



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

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Decision on the general application of technical requirements in accordance with Articles 13-28 of the EU Commission Regulation (EU) 2016/631 establishing a network code on requirements for grid connection of generators (RfG), and Generation Banding Thresholds.

Decision Paper

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1. Introduction

The Commission for Regulation of Utilities (CRU) is Ireland's independent energy and water regulator. The CRU's mission is to regulate water, energy and energy safety in the public interest. Further information on the CRU's role and relevant legislation can be found [here](#).

1.1. Requirements for Generators (RfG) Network Code Requirements

Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a network code on requirements for grid connection of generators (hereafter referred to as RfG) lays down the technical requirements regarding grid connection of power-generating facilities to the transmission and distribution electricity networks in all EU Member States. Compliance with the requirements of the RfG will be required of all new power generating installations connecting to national electricity networks. In accordance with the RfG these connection standards will apply to all new power generating modules (PGM) greater than 800W connecting to a transmission or distribution network from 17 May 2019 (unless as per the recent CRU clarification [CRU18226](#) the power generating facility owner has concluded a final and binding contract for purchase of the main generating plant and notified the relevant system operator by 30th November 2018).

1.2. RfG Banding Thresholds

The RfG defines the requirements applicable to new generators with a Maximum Capacity of 800 Watts or greater. There are four 'type' categories of generators; A-D which have to meet different technical requirements as defined in the RfG. These "type" categories are as defined in Article 5 of the RfG (see Appendix 1 of the RfG) and are based on:

- the synchronous area;
- the maximum capacity of the power generating module (PGM); and
- the connection point voltage level.

As part of the national implementation of RfG, the relevant TSO of each member state is required to set banding thresholds within these maximum values. TSOs can either apply the maximum megawatt (MW) boundaries as defined in Table 1 of Article 5 (reproduced below) or, where it is reasonable (e.g. for reasons of system security), choose lower values.

Synchronous Area	Limit for maximum capacity threshold from which a PGM is of Type B	Limit for maximum capacity threshold from which a PGM is of Type C	Limit for maximum capacity threshold from which a PGM is of Type D
Continental Europe	1MW	50MW	75MW
Great Britain	1MW	50MW	75MW

Nordic	1.5MW	10MW	30MW
Ireland and Northern Ireland	0.1MW	5MW	10MW
Baltic	0.5MW	10MW	15MW

Table 1: Limits for Thresholds of Type B, C and D power generating modules

As required by Article 5 (3) of the RfG, EirGrid carried out a public consultation on the proposed banding thresholds for Ireland. The TSO has published and submitted its final proposed banding thresholds to the CRU, as the competent decision making authority, in May 2018. The CRU outlines its decision in Section 2 of this paper.

1.3. Requirements of General Application in accordance with Article 7 of RfG

The RfG Network Code outlines a range of technical standards and parameters that Transmission System Operator (TSO), Distribution System Operators (DSO) or Relevant System Operator (RSO) has to apply in their implementation of the RfG. As this is a pan-European requirement the RfG provides that some of the parameters can be determined and specified at a national level to take account of different power system structures and sizes. In doing so the RfG outlines requirements that are commonly described as either mandatory or non-mandatory, and also requirements that are exhaustive or non-exhaustive;

- A mandatory requirement must be applied by the TSO/DSO/RSO
- A non-mandatory requirement is one which the TSO/DSO/RSO may choose to apply
- An exhaustive parameter has a specified value or range in the RfG which the RSO must apply
- A non-exhaustive parameter is one for which the RfG provides a range from which the TSO/DSO/RSO selects the applicable value for their region.

In accordance with article 7 of the RfG Network Code, the relevant system operator or TSO shall submit a proposal for requirements of general application, or the methodology used to calculate or establish them, for approval by the competent entity within two years of entry into force of this Regulation, i.e. by 5 May 2018. The CRU is the competent entity in Ireland for approval of system operator proposals.

The Irish TSO and DSO, EirGrid and ESNB respectively, have actively engaged, consulted upon, developed and submitted a proposal for requirements of general application, which focused on the non-mandatory and non-exhaustive parameters of the RfG for application in Ireland. The final proposal submitted to the CRU on 17 May 2018, covers a range of standards that power generating modules must comply with to successfully connect to the distribution or transmission grid network.

Some of the standards consulted upon are in line with existing Irish Grid Code and Distribution Code requirements and some are new. In accordance with the RfG code, the CRU has six months to issue a decision on the RfG parameters proposed by the TSO and DSO, by Nov 17th 2018.

1.4. Relevant Documents

It is important to highlight to stakeholders that several other documents are essential to gaining a full understanding of the decisions made in this paper. The relevant documents are as follows:

- The RfG Network Code – [Regulation 2016/631](#)
- CRU [18226](#) RfG information note on date of application
- CRU Emerging Technology [Decision](#) and relevant updates
- EirGrid/ESBN Consultation and [Proposal](#) on General application of RfG parameters
- EirGrid/ESBN Consultation and [Minded to Decision](#) on RfG Banding Threshold

1.5. Acronyms used in this document

DSO – Distribution System Operator (ESB Networks in Ireland)

DS3 - Delivering a Secure Sustainable Power System

ENTSO-E – European Network of Transmission System Operators

MEC – Maximum Export Capacity

PGM - Power Generating Module

PPM - Power Park Module

RfG NC - Requirements for Generators Network Code

RSO - Relevant System Operator - i.e. DSO or TSO

SNSP - System Non-Synchronous Penetration

SO - System Operator

TSO - Transmission System Operator (EirGrid in Ireland)

2. Banding Thresholds and Overview of Generation Types

2.1. Banding Thresholds Decision

In May 2018 the TSO and DSO submitted their Final Position on Banding Threshold to the CRU. Within their paper the SOs propose the following thresholds for power generating modules in Ireland, which will require all PGMs from 800W upwards to comply with the relevant sections of the RfG

- **Type A units include units from 800 W to < 0.1 MW (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 \geq 10MW**

In addition, the TSO and DSO have stated that all generation connecting at 110kV or higher is automatically considered as Type D. The CRU accepts the rationale of the SOs in utilising the largest MW size available in each Band and therefore approves the proposal.

The TSO and DSO have highlighted in their proposal paper that the RfG requires application of standards based on a generator's maximum capacity or 'Pmax' (the maximum continuous active which a PGM can produce less any demand associated solely with the operation of the PGM) . This represents a fundamental change from the existing Irish Grid and D-Code application which is based on registered capacity -i.e.;

- For wind farm power stations this is the lesser of MEC or installed capacity.
- For conventional units this is the maximum capacity, expressed in whole MW, that a Generation Unit can deliver on a sustained basis, without accelerated loss of equipment life. This shall be the value at 10°C, 70 % relative humidity and 1013 hPa.

Essentially this means that all generation installed post 17th May 2019 will have to comply with the RfG and will be considered based on the actual installed capacity less house load, and not the registered capacity. For example, wind farms will now have to comply with RfG Code standards that will be based on their Pmax (close to installed capacity), whereas previously there was scope to have standards applied to a lower MEC than installed capacity.

2.2. Topologies of Generation connected to the Distribution System - Decision

The CRU approves the DSO's proposal to rename the existing Distribution Code types A-E and adopt the proposed Topologies 1-5 as outlined in the Banding Threshold Position Paper and the General requirements proposal paper.

3. Technical Requirements - Articles 13-28 Proposals

3.1. Derogations required

As outlined in the EirGrid/ESBN proposal paper, in Section 4.3, the System Operators consider three derogations are required in relation to the application of RfG. . Two of these derogation requests relate to items in the RfG text which have been noted by EirGrid as inaccurate;

- Active Power range specifications in Frequency Sensitive Mode (*Article 15.2.d (i) Frequency Sensitive Mode Parameter Selection*) and
- Voltage Withstand Capability and Associated Reactive Power Maximum Voltage (*Article 18.2.b(i) SPGM Parameters required for U-Q/Pmax Profile and Article 21.3.b (i) and Article 25.5: PPM: Parameters required for U-Q/Pmax profiles*). In relation to this provision the CRU notes that for Distribution Voltages a Distribution Code Modification has been proposed by ESBN, recommended by the Distribution Code Review Panel and approved by the CRU to change the Declared Supply Voltages to ensure alignment with the provisions of the RfG and also with CENELEC Standard EN50160.

The CRU has not yet received a derogation request for the Active Power range specifications but will consider derogation requests once received from the System Operators.

The third derogation issue concerns the application of Article 15.2.d (*iii) Frequency Sensitive Mode Power Park Module (PPM) Frequency Response Capability*). For this requirement the TSO considers that the current requirements in the Grid Code require greater frequency response to the system, and to implement the RfG requirements would result in a lower frequency response capability of future connecting PPMs compared to the capability of today's connected PPMs. The TSO considers that this could result in potentially negative outcomes for system stability at high levels of System Non-Synchronous Penetration (SNSP). The CRU understands the rationale behind this proposal, and the significant body of work that has been undertaken, completed and is continuing as part of the DS3 Programme to ensure that the All-island Synchronous area can remain secure with high levels of SNSP. Currently the system is able to accept up to 65% instantaneous SNSP, and the trajectory is to get to 75% through the work underway at both TSO and DSO level. The island of Ireland is a small synchronous area with two TSOs and two monitoring areas, connected via tie-lines. The level of risk to power system stability with high levels of non-synchronous generation and no AC connection to other synchronous areas results in a greater risk of a system split between Northern Ireland and Ireland than may be faced by larger interconnected continental EU power systems. In [guidance](#) on similar issues to this provided by ENTSO-E, it provides detail on how an System Operator may specify more stringent requirements .

The CRU therefore directs the SOs to submit formal derogation requests immediately, in line with the Derogation Criteria published in April 2017([CER 17084](#)) to enable decisions to be made on these

key aspects of RfG.

3.2. Frequency and Voltage based parameters decision

The CRU recognises that the TSO and DSO undertook a wide consultation process with industry in determining appropriate parameters. The RfG did not mandate such consultative processes and the CRU welcomes the transparency provided to industry by EirGrid and ESB Networks in this regard. The CRU has reviewed the submitted proposals, and the Industry responses in its determination of the Frequency based parameters.

In general, the CRU is content to approve the proposals as submitted by the System Operators, but notes that there is still significant work required to translate the approved proposals and the wider mandatory requirements of the RfG into Grid Code, Distribution Code and operational procedures at both TSO and DSO level.

The CRU hereby approves the proposed parameters, (not including the items requiring derogation as discussed in Section 3.1) and will separately direct EirGrid and ESB Networks to ensure translation of all the RfG requirements into Grid Code, Distribution Code, testing procedures and processes at the earliest opportunity.