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RfG GB Tasklist and Parameter Setting

RfG Workgroup meeting
20th October 2014

GB Task List (high level)

- Retrospectivity process (3.a.3)
- Process for consideration of plant as new/existing (3.a.4)
- TSO setting of banding thresholds (3.b.2-4)
- Specific technical requirements: (some of main areas being)
  - Frequency response
  - Frequency stability
  - Restoration (B-D)
  - Black Start (C-D)
  - Pole slipping protection (C-D)
  - Dynamic system monitoring (C-D)
  - Fault Ride Through. Type B especially – which is not under FRT workgroup as this only covers large synchronous plant
  - Reactive power capability (C-D synchronous & PPMs)
- GB parameter setting
- Processes for: (may require alignment or extension to D-code)
  - Operational notification
  - Compliance
- Derogation process
- Reflection of RfG requirements into BCAs

GB Parameters

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Article	Provision	GB Parameter Setting Requirement
8.1(a)-(d)	Frequency ranges	GB parameters already consistent
8.2	RoCoF	Set value and include in GC/DC. At present set in BCAs.
8.3.a.1	LFSM-O threshold:	50.4Hz is within range. BC3.7.2
8.3.a.2	LFSM-O droop	10% is within range. BC 3.7.2
8.4	The Power Generating Module shall be capable of maintaining constant output at its target Active Power value regardless of changes in Frequency:	Already consistent with CC6.2.3
8.5	Admissible Active Power reduction from maximum output with falling Frequency	GB values are within allowable range. CC6.3.3
9.3	Type B Fault ride through	Not under FRT workgroup as this only covers large synchronous plant. GB parameters need setting
10.2.b	Type C LFSM-U settings	New requirement to codify in CC 6.3.7 and parameters to be selected (range, droop, trigger points etc).
10.2.c	Frequency Sensitive Mode (FSM) settings	Broadly the same as GB Grid Code CC6.3.7. Parameters fall within range. Set Freq Response Insensivity range – GB doesn't have this but does have freq response deadband
10.2.c.5	Active Power Frequency Response details and period of provision	Existing GB values within range (primary/secondary response timescales). But some new requirements (max delays).
11.3.a	Type D Fault ride through (Add-on to type B but with different parameters).	Requirements need to be transposed and GB parameters need to be set and checked. Some of this is being progressed through GC WG
12.3	Robustness and post fault Active Power recovery after fault-ride-through.	Select active power recovery parameters. Otherwise consistent with current GB Grid Code wording
13.2.a	Reactive power capability	New text to be included
13.2.b-c	Reactive Power capability at and below Maximum Capacity	Code changes and parameter settings necessary. Specified in a very different way in current GB codes
14.2.a-b	Voltage stability	Parameters and settings of the Voltage control system and excitation system. Agreement through BCAs currently. Excitation spec already in GB Grid Code under CC6.3.8 & CCA.6. Needs consistency checks
15.2.b	Fast Fault Current	New requirement. Loosely covered in GB Grid Code but needs text changes & expansion of FRT requirements. Plus GB parameter setting
16.3.b-c	Reactive power capability at and below maximum capacity	Code changes and parameter settings necessary. Specified in a very different way in current GB codes
16.3.e	Active Power contribution or Reactive Power contribution priority during faults	Defined by TSO. New text. Parameters and decisions required. Linked to fast current injection for PPMs
20	Offshore PPMs Voltage stability requirements	New text and parameters required. Parameters depend on configuration

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Specific Technical Requirements

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Type A Power Generating Modules

- 8.3.a.3 Active power freq response. Evaluation of 2 sec clause required and may be included in coding.
- 8.3.b The Power Generating Module shall be capable of stable operation during LFSM-O operation. Active power freq response. Include in GB drafting
- 8.5 Falling frequency requirements. Consider moving current requirement from BC3.7.2 into CCs.
- 8.6 The Power Generating Module shall be equipped with a logic interface (input port) in order to cease Active Power output within 5 seconds following an Instruction from the Relevant Network Operator. DNO type A provision. New requirement but only for type As – overwritten by B+.
- 8.7 The Relevant TSO shall define while respecting the provisions of Article 4(3) the conditions under which a Power Generating Module shall be capable of connecting automatically to the Network. DNO type A provision. Type A only – DNO issue

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Type B Power Generating Modules

- 9.2 Frequency stability criteria. DNO provisions. Type B only – overwritten by C/D.
- 9.3 Fault ride through. Not under FRT workgroup as this only covers large and medium synchronous plant. GB parameters need setting. Significant work area.
- 9.4.a-b Restoration (capability and automation). Define process and requirements in BC and D-Code.
- 9.5.a-b Control and protection schemes and settings. Thought not to conflict with GB codes but needs checking.

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Type C Power Generating Modules (#1)

- 10.2 Frequency stability criteria. Thought to be consistent with GB codes but needs checking.
- 10.2.b LFSM-U settings. New requirement to codify in CC 6.3.7 and parameters to be selected (range, droop, trigger points etc).
- 10.2.c.2 Frequency Response Deadband. Text revisions required in GC.
- 10.2.c.4 If the delay in initial activation of full Active Power Frequency Response is greater than 2 seconds the Power Generating Facility Owner shall provide technical evidence setting out why a longer time is needed. New requirement in GC.
- 10.2.c.4 For generation technologies without inertia, the Relevant TSO, respecting the provisions of Article 4(3), may specify a shorter time than 2 seconds for which the Power Generating Facility Owner is required to provide technical evidence setting out why a longer time is needed for the initial activation of full Active Power Frequency Response. New requirement in GC.
- 10.2.c.5 Active Power Frequency Response details and period of provision. Existing GB values within range (primary/secondary response timescales). Some new requirements (max delays).
- 10.2.d Frequency restoration control. Include text in GC.
- 10.2.e Disconnection due to underfrequency. Include text in GC.
- 10.2.f Real-time monitoring of FSM. OC5.4.1 doesn't include enough detail at present. Should transfer into CCs. Will also need to change NGTS 3.24/95 & RES.

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Type C Power Generating Modules (#2)

- 10.3 Voltage stability. Check GC consistency
- 10.4 Fault Ride Through. Check GC consistency
- 10.5.a to Black Start Capability. Current GC requirement is only within BCAs and requirements would then be written in to Black Start contracts - do reqs need to also be in code?
- 10.6.a (a) Pole slipping protection. Mandatory capability requirement. At present is noted in GC but if reqd specifica are in each BCA. Will need to make changes to text and policy.
- 10.6.b DSM – dynamic system monitoring; currently doesn't require reactive power and only applies in GB to large power stations. Will require changes to text, BCAs and policy. Also requires fault recording and quality of supply monitoring.
- 10.6.c Simulation modelling. Already covered in Grid Code. EMT simulations? Need to check for consistency.
- 10.6.e Ramping limits. Already covered in Grid Code. Need to check for consistency.
- 10.6.f Earthing arrangements. Already covered in Grid Code. Need to check for consistency.
- 10.6.g-h Replacement/modernisation of equipment – notification needed. Already in PCA1.2 and CUSC/Grid Code mod processes – needs consistency check & clarify legality

Type D Power Generating Modules

- 11.2.a Voltage ranges. Almost the same as existing GC requirements. Minor revision to GC - for voltages from 110-300kV RfG reqs +/-10% whereas GC reqs +/-6%.
- 11.3.a Fault ride through (Add-on to type B but with different parameters). Requirements need to be transposed and GB parameters need to be set and checked. Some of this is being progressed through GC WG.
- 11.4 Synchronisation. Covered under RES and BCA but needs checking for consistency and likely to need words adding to Grid Code.

Synchronous Power Generating Modules

Type B:

- 12.2 Voltage stability provisions. Specified by DNO.
- 12.3 Robustness and post fault Active Power recovery after fault-ride-through. Select active power recovery parameters. Otherwise consistent with current GB Grid Code wording.

Type C:

- 13.2.a Reactive power capability - new text to be included
- 13.2.b-c Reactive Power capability at and below Maximum Capacity - Code changes and parameter settings necessary. Specified in a very different way in current GB codes.

Type D:

- 14.2.a-b Voltage stability. Parameters and settings of the Voltage control system and excitation system. Agreement through BCAs currently. Excitation spec already in GB Grid Code under CC6.3.8 & CCA.6. Needs consistency checks.

Power Park Modules

Type B:

- 15.2.a Reactive power capability. Specified by DNO.
- 15.2.b Fast Fault Current. New requirement. Loosely covered in GB Grid Code but needs text changes & expansion of FRT requirements. Plus GB parameter setting.

Type C:

- 16.2 Provision of Synthetic Inertia to a low Frequency event. Freq response WG. Synthetic inertia – new requirement. Under Freq Response WG. Will need text changes.
- 16.3.b-c Reactive power capability at and below maximum capacity. Code changes and parameter settings necessary. Specified in a very different way in current GB codes.
- 16.3.d Reactive Power control modes. Voltage control element consistent with CC.A.7. Additional text changes required for reactive power control mode and power factor control mode.
- 16.3.e Active Power contribution or Reactive Power contribution priority during faults. Defined by TSO. New text. Parameters and decisions required. Linked to fast current injection for PPMs.
- 16.3.f Power oscillations damping control. Consistent with GB Grid Code but may need to be some text amendments.

Offshore Power Park Modules

- General task - Check for consistency with GB offshore transmission regime.
- 18.1 Define offshore PPMs (probably in definitions). Text changes to define the criteria for offshore PPMs and how they are treated – and by extension, what other offshore aspects are covered under HVDC code**.**
- 19 Frequency stability requirements. Check applicability of GB codes.
- 20 Voltage stability requirements. New text and parameters required. Parameters depend on configuration.
- 21 Fault ride through. Check and amend as required for consistency with onshore requirements
- 22 Restoration. Mirrors onshore requirements. Text changes and consistency checks.

Operational Notification Procedure

Articles 24-32: Fairly consistent with GB Grid Code requirements for larger generators in particular but will require some addition of Grid Code requirements to D-Code.

- Introduces use of equipment certificates

(Query how to use authorised certificates from elsewhere - what about non-GB certified equipment being used in GB?)

- Introduces requirements to smaller plant than current case in GB
- Check also how this will be implemented in D-Code.

Types B-C

- 27 Power Generating Module Document (PGMD) shall be provided by the Power Generating Facility Owner to the Relevant Network Operator and shall include a Statement of Compliance.

Type D

- 28 Grid Code requirements for Transmission connected plant are consistent – but will need to be introduced to D-Code.

Operational Notification Procedure for existing plant

- 33 - Existing GB Compliance Provisions would be expected to apply to existing Power Stations. If future provisions are the same as the existing arrangements then opportunity should be taken to align the requirements

Compliance

Articles 34-44: Fairly consistent with GB Grid Code requirements for larger generators in particular but will require some addition of Grid Code requirements to D-Code.

- Introduces use of equipment certificates
- Introduces compliance requirements to smaller plant than current case in GB
- Check also how this will be implemented in D-Code.
- Clarify LEEMPS treatment - currently in D-Code do not point to Compliance Code in the Grid Code.

Compliance Simulations

Articles 45-51: Fairly consistent with GB Grid Code requirements for larger generators in particular but will require some addition of Grid Code requirements to D-Code.

- Clarify allowed use of Equipment Certificates instead of compliance checks.
- Check also how this will be implemented in D-Code.
- 45.1 LFSM-O response test compliance tests in relation to Type B Power Park Modules specific new requirements.
- LFSM-U is a brand new requirement for which new simulations and tests will be required.

Derogations

Articles 52-56:

- Only licencees can apply for derogations currently.
- Consider whether process needs to be added to GB codes.
- Check also how this will be implemented in D-Code.

Transitional Arrangements for New Technologies

Articles 57-61:

- Consider arrangements in GB codes (probably D-code only)

Entry into Force

Article 63:

- From Entry into Force will need to reflect code in BCAs. Groupings of users will be:
  - ‘Existing’ – not impacted by RfG
  - ‘New’ – caught by RfG
    - Connection offer made prior to RfG entry into force
    - Connection offer made after RfG entry into force