

**Grid Code
Modification Proposal Form**

Email to gridcode@eirgrid.com



Title of Modification Proposal:

Integration of the RfG requirements into the Grid Code

MPID (EirGrid Use Only): MPID275

Date:	21 March 2019		
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Grid Code Version:	7.0		
Grid Code Section(s) Impacted by Modification Proposal:	Various – further details are available in the document entitled “MPID275_GC8_RfG_ArticleIncorporationLocations”, as attached to the GCRP invitation email.		

Modification Proposal Justification:

Background:

On the 17th May 2016, the Commission Regulation (EU) 2016/631 establishing a network code on requirements for grid connection of generators (hereafter known as “RfG”) entered into force. In December 2018, the CRU confirmed that the “existing classification” date for the RfG would be extended until 30th November 2018, as allowed under the RfG.

The requirements of the RfG apply from three years after its publication as per Article 72 of the RfG. The requirements of RfG do not apply to existing Power Generation Modules (PGMs).

A PGM is defined as existing if:

- (a) It is already connected to the transmission system by 30th November 2018 or
- (b) The power-generating facility owner has concluded a final and binding contract for the purchase of the main generating plant by 30th November 2018

It is important to note that, as per Article 4 of RfG, following a substantial modification to an existing PGM, some or all of the RfG requirements may become applicable.

The full text of the RfG is available on the [ENSTO-E website](#).

Consultation and approval of submitted parameters

While the RfG requires the TSO and DSO to consult on some of the non-exhaustive and/or non-mandatory parameters of the RfG, in the interests of openness and transparency, the TSO and DSO decided to consult on all of the non-exhaustive and/or non-mandatory parameters of the RfG. To that end, on the 20th of December 2017, EirGrid, as TSO, and ESB Networks, as DSO, issued a joint consultation paper on our proposal for the general application of technical requirements in accordance with Articles 13 – 28 of the RfG. This consultation was open for a period of six weeks until the 16th of February 2018.

The TSO received a total of 13 individual submissions. The focus of these submissions were:

1. The upper boundary of the RfG U-Q outer envelope
2. The harmonisation of requirements across the two jurisdictions on the island of Ireland.

A summary of the submissions was included in the joint EirGrid and ESB Networks submission to the CRU on the 16th of May 2018.

The CRU approved the submitted non-exhaustive and/or non-mandatory parameters of the RfG via a decision paper on the 26th of November 2018.

Please note that the relevant consultation and decision paper are available on the [Network Codes page](#) of the EirGrid website. Please scroll down to the consultation sections for further details.

Post consultation

EirGrid met and consulted with the CRU regarding the optimal method for incorporating the requirements under Articles 13 to 28 of RfG to the Grid Code. A number of options were considered, including:

- A “Bolt-on” method
- An “Incorporative” method
- A combination of Bolt-on and Incorporative

These different options were also presented and discussed at the Joint Grid Code Review on the 18th of October 2018.

The advantages and disadvantages of each method was assessed and it was determined that the use of the incorporative method provided the optimal solution.

This method uses a combination of symbols as well as the enclosing of text in boxes to identify requirements that are:

1. Applicable to all users
2. Applicable to Non-RfG Generation Units only
3. Applicable to RfG Generation Units only

A more detailed description of the Incorporative methodology, as well as how it can be used for future versions of the Network Codes, is available in the document

“**DemarcationAndFutureHarmonisationMethodology**”, as attached to the GCRP invitation email.

All proposals detailed in the submission paper, dated 16th May 2018 have been integrated into the Grid Code with the exception of section 5.6.4.1 of the submission paper – simulation model provision.

During the integration process, it was determined that the existing Grid Code requirements of PC.A8.2.1, PC.A8.3 and PC.A8.6 were sufficient to cover the RfG requirements for Articles 15.6.c.i, 15.6.c.ii, 15.6.c.iv and 19.2.b(v), which related to the provision, verification and coordination of simulation models and that no changes to the Grid Code were required.

Planned derogations

As part of the joint EirGrid and ESB Networks submission to the CRU on the 16th of May 2018, EirGrid stated that they would be seeking three derogations, listed 1 – 3 below. In addition to these, the need for a fourth derogation was identified during the integration of the RfG into the Grid Code, as described in item 4. These derogation requests are related to the following:

1. Article 15.2.d (i) and (ii) - Frequency Sensitive Mode - Active Power Range ($\Delta P/P_{max}$):

As part of the RfG Consultation process, EirGrid consulted with the ENTSO-E Frequency Expert Group in relation to the specification of this parameter. The ENTSO-E Frequency Expert Group confirmed EirGrid’s understanding that this parameter had been included in the RfG as an error.

The ENTSO-E Frequency Expert Group also stated that they would be recommending an update to Table 16 of the RfG to remove the requirement to specify this parameter in the next iteration of the RfG Network Code.

In the interim, EirGrid will be seeking a derogation against the specification of the Active Power Range ($\Delta P/P_{max}$) parameter.

2. Article 15.2.d (iii) - Frequency Sensitive Mode – PPM Frequency Response Capability:

The RfG range in Article 15.2.d states that the range of the change to power output must be specified in between 1.5% and 10%.

During the course of the consultation process, EirGrid expressed concern that the allowable range in the RfG would result in loss of frequency response from PPM units which is currently specified in the Grid Code.

The current Grid Code requirement for PPMs requires a 60% increase in active power within 5 seconds and 100% of expected increase within 15 seconds of a frequency event. This requirement is pivotal to the achievement of a 40% RES-E target and the ability to operate the transmission system with system non-synchronous penetration levels up to 75%.

EirGrid did not feel that it was the intention of RfG to undermine the existing capabilities specified in the Grid Code. Following further discussions with ENTSO-E, it was confirmed that there was an understanding that the requirements under RfG are not intended to reduce the capability of a fleet of generation connected to a transmission system. The understanding is that once a National Code was submitted to the National Regulatory Authority by 2012 that those requirements can be considered when implementing the RfG requirements.

As such, EirGrid will be seeking a derogation to maintain the existing Grid Code requirements for Frequency Response of PPMs.

3. Article 18.2.b(i) and Article 21.3.b(i) & (ii) -Voltage Withstand Capability and associated Reactive Power Maximum Voltage:

Following engagement with ENTSO-E, it became clear that there is an error in Article 18 figure 7 and Article 21 figure 8 of RfG. The maximum voltage included in these diagrams is 1.1 p.u. whilst Article 16 Table 6.1 and Article 25 Table 10 show a maximum voltage withstand capability of 1.118 p.u. for connections greater or equal to 110 kV and below 300 kV. It is incorrect that the reactive power capability range at the connection point would be less than the withstand voltage that is defined at the connection point.

EirGrid will prepare a class derogation for all PGMs connected at a voltage level equal to or greater than 110 kV and below 300 kV to rectify this error.

4. Article 16 and Article 25 -Voltage Withstand Capability:

Article 16 Table 6.1 and Article 25 Table 10 show a maximum voltage withstand capability of 1.118 p.u. for connections greater or equal to 110 kV and below 300 kV. In the case of 220 kV, this would require equipment to be able to continually withstand 246 kV.

It is important to note that under the existing Grid Code clauses CC.8.3.1 and CC.8.3.2, the maximum transmission system voltages are nominally 240 kV and 245 kV during normal conditions and following transmission faults respectively. As such, the transmission system would not be continuously operated at 246 kV.

In addition, 220 kV equipment is only able to withstand 245 kV on a continuous basis. To comply with the RfG requirement of 246 kV, 300kV equipment would have to be used at 220 kV level. This would place a substantial and unnecessary cost on any 220 kV installations going forward.

EirGrid is now planning to submit a class derogation to address this, which would align the voltage withstand capability requirements for new plant with the existing Grid Code requirements.

Formatting:

Finally, in order to maintain the usability of the Grid Code throughout the Incorporative process for RfG, where needed, EirGrid has updated the formatting and numbering of the relevant sections.

Red-line Version of Impacted Grid Code Section(s) - show proposed changes to text:

See document entitled **MPID275_GC8_Red Line Version** attached to the GCRP invitation email.

Green-line Version of Impacted Grid Code Section(s) - show proposed final text:

See document entitled **MPID275_GC8_Green Line Version** attached to the GCRP invitation email.