- Capacity Allocation and congestion management (CACM) EU [Regulation](#) 2015/1222 – which outlines arrangement for NEMOs and market entities
- Forward Capacity Allocation (FCA ) - EU [Regulation](#) 2016/1719 - which outlines arrangement for NEMOs and market entities

## 2. Legal Background

### 2.1 Focus of ER NC

The Emergency Restoration Network Code (ER NC) is a European regulation that provides detailed guidelines for the purposes of safeguarding operational security, and lays down requirements on

- (a) the management by TSOs of the emergency, blackout and restoration states;
- (b) the coordination of system operation across the Union in the emergency, blackout and restoration states;
- (c) the simulations and tests to guarantee a reliable, efficient and fast restoration of the interconnected transmission systems to the normal state from the emergency or blackout states;
- (d) the tools and facilities needed to guarantee a reliable, efficient and fast restoration of the interconnected transmission systems to the normal state from the emergency or blackout states.

### 2.2 Application of the ER NC

The ER NC shall apply to TSOs, DSOs SGUs, defence service providers, restoration service providers, balance responsible parties, balancing service providers, nominated electricity market operators and other entities designated to execute market functions pursuant to CACM and FCA.

In particular, as outlined in Article 2.2, 2.3, 2.4 and 2.5 of ER NC, the requirements shall apply to the following significant grid users;

- a) existing and new power generating modules classified as type C and D in accordance with the criteria set out in Article 5 of Commission Regulation (EU) 2016/631 (RfG)
- (b) existing and new power generating modules classified as type B in accordance with the criteria set out in Article 5 of Regulation (EU) 2016/631, where they are identified as SGUs in accordance with Article 11(4) and Article 23(4); (RfG)
- (c) existing and new transmission-connected demand facilities;
- (d) existing and new transmission connected closed distribution systems;
- (e) providers of re-dispatching of power generating modules or demand facilities by means of aggregation and providers of active power reserve in accordance with Title 8 of part IV of Regulation (EU) 2017/1485 (SOGL); and
- (f) existing and new high voltage direct current ('HVDC') systems and direct current-connected power park modules in accordance with the criteria set out in Article 4(1) of Commission Regulation (EU) 2016/1447 (HVDC).

ER NC requirements also apply to existing and new type A power generating modules, in accordance with the criteria set out in Article 5 of Regulation (EU) 2016/631 (RfG), to existing and new type B power generating modules other than those referred to in paragraph 2.2(b) above, as

well as to existing and new demand facilities, closed distribution systems and third parties providing demand response where they qualify as defence service providers or restoration service providers pursuant to Article 4(4) of the ER NC Regulation.

Type A and type B power generating modules referred to above, demand facilities and closed distribution systems providing demand response may fulfil the requirements of this Regulation either directly or indirectly through a third party (aggregation), under the terms and conditions set in accordance with Article 4(4).

For clarity Type A, B, C and D generators are classified in Ireland as follows;

- Type **A** units include all generation units from **800W to < 100kW**
- Type **B** units include units from **0.1MW (100kW) to < 5 MW**
- Type **C** units range from 5MW to < 10 MW
- Type **D** units are **≥ 10MW**. Also, all generation **connected at 110 kV or higher** is automatically considered as Type D.

The ER NC shall apply to energy storage units of an SGU, a defence service provider or a restoration service provider, which can be used to balance the system, provided that they are identified as such in the system defence plans, restoration plans or in a relevant service contract.

## 2.3 Requirements of ER NC

This decision paper outlines the CRU's decision on the requirements of Articles 4, 11, 23, 36 and 39. The TSO also has a responsibility to consult and coordinate with stakeholders as outlined in Article 5 and 7 of the ER NC. These Articles are set out below.

The CRU's role as the competent Regulatory Authority is outlined in Article 4 below.

Please note however that many of these Articles refer to other Articles and requirements contained within the ER NC and so it may be beneficial to have the full [text](#) of the ER NC to refer to when reviewing this decision paper.

### Article 4 Regulatory aspects

*1. When applying this Regulation, Member States, regulatory authorities, competent entities and system operators shall:*

- (a) apply the principles of proportionality and non-discrimination;*
- (b) ensure transparency;*
- (c) apply the principle of optimisation between the highest overall efficiency and lowest total costs for all parties involved;*
- (d) ensure that TSOs make use of market-based mechanisms as far as is possible to ensure network security and stability;*
- (e) respect technical, legal, personal safety and security constraints;*
- (f) respect the responsibility assigned to the relevant TSO in order to ensure system security, including as required by national legislation;*

*(g) consult with relevant DSOs and take account of potential impacts on their system; and*

*(h) take into consideration agreed European standards and technical specifications.*

*2. Each TSO shall submit the following proposals to the relevant regulatory authority in accordance with Article 37 of Directive 2009/72/EC for approval:*

*(a) the terms and conditions to act as defence service providers on a contractual basis in accordance with paragraph 4; 28.11.2017 EN Official Journal of the European Union L 312/57*

*(b) the terms and conditions to act as restoration service providers on a contractual basis in accordance with paragraph 4;*

*(c) the list of SGUs responsible for implementing on their installations the measures that result from mandatory requirements set out in Regulations (EU) 2016/631, (EU) 2016/1388 and (EU) 2016/1447 and/or from national legislation and the list of the measures to be implemented by these SGUs, identified by the TSOs under Art. 11(4)(c) and 23(4)(c);*

*(d) the list of high priority significant grid users referred to in Articles 11(4)(d) and 23(4)(d) or the principles applied to define those and the terms and conditions for disconnecting and re-energising the high priority grid users, unless defined by the national legislation of Member States.*

*(e) the rules for suspension and restoration of market activities in accordance with Article 36(1);*

*(f) specific rules for imbalance settlement and settlement of balancing energy in case of suspension of market activities, in accordance with Article 39(1);*

*(g) the test plan in accordance with Article 43(2).*

*3. Where a Member State has so provided, the proposals referred to in points (a) to (d) and (g) of paragraph 2 may be submitted for approval to an entity other than the regulatory authority. Regulatory authorities and entities designated by the Member States pursuant to this paragraph shall decide on the proposals referred to in paragraph 2 within six months from the date of submission by the TSO.*

*4. The terms and conditions to act as defence service provider and as restoration service provider shall be established either in the national legal framework or on a contractual basis. If established on a contractual basis, each TSO shall develop by 18 December 2018 a proposal for the relevant terms and conditions, which shall define at least:*

*(a) the characteristics of the service to be provided;*

*(b) the possibility of and conditions for aggregation; and*

*(c) for restoration service providers, the target geographical distribution of power sources with black start and island operation capabilities.*

*5. By 18 December 2018, each TSO shall notify the regulatory authority or the entity designated by the Member State the system defence plan designed pursuant to Article 11 and the restoration plan designed pursuant to Article 23, or at least the following elements of those plans:*

*(a) the objectives of the system defence plan and the restoration plan, including the phenomena to be managed or the situations to be solved;*

*(b) the conditions triggering the activation of the measures of the system defence plan and the restoration plan;*

*(c) the rationale of each measure, explaining how it contributes to the objectives of the system defence plan and the restoration plan, and the party responsible for implementing those measures; and*

*(d) the deadlines set out pursuant to Articles 11 and 23 for the implementation of the measures.*

*6. Where a TSO is required or permitted under this Regulation to specify, establish or agree on requirements, terms and conditions or methodologies that are not subject to approval in accordance with paragraph 2, Member States may require prior approval by the regulatory authority, the entity designated by the Member State or other competent authorities of the Member States of these requirements, terms and conditions or methodologies.*

*7. If a TSO deems an amendment to the documents, approved in accordance with paragraph 3, to be necessary, the requirements provided for in paragraphs 2 to 5 shall apply to the proposed amendment. TSOs proposing an amendment shall take into account the legitimate expectations, where necessary, of power generating facility owners, demand facility owners and other stakeholders based on the initially specified or agreed requirements or methodologies.*

*8. Any party can complain against a relevant system operator or TSO in relation to that relevant system operator's or TSO's obligations or decisions under this Regulation and may refer the complaint to the regulatory authority which, acting as dispute settlement authority, shall issue a decision within two months after receipt of the complaint. That period may be extended by a further two months where additional information is sought by the regulatory authority. That extended period may be further extended with the agreement of the complainant. The regulatory authority's decision shall be binding unless and until overruled on appeal.*

#### **Article 11 Design of the System Defence Plan**

*1. By 18 December 2018, each TSO shall design a system defence plan in consultation with relevant DSOs, SGUs, national regulatory authorities, or entities referred to in Article 4(3), neighbouring TSOs and the other TSOs in its synchronous area.*

*2. When designing its system defence plan, each TSO shall take into account at least the following elements:*

*(a) the operational security limits set out in accordance with Article 25 of Regulation (EU) 2017/1485;*

*(b) the behaviour and capabilities of load and generation within the synchronous area;*

*(c) the specific needs of the high priority significant grid users listed pursuant to point (d) of paragraph 4; and*

*(d) the characteristics of its transmission system and of the underlying DSOs systems.*

*3. The system defence plan shall contain at least the following provisions:*

*(a) the conditions under which the system defence plan is activated, in accordance with Article 13;*

*(b) the system defence plan instructions to be issued by the TSO; and*

*(c) the measures subject to real-time consultation or coordination with the identified parties.*

*4. In particular, the system defence plan shall include the following elements:*

- (a) a list of the measures to be implemented by the TSO on its installations;*
- (b) a list of the measures to be implemented by DSOs and of the DSOs responsible for implementing those measures on their installations;*
- (c) a list of the SGUs responsible for implementing on their installations the measures that result from the mandatory requirements set out in Regulation (EU) 2016/631, (EU) 2016/1388 and (EU) 2016/1447 or from national legislation and a list of the measures to be implemented by those SGUs;*
- (d) a list of high priority significant grid users and the terms and conditions for their disconnection, and*
- (e) the implementation deadlines for each measure listed in the system defence plan.*

5. The system defence plan shall include at least the following technical and organisational measures specified in Section 2 of Chapter II:

- (a) system protection schemes including at least: (i) automatic under-frequency control scheme in accordance with Article 15; (ii) automatic over-frequency control scheme in accordance with Article 16; and (iii) automatic scheme against voltage collapse in accordance with Article 17.*
- (b) system defence plan procedures, including at least: (i) frequency deviation management procedure in accordance with Article 18; (ii) voltage deviation management procedure in accordance with Article 19; (iii) power flow management procedure in accordance with Article 20; (iv) assistance for active power procedure in accordance with Article 21; and (v) manual demand disconnection procedure in accordance with Article 22.*

6. The measures contained in the system defence plan shall comply with the following principles:

- (a) their impact on the system users shall be minimal;*
- (b) they shall be economically efficient;*
- (c) only those measures that are necessary shall be activated; and*
- (d) they shall not lead the TSO's transmission system or the interconnected transmission systems into emergency state or blackout state.*

### **Article 23 Design of the restoration plan**

1. By 18 December 2018, each TSO shall design a restoration plan in consultation with relevant DSOs, SGUs, national regulatory authorities or entities referred to in Article 4(3), neighbouring TSOs and the other TSOs in that synchronous area.

2. When designing its restoration plan, each TSO shall take into account, at least, the following elements:

- (a) the behaviour and capabilities of load and generation;*

*(b) the specific needs of the high priority significant grid users listed pursuant to paragraph (4); and*

*(c) the characteristics of its network and of the underlying DSOs networks.*

3. *The restoration plan shall contain at least the following provisions:*

*(a) the conditions under which the restoration plan is activated, as provided for in Article 25;*

*(b) restoration plan instructions to be issued by the TSO; and*

*(c) measures subject to real-time consultation or coordination with identified parties.*

4. *In particular, the restoration plan shall include the following elements:*

*(a) a list of the measures to be implemented by the TSO on its installations;*

*(b) a list of the measures to be implemented by DSOs and of the DSOs responsible for implementing those measures on their installations;*

*(c) a list of the SGUs responsible for implementing on their installations the measures that result from mandatory requirements set out in Regulations (EU) 2016/631, (EU) 2016/1388 and (EU) 2016/1447 or from national legislation and a list of the measures to be implemented by those SGUs;*

*(d) the list of high priority significant grid users and the terms and conditions for their disconnection and reenergisation;*

*(e) a list of substations which are essential for its restoration plan procedures;*

*(f) the number of power sources in the TSO's control area necessary to re-energise its system with bottom-up reenergisation strategy having black start capability, quick re-synchronisation capability (through houseload operation) and island operation capability; and*

*(g) the implementation deadlines for each listed measure.*

5. *The restoration plan shall include at least the following technical and organisational measures specified in Chapter III:*

*(a) re-energisation procedure, in accordance with Section 2;*

*(b) frequency management procedure, in accordance with Section 3; and*

*(c) resynchronisation procedure, in accordance with Section 4.*

6. *The measures contained in the restoration plan shall comply with the following principles:*

*(a) their impact on system users shall be minimal;*

*(b) they shall be economically efficient;*

*(c) only those measures that are necessary shall be activated; and*

*(d) they shall not lead the interconnected transmission systems into emergency state or blackout state.*

### **Article 36 Rules for suspension and restoration of market activities**

1. *By 18 December 2018, each TSO shall develop a proposal for rules concerning the suspension and restoration of market activities.*
2. *The TSO shall publish these rules on its website following their approval by the relevant regulatory authority in accordance with Article 37 of Directive 2009/72/EC.*
3. *The rules for suspension and restoration of market activities shall be compatible to the extent possible with:*
  - (a) the rules on provision of cross zonal capacity within the concerned capacity calculation regions;*
  - (b) the rules for submission by balancing service providers of balancing capacity and balancing energy bids resulting from arrangements with other TSOs for the coordination of balancing;*
  - (c) the rules for provision by balance responsible party of a balanced position at the end of day-ahead timeframe if required by the terms and conditions related to balancing;*
  - (d) rules for provision of modifications of the position of balance responsible parties; and*
  - (e) the rules for provision of schedules referred to in Article 111(1) and (2) of Regulation (EU) 2017/1485.*
4. *When developing the rules for suspension and restoration of market activities, each TSO shall convert the situations referred to in Article 35(1) into objectively defined parameters taking into account the following factors:*
  - (a) the percentage of load disconnection in the LFC area of the TSO corresponding to: (i) the inability of a significant share of balancing responsible parties to maintain their balance; or (ii) the necessity for the TSO not to follow the usual balancing processes to perform an efficient re-energisation;*
  - (b) the percentage of generation disconnection in the LFC area of the TSO corresponding to the inability of a significant share of balancing responsible parties to maintain their balance;*
  - (c) the share and geographic distribution of unavailable transmission system elements corresponding to: (i) the desynchronisation of a significant part of the LFC area rendering the usual balancing processes counterproductive; or (ii) the reduction to zero of cross zonal capacity on a bidding zone border(s);*
  - (d) the inability of the following affected entities to execute their market activities for reason(s) outside their control: (i) balance responsible parties; (ii) balancing service providers; (iii) NEMOs and other entities assigned or delegated to execute market functions pursuant to Regulation (EU) 2015/1222; (iv) transmission connected DSOs;*
  - (e) the absence of properly functioning tools and communication means necessary to perform: (i) the single day-ahead or intraday coupling or any explicit capacity allocation mechanism; or (ii) the frequency restoration process; or (iii) the reserve replacement process; or (iv) the provision by balance responsible party of a balanced position in day ahead and the provision of change of its position; or (v) the provision of schedules referred to in Article 111(1) and (2) of Regulation (EU) 2017/1485.*

5. *The rules for suspension and restoration of market activities shall define a time delay to be respected for each parameter defined pursuant to paragraph 4, prior to starting the procedure for suspension of market activities.*

6. *The concerned TSO shall assess in real-time the parameters defined pursuant to paragraph 4, on the basis of the information at its disposal.*

7. *By 18 December 2020, ENTSO for Electricity shall submit to the Agency a report assessing the level of harmonisation of the rules for suspension and restoration of market activities established by the TSOs and identifying, as appropriate, areas that require harmonisation.*

8. *By 18 June 2019, each TSO shall submit to ENTSO for Electricity the data required to prepare and submit the report in accordance with paragraph 7.*

### **Article 39 Rules for settlement in case of suspension of market activities**

1. *By 18 December 2018, each TSO shall develop a proposal for rules for imbalance settlement and settlement of balancing capacity and balancing energy which shall be applicable for imbalance settlement periods during which the market activities were suspended. The TSO may propose the same rules it applies for normal operations. The TSO shall publish these rules on its website following their approval by the relevant regulatory authority in accordance with Article 37 of Directive 2009/72/EC. A TSO may delegate the TSO's tasks referred to in this Article to one or more third parties, provided that the third party can carry out the respective function at least as effectively as the TSO(s). A Member State or, where applicable, a regulatory authority, may assign the tasks referred to in this Article to one or more third parties, provided that the third party can carry out the respective function at least as effectively as the TSO(s).*

2. *The rules referred to in paragraph 1 shall address the settlements of TSO's and third parties, where relevant, with balance responsible parties, and balancing services providers.*

3. *The rules developed in accordance with paragraph 1 shall:*

*(a) ensure the financial neutrality of each TSO and relevant third party referred to in paragraph 1;*

*(b) avoid distortions of incentives or counterproductive incentives to balance responsible parties, balance service providers and TSOs;*

*(c) incentivise balance responsible parties to strive to be balanced or help the system to restore its balance;*

*(d) avoid any financial penalties imposed on balance responsible parties and balancing service providers due to the execution of the actions requested by the TSO;*

*(e) discourage TSOs from suspending market activities, unless strictly necessary, and incentivise TSOs to restore the market activities as soon as possible; and*

*(f) incentivise balance service providers to offer services to the connecting TSO that helps restore the system to normal state.*

### **Article 5 Consultation and coordination**

1. Where this Regulation provides that a TSO shall consult concerned parties for actions it defines before real-time or in real-time, the following procedure shall apply:

(a) the TSO shall liaise with at least the parties identified in the Articles of this Regulation requiring consultation;

(b) the TSO shall explain the rationale and objective of the consultation and of the decision that it has to take;

(c) the TSO shall collect from the parties referred to in point (a) any relevant information and their assessment;

(d) the TSO shall duly take into account the views, situations and constraints of the parties consulted;

(e) before taking a decision, the TSO shall provide an explanation to the parties consulted of the reasons for following or not their views.

2. Where this Regulation provides that a TSO shall coordinate the execution of a set of actions in real-time with several parties, the following procedure shall apply:

(a) the TSO shall liaise at least with the parties identified in the Articles of this Regulation requiring real time coordination;

(b) the TSO shall explain the rationale and objective of the coordination and of the actions to be taken;

(c) the TSO shall make an initial proposal on actions to be taken by each party;

(d) the TSO shall collect from the parties referred to in point (a) any relevant information and their assessment;

(e) the TSO shall make a final proposal on actions to be taken by each party, duly taking into account the views, situations and constraints of the concerned parties and setting a deadline for parties to express their opposition to the actions proposed by the TSO;

(f) where the concerned parties do not oppose executing the actions proposed by the TSO, each party, including the TSO, shall execute the actions in line with the proposal;

(g) where one or more of the parties refuse the action proposed by the TSO within the set deadline, the TSO shall refer the action proposed to the relevant authority for decision, together with a justification of the rationale and objectives of the action proposed by the TSO and of the assessment and position of the parties;

(h) if real-time referral to the relevant authority is not possible, the TSO shall initiate an equivalent action that has the least or no impact on the parties that refused to execute the action proposed.

3. A party may refuse to execute real time actions proposed by the TSO under the coordination procedure described in paragraph 2 if it justifies that the proposed action would lead to the violation of one or more technical, legal, personal safety or security constraint(s).

#### **Article 7 Public consultation**

*1. The relevant TSOs shall consult stakeholders, including the competent authorities of each Member State, on proposals subject to approval in accordance with points (a), (b), (e), (f) and (g) of Article 4(2). The consultation shall last for a period of not less than one month.*

*2. The relevant TSOs shall duly take into account the views of the stakeholders resulting from the consultations prior to the submission of the draft proposal. In all cases, a sound justification for including or not including the views of the stakeholders shall be provided and published in a timely manner before, or simultaneously with, the publication of the proposal.*

## 3. General comments

The CRU's assessment is detailed at two levels – this section contains the CRU's comments on overarching issues identified across the TSO's submitted documents. Specific comments on each of the individual documents are detailed in Sections 4-9 of this paper

The TSO in its approach to the implementation of the requirements has taken an approach that aims to minimise changes to existing processes and arrangements. While this approach may be advantageous to network operators and network users, in this case the CRU is of the view that the proposals submitted by the TSO do not sufficiently address the requirements of the ER NC.

The comments outlined below apply in general to all of the TSO's documents submitted to the CRU. The TSO will need to ensure that the issues raised below are addressed and rectified across all the documents to be amended and re-submitted to the CRU.

### 3.1 Alert State definitions -alignment with Article 18 of SOGL

The TSO has not properly aligned its nomenclature and definitions of its Alert System (Amber, Red Blue etc) to the states referenced in the ER NC. The System States to be utilised through the EU Network Codes and in their implementation are defined in Article 18 of the System Operation Guideline (SOGL), and are;

- Normal State
- Alert State
- Emergency State
- Blackout State
- Restoration State

The TSO will need to map the SOGL definitions of System States to its operations and ensure that the appropriate Grid Code clauses, processes, procedures and communication systems formats (that detail interactions with market participants, neighbouring TSOs and EU counterparts) are amended to align with the SOGL system states. Cognisance should also be taken of the requirements under the new Regulation on Risk Preparedness in the Electricity Sector, [Regulation 941 of 2019](#), and ensure that the work conducted to map system states also addresses the requirements of the new Regulation and avoids the creation of confusing or overlapping documentation. In addition, the TSO is obliged to comply with the requirements of Article 15 of SOGL on reporting on operational security indicators, and so this mapping exercise will need to be completed to align with the required reporting timelines.

### 3.2 Hierarchy of actions

It is not clear from the TSO's submissions what distinguishes an alert state from an emergency state. Under Article 11 (Design of the System Defence plan) of ERNC it is necessary to outline the conditions under which the defence plan is activated, and the actions to be taken by the TSO, DSO and SGUs.

Additionally, under Article 4(3) of ERNC, in the Terms and Conditions for Defence service providers it is necessary to ensure that defence services (to be enacted in an emergency state) are defined. The TSO in its submissions has listed measures that are also activated during normal and alert states, and so it is not clear what constitutes a defence service, when a defence service is triggered, when the system defence plan is activated nor what conditions signal that the system has moved from an alert state to an emergency state. In addition, the System Defence plan currently outlines a number of automatic actions and actions that the TSO can manually take to avoid moving from an emergency state to a blackout state, but there is no hierarchy set out.

The CRU therefore requires the TSO to provide a clear hierarchy of actions and conditions that outline the transition from alert state to emergency state and that trigger the activation of the system defence plan, and the responsibilities that therefore come to bear on system defence service providers.

### 3.3 High Priority SGUs

Article 4 (2) of the ER NC requires TSOs to submit to the Regulatory Authority the list of High Priority Significant Grid Users (SGUs). According to the ER NC a High Priority Significant Grid User means “*the significant grid user for which special conditions apply for disconnection and reconnection*”.

EirGrid has proposed that there are no High Priority SGUs in Ireland and has therefore not provided a list of such grid users. The CRU is aware that ESBN, in its role as the DSO, maintains a list of priority customers (e.g. hospitals) for which it seeks to maintain connection even in the event or emergencies. EirGrid’s response may relate to this, however Eirgrid are require to explain their response in this regard.

In this context it is worth noting that the Grid Code in Section OC 5.15 that “*Demand Control (customer demand reduction, customer demand reconnection automatic low frequency or low voltage demand disconnection) shall not, so far as is possible, be exercised in respect of Priority Customers*”.

The Grid Code defines priority customers as;

“*Customers which are either:*

- *exempt from load shedding under the rota load shedding scheme or*
- *exempt from load shedding under the technical under-frequency load shedding scheme or*
- *prioritised for supply under the technical under-frequency load shedding scheme*

Also, the System Restoration plan as submitted, contradicts the proposed approach of the TSO not to identify high priority users, given the statement on page 8 “The NCC in cooperation with the ESB Network National Distribution Control Centre is to restore supply to priority customers”.

The CRU therefore requests that the TSO fully clarifies the current approach to prioritising certain significant grid users in line with Grid Code and restoration procedures, in cooperation with the DSO, and also assesses the most appropriate future process for prioritising grid users (demand and generation). The CRU expects that following such analysis and assessment the TSO (and DSO where appropriate) may submit to the CRU a list of High Priority Significant Grid Users

compliant with the requirements of Article 4 (2) (d), Article 11 (4) (d) and Article 23 (4)(d) of the ER NC. If the submission of a list of High Priority Significant Grid Users is not made to the CRU by the TSO and DSO, a detailed document with justification of their approach, which includes detail on their ability to protect critical energy users during emergency states, must be submitted to the CRU.

### 3.4 Grid Code versus ER primacy

The TSO refers to the Grid Code in many instances as the primary document for compliance with the requirements of the ER NC. The EU Network Codes are primary legislation, and thereby the Grid Code and Distribution Codes have to align with (and refer to as necessary) the requirements of the ER NC. The ER NC (unlike the Grid Connection Network Codes) specifically does not facilitate derogations from the requirements- therefore it must be implemented in full.

### 3.5 Grid code references

The TSO in several sections refer directly to the Grid Code for relevant parameters, however often accurate references are not given, with references only to the “Grid Code” or to a broad section of the Grid Code. This could mean that future changes to the Grid Code create non-compliant standards with the ER NC requirements, with no referral back to the Regulatory Authorities in terms of ER NC compliance. The ER NC submissions will therefore have to include exact and specific references to relevant elements of the Grid Code, Distribution Code or other relevant documents, and ensure that there are processes established to ensure cross checking of compliance requirements against EU regulation and national legislation. Accordingly, the TSO and DSO should engage separately with the CRU to confirm that the TSO and DSO have established appropriate cross check procedures.

### 3.6 Ensuring cohesion between the requirements of the System Operation Guideline (SOGL), the Connection Network Codes, Market Codes and ER NC

During the CRU’s assessment of the submitted ER documents it has become apparent that the approach being taken by the TSO in its proposals is not cohesive with the required implementation of the interlinked areas of SOGL, the market actors referenced in CACM and FCA and the requirements of the three connection Network Codes (RfG, DCC, HVDC). The requirements of the ER NC apply to TSOs, DSOs, SGUs, defence service providers, restoration service providers, balance responsible parties balancing service providers, nominated electricity market operations and market entities pursuant to CACM and FCA. The ER NC requirements apply to both new and existing generation and demand grid users, therefore it is imperative for the TSO to be clear on what the requirements are for each type of entity.

It will be essential that the TSO utilises the capabilities now required of technologies captured by the RfG, DCC and HVDC codes and the new requirements for sharing and exchange of reserves facilitated by the SOGL in its processes and procedures for system defence and system restoration.

As an example, the CRU has (in conjunction with the UR) requested amendments to the submitted Synchronous Area Operational Agreement (SAOA) and Load Frequency Control Block Operational Agreement (LFCBOA) which detail how the TSOs of Ireland and Northern Ireland operate the system during normal and alert states. The TSO should make it clear in the ER NC

submissions that procedures are established on an All island basis between EirGrid and SONI under the SAOA and LFCBOA that deal with alert and normal state operations and ensure that there is a distinction between the actions of the System Defence plan and those identified in the SAOA and LFCBOA. In addition, the TSO's proposals in the ER NC documents should ensure that the reporting requirements on Operational Security Indicators (Article 15 of the SOGL) can be fulfilled comprehensively.

### **3.7 Definition of an Emergency/Restoration relevant SGU**

The TSO needs to provide greater detail on what constitutes an SGU (generation and demand) that is captured by the requirements of the ER NC, and what the roles and responsibilities of such SGUs are during system defence (emergency) and system restoration (black out and restoration) states. There is no clearly discernable definition available from the documents submitted to the CRU, and it is not clear which SGUs have been contacted and informed of their roles and responsibilities during emergency, blackout and restoration states.

## **4. Terms and Conditions to be a Defence Service Provider and a Restoration service provider**

### **4.1 TSO approach**

The TSO has submitted one document to the CRU that encompasses their proposed Terms and Conditions for both Defence service providers and Restoration service providers. The TSO states that the terms and conditions are conveyed through the 'existing legal framework', including the Statutory Instrument SI 445/2000, the Grid Code and 'any bilateral contracts that are consequential under Grid Code requirements', and therefore has not listed any terms and conditions or met the requirements of Article 4(4) of ERNC which requires that the TSO defines at least the following;

- a) The characteristic of the service to be provided
- b) The possibility and conditions for aggregation
- c) For restoration service providers, the target geographical distribution of power sources and with black start and island operation capabilities.

The T&C Proposal does not explicitly list Defence services nor define the characteristics of the services it requires during the Emergency state in the Terms and Conditions document. The TSO has pointed to bilateral contracts it holds with DS3 system service providers in the System Defence plan but yet has not listed any of the relevant terms and conditions of these contracts. DS3 System Services are also available for use during normal and alert states so it needs to be clarified which of the services are to be called upon during the emergency state.

In relation to Restoration services the TSO has listed the Black Start sections of the Grid Code and state that these apply to certain units in relation to restoration service providers. It is clear that the TSO holds bilateral contracts for such black start services but does not give further detail on the characteristics of the service or how these units are contracted, other than the reference in Section 3.4 of the System Restoration plan whereby "If EirGrid deems that it needs more black start generation in an area, then it can contract for that generation". No other services have been listed for use during the Restoration or Blackout state in the Terms and Conditions document or the System Restoration Plan. The ER NC in Article 23 (4)(f) outlines that island operation capabilities and quick re-synchronisation capability can also be utilised in re-energising the system. The CRU notes the Grid Code includes requirements to sustain operation, where supply from the Transmission System is lost (e.g Section CC 7.3.2), yet these are not listed in the Terms and Conditions document.

### **4.2 Geographic distribution of Restoration service providers**

The TSO states in the submitted document that it does not propose to target geographical distribution of restoration services, however the System Restoration Plan (SRP) explicitly references in Section 3.4 procuring additional blackstart generation in an area if this is needed and discusses sub-systems that need to be based on geographically located black start plant.

Given that the future development of the power system will most likely include new types of units with new capabilities and that there is an onus on the TSO to ensure that services are procured in

an economically efficient (and market based where possible) manner if the TSO considers that at all times a geographic distribution of service providers is required this needs to be reflected in the terms and conditions documents and procurement strategy of the TSO, and procured on an economically efficient basis.

### 4.3 Additional ancillary service contracts

As part of the revenue submissions from EirGrid to the CRU in 2019 the TSO listed Powersave contracts and flexibility service contracts as ancillary services required for system operation. No detail was provided as to whether these refer to services necessary during emergency and restoration states or normal or alert states. The CRU therefore requires the TSO to provide detail on these services, and whether these services are to be activated during emergency, blackout or restoration states. If these services are required by the TSO during emergency or restoration states the TSO will need to include these services and their terms and conditions in the required documents outlined in Section 3.1 above.

### 4.4 Automatic triggering of pumped hydro in an underfrequency event

The TSO has listed this as a measure of the System Defence plan in Section 4.1 but has not detailed how this is contracted or whether it is remunerated. The TSO will need to detail the characteristics of this service/capability and how it is procured and recompensed. If it is contracted bilaterally then this will need to be included in the documents required in Section 4.1 above.

### 4.5 High frequency response services

The TSO has stated that commercial arrangements are in place for high frequency response services in Section 4.2 of the System Defence plan but has not listed these in the Terms and Conditions document. The TSO will need to detail the characteristics of these services, how the services are remunerated and include the terms and conditions applicable to contracted providers in the documents outlined in Section 3.1 above.

### 4.6 CRU request for amendments to the Terms and Conditions of Restoration and Defence service providers

In summary, insufficient detail has been provided in the submitted Terms and Conditions document and the TSO will need to provide further detail on the services it will utilise during emergency, blackout and restoration states. The TSO in the preparation of the amended documents will need to address the points raised in Section 4.5 above and ensure that their proposals are suitable for future procurement of Defence and Restoration service providers, taking account of the ongoing evolution of the electricity generation and demand sectors. The TSO should ensure that the documents and procurement principles within their revised proposals are compatible with the requirements of Article 4(1) of ER NC and meet the following criteria;

- apply the principles of proportionality and non-discrimination,
- apply the principle of optimisation of the highest overall efficiency and lowest total costs for all involved,

- use market-based procurement mechanisms as far as is possible,
- achieve transparency

The TSO is therefore requested to two submit separate documents on that focuses on the Terms and Conditions for Defence Service providers, and one that focused on the Terms and Conditions for Restoration Service providers.

The TSO is requested to include the following in the Terms and Conditions for Defence service providers:

- a) provide accurate detail on the characteristics of the defence services utilised by the TSO and the terms and conditions required of SGUs contracted to provide such defence services, in line with the requirements of Article 4(4) of ERNC.
- b) In addition, clarity is required on how the TSO meets the objectives of Article 4(1) and Article 11(6) of ER NC and the TSO Licence, in particular Condition 3.

The TSO is requested to include the following in the Terms and Conditions for Restoration Service providers:

- a) provide accurate detail on the characteristics of the restoration services utilised by the TSO and the terms and conditions required of SGUs contracted to provide restoration services, in line with the requirements of Article 4(4) of ERNC.
- b) In addition, clarity is required on how the TSO meets the objectives of Article 4(1) and Article 23(6) of ER NC and TSO Licence, in particular Condition 3.

## 5. Rules for suspension and restoration of market activities

### 5.1 TSO analysis of potential market suspension during emergency and restoration states

The TSO has proposed it is not necessary to suspend market activities during a black out or during the restoration to a fully synchronised system. From the submitted documents it would appear that the TSO has undertaken the analysis from a purely operational perspective of returning to a synchronised system rather than analysis as to whether market suspension might be advantageous in a limited set of circumstances.

The CRU queries whether sufficient consideration has been given to situations (in line with the requirements of Articles 35 and 36 of ER NC) when the system is in a blackout state for a period of time. By obliging participants to continue to submit balancing positions and commercial offer data (COD) even when a blackout is in place and during the restoration phase, this could potentially lead to unusual or inefficient settlement or pricing outcomes

While the CRU recognises that the intention of the TSO is always is to get back to a normal system state as soon as possible, it could be the case that for whatever reason a blackout occurs full restoration (as outlined in the System Restoration plan) fails a number of times and it could take greater than 24 hours to return a fully synchronised system. Indeed, on very rare occasions this could continue for greater than 24 hours. Requiring markets to continue while the TSO is attempting to get generation and demand processes restored on a geographic basis before full re-synchronisation may not lead to the most efficient outcomes and may indeed precipitate local market power issues.

The TSO has not provided any detail on whether it has analysed the case for market suspension if a communications or market systems failure or cyber-attack leads to the loss of data transfer tools or facilities and therefore the to maintain secure markets is not available (as per Art 35.1(d)). Further consideration of the impacts on market operations should be conducted if such market systems, tools and facilities were unavailable for a significant period of time. Also the TSO should analyse and propose an appropriate pricing approach during such events.

The TSO in its submission stated that there would be no need to suspend interconnector schedules provision but has not provided detailed analysis in line with Article 111(1) and 111(2) of SOGL as required. In addition, there is no detail provided on the impact of not suspending market operations on the forwards or capacity markets in the TSO's submission, despite the linkages that exist. This should be given further consideration.

The System Restoration plan proposed by the TSO lists only one situation that has been analysed in their proposal to continue with market operations (i.e. total system blackout, with bottom up restoration). The CRU considers that the TSO needs to look at a wider range of potential scenarios, and requests detail on what the TSO's proposal on market suspension would be if one of their listed assumptions;

- Total blackout of system
- No damage to generation plant has occurred
- Black start generation stations remain fully operational
- Sufficient water available in all hydro and pumped storage stations in order to energise a restoration path

- All generation stations are adequately staffed
- No major loss of telecommunications facilities has occurred
- No major loss of NCC computing facilities has occurred.

does not hold true during a particular blackout or partial blackout state while striving to meet the principles outlined in Article 4(1) of ER NC.

## 5.2 CRU request for further analysis on Market suspension proposals

The TSO is therefore required to consider further the potential impacts of their proposal (not to suspend market operations) on system operations, market incentives, market manipulation, capacity and forwards markets, and resettlement actions that could arise in the event of a total blackout, a partial black out, loss of communications, market system outages or loss of data transfer tools and functions etc. The TSO is requested to engage with all potentially affected parties as part of this analysis and to reflect upon potential impacts to affected parties in their re-submitted proposals.

## **6. Rules for imbalance settlement and settlement of balancing energy following market suspension**

### **6.1 TSO approach to development of specific settlement rules following market suspension**

The TSO has proposed that there is no need for additional specific rules for imbalance settlement and the settlement of balancing energy following market suspension, based on the TSO's proposal not to suspend the market during emergency, blackout or restoration states. The TSO points to the Trading and Settlement Code Part B for existing rules (Section E, F and G) that cover market suspension during normal state. It is difficult to ascertain which specific clauses of the TSC Sections are being referred to. It is not clear from the submission that the TSO has fully considered all of the requirements of Article 39 of the ER NC.

### **6.2 CRU request for further analysis to the TSO's proposal on imbalance settlement and balancing energy settlement following market suspension**

In line with the CRU's request under Section 5 above to re-examine the possible implications of not suspending markets during an emergency, blackout or restoration state the CRU also requests the TSO to re-examine the rationale behind the proposal not to develop additional rules. The CRU requests that this analysis is submitted to the CRU along with the TSO's final proposal and provide detail on existing TSC clauses and TSC changes required to support their proposal.

## 7. Significant Grid Users

A significant grid user (SGU) is a user of electricity networks that can impact the operational security of the system or provides ancillary services. As outlined in Section 2.2 of this paper, and in Article 2.2 and 2.3 of ER NC, the term SGU for defence and emergency purposes applies to

- generators (RfG compliant) from 100kW upwards
- generators (existing or non-RfG compliant) from 5MW upwards
- generators (existing or non-RfG compliant) from 100kW where these units are identified as system defence or system restoration service providers
- aggregators of re-dispatching of power generation modules, or demand facilities,
- providers of active power reserves,
- interconnectors
- transmission connection demand facilities and
- closed distribution systems

In the SGU document the TSO stated it has not identified any high priority significant grid users, and so has not submitted a separate High Priority Significant Grid user list as required under Article 4 (2) (d) of ER NC. As per the comments outlined in Section 3.3 of this document, the CRU requests the TSO to re-consider this position in conjunction with the DSO.

### 7.1 Accuracy of the SGU list

The TSO has submitted a document that only partially lists the definition of an SGU as outlined in Article 2 (2) of ER NC and then subsequently lists the units it classes as SGUs. The TSO stated it has not identified any units of Type B (below 5MW) that qualify as SGUs.

The CRU considers there is a need for the TSO to review the list to ensure it is accurate and that the list contains all units captured by Article 2.2 of ER NC.

The TSO should clarify why some units smaller than 5MW are included given the statement that no Type B units have been identified as an SGU. Additionally, the TSO must clarify if the capacity values listed are based on market unit values or connection agreements (installed capacity or Maximum export capacity).

### 7.2 Requirement to specify SGU measures

Article 4(2)(c) of the ER NC requires the TSO to list the measures to be implemented by SGUs utilised by the TSO in its System Defence and System Restoration processes. The TSO did not list any measures in the SGU document submitted to the CRU.

The TSO will need to amend the document to fully incorporate all measures required of the specified SGUs and their roles and responsibilities in relation to System Defence and System Restoration.

### 7.3 Demand disconnection

As outlined in the System Defence plan the TSO can take actions that result in demand disconnection, Automatic under frequency control, Automatic low voltage demand disconnection and Manual Demand Disconnection procedures.

The TSO has indicated that there are no High Priority SGUs, which by implication means that all demand could be subject to disconnection to preserve system stability. The CRU understands that this approach is inconsistent with text in the Grid Code (as outlined in Section 3.3 above) and should be reviewed by the TSO. As outlined in Section 3.3 above the CRU requires that the TSO fully clarifies the current approach to prioritising certain significant grid users in line with Grid Code and restoration procedures, in cooperation with the DSO, and also assesses the most appropriate future process for prioritising grid users (demand and generation).

#### **7.4 Application to Energy storage devices**

Energy storage devices that are connected to the TSO's and DSO's networks need to be treated in accordance with Article 15 (3) and 15 (4) of the ER NC, and the frequency thresholds relevant for energy storage units need to be outlined within the System Defence Plan. The TSO needs to ensure that the amended version of the SGU document contains provisions that outline the implications of Article 15 (a) for storage units and also that such units are informed of such requirements, and that the System Defence plan lists the relevant thresholds and procedures application to energy storage units.

#### **7.5 Providers of re-dispatching of Power generating modules or demand facilities by means of aggregation and providers of active power reserve**

The TSO has listed aggregators in the same category as generation units in the submitted list. The TSO is asked for further clarification on the types of aggregator; e.g. demand aggregation or power generating modules, and where necessary submission of an amended list that explicitly distinguishes such providers.

#### **7.6 Transmission connected closed distribution systems**

The TSO has not listed any closed distribution systems connected to the Transmission system. The TSO is asked to confirm if no such systems exist. If such systems do exist the TSO should, in coordination with the DSO, clarify what the responsibilities of a closed distribution system are in relation to system restoration and system defence under the ER NC.

#### **7.7 CRU request for amendment to the SGU list and the measures to be implemented by SGUs**

The CRU requests that the TSO addresses the points raised in Sections 7.1-7.6 above, and ensures that the revised proposals are in compliance with Articles 4(2), 11(4)(c) and 23(4)(c) of ER NC.

## 8. Design of the System Defence Plan

The System Defence plan is required by the ER NC to provide a clear set of procedures that the TSO, DSO and SGUs follow during an emergency state and detail on the types of instruction that the TSO or DSO can issue to SGUs.

The submitted System Defence plan (SDP) details the current procedures the TSO has in place to deal with emergency state situations. While the ER NC does not stipulate that the CRU has an explicit approval role in relation to the SDP, the TSO is obliged (under Article 4(5)) to notify the CRU of the SDP and provide at least the following elements of the plan in its notification:

- a) the objectives of the system defence plan, including the phenomena to be managed or the situations to be solved;
- b) the conditions triggering the activation of the measures of the system defence plan;
- c) the rationale of each measure, explaining how it contributes to the objectives of the system defence plan, and the party responsible for implementing those measures; and
- d) the deadlines set out pursuant to Articles 11 for the implementation of the measures.

The CRU notes that not all of the above points have been addressed in the submission of the SDP, and requests that the TSO addresses each of points (a) to (d) above in a revised version of the SDP. The SDP strongly interacts with the ER NC documents that do require CRU approval and so additional informal comments are provided by the CRU below.

The submitted SDP does not read as a plan and does not provide a clear set of procedures. The CRU considers that the ER NC requires the TSO to include a clear plan, a clear set of procedures that the TSO, DSO and SGUs follow during an emergency state and detail on the types of instruction that the TSO or DSO can issue to SGUs.

In relation to point (b) above the TSO has stated in their SDP that they shall activate a measure of the SDP based on the fact the system is in an emergency state and there are no remedial actions available to restore the system to a normal state.

The TSO needs to clarify if its interpretation of remedial actions is in line with that of the ER NC Article 18 (1) and SOGL Article 21, 22 and 23, as it is not clear remedial actions such as those outlined in Article 22 of SOGL could not be utilised in an Emergency State. Indeed Article 23 (2) of SOGL states that remedial actions are legitimate actions to be contained within a System Defence plan.

### 8.1 Measures to be included in a System Defence plan

The CRU's analysis has shown that the TSO's proposals do not address the requirements of Articles 11(2), 11(3) and 11(4).

The TSO's approach to the SDP is primarily to refer to existing processes without specifically mapping these to the requirements of the ER NC. Further consideration of the requirements of Article 11 and mapping of existing measures identified by the TSO should be conducted during the revision of the SDP. The TSO should also identify instances where it does not have existing processes or measure in place to comply with the ER NC requirements and provide detail that demonstrates compliance or at the very least outline a detailed timetable of work that is required to achieve compliance.

## 8.2 Automatic under-frequency control scheme

The TSO has referred to arrangements in place for automatic disconnection of demand based on falling frequency. It is not clear how this defence service is mandated or procured, or whether in advance of activation of such a disconnection process the TSO will activate a limited frequency sensitive mode-underfrequency process in the LFC area as required by Article 15 (2)

The TSO points to Grid Code section OC4.3.3, however this also includes references to POR, SOR and TOR which cannot be classified as either automatic demand disconnection or limited frequency sensitive mode-underfrequency. The TSO should provide more specific detail on the products that are classified as defence services.

In addition, the TSO points to Section OC5 of the Grid Code, which includes OC5.5.3 which refers to low frequency demand disconnection as an ancillary service. It needs to be clarified if this is a defence service and if this is the case then the terms and conditions for the contracting of such services need to be captured in the Terms and Conditions documents discussed in Section 4 of this document. Further detail is also needed on the timings and scale of such demand disconnection, and any subsequent measures required to ensure the system does not subsequently enter an over-frequency state.

The TSO needs to confirm if the automatic triggering of pumped storage plant in an under-frequency event is a contracted service, and if not, how this is activated. The CRU understands this is only available to the TSO if the pumped storage plant is in import mode at the time of the emergency event.

No reference has been made to the requirements to be placed on energy storage devices as required by Article 15(3). Article 15(4) requires the frequency thresholds at which the automatic switching or disconnection of energy storage units shall occur to be established in the SDP. There is no detail on such frequency thresholds in the SDP proposal. More generally the TSO has not detailed how energy storage units can support the system during underfrequency events.

## 8.3 Automatic over-frequency control scheme

Article 11 of ER NC outlines the requirements on TSOs to establish and detail an over-frequency automatic control scheme in the SDP in line with the requirements of Article 16. Article 16 refers to specific services 'limited frequency sensitive mode-overfrequency' and 'step-wise linear disconnection of generation'.

Section 4.2 of the TSO's SDP proposal refers to the Grid Code and commercial agreements. Firstly, the TSO points to Grid Code CC.10.9.2, CC.10.10.2 and CC.10.11.2 for the requirement for generator/demand customers to install over-frequency control schemes'. CC.10.10.2 and CC.10.11.2 do not refer to control schemes but to unit protection schemes, CC.10.9.2 refers to 'control schemes', but not to 'automatic over-frequency control scheme'. Therefore, the referenced Grid Code articles do not appear to address the requirements for a limited frequency sensitive mode or a step wise linear disconnection procedure. The TSO needs to review the references to the Grid Code articles and consider whether sufficient information is included in the SDP.

In addition, SDP section 4.2, refers to commercial agreements that provide high frequency response services to the TSO. No further detail has been provided as to what the frequency thresholds are for such services, as required by Article 16 (2). It needs to be clarified if these are defence services and if this is the case then the terms and conditions for the contracting of

such services need to be captured in the Terms and Conditions documents discussed in Section 4 of this document.

## 8.4 Automatic Scheme against Voltage Collapse

Article 17 specifies three automatic schemes that may be considered services required for system defence. Section 4.3 of the TSO's SDP proposal implicitly addresses the first scheme by referring to Grid Code OC.5.7 for details on the requirements for automatic low voltage demand disconnection in coordination with the DSO.

In the submitted SDP section 4.3.2 refers to specific products that have been procured and contracted to allow EirGrid to manage system voltage. The TSO refers to appendix 7.1 of the SDP, however no such appendix was included in the submitted SDP. It is therefore not clear what these services are and if they relate to the schemes referred to in Article 17. If such services are classified as defence services then the terms and conditions for the contracting of such services need to be captured in the Terms and Conditions documents discussed in Section 4 of this document.

The TSO also needs to share its assessment on the need for the measures listed in Article 17(1) and in particular on the need of a blocking scheme for on load tap changers. If such a blocking scheme is considered necessary, the TSO needs to include the requirements of Article 17(2) in their SDP.

## 8.5 Frequency deviation management

In accordance with Article 18(1), the frequency deviation management procedure of the SDP 'shall contain a set of measures to manage a frequency deviation outside the frequency limits defined for the alert state in Article 18(2) of Regulation (EU) 2017/1485 (*System Operation Guideline*)'. For the NI/IE synchronous area this means that the measures shall manage a steady state system frequency deviation that is larger than 500 mHz. Article 18(3) entitles the TSO to establish set-points that SGUs and Defence Service Providers shall implement without undue delay. The TSO is also allowed to disconnect load or generation. This is further specified in Article 18(3)-(5).

Section 4.4 of the TSO's SDP proposal refers to the capabilities of generation units to remain connected and operation specified in Grid Code CC.7.3.1.1, but it is unclear how this relates to the measures referred to in Article 18(1). In addition, the listed frequency requirements in the SDP do not match the requirements for RfG compliant generators.

In SDP section 4.4, item 2-5, the TSO refers to a number of products (POR, SOR, TOR1, TOR2, RRS and RRD). All these products are also applied if the frequency deviation is inside the frequency limits for the alert state and the normal state. The CRU understands therefore that these products are not specifically measures to be delivered by Defence service providers.

Alternatively, according to ER article 18(3) and (4), the TSO is entitled to establish an active power set-point for SGUs or disconnect SGUs and DSPs. These measures are not defined in the SDP section 4.4.

The TSO needs to include the required set of measures as referred to in ER article 18.

## 8.6 Voltage deviation management procedure

ER articles 11(5)(b)(ii) and ER article 19 require the TSO to include in the SDP a voltage deviation management procedure that shall contain a set of measures to manage voltage deviations outside the operational security limits set out in SOGL Article 25.

Section 4.5 of the proposed SDP includes a generic reference to Grid Code OC.4.4 Voltage control. Grid Code OC.4.4.6 refers to 'Emergency or Exceptional Voltage Control' and also includes specific services that seem to align with the procedure in ER article 19. The TSO should ensure the references provided to Grid Code sections are specific and address the requirements of Article 19 of the ER NC.

## 8.7 Power flow management

In accordance with ER article 20(1), 'The procedure for power flow management of the system defence plan shall include a set of measures to manage power flow outside the operational security limits set out in Article 25 of Regulation (EU) 2017/1485.' According to ER article 20(2) and (3), the TSO is entitled to establish an active power set-point for SGUs or even disconnect SGUs and Defence Service Providers.

The TSO's SDP proposal does not specifically define these measures, but has pointed instead to the Scheduling and Dispatch Code No. 2, which includes the procedure for the issue of Dispatch Instructions by the TSO. Furthermore, the TSO refers to the Operational Constraints update. These two documents referred to by the TSO seem to reflect operation of the Grid in normal state, do not provide details on Power Flow management during emergency or blackout states and are not specific to SDP.

The TSO should ensure that the detail contained within the SDP related to power flow management meets in full the requirements of Article 20 of ER NC.

## 8.8 Assistance for active power procedure

Article 11(5)(b)(iv) requires the TSO to include in the SDP an assistance for active power procedure in accordance with Article 21. Section 4.7 of the proposed SDP refers to commercial agreements with neighbouring TSOs for assistance in an emergency situation. If this is a defence service this needs to be listed in the terms and conditions for defence service providers, as required by Article 4 of ER NC.

The TSO has also listed Grid Code OC.2.7.2 which allows to the TSO to request alterations to maintenance outages for system support issues. and refers to 'alterations to maintenance of generators and interconnectors.

Neither section 4.7 of the SDP, nor the referred to Grid Code articles read as a procedure as required by the ER NC. It is unclear how the referred Grid Code article relates to ER Article 11(5)(b)(iv) and Article 21. The TSO should ensure that sufficient detail and a clear procedure is developed that complies with Article 21.

## 8.9 Manual demand disconnection procedure

ER Article 11(5)(b)(v) requires the TSO to include in the SDP a manual demand disconnection procedure. Section 4.8 of the proposed SDP refers to Grid Code OC5, which covers demand control in general (including automatic). This reference is too generic and needs to be more specific

and refer to relevant specific sections, for example, section OC.5.4 including the 'Procedure for the Implementation of Demand Control on the Instructions of the TSO'.

## **9. Design of the System Restoration Plan (SRP)**

The submitted System Restoration plan (SRP) details the current procedures the TSO has in place to deal with a total Blackout situation. While the ER NC does not stipulate that the Regulatory Authorities have an explicit approval role in relation to the System Restoration plan, the TSO is obliged (under Article 4(5)) to notify the CRU and include at least the following elements of the plan;

- a) the objectives of the system restoration plan, including the phenomena to be managed or the situations to be solved;
- b) the conditions triggering the activation of the measures of the restoration plan;
- c) the rationale of each measure, explaining how it contributes to the objectives of the system restoration plan, and the party responsible for implementing those measures; and
- d) the deadlines set out pursuant to Articles 23 for the implementation of the measures.

The CRU notes that not all of the above points have been addressed in the submission of the SRP, and requests that the TSO provides clear detail on each of points (a) to (d) above in a revised version of the SRP.

The SRP strongly interacts with the ER NC documents that do require CRU approval and so additional informal comments are provided by the CRU below.

The CRU is concerned that the TSO has listed the following seven assumptions in Section 3.5 of the SRP and has proposed a System restoration plan that deals only with bottom up restoration of a total system blackout that works if all of the assumptions below hold true;

- Total blackout of system
- No damage to generation plant has occurred
- Black start generation stations remain fully operational
- Sufficient water available in all hydro and pumped storage stations in order to energise a restoration path
- All generation stations are adequately staffed
- No major loss of telecommunications facilities has occurred
- No major loss of NCC computing facilities has occurred.

The CRU considers that additional scenario planning should be undertaken to ensure the TSO is prepared for a wider range of blackout/partial blackout scenarios, and for scenarios where some of the above assumptions do hold true. The CRU will seek further clarification from the TSO in this regard.

### **9.1 Measures to be included in a System Restoration plan**

As per Article 23 (4) of ERNC TSOs are required to include the following elements in a System Restoration plan:

- a) A list of the measures to be implemented by the TSO on its installations
- b) A list of the measures to be implemented by the DSOs on their installations
- c) A list of the SGUs responsible for implementing on their installations the measures related to system restoration
- d) The list of high priority significant grid users and terms and conditions for disconnection and energisation
- e) A list of substations which are essential for its restoration plan procedures
- f) The number of power sources in the TSO's control area necessary to re-energise its system with bottom up energisation strategy having black start capability, quick resynchronisation capability (through house load operation) and island operation capability
- g) The implementation deadlines for each listed measure.

The CRU notes that the above listed requirements have not been addressed in the plan submitted to the CRU or published for consultation. This should be addressed in the next iteration of the document.

## 9.2 Re-energisation procedure, frequency management and load frequency control area operations

Article 26 of ER NC requires the TSO to include in the re-energisation procedure the measures allowing the TSO to apply a) a top down re-energisation strategy and b) a bottom up strategy.

The TSO has not outlined a top-down re-energisation procedure, and only mentions that this will be included in a future version of the SRP (page 19 Section 4). However the CRU has not received or been notified of an updated SRP, and would like to highlight that a top-down re-energisation procedure is required in full as per Article 26. As outlined in work underway on the System Operation Guideline EirGrid as the Irish TSO and SONI as the Northern Irish TSO closely coordinate in maintaining stability across the transmission systems in Ireland and Northern Ireland and manage frequency on an all island basis (one load frequency control block and one synchronous area). The two systems are connected by the double circuit 275kV North South tie-lines and two separate 110kV connections in the West.

The TSO has stated the concepts of frequency leader do not apply in Ireland. The CRU notes the possibility of a system split between the Ireland and Northern Ireland systems has not been addressed in the SRP, nor has the TSO included any detail on how system restoration would be carried out in conjunction with the Northern Irish TSO and DSO if a black out was to occur in the Load Frequency Control block.

The protocols that exist between EirGrid and National Grid UK (GB TSO) details procedures related to the provision of emergency assistance across the interconnector with GB. The TSO has not provided enough detail in the SRP on how this could be utilised in the provision of system restoration services, in a top down restoration procedure.

## Next Steps

The CRU requests that the TSO, in collaboration with the DSO, amends the documents in line with the comments raised in this decision paper, engage with relevant stakeholders and consult upon the amended versions, following the procedures outlined in Article 5(1) of the ER NC.

Following such engagement and consultation, the TSO and DSO should collaborate to review the comments received and duly take into account the views of stakeholders when drafting final proposals.

The final proposals are required to be submitted to the CRU within 4 months of the publication of this decision paper.