Ireland Grid Code Review Panel #2 2019

Welcome to all members

19 November 2019

Agenda

Time	Topic	Duration
11:30 – 13:00	Introduction: • Welcome members • Minutes and Actions from Previous Meeting (12 Apr 2019)	 10 mins
	Modification Proposals: • MPID 276 (a) Incorporation of DCC Non-Exhaustive Parameters • MPID 276 (b) RfG Operational Notification • MPID 276 (c) RfG Derogation Process • MPID 276 (d) Housekeeping Modification	 40 mins 15 mins 15 mins 10 mins
13:00 – 13:30	Break for Lunch	30 mins
13:30 – 15:00	Modification Proposal: MPID 277 PPM FRT Discussion: • PPM FRT: Reactive Current Rise and Settling Times • PPM FRT: Post-Fault Recovery of Active and Reactive Power • The application of Connection Network Codes to existing users following a modernisation or replacement of equipment. • Interpretation of Register Capacity Definition.	 10 mins 10 mins 10 mins 20 mins 20 mins

EIRGRID

MPID 276 (a) Incorporation of DCC Non-Exhaustive Parameters

Éanna Farrell

EIRGRID

DCC Background

- 06/07/18: EirGrid and ESBN issue a joint consultation paper on “the proposal for the general application of technical requirements in accordance with Articles 12-21 and 27-30 of the DCC”.
- 10/08/18: Joint consultation closes.
- 17/09/18: ESBN submits DSO DCC proposal to CRU.
- 20/09/18: EirGrid submits TSO DCC proposal to CRU.
- 13/06/19: CRU issues a letter extending the existing classification date for DCC to connections on or before 7th September 2019.
- 12/09/19: CRU issues a decision paper on the DCC proposals, including a request for amendment.

Incorporative Method

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 as per *Table 1: Non-Network Code User Requirements* are applicable to Non-Network Code Users.

Table 1: Non-Network Code User Requirements

Symbol	Applicable to
⏀	**Non-RfG Generation Units**
⏀	**Non-DCC Units**

Requirements in the **Grid Code** which are marked by a symbol and border as per *Table 2: Network Code User Requirements* are applicable to Network Code Users.

Table 2: Network Code User Requirements

Symbol	Applicable to
○	**RfG Generation Units**
⌂	**DCC Units**

EIRGRID

Incorporative Method

Non-DCC Unit	A **Demand Facility**, **Closed Distribution System** or **Distribution System** with a signed **Connection Agreement**: a. Connected to the **Network** on or before the 7th September 2019; or b. Whose owner has concluded a final and binding contract for the purchase of the main **Plant** on or before the 7th September 2019 and provides evidence of same, as acknowledged by the **TSO**, on or before the 7th March 2020. Such evidence shall at least contain the contract title, its date of signature and date of entry into force, and the specifications of the main **Plant** to be constructed, assembled, or purchased; or c. Is an exception to the applicability of the **DCC Unit** requirements and is a **Non-DCC Unit** such as a **Pumped Storage Unit** that has both generating and pumping operation mode. An existing **Demand Facility**, **Closed Distribution System** or **Distribution System** that undergoes modernisation, refurbishment or replacement of equipment which drives a modification to its **Connection Agreement,** and has concluded a final and binding contract for the purchase of the **Plant** being modified after the 7th September 2019 will be deemed a **DCC Unit**, unless the **Plant** being modified is one of the exceptions listed in c) above. For clarity, should an existing **Distribution System** undergo modernisation, refurbishment or replacement of equipment, such as the addition of a new **Distribution Facility** or the refurbishment of an existing **Distribution Facility**, part or all of the DCC requirements will apply to the appropriate part of the **Distribution System** in question. Note: Where a **Generation Unit** is installed to provide back-up power to a **Demand Facility**, the **Generation Unit** shall be deemed to be an **RfG Generation Unit** and will be subject to the relevant sections of the **Grid Code**, unless the **Generation Unit** is only intended to provide back-up power and will operate in parallel with the **System** for less than five minutes per calendar month while the **System** is in normal state.

DCC Unit	A **Demand Facility**, **Closed Distribution System** or **Distribution System** that is not a **Non-DCC Unit.** A **Pumped Storage Unit** which only operates as **Pumped Storage Plant Demand**, and does not meet **Non-DCC Unit** criteria, is classified as a **DCC Unit**.

EIRGRID

Incorporative Method

Sum Q is the Reactive Energy exchanged with the **Demand Customer** at the **Connection Point** for the same half-hour period.

CC.10.13.3	A **Demand Customer** shall ensure that at any load above 50% of **Maximum Import Capacity** the aggregate power factor as determined at the **Connection Point** in any half-hour period shall be within the range 0.90 lagging to unity.

Incorporative Method

CC.10.11.3 Distance protection or over-current protection shall be provided by the **TSO** on the **Grid Connection Point** circuit breaker(s).

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**.

119

Incorporative Method

CC.7.2.5 **Grid Connected Transformers**

CC.7.2.5.1 **Generators** shall provide on-load tap-changing (OLTC) facilities for all **Generator Transformers**.

Demand Customers are advised to provide on-load tap-changing (OLTC) facilities for all **Grid Connected Transformers**.

Where the **TSO** specifies the use of blocking of OLTC, the **Grid Connected Transformers** at **Distribution Facilities** shall be capable of automatic or manual OLTC blocking. The **TSO** will specify the automatic OLTC blocking functional capability.

All **Users** shall liaise with the **TSO** on the design specification for the performance of the tap-changing facility on **Grid Connected Transformers**.

81

Locating DCC in the Grid Code

CHAPTER 1

General requirements

Article 12

General frequency requiremen

1. Transmission-connected demand facilities, transmission-connected di
shall be capable of remaining connected to the network and operating
specified in Annex I.

2. The transmission-connected demand facility owner or the DSO n
frequency ranges or longer minimum times for operation. If wider frequ
operation are technically feasible, the consent of the transmission-connecte
unreasonably withheld.

Article	GC8 Location (Black = Already in Grid Code) (Red = Grid Code Modified)
12.1	CC.7.4.2.1
12.2	CC.7.4.2.1
13.1	CC.7.4.2.2
13.2	CC.7.4.2.2
13.3	CC.7.4.2.2
13.6	OC.5.7
14.1	CC.7.4.2.7
14.7	PC.A3.4

CC.7.4.2 **Demand Facilities, Closed Distribution Systems** and **Distribution Systems** shall:

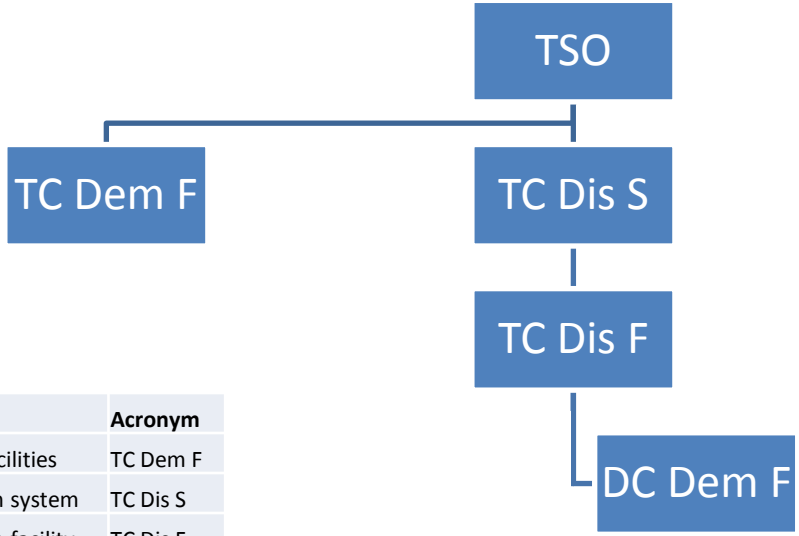
CC.7.4.2.1 Remain synchronised to the **Transmission System** and operate within the frequency ranges and time periods specified in *Table CC.7.4.2.1.*

*Table CC.7.4.2.1: Minimum Time Periods for **Demand Facilities,** Closed Distribution Systems and **Distribution Systems** to Remain Operational without Disconnecting*

Frequency Range	Time Period
47 – 47.5 Hz	20 seconds
47.5 – 48.5 Hz	30 minutes
48.5 – 49 Hz	90 minutes
49 – 51 Hz	Unlimited
51 – 51.5 Hz	30 minutes
51.5 – 52 Hz	60 minutes

EIRGRID

Demand Related Definitions



Term	Acronym
Transmission-connected demand facilities	TC Dem F
Transmission-connected distribution system	TC Dis S
Transmission-connected distribution facility	TC Dis F
Distribution-connected demand facility	DC Dem F
Closed distribution systems	C Dis S
Demand unit	Dem U

- Geographically confined
- Separate to the Distribution System
- Operate own system
- Meter and bill their own customers

EIRGRID

Demand Related Definitions

Existing Grid Code Terms	New DCC Grid Code Terms
Demand Customer (Note: **Demand Facilities** are a type of **Demand Customer**)	Closed Distribution System
Distribution System	DCC Unit
Demand	Demand Facility
Facility	Distribution Facility
Grid Supply Point	Non-DCC Unit
Demand Side Unit	
Customer	

EIRGRID

Updates Following CRU DCC Decision Paper

- **Article 18.3**

  Preparing response to RfA for CRU approval. Grid Code mod will be brought to GCRP if required.

- **Article 19.1**

  Preparing response to RfA for CRU approval in co-ordination with ER lead. MPID 276(a) accounts for known required changes. Any further changes to Grid Code for Article 19.1 will be brought to GCRP if required.

- **Article 28.2 (e) and (l), and Article 29.2 (d) and (e)**

  Preparing response to RfA for CRU approval. Grid Code mod will be brought to GCRP if required.

MPID 276 (b) RfG Operational Notification

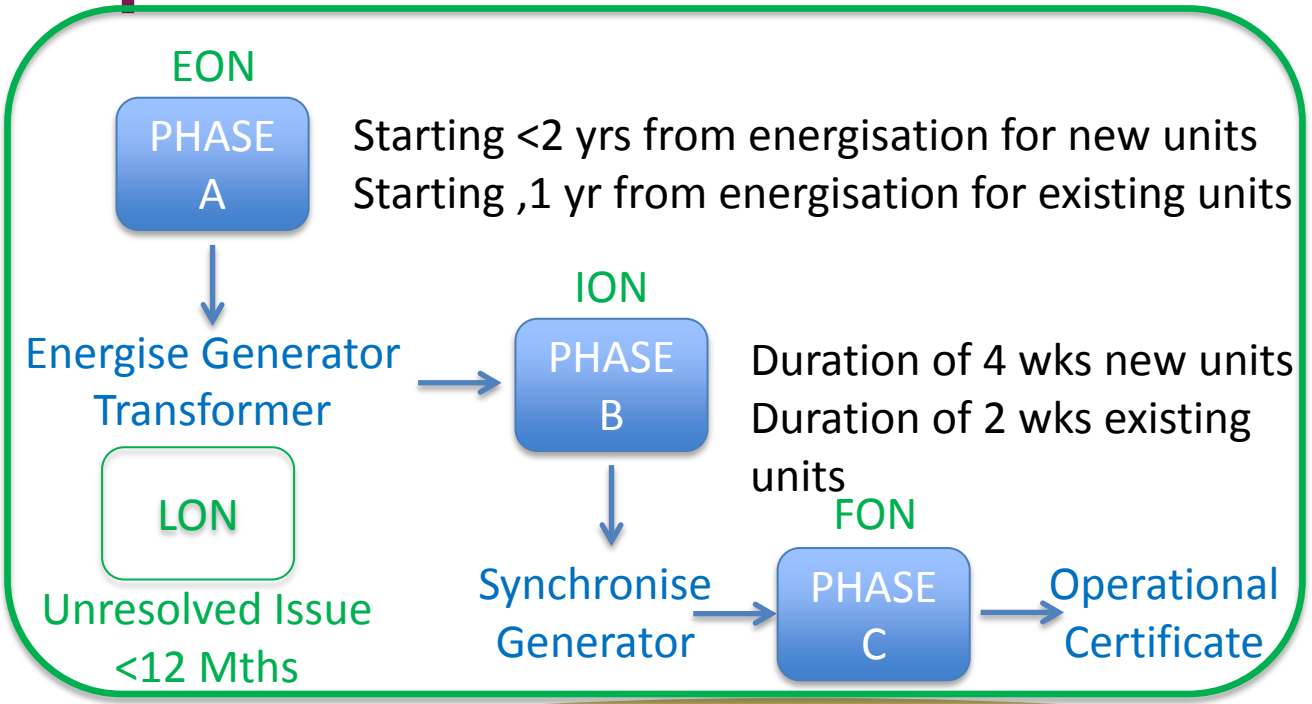
Darren Molloy

Aim

- Overview of Operational Notification
- Outline Operational Notification Process
- Compliance Requirements
  - EON (Energisation Operational Notification
  - ION (Interim Operational Notification)
  - FON (Final Operational Notification)
- Summary of Implementation Process

EIRGRID

Operational Notification - Overview



Schedule of Tests
Progress Summary

RfG Compliance Check List

EIRGRID

Operational Notification - Process

- **EON (Energisation Operational Notification)**
  - As per existing Phase A within schedule of tests
  - Generator may energise using the grid connection from their connection point
- **ION (Interim Operational Notification)**
  - As per existing Phase B within schedule of tests
  - May operate for a limited period of time (< 24 months)
  - Extension of period can be granted via derogation
- **FON (Final Operational Notification)**
  - As per existing Phase C within schedule of tests
  - Generator may generate power from the connection point
- **LON (Limited Operational Notification)**
  - Unresolved issued – maximum period of 12 months

EIRGRID

EON

	PPM
1	PPM Commissioning schedule
2	Study Requirements
3	Power Quality Report
4	Voltage Fault Ride Through
5	Dynamic Model
6	Reactive Power Capability and Transmission System Voltage Range
7	Notification Of Study Status
8	Signal List
9	ROCOF Capability
10	Transmission System Frequency Ranges
11	Data Sheets
12	Grid Connected Transformer
13	Agree Protection Settings
14	Implemented Protection Settings
15	Controller settings (Frequency Response, Voltage Droop etc.)
16	Metering Equipment
17	Authorisation to Construct
18	Connection Agreement Pre-requisites to Energisation
19	Market Registration
20	Operational Information
21	Inspection of WFPS Procedures
22	Operation Instruction
23	Energisation Instruction
24	Wiring Certificate
25	Pre-energisation signals and controls check

	SPGM
1	Provision of Requirements
2	Provision of Studies & Model
3	Modes of Operation
4	Protection Settings
5	Governor Data
6	Excitation System & Generator
7	Transformer
8	Transformer Oil Test
9	Interface Cabling Scheme
10	Earthing & Lightning Protection
11	Power Station CT's & VT's
12	Function and accuracy check of protection
13	Operation & Interlocking Check
14	Interface Cabling Checks
15	Metering Equipment
16	Insulation resistance tests
17	Resistance test for connections.
18	Authorisation to Construct
19	Unit Registration
20	Operational Information
21	Operation Instruction & Standard Operating Procedure
22	Declaration of Fitness
23	Energisation Instruction
24	Isolation for Energisation

- An Energisation Operational Notification (EON) prior to first energisation of a generator / wind farm *etc.*
  - This is a formal document giving permission for the generator to energise, based on completion of testing (Phase A closed)
  - The testing co-ordinator may agree to move certain requirements (or partial requirements) to phase B.
  - The phase A element of those tests should be closed prior to energisation and the items being moved to phase B should be tracked and completed under phase B. Note.
  - This only applies to items which are not critical to first energisation.

EIRGRID

ION

PPM

26	Harmonics Baseline
27	Post-energisation signals and controls check
28	Dispatch Testing Program
29	Reactive Power Dispatch Test Program
30	PPM Transformer Tap
31	Implemented Protection Settings
32	Installed Plant Survey
33	Harmonics Assessment

SPGM

25	Energise transformer
26	Insulation Resistance Tests
27	Resistance test for connections.
28	Function and accuracy check of protection
29	Signal Interface
30	Generator Excitation - offline checks
31	Function Check of protection alarm
32	Function check of signals
33	Turbine overspeed test.
34	Generator Governor - offline checks
35	Synchroniser Checks
36	Declarations of Fitness

- An Interim Operational Notification (ION) prior to first synchronisation of a generator / wind farm *etc.*
  - As per EON, but Phase B items all closed.
  - The testing co-ordinator may agree to move certain requirements (or partial requirements) to phase C.
  - The phase B element of those tests should be closed prior to energisation and the items being moved to phase C should be tracked and completed under phase C.
  - **Note.** This only applies to items which are not critical to first synchronisation.

FON

SPGM

37	Synchronise generator.
38	Block Load
39	Governor response and Operating Reserves
40	Governor Droop
41	Governor Deadband
42	Minimum Generation
43	Ramp Rates
44	Trip to House Load
45	Startup Time
46	Shutdown Time
47	Operation on Primary/Secondary/Mix fuel
48	Modes of Operation
49	Verification of Output vs Ambient Conditions
50	Reactive Power Capability/Excitation Limiters
51	Automatic Voltage Regulator Droop
52	Online SCADA signals check
53	Generator capability over voltage range/rated PF
54	Operation at high and low frequency
55	Alerts
56	Automatic Generator Control
57	Emergency power supplies
58	Auxillary/Balance of Plant Fault ride through
59	Online PSS and Excitation controller testing
60	Registered Capacity
61	Registered Characteristics
62	Reliability run
63	Export Adjustment Factors
64	Model Validation
65	Technical Offer Data
66	Special Protection Scheme Testing

PPM

34	Active Power Control
35	Frequency Response
36	Reactive Power Control
37	Reactive Power Capability
38	Black Start Shutdown
39	Test Report
40	Capacity Test
41	Generator Data
42	Model Validation
43	Harmonics Assessment

- A Final Operational Certificate (FON) following demonstration of compliance with the Grid Code
  - As per EON, but Phase C items all closed.

EIRGRID

Implementation - PPM

- **RfG Compliance Documents**

  - Signal List Template TSO PPM Type D – RfG
  - PPM Schedule of Grid Code Compliance Tests (RfG Checklist)
  - PPM Test Procedure Active Power Control
  - PPM Test Procedure Frequency Response
  - PPM Test Procedure Reactive Power Capability
  - PPM Test Procedure Reactive Power Control
  - PPM Met Mast Requirements
  - PPM Site Survey Procedure
  - PPM Test Report
  - PPM Test Procedure Black Start Shutdown

Implementation - SPGM

- **RfG Compliance Documents**

  - Progress Summary Template (RfG Checklist)
  - Governor Deadband Test Procedure Template
  - Governor Response and Operating Reserves Test Procedure Template
  - Operation at High and Low Frequency Test Procedure Template
  - Reactive Power Capability Excitation Limiters Test Procedure Template
  - RoCoF Test Procedure Template
  - RoCoF Test Report Procedure Template
  - Trip to House Load Test Procedure Template

MPID 276 (c) RfG Derogation Process

Anne Trotter

EIRGRID

MPID 276 (c) RfG Derogation Process

- Incorporation of RfG Connection Network Codes (RfG Articles 60 to 65) into EirGrid Grid Code
- RfG derogation process applies to Generation Units connected/contracted after 30 November 2018 (or existing Generation Units that have undergone substantial modification)
- Defined Timelines for each stage of the process:
  - 2 weeks for validation by TSO
  - 1 month for Generator to submit additional information
  - 6 months for TSO to complete derogation assessment
    - *possible extension of 1 month if additional information requested from Generator*
  - 6 months for CRU to make decision on whether to grant derogation
    - *possible extn. of 3 months if further info. Required from Generator – Generator 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 existing units (connected/contracted on/before 30 November 2018)
  - *TSO will continue to maintain register and will include link to CRU register of Network Codes (RfG Derogations)*

EIRGRID

MPID 276 (d) Housekeeping Modification

Arlene Chawke

EIRGRID

Table Items 1 – 17

- Grid Code Modification MPID 269 introduced the new PPM definition and updated existing terminology, it also created new definitions for energy storage devices.
- Approved by the CRU 10 Oct 2016
- The **PPM** term change was unintentionally missed in a number of PCA and PPM clauses.
- The inclusion of the term **Energy Storage Power Station Demand** was missed in a number of SDC clauses.

EIRGRID

Table Item 18

- Grid Code Modification MPID 240, titled Demand side Units, changed the term **Dispatchable Demand Customers** to **Demand Side Unit Operator**.
- Approved by the CRU on 23.09.2013.
- At the time of updating the Grid Code the term change was missed in the Introduction of the Planning Code Appendix.
- We are also fixing a ‘typo’ in the final paragraph of the clause. The clause refers to PC.A77. The correct reference is PC.A7.

Table Items 19 & 20

- Clauses OC.2.6.3.3 and OC.2.6.3.4 refer to clause OC2.5.
- OC2.5 is not used and we recommended removing the reference to it.

Table Item 21

- Clause OC4.3.4.1.2 refers to clause OC.4.3.4.3 which was re-numbered to OC.4.3.4.1.3.
- This is a simple correction of the reference.

Table Item 22

- Grid Code Modification MPID 240, titled Demand Side Units, removed clauses OC.7.2.4.3.6 and OC.7.2.4.3.7.
- Approved by the CRU on 23.09.2013.
- However references to these clauses were not removed from OC.7.2.4.7.3.
- We are capturing the removal of these references now.

Table Item 23

- The reference to clause OC.7.2.5 in clause OC.7.2.6.1.3 was unintentionally left blank in Grid Code version 8. We now propose including it.

Table Item 24

- In 2017 the CER changed its name to CRU to better reflect the expanded powers and functions of the organisation.
- We are now reflecting the name change throughout the latest version of the Grid Code.

Table Item 25

- The modification MPID 268, titled Outturn Availability, was recommended by the Ireland GCRP on 26 May 2016. The CRU approved the recommendation on 10 October 2016.
- The actual modification to the Grid Code was inadvertently missed in Grid Code version 8.

Table Item 26

- The modification MPID 271(a), titled Scheduling and Dispatch for I-SEM (a revised version of the clause SDC2.4.10(c)), was recommended by the GCRP on 31 January 2018. The CRU approved the recommendation on 30 April 2018.
- The modification to the Grid Code was inadvertently missed in Grid Code version 8.

MPID 277 PPM FRT

Alan Rogers

EIRGRID

Background

- Wind Grid Code mods were developed as part of the DS3 programme a few years ago
- With experience of testing and operation, some aspects need to be changed to better reflect PPM capabilities
- MPID 277 concerns the reactive current response of a PPM during a fault, and is the result of many months of discussion with industry

Existing Grid Code Wording

- PPM1.4.2(a) currently states: “During Transmission System Voltage Dips, the Controllable PPM shall provide Active Power in proportion to retained Voltage, and provide reactive current as set out in PPM1.4.2(c)”.
- PPM1.4.2(c) states that the reactive current should be at least proportional to the voltage dip.
- May not always be possible for a PPM to provide reactive current in proportion to the voltage dip, depending on pre-fault P and Q operating points, or Q response may be too great, and cause overvoltages.

EIRGRID

Proposed Text

- During and after faults, priority shall always be given to the Active Power response as defined in PPM1.4.2(a) and PPM1.4.2(b). The reactive current response of the Controllable PPM shall attempt to control the Voltage back towards the nominal Voltage, ~~*and should be at least proportional to the Voltage Dip.*~~ *up to the Reference Current Rating of the Controllable PPM as required*. The reactive current response shall be supplied within the rating of the Controllable PPM, with a Rise Time no greater than 100ms and a Settling Time no greater than 300ms. *The **Reference Current Rating** is calculated as per the formula below:*
- $$I_{ref}[kA] = \frac{\textbf{Registered Capacity } [MW]}{0.95 \times V_{nominal}[kV] \times \sqrt{3}}$$
- For the avoidance of doubt, the Controllable PPM may provide this reactive response directly from individual Generation Units, or other additional dynamic reactive devices on the site, or a combination of both.

- ***New Glossary Entry: Reference Current Rating:*** *The magnitude of the total current per phase, at nominal voltage, of a **Power Park Module** when it is operating at its **Registered Capacity** and at a **Power Factor** of 0.95, as measured at its **Connection Point**.*

Lunch – 30 mins

PPM FRT: Reactive Current Rise and Settling Times

Alan Rogers

EIRGRID

Issue 2: Rise and Settling Times

GC** 8 **Definitions:

- ***Rise Time:** In relation to reactive current response from Controllable PPM, it is the length of time from Fault Inception for reactive current to reach 90% of its steady-state value.*
- ***Settling Time:** In relation to reactive current response from Controllable PPM, it is the length of time from Fault Inception for reactive current to settle within +/-10% of its steady-state value.*

- Queries from industry - there doesn't seem to be a steady-state value, as evidenced from FRT studies for different fault durations

EIRGRID

(c) During and after faults, priority shall always be given to the **Active Power** response as defined in PPM1.4.2(a) and PPM1.4.2(b). The reactive current response of the **Controllable PPM** shall attempt to control the **Voltage** back towards the nominal **Voltage**, and should be at least proportional to the **Voltage Dip**. The reactive current response shall be supplied within the rating of the **Controllable PPM**, with a **Rise Time** no greater than 100ms and a **Settling Time** no greater than 300ms. For the avoidance of doubt, the **Controllable PPM** may provide this reactive response directly from individual **Generation Units**, or other additional dynamic reactive devices on the site, or a combination of both.

Discussion

- The original intention of the 100ms / 300ms was to guide the OEMs in how they tune their control systems gains etc.
- A 100ms fault would not be sufficient to determine compliance, hence longer fault simulations required
- Suggestion to use average reactive current during fault if Iq requirement varies during fault – we are happy to discuss

EIRGRID

PPM FRT: Post-Fault Recovery of Active and Reactive Power

Alan Rogers

EIRGRID

(d) The **Controllable PPM** shall be capable of providing its transient reactive response irrespective of the reactive control mode in which it was operating at the time of the **Transmission System Voltage Dip**.

The **Controllable PPM** shall revert to its pre-fault reactive control mode and setpoint within 500ms of the **Transmission System Voltage** recovering to its normal operating range as specified in CC.8.3.1.

The **Controllable PPM** shall revert to its pre-fault reactive control mode and setpoint within 500ms of the **Transmission System Voltage** recovering to its normal operating range as specified in CC.7.3.1.1 (x).

Issue 3: Post Fault Recovery

- Issue is related to interpretation of “set-point” – does it mean pre-fault Q value – if network has changed, the pre-fault Q value may be inappropriate.
- Also queries on relationship between P and Q and their interaction – essentially Q cannot settle until P is settled…
  - PPM1.4.2(d): *“The Controllable PPM shall revert to its pre-fault reactive control mode and set point within 500ms” (regardless of fault duration)*
  - PPM1.4.2(b): *“The Controllable PPM shall provide at least 90 % of its maximum Available Active Power or Active Power Set-point, whichever is lesser, as quickly as the technology allows and in any event within 500 ms of the Transmission System Voltage recovering to 90% of nominal Voltage, for Fault Disturbances cleared within 140 ms. For longer duration Fault Disturbances, the Controllable PPM shall provide at least 90% of its maximum Available Active Power or Active Power Set-point, whichever is lesser, within 1 second”*

EIRGRID

Issue 3: Post Fault Recovery

- Wording “pre-fault reactive control mode and setpoint” could be seen as WFPS switching back to that mode in 500ms, and then taking a period of time to get back to the setpoint, rather than getting to the setpoint itself in 500ms.
- Further analysis is required to demonstrate the interrelation of reactive and active power post-fault recovery for different turbine types (Full-converter, DFIG, etc.)
- Eirgrid happy to continue to discuss this issue with IWEA / industry and bring forward GC modifications as appropriate

The application of Connection Network Codes to existing users following a modernisation or replacement of equipment.

Miriam Ryan

EIRGRID

Application of CNCs to Existing Users

Feedback and Comments?

Interpretation of Registered Capacity Definition.

Miriam Ryan

EIRGRID

Registered Capacity Definition (1)

- Background:
  - Originally intended for large transmission-connected conventional generation units
  - Used as baseline for determining numerous requirements under the Grid Code, e.g. ramping capability, reserve requirements, etc.
  - Definition has been refined since Version 1 of the Grid Code but needs to be re-examined with new evolving technologies in mind.

Registered Capacity Definition (2)

- The main area of focus has been the interpretation of the term “Sustained basis”.
- Our proposal is:
  - Gas fired CCGT – a minimum of 4 hours
  - Hydro Generation unit – a minimum of 4 hours
  - Wind or Solar power PPM – due to variability, reg capacity verified via ongoing compliance monitoring
  - Energy Storage PPM (batteries) – 20 minutes

EIRGRID

Registered Capacity Definition (3)

- The second area of focus is fuel types
  - Different registered capacities depending on the fuel type used
  - Allowing different registered capacities would enable the capability of the generation unit to be assessed more accurately.

EIRGRID

Registered Capacity Definition (4)

- What about other Unit types?
  - DSUs
  - Energy storage other than batteries
  - Other new technologies?

Registered Capacity Definition (5)

- Full discussion paper to be issued post GCRP meeting, with a request for comments to be returned by 20 December 2019.
- A full interpretation paper will be developed and will be made public.

Update from the CRU

AOB

Draft Minutes will be issued within 10 working days