

# Ireland Grid Code Review Panel #1 2020

Welcome to all members

02 July 2020



# Agenda

## INTRODUCTION: 15 mins

- a. Welcome to Members;
- b. Minutes and Actions from [Previous Meeting](#) (19 November 2019).

## MODIFICATION PROPOSALS: 1 hr 05

- a. **MPID 276(a)** Update on the Incorporation of DCC non-exhaustive parameters **5 mins**
- b. **MPID 281** DCC Derogation Process **10 mins**
- c. **MPID 282** DCC Operational Notification Process **10 mins**
- d. **MPID 284** Compliance Simulation **10 mins**
- e. **MPID 279** Correction of Connection Voltage Graphs for 110kV and 220KV Systems under PPM1.6.3.4. **10 mins**
- f. **MPID 278** Correction of Reactive Power Capability Requirements under CC.7.3.6.1 **10 mins**
- g. **MPID 280** Remove duplication of clause OC.9.4.1 **5 mins**
- h. **MPID 283** Correction of Grid Code applicable section list PPM1.3.2. **5 mins**

## FOR INFORMATION: 20 mins

- a. Retaining of the DCC Demand Response Requirements outside of the Grid Code **10 mins**
- b. PPM FRT Update **10 mins**

## UPDATES: 5 mins

- a. CRU Update **5 mins**

## AOB 10 mins



# MPID 276a - Incorporation of DCC non-exhaustive parameters

Miriam Ryan



# MPID 276a – Incorporation of DCC

- Background:
  - 06/07/2018 – 10/08/2018: EirGrid and ESBN ran a joint consultation on the non-exhaustive parameters of the DCC.
  - 20/09/2018: EirGrid submitted the TSO DCC proposal to the CRU.
  - 12/09/2019: The CRU issued the partial approval of the TSO DCC proposal with requests for amendments to the proposals for the following:
    - Article 18.3 Information Exchange
    - Article 19.1 Demand disconnection and demand reconnection
    - Article 28.2 (e) and (l) Provision of demand response active power, reactive power control and transmission constraint management
    - Article 29.2 (d) and (e) Frequency Control



# MPID 276a – Incorporation of DCC

- Proposed Grid Code Modification was originally brought to the GCRP in November 2019 but could not be approved by CRU due to outstanding RfAs related to Articles 18.3 and 19.1, which have since been submitted to CRU.
- OC.5.5.4 has been amended to align with the RfA for Article 19.1.
- It should be noted that the RfA for Article 18.3 proposed the use of the existing signal list process for DCC users, so no additional changes or amendments to the Grid Code are required.
- An error was identified in the DCC frequency requirements in CC.7.3.1.1 which was also corrected as part of this modification.

# MPID 276a – Incorporation of DCC

## Demarcation of Requirements

Requirements in the **Grid Code** which are not marked by a symbol and border are applicable to all **Users** (which expression means all persons (other than the **TSO**) to whom any individual section of the **Grid Code** applies).

Requirements in the **Grid Code** which are marked by a symbol and border are applicable to the corresponding **Users** as per Table 1: Demarcation of Requirements.

Table 1: Demarcation of Requirements

Symbol	Applicable to
○	RfG Generation Units
⊖	Non-RfG Generation Units
⌢	DCC Units
⌢	Non- DCC Units

# MPID 276a – Incorporation of DCC

- Example of incorporated DCC requirement:



CC.10.11.4

The **TSO** shall specify the devices and settings necessary to protect the **Transmission System**, taking into account the characteristics of the **Demand Facility**, on a site-specific basis. The protection schemes needed for the **Demand Facility** and the **Transmission System**, as well as the settings relevant to the **Demand Facility**, shall be coordinated and agreed between the **TSO** and the **Demand Facility** owner.

Electrical protection of the **Demand Facility** shall take precedence over operational controls, taking into account the security of the system and the health and safety of staff and of the public, as well as mitigating any damage to the **Demand Facility**.

# MPID 276a – Incorporation of DCC

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# MPID 281 – DCC Derogation Process

Anne Trotter



# MPID 281 DCC Derogation Process

- Incorporation of Demand Connection Codes (DCC Articles 50 to 55) into EirGrid Grid Code
- DCC derogation process applies to Demand Connections connected/contracted after 7 September 2019
- Applies to Demand Facility Owners, DSOs and Closed Distribution System Owners, the TSO and the CRU
- 3 derogation application forms: CNCD1 for DSO; CNCD2 for all other DCC units; CNCD3 for TSO class derogations
- Defined Timelines for each stage of the process:
  - 2 weeks for validation by TSO
  - 1 month for DCC Unit to submit additional information
  - 6 months for TSO to complete derogation assessment
    - *possible extn. of 1 month if addn. info. requested from DCC Unit*
  - 6 months for CRU to make decision on whether to grant derogation
    - *possible extn. of 3 months if further info. Required from DCC Unit – DCC Unit has 2 months to supply additional info to CRU*
- CRU will maintain register of derogations granted or refused, including reasons for decision and consequences
- No change to existing derogation process for non-DCC units (connected/contracted on/before 7 September 2019)
  - *TSO will continue to maintain register and will include link to CRU register of Network Codes (DCC Derogations)*

# MPID 281 – DCC Derogation Process

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# MPID 282 - DCC Operational Notification Process

Miriam Ryan



# MPID 282 – DCC Operational Notification Process

- The Operational Notification Process is very similar to the process in RfG for PGMs.
- The process consists of:
  - EON (Energisation Operational Notification);
  - ION (Interim Operational Notification);
  - FON (Final Operational Notification); and
  - LON (Limited Operational Notification).

# MPID 282 – DCC Operational Notification Process

- **EON (Energisation Operational Notification):**
  - Allows energisation of the transmission connected demand facility or distribution facility using the Grid connection via their connection point.
- **ION (Interim Operational Notification):**
  - May operate for a limited time period (<24 months)
  - Time period may be extended via a derogation.

# MPID 282 – DCC Operational Notification Process

- FON (Final Operational Notification)
  - The transmission-connected demand facility or distribution facility may consume power at the connection point.
- LON (Limited Operational Notification)
  - Unresolved issue (no longer than 12 months)



# MPID 282 – DCC Operational Notification Process





# MPID 284 – PC.A8.2 and PC.A8.5 Simulation Compliance

Alan Rogers



# MPID 284 – Modification to PC.A8.2 and PC.A8.5

- A detailed review has been carried out of Network Code requirements with respect to Simulation Compliance vs Current Grid Code requirements
- PC.A8.2 refers to model details specified in the Grid Code
- These details have never been specified in the GC, and the Grid Code is not an appropriate place for them
- Propose to remove Grid Code reference, and put all modelling and simulation details in a supplementary document.

# Proposal Justification

- PC.A8.2 refers to dynamic model details that are captured in documents external to the Grid Code, and which have never been part of the Grid Code. This modification is intended to remove this ambiguity, by removing the relevant text.
- In addition, some commas have been removed from PC.A8.2, as they appeared to suggest more than one dynamic model is required.
- There are also some typos in section PC.A8.5 that gives incorrect references to other sections of the Grid Code. These are being remedied in this modification.
- Finally, as part of the implementation of the European Network Codes, the supplementary documentation has been reviewed and will be published on the relevant section of the EirGrid website.

# GC Text Modification

## PC.A8.2 Model Capabilities

- The **Users** shall supply **Models** that shall be capable of representing the behaviour of the **Plant** in balanced, root mean-square, positive phase-sequence, time-domain studies and where specified, electromagnetic transient and harmonic studies. ~~The detail to be represented in the **Models** shall be specified by the **TSO** in this **Grid Code**.~~

# GC Reference Fixes to PC.A8.5

## PC.A8.5 Time to comply

The **User** shall provide a **Model** of the **User's Plant** in accordance with **PC.6.6.1**. Where a **User** requires reasonable time to develop the necessary **Model** or **Models** so as to comply fully with all the provisions in this section, **PC.A8.2** and **PC.A8.3**, the **User** may apply to the **TSO** to be deemed compliant with the provisions of **PC.A8.2** and **PC.A8.3** on the basis of **GC.10.1.3** of the **General Conditions** of the **Grid Code**. The **TSO** shall consider any such application in accordance with **GC.10.1.3**, and if the **TSO** is satisfied as to the **User's** programme for developing and testing the necessary dynamic model, the **TSO** may, for so long as the **TSO** is so satisfied, treat the **User** as being in compliance with the provisions of this section. If the **TSO** decides, acting reasonably, that it is not satisfied as to the **User's** programme for developing and testing the necessary dynamic **Model** and that the **User** cannot be deemed to be in compliance with **PC.A8.2** and **PC.A8.3**, the provisions of **GC.10.1.4** shall apply and the **User** shall apply for a derogation under the terms of **GC.9**.

# MPID 284 – Modification to PC.A8.2 and PC.A8.5

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# MPID 279 – Correction of Connection Voltage Graphs for 110kV and 220KV Systems under PPM1.6.3.4

Miriam Ryan



## MPID 279 – Correction of reactive power graphs under PPM1.6.3.4

- A voltage graphs for 110 kV and 220 kV was included in PPM1.6.3.4 as part of MPID 275.
- However, it was later noted that when the graph contained an error – the voltage requirement of 1.118 p.u. had been rounded up to 1.12.
- To correct this error, it is proposed to separate out the reactive power graphs for 110 kV and 220 kV.



# MPID 279 – Correction of reactive power graphs under PPM1.6.3.4

- For 110 kV, the reactive power graph will be corrected to state 1.118 p.u. for voltage, which equates to a transmission system voltage of 123 kV.
- For 220 kV, the reactive power graph will be amended to state 1.114 p.u for voltage. This equates to 245 kV which is the maximum Transmission System Voltage at 220 kV and aligns with the IEC standard.
- A derogation request for the relevant sections of the RfG related to the requirement for the continuous voltage rating of 1.118 p.u. has been submitted to the CRU.

# MPID 279 – Correction of reactive power graphs under PPM1.6.3.4



# MPID 278 - Correction of Reactive Power Capability Requirements under CC.7.3.6.1

Miriam Ryan



# MPID 278 Correction of CC.7.3.6.1

- CC.7.3.6.1 defines the reactive power capability at the Generation Unit's alternator terminals.
- The voltage ranges listed under CC.7.3.6.1 are wider than the Transmission System Voltages defined in CC.8.3.
- An internal investigation revealed that in 2000, the operational standards for voltage were revised and the new Transmission System Voltages were included in CC.8.3. of Grid Code Version 1.0.

# MPID 278 Correction of CC.7.3.6.1

- The wider voltage ranges in CC.7.3.6.1 were only intended to be used as a transitional measure. However, their inclusion in the Grid Code is now causing unnecessary confusion.
- The proposal is to remove these wider voltage in CC.7.3.6.1 and to align them with Transmission System Voltages in CC.8.3.

# MPID 278 Correction of CC.7.3.6.1

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# MPID 280 - Removal of the duplicated clause OC.9.4.1

Arlene Chawke



# MPID 280

- The requirement set out in clause OC.9.4.1 is inadvertently duplicated in clause OC.9.4.2;
- A cut and paste error occurred when transitioning from Grid Code version 5 to version 6;
- We propose reinserting the correct text for clause OC.9.4.2.



# MPID 280

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# MPID 283 - Correction of reference in applicable Grid Code section list PPM1.3.2

Arlene Chawke



# MPID 283

- Typo error in the list of sections in clause PPM1.3.2;
- Occurred when transitioning from Grid Code version 5 to version 6;
- We propose fixing the typo error.

# MPID 283

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# DCC Articles 27 to 30 – retaining these articles outside of the Grid Code

Miriam Ryan



# DCC Articles 27 - 30

- These Articles list the requirements for the connection of Demand units which provide Demand Response Services.
- The existing suite of Demand Response Services are provided via the existing products under DS3.
- In order to determine the existing level of compliance with the requirements of the DCC Articles 27 to 30, a mapping exercise was carried out.

# DCC Articles 27 to 30

Characteristics													
Demand Response Service Category	28.2.f - Time to adjust power consumption	28.2.f - Modify power consumption	28.2.k - RoCoF	29.2.d - SFR deadband	29.2.e - SFR providing DU time delay before return to normal operation	29.2.e - SFR max frequency deviation response	29.2.f - Controller measurement interval	29.2.g - SFR controller sensitivity	29.2.g - SFR time delay	29.2.g - SFR controller offset	30.2.a - VF APC changing active power related to a specified metric	30.2.b - VF APC operating principle and performance parameters	30.2.c - VF APC response time
Remotely Controlled - Active Power Control (RC-APC)	Site specific	Site specific	1 Hz/s over 500 ms										
Remotely Controlled - Reactive Power Control (RC-RPC)	Site specific	Site specific	1 Hz/s over 500 ms										
Remotely Controlled - Transmission Constraint Management (RC-TCM)	Site specific	Site specific	1 Hz/s over 500 ms										
Autonomously Controlled - System Frequency Control (AC-SFC)				Frequency insensitivity of +/- 15 mHz and a selectable deadband with steps of 0.05 Hz	5 mins	48.9 Hz and 51.1 Hz	0.2 s	0.01 Hz	0 s	0.05 Hz			
Autonomously Controlled - Very Fast Active Power Control (AC-VFAPC)											Site specific	Site specific	< 2 s

# DCC Articles 27 to 30

- The mapping exercise showed that the requirements of DCC Articles 27 to 30 are already met via the DS3 programme.
- However, it is noted that the DS3 programme sits alongside the Grid Code and as such, the DS3 products are not defined within the Grid Code.



# DCC Articles 27 to 30

- Following discussions with the CRU, it was decided that these requirements are met via an existing and well established programme and as such, it is not necessary to incorporate these requirements into the Grid Code in order to demonstrate compliance with Articles 27 of 30 of DCC.
- The procurement and provision of Demand Response services will continue to be delivered via the DS3 programme, as per current practices.

# DCC Articles 27 to 30

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# FRT Update

Alan Rogers



# FRT Update

- IWEA had identified several issues related to PPM compliance during Fault Ride Through simulations
  - Reactive Current Measurement
  - Rise Time
  - Post Fault Recovery
- Various proposals have been discussed over the past two years, but no Grid Code modification has proved acceptable to both Eirgrid and IWEA
- Eirgrid propose to issue a Grid Code interpretation note along with guiding principles to be used when assessing GC compliance that aim to address the issues raised by IWEA

# Reactive Current Response

- The TSO will take into account the response of the individual PPM elements when assessing overall FRT.
  - E.g. If it is shown that a WTG has reached its maximum current output during a fault, then it is accepted that the TSO cannot ask for more than this
- A tolerance of +/- 10% will be adopted in assessing FRT, so if 100Amps is expected, 90 – 110 Amps is acceptable. Over-provision will be noted but will not be deemed an incompliance.
- There is a potential overlap with DS3 System Services that needs to be acknowledged and understood.

# Rise Time of Fault Current

- We propose to assess this through application of a suitable step change in voltage, and assume that compliance will then apply for all fault types
- The TSO accepts that it is not always possible to assess rise time correctly during very short fault durations, however the TSO will want to check general stability of the PPM during and after a variety of faults

# Post Fault Reactive Power Recovery

- The TSO will assess PFRPR as follows, which follows the spirit of the original DS3 FRT modification:
  - Once the voltage has recovered above 0.9pu, the windfarm or PPM has 500ms to switch back into normal operation (pre-fault control mode, and pre-fault reactive setpoint). It then has a further 1 second to achieve those values based on PPM 1.6.2.4. The voltage droop should take into account the fact that the transmission voltage may be different to what it was pre-fault. We do not necessarily expect the PPM to go back to the pre-fault MVar value.
- Thus the PPM has 1.5 seconds to settle to its new Q value based on its setpoint, droop, and prevailing grid voltage.

# AOB

Draft Minutes will be issued within 10 working days

