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| <p style="text-align: center;">Grid Code Modification Recommendation Form</p> |  |
| <p>Title of Recommended Proposal: Integration of the RfG requirements into the Grid Code</p> <p>MPID: 275</p> | |
| <p>Date:</p> | <p>24/05/2019</p> |
| <p>Recommended at GCRP Meeting No.:</p> | <p>Ireland GCRP Meeting – 12/04/2019</p> |
| <p>Grid Code Version:</p> | <p>7</p> |
| <p>Grid Code Section(s) Impacted by Recommended Proposal:</p> | <p>Various; further details are available in the document entitled “MPID275_GC8_RfG_ArticleIncorporationLocations”.</p> |
| <p>The Reason for the Recommended Modification:</p> <p>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. The aim of RfG is to harmonise standards for generators connecting to the grid. These harmonised standards are now in effect across Europe and will boost the market of generation technology and increase competitiveness.</p> <p>Generators with a maximum capacity of 800 W and greater will be subject to RfG if they are classed as an “RfG Generation Unit” (please refer to modified Grid Code). EirGrid and ESB Networks have lead the specification and harmonisation of RfG parameters in Ireland. This has included two consultations, stakeholder workshops, and presentations to the Grid Code Review Panel and at the All-Island Forum.</p> <p>As a result, the requirements in Articles 13-28 of RfG are now fully specified for the Irish electricity system.</p> <p>This Grid Code modification was prepared by incorporating RfG Articles 13 – 28 requirements into the Grid Code. In order to maintain the usability of the Grid Code for all generation facility owners, wording of the RfG requirements was harmonized with the existing Grid Code wording, whilst ensuring that none of the RfG requirements themselves were lost or altered.</p> | |
| <p>History of Progression through GCRPs, Working Group and/or Consultation:</p> <p>17/05/2016: Commission Regulation (EU) 2016/631 establishing a network code on requirements for grid connection of generators entered into force.</p> <p>07/04/2017: EirGrid and ESB Networks issued a consultation on RfG banding thresholds in Ireland.</p> <p>15/05/2017: Banding thresholds consultation closed.</p> <p>20/12/2017: EirGrid and ESB Networks issued a joint consultation paper on proposals for the general application of technical requirements in accordance with Articles 13 – 28 of the RfG.</p> <p>16/02/2018: Joint technical requirements consultation closed.</p> <p>15/05/2018: Final position on the banding thresholds for generators published.</p> | |

16/05/2018: Joint EirGrid and ESB Networks proposal on RfG technical requirements submitted to CRU. This contained a summary of the submissions received during the consultation and specified the final proposals.

18/10/2018: Methods for incorporating the technical requirements under Articles 13 to 28 of RfG to the Grid Code presented to the Joint Grid Code Review Panel.

26/11/2018: CRU approved the submitted technical requirements proposal from 16/05/2018 via a decision paper.

11/01/2019: Publication of Grid Code Version 7.0.

22/03/2019: “MPID275_Intergration_RfG_GridCode” modification proposal circulated to GCRP along with green and red line versions of the Grid Code and a document specifying the locations of RfG articles in the modified Grid Code. A request for comments in advance of the GCRP meeting was issued at the same time.

12/04/2019: GCRP meeting held at EirGrid offices. Presentation delivered on MPID 275, with specific sections focused on feedback received in advance of the meeting, and further questions fielded by meeting attendees on the incorporation of RfG requirements to the Grid Code.

26/04/2019: Minutes of the GCRP meeting on 12/04/2019 issued along with updated green and red line versions of the Grid Code for MPID 275 following feedback and further assessment by EirGrid.

10/05/2019: Deadline for comments on minutes from GCRP meeting on 12/04/2019. No comments received, and minutes deemed approved.

Summary Note of any Objections to the Recommended Change from GCRP Members or Consultation Responses:

The CCGT representatives for the GCRP submitted comments for the GCRP meeting on 12/04/2019 in relation to Article 13.4 and 13.5 – Admissible Power Reduction with falling frequency, which was incorporated to section CC.7.3.1.1(dd) of the Grid Code. Their concerns related to the selection of the most arduous allowable limit under the RfG and the ability of CCGTs to stay within the required power reduction of 2 %. Their preference would be to have:

- A wider allowable Admissible Power Reduction Range, ideally closer to the maximum allowable limit of 10 %; or
- An Admissible Power Reduction to be determined on an individual generation unit basis.

EirGrid engaged with the CCGT representatives and provided an explanation as to how the Admissible Power Reduction parameter was selected by EirGrid during the consultation process. EirGrid clarified that the CRU had already approved this parameter and further amendment or alteration to the parameter itself was not possible.

It should also be noted that during the drafting stages of RfG, ENTSO-E held open consultations on the requirements of the RfG and all stakeholders were able to comment on the proposals within RfG.

The Irish Transmission System is a very small Transmission System with very limited interconnection. The tripping of a single PGM, such as a CCGT, can result in far larger deviations in system frequency than would be seen on the European system for units of a similar size. As such, any further reduction in the output of the remaining PGMs would result in an additional reduction in the system frequency, further reducing the overall stability of system frequency.

Furthermore, post consultation and following further clarification from ENTSO-E in the form of the RfG implementation guidance document for “Maximum admissible active power reduction at low frequencies” dated 31/01/2018, the initial proposal was revised to the following:

- (i) Steady State Domain: 2% of the **Registered Capacity** at 50 Hz, per 1 Hz frequency drop, below 49.5 Hz; and
- (ii) Transient Domain: 2 % of the **Registered Capacity** at 50 Hz, per 1 Hz frequency drop below 49 Hz

These approved parameters reduce the steady state domain requirements for PGMs in comparison to the initial

proposal. Following consultation with OEMs at European level, the limits proposed under the RfG Network Code were deemed to be achievable.

Taking this history into account, EirGrid continued engagement with the CCGT representatives and proposed the following amendment to MPID 275:

“The maximum admissible **Active Power** reduction from **Registered Capacity** with falling frequency shall be no greater than;

(i) Steady State Domain: 2% of the **Registered Capacity** at 50 Hz, per 1 Hz frequency drop, below 49.5 Hz; and

(ii) Transient Domain: 2 % of the **Registered Capacity** at 50 Hz, per 1 Hz frequency drop below 49 Hz

and subject to the ambient condition correction curves as provided by each individual **Generation Unit** as well as other relevant technical factors as agreed between the **TSO** and the **Generator**.

For **Generation Units** using gas a fuel source at the time of the **Low Frequency Event**, the standard ambient conditions for the measurement of admissible **Active Power** Reduction will be 10°C, 70 % relative humidity and 1013 hPa.”

Following the proposed change in red above, the CCGT reps stated that they cannot support clause CC.7.3.1.1(dd) of the proposed modification.

No further objections were raised by the panel members to the final modification proposal.

Outcome of any GCRP Meeting Actions Relating to the Recommended Modification:

Clarification was sought in relation to the fault ride through profile for PPMs under RfG. Parts (i), (ii) and (iii) of PPM1.4.2(f) detail the information that TSO is obligated to share with Generators under RfG. This information will form part of the minimum system strength data specified for the pre-fault and post-fault conditions.

A comment was made regarding manual local measures under PPM1.5.2.1 and whether this requirement potentially opens up unfairness in the performance monitoring and the re-categorisation of Non-RfG Generation Units versus RfG Generation Units. Non-RfG Generation Units can be re-categorised for going into manual control mode and therefore RfG Generation Units may have an unfair advantage. Following the GCRP meeting, the text has now been updated to include “Best endeavours shall be made to resolve the loss of automatic remote control in as quick a timeframe as possible.”

Updates were also made to the RfG reactive power control modes described under PPM1.6.2.2, following the GCRP meeting. This was needed to more accurately reflect the RfG requirements and further harmonise the control modes with existing modes.

With regard to the 3 new frequency modes under RfG, namely FSM, LFSM-O and LFSM-U, EirGrid took an action to carry out a mapping exercise between the current modes (curve 1 and curve 2) and the three new modes. A matrix will be developed and made available to help Grid Code Users understand the difference in frequency control modes for Non-RfG Generation Units and RfG Generation Units.

EirGrid also took an action to publish the document entitled “**MPID275_GC8_RfG_ArticleIncorporationLocations**” to allow Grid Code Users understand where the requirements of RfG Articles 13-28 are incorporated in the modified Grid Code.

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

See document entitled “**190425_GC8_Red Line Version**”.

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

See document entitled **"190425_GC8_Green Line Version"**.