



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

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Commission for Regulation of Utilities

Decision to approve ‘Test Plan’ submitted by EirGrid under EU Regulation 2017/2196 Emergency & Restoration

In accordance with Article 43(2)

Decision / Information Paper

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Executive Summary

This Decision paper provides detail on the Commission for Regulation of Utilities' (CRU's) decision to approve the proposal submitted by EirGrid (or "the TSO") under Article 43(2) of the Emergency Restoration Network Code ("ER NC") on 27 August 2021. Article 43(2) of ER NC requires that the TSO defines a 'Test Plan' which identifies equipment and capabilities relevant for the System Defence Plan (SDP) and System Restoration Plan (SRP) (documents that the TSO must design under Article 4(5)) that have to be tested.

EirGrid held a public consultation on their proposed 'Test Plan' document a period of 4 weeks from 9 April 2021 to 7 May 2021, in compliance with Article 7(1) of ER NC.

The EU Network Codes, including 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.

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.

Having reviewed the proposal submitted by the TSO under Article 43(2) of ER NC, the CRU is satisfied the proposal contains sufficient detail in order to be compliant with the network code (NC). The CRU has made a number of requests for future updates from the TSO in Section 6 (Next Steps) of this Decision paper which may be necessary for full implementation of these requirements.

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

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Glossary of Terms and Abbreviations

| Abbreviation or Term | Definition or Meaning |
|----------------------|---|
| CRU | Commission for Regulation of Utilities |
| DCC NC | Commission Regulation (EU) 2016/1388 of 17 August 2016 – establishing a Network Code on Demand Connection |
| DSO | Distribution System Operator (ESB Networks) |
| DSU | Demand Side Unit |
| ER NC | Commission Regulation (EU) 2017/2196 of 24 November 2017 – establishing a network code on electricity emergency and restoration |
| HVDC NC | Commission Regulation (EU) 2016/1447 of 26 August 2016 – establishing a network code on requirements for grid connection of high voltage direct current systems and direct current-connected power park modules |
| NC | Network Code |
| RfG NC | Commission Regulation (EU) 2016/631 of 14 April 2016 – establishing a network code on requirements for grid connection of generators |
| SDP | System Defence Plan |

| | |
|------------|--|
| SGU | Significant Grid User |
| SRP | System Restoration Plan |
| TSO | Transmission System Operator (EirGrid) |

1. Introduction

1.1 Background

ER NC 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.

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. ER NC links closely to a number of the other EU Network Codes, in particular the:

- Requirements for Generators Network Code (RfG NC) – EU Regulation 2016/631
- Demand Connection Code (DCC NC) – EU Regulation 2016/1388
- High Voltage Direct Current (HVDC NC) – EU Regulation 2016/1447

Article 43(2) of ER NC states that the TSO should define the ‘Test Plan’ by 18 December 2019, exactly one year after the submission date of all other documents (listed in Article 4(2)(a)-(f)) to be approved by the regulatory authority. While EirGrid submitted the initial documents on time, they were subject to requests for amendment in Decision paper CRU19110¹. As it is necessary for these documents to be approved before the ‘Test Plan’ can be formulated, the submission date in Article 43(2) could not be met. Instead the CRU requested that it was submitted within a year of re-submission of proposals required under Article 4(2)(a)-(f), which were received on 16 October 2020.

1.2 Related Documents

- [Consultation Document – Design of the Test Plan for Ireland](#)
- [Commission Regulation \(EU\) 2017/2196 of 24 November 2017 – establishing a network code on electricity emergency and restoration \(“ER NC”\)](#)
- [Design of the System Defence Plan for Ireland](#)

¹ [Decision to not approve and seek amendments to the documents submitted by EirGrid under EU Regulation 2017/ 2196 Emergency Restoration](#)

- [Design of the System Restoration Plan for Ireland](#)
- [Commission Regulation \(EU\) 2016/631 of 14 April 2016 – establishing a network code on requirements for grid connection of generators \(“RfG NC”\)](#)
- [Commission Regulation \(EU\) 2016/1388 of 17 August 2016 – establishing a Network Code on Demand Connection \(“DCC NC”\)](#)
- [Commission Regulation \(EU\) 2016/1447 of 26 August 2016 – establishing a network code on requirements for grid connection of high voltage direct current systems and direct current-connected power park modules \(“HVDC NC”\)](#)

Information on the CRU’s role and relevant legislation can be found on the CRU’s website at www.cru.ie

1.3. Structure of Paper

Sections 2-6 contains reviews of proposals regarding Articles 44-47, which the ‘Test Plan’ must be designed in accordance with.

Finally, Section 6 sets out next steps following on from the publication of this Decision paper.

2. Compliance testing of power generating module capabilities

2.1 ER NC Provisions

Article 44(1) of ER NC states:

*“Each restoration service provider which is a power generating module delivering black start service shall **execute a black start capability test, at least every three years**, following the methodology laid down in Article 45(5) of RfG NC.”*

The methodology laid down in Article 45(5) of RfG NC is as follows:

- a) *“for power-generating modules with black start capability, this technical capability to start from shut down without any external electrical energy supply shall be demonstrated;*
- b) *the test shall be deemed successful if the start-up time is kept within the time frame set out in point (iii) of Article 15(5)(a).”²*

Article 44(2) of ER NC states:

*“Each restoration service provider which is a power generating module delivering a quick re-synchronisation service shall **execute tripping to houseload test after any changes of equipment having an impact on its houseload operation capability, or after two unsuccessful consecutive tripping in real operation**, following the methodology laid down in Article 45(6) of RfG NC.”*

The methodology laid down in Article 45(6) of RfG NC is as follows:

“With regard to the tripping to houseload test the following requirements shall apply:

- (a) the power-generating modules' technical capability to trip to and stably operate on house load shall be demonstrated;*
- (b) the test shall be carried out at the maximum capacity and nominal reactive power of the power-generating module before load shedding;*

² As per Section 5.1.1 of the submitted Test Plan, this is set at 60 minutes in Ireland.

(c) the relevant system operator shall have the right to set additional conditions, taking into account point (c) of Article 15(5);

(d) the test shall be deemed successful if tripping to house load is successful, stable houseload operation has been demonstrated in the time period set out in point (c) of Article 15(5) and re-synchronisation to the network has been performed successfully.”

2.1 TSO Proposal

Article 44(1)

On 20 January 2021, EirGrid sought CRU approval of Grid Code modification MPID 288³. It proposed to change requirements for restoration service providers which are power generating modules delivering black start service to execute a black start capability test from **no more than once a year** to **every three years**. The CRU approved MPID 288 on 18 May 2021⁴.

The CRU approves EirGrid’s proposal under Article 44(1), as it is compliant with the requirements of ER NC.

Article 44(2)

Article 15(5)(c)(ii) of RfG NC stipulates that the requirement of Article 44(2) of ER NC only applies to power-generating modules “*with a minimum re-synchronisation time greater than 15 minutes*”. Although there are no RfG generation units with a start-up time greater than 15 minutes in the TSO controlled area, EirGrid have uploaded an ‘RfG Trip to House Load’ test on their website in anticipation for when applicable generation does commission onto the system.

The CRU approves the proposal under Article 44(2).

³ [MPID288 - Proposal](#)

⁴ [MPID288 - CRU Approval Letter](#)

3. Compliance testing of demand facilities providing demand side response

3.1 ER NC Provisions

Article 45(1) of ER NC states:

*“Each defence service provider delivering demand response shall **execute a demand modification test, after two consecutive unsuccessful responses in real operation or at least every year, following the methodology laid down in Article 41(1) of DCC NC.**”*

The methodology laid down in Article 41(1) of DCC NC is as follows:

“With regard to the demand modification test:

- (a) the technical capability of the demand unit used by a demand facility or a closed distribution system to provide demand response active power control, demand response reactive power control or demand response transmission constraint management to modify its power consumption, after receiving an instruction from the relevant system operator or relevant TSO, within the range, duration and time frame previously agreed and established in accordance with Article 28⁵, shall be demonstrated, either individually or collectively as part of demand aggregation through a third party;*
- (b) the test shall be carried out either by an instruction or alternatively by simulating the receipt of an instruction from the relevant system operator or relevant TSO and adjusting the power demand of the demand facility or the closed distribution system;*
- (c) the test shall be deemed passed, provided that the conditions specified by the relevant system operator or relevant TSO pursuant to Article 28(2)(d)(f)(g)(h)(k) and (l) are fulfilled;*
- (d) an equipment certificate may be used instead of part of the tests provided for in paragraph 1(b), on the condition that it is provided to the relevant system operator or relevant TSO.”*

⁵ Decision [CRU19101](#) approved TSO/DSO proposals under Article 28 excluding 28(2)(e)&(l) (related to information exchange), which were subsequently approved in Decision [CRU20127](#).

Article 45(2) of ER NC states:

*“Each defence service provider delivering demand response low frequency demand disconnection shall **execute a low frequency demand disconnection test within a period to be defined at national level** and following the methodology laid down in Article 37(4) of DCC NC for transmission connected demand facilities or according to a similar methodology defined by the relevant system operator for other demand facilities.”*

The methodology laid down in Article 37(4) of DCC NC is as follows:

“With regard to the remote disconnection test, the transmission-connected distribution facility's technical capability for remote disconnection at the connection point or points from the transmission system when required by the relevant TSO and within the time specified by the relevant TSO shall be demonstrated.”

3.2 TSO Proposal

Article 45(1)

EirGrid identified Demand Side Units (DSUs)⁶ as the only defence service providers delivering demand response that must perform a demand modification test (i.e. providing demand response for a set duration following a dispatch instruction, before returning to normal operation following a further instruction).

Section 5.2.3 of EirGrid's submission states that current policy is for DSUs to be able to “*receive a dispatch instruction approximately every 12 weeks unless prohibitively expensive*” and propose to update this to ensure that each DSU receives at least one dispatch instruction a year, so-to comply with the requirement of Article 45(1).

The CRU approves the proposal under Article 45(1).

Article 45(2)

As noted in EirGrid's System Defence Plan (SDP)⁷ (which each TSO shall design as required by Article 11(1) of ER NC), there is currently no transmission connected demand facilities providing low frequency demand disconnection. As a result, EirGrid has not proposed requirements under Article 45(2), but will amend the Test Plan if the situation changes in future.

⁶ Defined in Grid Code as “*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.*”

⁷ Table 6, Page 30 of EirGrid's [SDP](#)

The CRU acknowledges the non-applicability of Article 45(2) and therefore approves EirGrid's proposal.

4. Compliance testing of HVDC capabilities

4.1 ER NC Provisions

Article 46 of ER NC states:

*“Each restoration service provider which is an HVDC system delivering a black start service shall **execute a black start capability test, at least every three years**, following the methodology laid down in Article 70(11) of HVDC NC.”⁸*

The methodology laid down in Article 71(11) of HVDC NC is as follows:

“With regard to the black start test, if applicable:

- a) *the HVDC system shall demonstrate its technical capability to energise the busbar of the remote AC substation to which it is connected, within a time frame specified by the relevant TSO, according to Article 37(2)⁹;*
- b) *the test shall be carried out while the HVDC system starts from shut down;*
- c) *the test shall be deemed passed, provided that the following conditions are cumulatively fulfilled:*
 - (i) the HVDC system has demonstrated being able to energise the busbar of the remote AC-substation to which it is connected;*
 - (ii) the HVDC system operates from a stable operating point at agreed capacity, according to the procedure of Article 37(3)¹⁰.”*

⁸ There is no Article 70(11) in Regulation (EU) 2016/1447. It is assumed that the reference is meant to be to Article 71(11).

⁹ Set on a site-specific basis, see page 55-56 of Decision [CRU20124](#).

¹⁰ Set on a site-specific basis, see page 56 of Decision [CRU20124](#).

4.2 TSO Proposal

On 20 January 2021, EirGrid sought CRU approval of Grid Code modification MPID 288¹¹. It proposed to change requirements for restoration service providers which are HVDC systems providing black start service to execute a black start capability test from **no more than once a year** to **every three years**. The CRU approved MPID 288 on 18 May 2021¹².

The CRU approves EirGrid's proposal under Article 46, as it is compliant with the requirements of ER NC.

¹¹ See footnote 3

¹² See footnote 4

5. Compliance testing of low frequency demand disconnection relays

5.1 ER NC Provisions

Article 47 of ER NC states:

“Each DSO and TSO shall execute testing on the low frequency demand disconnection relays implemented on its installations, within a period to be defined at national level and following the methodology laid down in Article 37(6) and Article 39(5) of DCC NC.”

The methodology laid down in Article 37(6) and 39(5)¹³ of DCC NC is as follows:

“With regard to the low frequency demand disconnection relays test, the transmission-connected distribution facility’s technical capability to operate from a nominal AC supply input shall be demonstrated in accordance with Article 19(1) and (2). This AC supply input shall be specified by the relevant TSO.”

Low frequency demand disconnection (also known as ‘under-frequency load shedding’) relays are devices used by system operators that seek to limit the drop in frequency levels in an attempt to avoid a black-out situation from arising. These devices protect the system from a full system-wide black-out in the event of an unexpected system shortage.

5.2 TSO Proposal

In Section 5.2.1 of EirGrid’s Test Plan proposal, they state that *“there is currently a joint project between EirGrid and ESB Networks reviewing the overall strategy with regard to the fleet of relays and equipment involved”* which *“has the objective of providing a rolling 5 year programme of testing for the relays, including a review of functionality, a programme of maintenance and replacement as necessary”*.

The CRU approves the TSO/DSO proposal of a rolling 5 year program under Article 47. The CRU requests updates if there are any proposed changes to this definition and whenever formalisation occurs (i.e. proposal for incorporation into Grid Code and Distribution Code).

¹³ Both Articles contain the same text.

6. Next Steps

The CRU has approved the proposed 'Test Plan' submitted by EirGrid in accordance with Article 4(2)(g) of ER NC. This closes out the list of proposals to be approved by the CRU as regulatory authority under Article 4(2), following Decision CRU2113 which dealt with submissions under Article 4(2)(a)-(f).

We request that 12 months after the date of publication of this Decision, that EirGrid provide a report including updates in relation to:

- **Article 45(1)** - notify the CRU once the 'Availability Testing Policy' has been amended to comply with the requirements of ER NC.
- **Article 47** - provide relevant updates on the joint project between EirGrid and ESB Networks which includes the objective of providing a rolling 5 year programme of testing on low frequency demand disconnection relays and make any necessary Grid Code modifications.

Finally, in relation to Article 45(2), in the event that a transmission connected demand facilities begins to provide low frequency demand disconnection, the CRU requests that EirGrid makes the necessary changes to Grid Code in order to achieve compliance with this requirement of ER NC, without delay.