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GC0048: Joint GCRP/DCRP Workgroup on National Application of RfG

Meeting 2 - 24th March 2014

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Agenda

Item	Topic	Lead	Documents
1	Introductions & apologies	RW	
2	Review of actions & approval of minutes	RJ	Attached (action log, minutes, final ToRs)
3	Progress update	RW	
4	Feedback from DECC to Commission	RW	
5	Timescales	RW	
6	Code applicability	AJ	
7	GB banding thresholds	AJ	
8	Agree actions	RJ	
9	AOB	RJ	

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Progress Update

- 'Informal draft' of code published by the European Commission on 14 January 2014
- 4 Feb – DECC/Ofgem stakeholder workshop on Commission draft to collate comments
- 12 March – part I of ECCAF Code Mapping Group on RfG
- 27 March – part II of ECCAF Code Mapping Group
- Informal discussion of code at Electricity Cross Border Committee meetings in Jan/Feb – but not on March agenda

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ECCAF Code Mapping Working Group

- At their meeting on 30 January 2014, ECCAF, in determining its work process asked for Code Administrators, as technical experts on GB Codes, to prepare the initial mapping of European Network Code (ENC) requirements to GB Codes. The **Code Mapping Working Group (CMWG)** is the subgroup established for that purpose.
- The proposed mappings prepared by CMWG will assign articles (or possibly sub-articles) of the ENC to sections of the GB Codes2, for report to ECCAF. ECCAF will then consolidate the work of CMWG, address any issues and send the information to the GB Code Panels for agreement and implementation. The changes to the GB Codes will be made through the standard governance procedures for each GB Code.
- As ECCAF is only concerned with GB Code changes, any changes that CMWG perceived as not fitting in the GB Codes should be flagged and sent to ECCAF without further discussion. ECCAF will then ensure DECC/Ofgem is aware of these issues, as DECC/Ofgem will need to take forward / resolve as appropriate as they are leading on the non-code aspects of GB application.

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Feedback from DECC to Commission

- Wish to increase flexibility of application of Fault Ride Through requirements to type B generators
- Wish to align initial GB banding thresholds with the continental block
- Suggested words on Retrospectivity to further define application in ‘exceptional’ circumstances only

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Banding – 5 Synchronous Areas

Synchronous Area	maximum capacity threshold from which on a Power Generating Module is of Type B	maximum capacity threshold from which on a Power Generating Module is of Type C	maximum capacity threshold from which on a Power Generating Module is of Type D
Continental Europe	1 MW	50 MW	75 MW
Nordic	1.5 MW	10 MW	30 MW
Great Britain	1 MW	10 MW	30 MW
Ireland	0.1 MW	5 MW	10 MW
Baltic	0.5 MW	10 MW	15 MW

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Retrospectivity – in latest draft of code

- Key GB stakeholder concern
- Helpful clarification provided in 'Whereas':

  (14) This Network Code should apply to new Generating facilities. Existing generating facilities and generating facilities already at an advanced stage of planning but not yet completed should continue to be subject to the requirements in force in their Member State at the entry into force of this Network Code. Only in exceptional circumstances and where there is a clear justification for extending the provisions of this network code to existing generating facilities or to generating facilities at an advanced stage of planning should national regulatory authorities approve such a change. This should be based on a detailed cost benefit analysis, taking into account the overall socio-economic impact and the impact on generators.

- Expansion on this and CBA process detailed in Article 3a - Application to New and Existing generators
  - Specific case for retrospective application needs to be made based on system change
  - Public consultation must be undertaken
  - Positive societal CBA required
  - Can be undertaken on a specific proposal only every 3 years
- Art 3.3 drafting error – this refers to 'Power Generating Facilities' with no distinction between new or existing; this is not intent of drafting but could be interpreted to mean code applies unilaterally.

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Timescales

Robyn Jenkins

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Timescales for Code

- Comitology expectations – end of 2014
- Code applies to ‘new generators’; still defined as those that have not let contracts for major plant items by 2 years after the code’s entry into force – so end of 2016
- Compliance period defined in code; was 3 years and is now X years (art 63) – but could still be end of 2017

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Workgroup Expectations

- RfG requirements need to be reflected in new contracts by end of 2016
- To do this, GB application of RfG must be completed by early 2016
- Pre-work on major topics under RfG can continue ahead of completion of comitology
- If comitology finishes at end of 2014, workgroup will have about 12 months to finish

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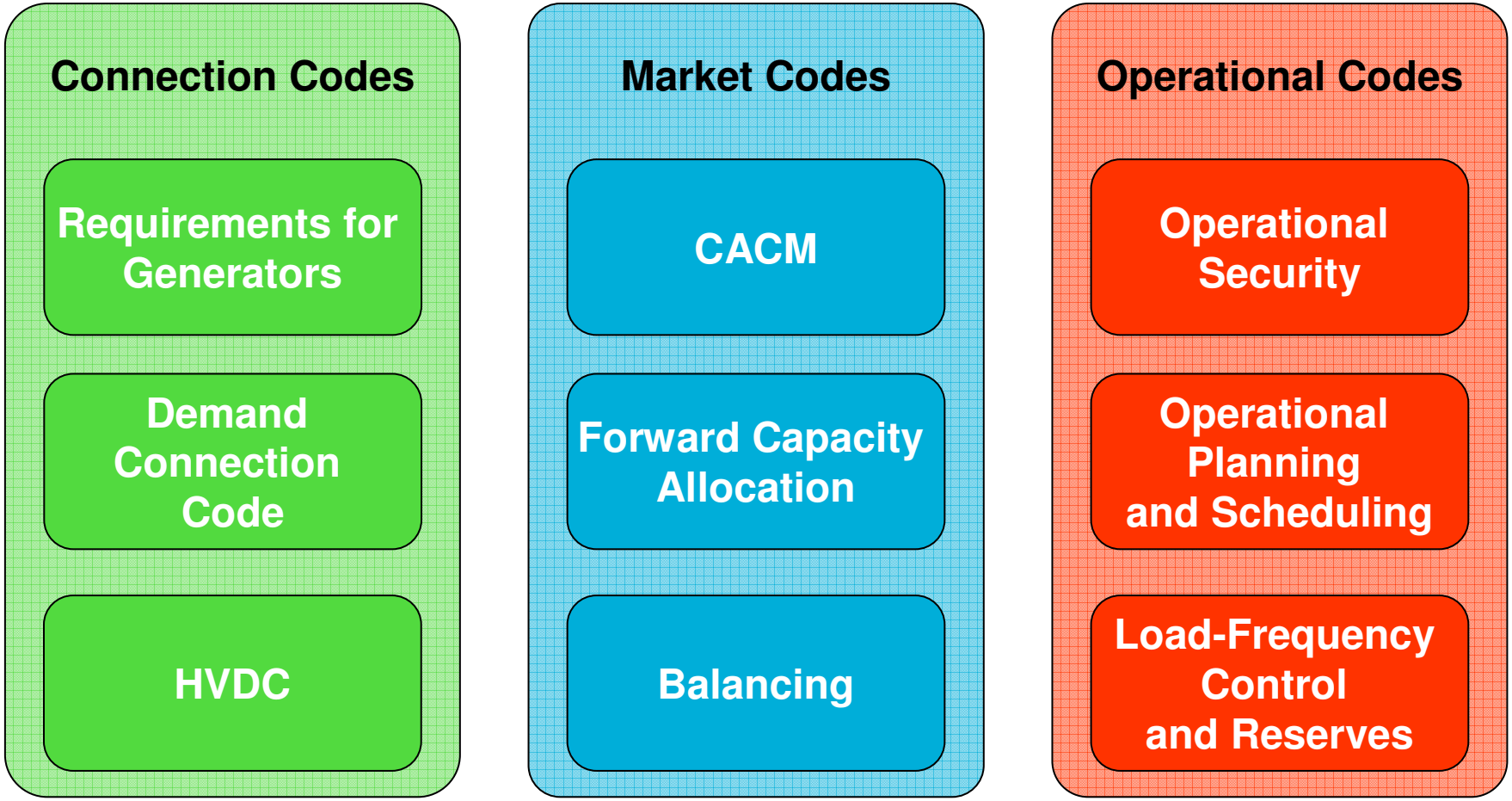
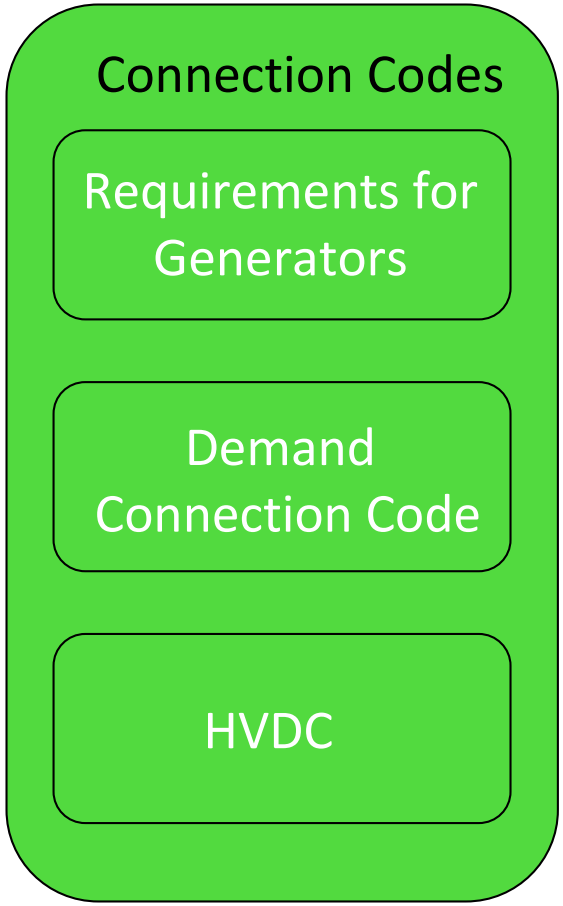
ENTSO-E Requirements for Generators Code Applicability

Antony Johnson – TNS Technical Policy

European Networks Codes – Commission target to enter into force by end of 2014



Connection Codes



Sets functional requirements which new generators connecting to the network (both distribution and transmission) will need to meet, as well as responsibilities on TSOs and DSOs .

Sets functional requirements for new demand users and distribution network connections to the transmission system, basic Demand Side Response capabilities, as well as responsibilities on TSOs and DSOs.

Sets functional requirements for HVDC connections and offshore DC connected generation.

RfG Applicability (1)

- Article 1 – Subject Matter – This Regulation estalishes a network code which defines a common framework for grid connection requirements for Power Generating Modules and Offshore Generation Facilities. It also defines a common framework of obligations for Network Operators to appropriately make use of the Power Generating Facilities capabilites in a transparent and non –discriminatory manner ensuring a level playing field throughout the European Union.
- Power Generating Facility – Is a facility to convert primary energy into electrical energy which consists of one or more Power Generating Modules connected to a Network at one or more Connection Points
- Power Generating Module – is either a Synchronous Power Generating Module or a Power Park Module.
- Article 3a – The requirements set forth by this Network Code shall apply to New Power Generating Modules in a Member State which are considered significant according to the provisions of this Network Code unless otherwise provided in this Network Code.

What type of Generating Plant is covered by RfG

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- Synchronous Generators
- Power Park Modules
- Offshore Synchronous Generators and Offshore Power Park Modules but only if connected via AC cables (Requirements on Offshore Generators connected via an HVDC link are covered in the HVDC Code).
- Pumped Storage Plant (If a Pumed Storage facility has only a demand element (no Generation this is only covered in the DCC).
- Industrial Sites
- Some relaxation for CHP Plant Embedded within an Industrial Site.
- Relaxation for Emerging Technologies

RfG Applicability (2)

- **Article 3b (1) – The applicability and extent of the requirements with which a Power Generating Module shall be required to comply shall be determined on the basis of voltage level of their connection point and their Maximum Capacity according to the categories set out in paragraph 2.**
- **Article 3b (2) Power Generating Modules which are considered to be significant are categorised as follows:-**

  Type A – 0.8kW or above and connected below 110kV

  Type B – Connected below 110kV and its Maximum Capacity is at or above a threshold defined by the TSO whilst respecting the provisions of Article 4(3). This threshold shall not be above the threshold for Type B Power Generating Modules according to Table 1.

  Type C - Connected below 110kV and its Maximum Capacity is at or above a threshold defined by the TSO whilst respecting the provisions of Article 4(3). This threshold shall not be above the threshold for Type B Power Generating Modules according to Table 1.

  Type D - Connected at or above 110kV. A Synchronous Power Generating Module or Power Park Module is of Type D as well if its Connection Point is below 110kV and its Maximum Capacity is at or above a threshold defined by each Relevant TSO whilst respecting the provisions of Article 4(3). This threshold shall not be above the threshold for Type D Power Generating Modules according to table 1.

RfG Thresholds

Synchronous Area	maximum capacity threshold from which on a Power Generating Module is of Type B	maximum capacity threshold from which on a Power Generating Module is of Type C	maximum capacity threshold from which on a Power Generating Module is of Type D
Continental Europe	1 MW	50 MW	75 MW
Nordic	1.5 MW	10 MW	30 MW
Great Britain	1 MW	10 MW	30 MW
Ireland	0.1 MW	5 MW	10 MW
Baltic	0.5 MW	10 MW	15 MW

Table 1: Thresholds for Type B, C and D Power Generating Modules

Retrospectivity

- Whereas – This Network Code should apply to new Generating facilities. Existing generating facilities and generating facilities at an advanced stage of planning but not yet completed should continue to be subject to the requirements in force in their Member State at the entry into force of this Network Code. Only in exceptional circumstances and where there is clear justification for extending the provisions of this network code to existing generating facilities or to generating facilities at an advanced stage of planning should national regulatory authorities approve such a change. This should be based on a detailed cost benefit analysis, taking into account the overall socio-economic impact and the impact on generators.
- Article 3a (2) – Member States and national regulatory authorities shall ensure that existing Power Generating Modules continue to be bound by such technical requirements that apply to them (including applicable derogations) pursuant to legislation in force in the respective Member States or contractual arrangements in force at the time of entry into force of this Network Code, including provisions therein for the change of such requirements.
- Existing Power Generating Modules are defined under Article 3(a) (4)(d)
- A process for retrospective application of the RfG code is covered under Article 3a(3). It is not the current intention of National Grid to propose retrospective requirements on Existing Generators as a result of the implementation of the RfG Code

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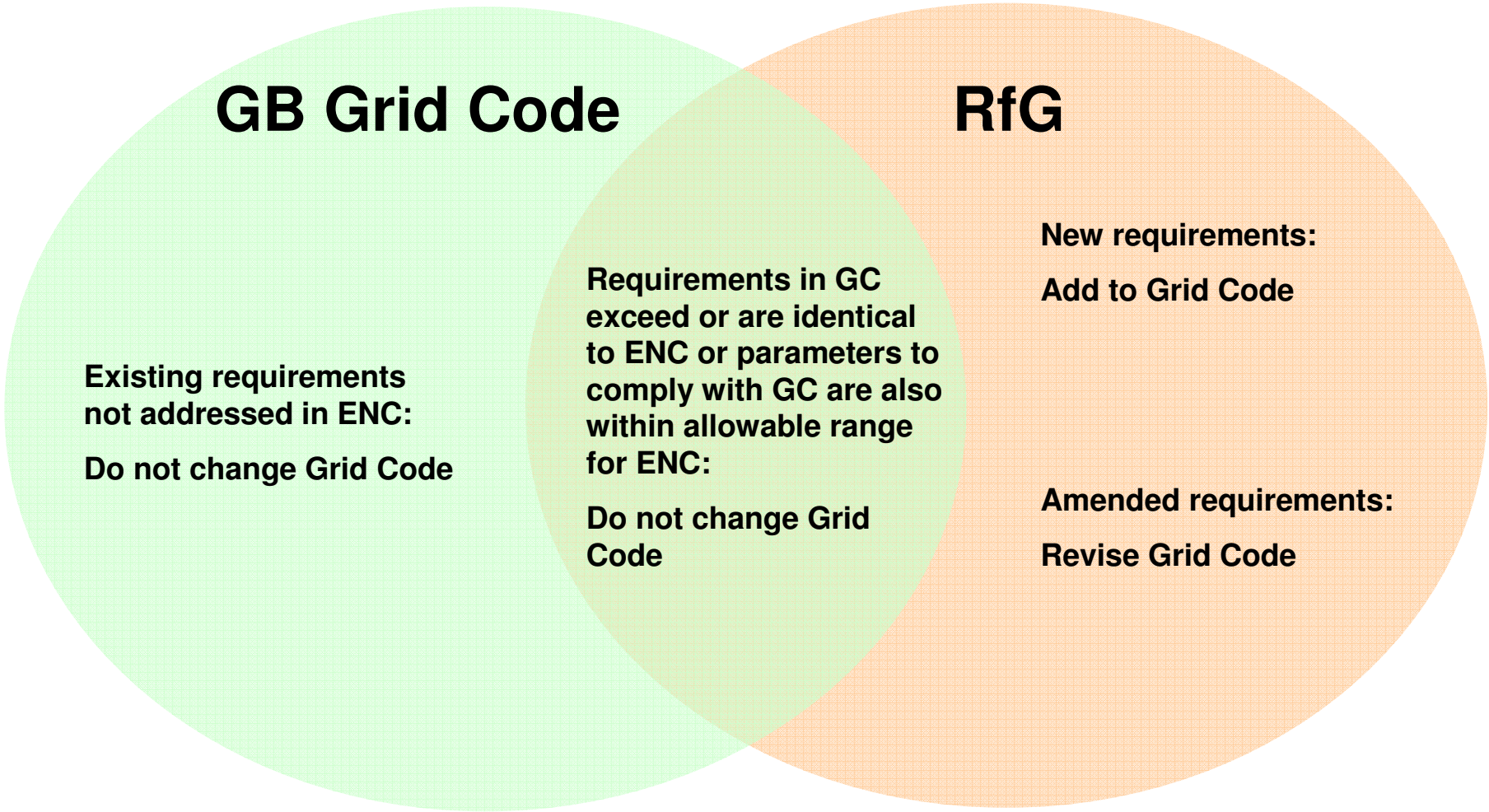
When do the New Requirements Apply

- Article 63 – This Network Code shall enter into force on the twentieth day following that of its publication in the Offical Journal of the European Union. With the exception of Article 3(4), which shall apply after the entry into force, and Title 6, all provisions of this Network Code shall apply as from the day of expiration of a [x] year period following its publication.
- Article 3(a)(4)(a) – Within a delay not exceeding thirty months as from the day of entry into force of this network code, the Power Generating Facility Owner shall provide the Relevant Network Operator with a confirmation of final and binding contracts is has concluded for the construction, assembly or purchase of the main plant of a Power Generating Module with relevance to the provisions of this Network Code and which exists prior to the day, which is two years after the day of entry into force of this Network Code.

European Network Codes:

GB application - overall concept is minimum change



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Areas of Grid Code not Impacted by RfG

- Most of the RfG requirements affect one specific area of the Grid Code being the Connection Conditions
- There are many other areas of the Grid Code. Even many parts of the Connection Conditions are not affected by RfG including the following:
  - References to relevant (GB) electrical standards
  - Protection
  - Quality of Supply
  - Control Telephony
  - Electronic Data Communication Facilities
  - Metering
  - Site related conditions, maintenance & safety responsibilities
  - Gas Insulated Switchgear
  - Site responsibility schedules

Parameters in RfG:
Example of Frequency Response

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- RfG Article 10(2) (c)(1) - General Requirements For Type C Power Generating Modules

  (1) The Power Generating Module shall be capable of providing Active Power Frequency Response in accordance with the parameters specified by each TSO within the ranges shown in table 4

Parameters		Ranges
Active Power range related to Maximum Capacity $\frac{\lvert\Delta P_1\rvert}{P_{max}}$		1.5 – 10 %
Frequency Response Insensitivity	$\lvert\Delta f_i\rvert$	10 – 30 mHz
	$\frac{\lvert\Delta f_i\rvert}{f_n}$	0.02 – 0.06 %
Frequency Response Deadband		0 – 500 mHz
Droop s_1		2 – 12 %

Parameters in GB Grid Code:
Example of Frequency Response

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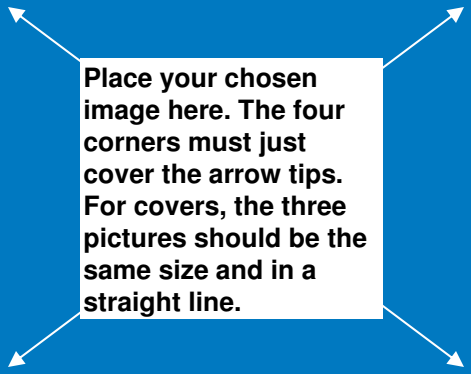
GB Parameters	Range / Requirement	Clause
Active Power range related to Maximum Capacity $\frac{\lvert\Delta P_1\rvert}{P_{max}}$	10 % +	CC.A.3.3
Frequency Response Deadband	0.03Hz (±0.015Hz)	CC.6.3.7(c) (iii)
Droop	3 – 5%	CC.6.3.7(c)(ii)

Note:- Frequency Response insensitivity is not used or defined in the GB Grid Code but would be considered to be an integrated part of the frequency response deadband

Options for Integration of EU Network Codes into GB Distribution Documents



Sarah Carter

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ENTSO-E Requirements for Generators Banding

Antony Johnson – TNS Technical Policy

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Generator Banding

- Replaces current GB Small/Medium/Large classifications with type A-D bandings
- Draft code clarifies intent for each type of generator in 'Whereas (15) – (19)
- TSOs define thresholds through a prescribed process requiring consultatiion and NRA approval – but may not be above levels set out in code

Current Grid Code banding:

Generator Size	Direct Connection to:		
	SHET	SPT	NGET
Small	<10MW	<30MW	<50MW
Medium			50-100MW
Large	10MW+	30MW+	100MW+

RfG banding:

RfG Type	Generator Capacity	Connection Voltage
A	800W-1MW	<110kV
B	1-10MW	<110kV
C	10-30MW	<110kV
D	≥30MW	>110kV

RfG Banding

- Type A – 0.8kW or above and connected below 110kV
- Type B – Connected below 110kV and its Maximum Capacity is at or above a threshold defined by the TSO whilst respecting the provisions of Article 4(3). This threshold shall not be above the threshold for Type B Power Generating Modules according to Table 1.
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Table 1: Thresholds for Type B, C and D Power Generating Modules

Note:- Types A, B and C only apply if connected at less than 110kV and Type D applies if connected at 110kV or above, irrespective of size or if over 30MW and above

RfG Banding

- During the comitology process there is a possibility the thresholds could increase.
- If this were to happen National Grid would not wish the thresholds to be increased beyond the current Grid Code levels in order to protect security of supply.
- Should the levels be increased as a starting point to align with Continental Europe National Grid would wish to reduce the levels to values which are similar to those currently proposed under the GB options defined in the RfG code.

Power Station Size – Definitions

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- Defined under the Grid Code
- Based on Registered Capacity not CEC / TEC or any other Commercial Product
- Large
  - England and Wales – 100MW or Greater
  - SPT's - Transmission Area – 30 MW or greater
  - SHETL – Transmission Area – 10MW or greater
  - Offshore – Transmission Area – 10MW or greater
- Medium
  - Apply only in England and Wales – 50 MW or greater but less than 100MW
- Small
  - England and Wales – Less than 50MW
  - SPT's - Transmission Area – Less than 30MW
  - SHETL – Transmission Area – Less than 10MW
  - Offshore – Transmission Area – Less than 10MW

Implications of RfG

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- The RfG places requirements on the TSO for Type A - D Generators. This extends down to 800W Generators. At present National Grid only deals with plants of 10MW or above in the North of Scotland or greater
- Contractually the TSO at present only deals with Generators which are CUSC signatories or those which are required to comply with the requirements of the Grid Code (eg LEEMPS).
- Under RfG there will be no requirement for Regional Differences (see Slide 4)
- There will need to be much greater co-ordination between the TSO and DNO's.
- How is the contractual relationship between the TSO and Generator aligned to the technical requirements under RfG
- The Market arrangements under BETTA are assumed not to change

Example 1

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- In GB – Large Power Station of 600MW directly connected to the Transmission System at 400kV
- The Power Station is Large and directly connected. It would need to meet the requirements of CUSC, Grid Code and BSC. All Grid Code requirements applicable to a Large Power Station would apply and the Generator would be a participant in the Balancing Mechanism.
- Under RfG all the Type D requirements would apply. All other requirements would remain unchanged but note the possible interaction of the other Network Codes - Issue for ECCAF.

Example 2

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- In GB – Large Power Station of 100MW connected to the DNO System at 132kV
- The Power Station is Large and Embedded. It would need to meet the requirements of CUSC, Grid Code, BSC, D Code and DCUSA. All Grid Code requirements applicable to a Large Power Station would apply and the Generator would be a participant in the Balancing Mechanism. The Generator would also need to meet the requirements of the Distribution Code.
- Under RfG all the Type D requirements would apply. All other requirements would remain unchanged but note the possible interaction of the other Network Codes - Issue for ECCAF.

Example 3

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- In GB – Medium Power Station of 50MW connected to the DNO System in England and Wales at 132kV and seeks Licence Exemption.
- The Power Station is Medium, Embedded and Licence Exempt. The Generator will have to sign the DCUSA and satisfy requirements of the Distribution Code. The Generator does not need to sign the CUSC or become party to the BSC however the Distribution Code obligates the Generator to satisfy specific requirements under the Grid Code applicable to Licence Exempt Embedded Medium Power Stations. The site specific requirements being specified to the Generator via the Connection Agreement with the DNO. Any site specific requirements National Grid requires of the Generator are specified to the DNO which in turn are included in the Connection Agreement between the DNO and Generator.
- Under RfG all the Type D requirements would apply. All other requirements would remain unchanged.
- As LEEMPS are SVA registered and cannot be instructed by National Grid the ability to issue instructions via the DNO may need to be considered.
- As regional differences are removed under RfG the LEEMPS provisions could be replaced by a BELLA type arrangement. This would however mean a contract would need to be placed with the Generator

Example 4

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- In GB – Small Power Station of 20MW connected to the DNO System in England and Wales at 33kV and SVA Registered
- The Power Station is Small, Embedded and SVA Registered. The Generator will have to sign the DCUSA and satisfy requirements of the Distribution Code. There is no contract to sign with National Grid and the requirements of the Grid Code or BSC would not apply.
- Under RfG all the Type C requirements would apply. All other requirements would remain unchanged.
- National Grid would need to have some method of issuing instructions to the Generator particularly for frequency control purposes and would need to be able to instruct the Generator either through the DNO or via direct communications with the Generator concerned.

Example 5

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- In GB – Large Power Station of 10MW connects to the DNO System in Scottish Hydro's Transmission Area and is SVA Registered
- The Power Station is Large, Embedded and SVA Registered and would be treated as a BELLA. The Generator will have to sign the CUSC and DCUSA and satisfy requirements of the Grid Code and Distribution Code but would not need to be party to the BSC.
- Under RfG all the Type C requirements would apply. All other requirements would remain unchanged.
- Under the current BELLA Arrangements, National Grid would be able to instruct the Generator through the Balancing Codes as applicbale to Generating Units (not BM Units).

Example 6

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- In GB – Small Power Station of 50kW connects to the DNO System in England and Wales is SVA Registered.
- The Generator will have to sign the DCUSA and satisfy requirements of the Distribution Code (G83) only. There is no requirement for the Generator to sign the CUSC, satisfy the requirements of the Grid Code or become party to the BSC.
- Under RfG all the Type A requirements would apply. All other requirements would remain unchanged.
- National Grid would need to have some control over the generation by issuing instructions to the DNO.

Summary

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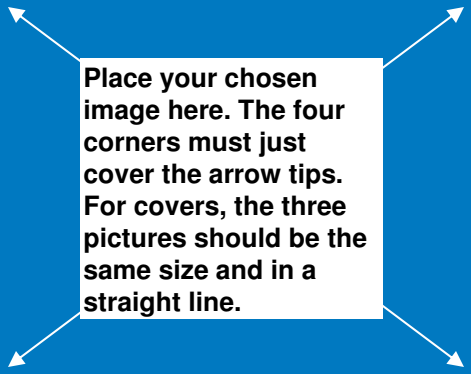
- National Grid is keen to ensure the banding thresholds (if increased as a starting point to the same values as in Continental Europe) are reduced to broadly the same levels as currently proposed under the RfG.
- Ensure consistency across GB and removal of regional differences
- The contractual arrangements require further assessment. Should for example all Type D Generators have a direct contract with National Grid (ie sign the CUSC) and Type A – C Generators have a contract with the DNO – Further consideration required?
- National Grid as the TSO will need to have some method of receiving aggregated data from the DNO and issuing instructions to the Embedded Generation.
- There needs to be much greater co-ordination between the TSO and DNOs in the future.
- These issues need to be more widely explored.

Actions & Next Steps



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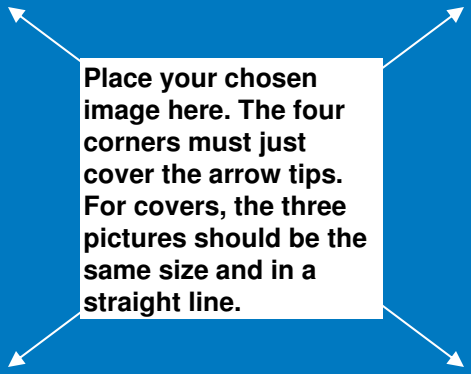
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