



GC0100/101/102  
Code Administrator  
Consultation Responses

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nationalgrid

Rob Wilson

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Grid Code Panel

8<sup>th</sup> Feb 2018

## GC0100

Respondent	Support		Summary of Points	View of Proposer
	Original/ Alternative	Implementation		
EDF Energy	Original	Yes	None	No action required.
AMPS/ADE (Joint Submission)	Original	Yes	Setting of Uret is crucial	No action required.
Deep Sea Electronics Plc	Original	Yes	Setting of Uret is crucial	No action required.
Electricity North West	Original	Yes	None	No action required.
Scottish Power Generation	Alternative	Yes	Selection of alternative based on reasoning given in WACM proposal	No action required.
GE Power	Yes	Yes	Minor points regarding: - FRT voltage profile for type D synchronous plant - Allowance for ambient conditions	Catch-up with respondent, clarification should resolve.
Scottish Power Renewable Ltd	Yes	No	Wants grace period before implementation	Catch-up with respondent, clarification should resolve. Timescale for implementation is not relevant as the point here is really around timescale for compliance which is not in GB gift.
RWE Generation UK	No	No	Unhappy with text around application of RfG to existing plant undergoing substantial modification	Understand the point, but existing legal text does work in conjunction with right to refer any connection offer to Ofgem. Minor change could aid understanding. Extensive discussion already on this in workgroup and no different to today's position with respect to application of current version of Grid Code.
Drax Power Ltd	Yes	Yes	Would have preferred a narrow approach only implementing ENC requirements	Unclear how this approach could have worked or been made user friendly. No action required.
Northern Powergrid	Original	Yes	One clause referring to DCC identified to remove from GB Code User definition. Possible typo to correct in DRC schedule 11 page 68.	Agree with both these. Neither is of great consequence.
NGET	Original	Yes	None	No action required.

Highlighted – possible action; see next slide(s)

## RWE – ‘Substantial modification’

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- Considers that clause applying RfG to plant that has undergone substantial modification is not compliant.
- RfG text refers to substantial modification leading to the need for a new connection agreement. This is provided for in GC0100.
- All parties agree that activation will be a rarity based on total replanting behind an existing connection point.
- In fact, existing GB processes allow a very similar process. Modifications to existing agreements are not subject to the latest Grid Code while new agreements are.
- RfG also refers to NRA approval; any GB connection agreement in dispute can be referred to Ofgem under Transmission Licence Condition C9 ‘Functions of the Authority’
- In Proposer’s view words in GC0100 are compliant but could potentially be improved. Can only apply to parties from May 2019 – so there is time to correct this subsequently if needed.

# Transmission Licence Condition C9

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## Condition C9: Functions of the Authority

1. If, after a period which appears to the Authority to be reasonable for the purpose, the licensee has failed to enter into an agreement with (as the case may be) any authorised electricity operator or any person entitled or claiming to be entitled thereto pursuant to a request under standard condition C8 (Requirement to offer terms), the Authority may, pursuant to section 7(3)(c) of the Act and on application of such authorised electricity operator or such person or the licensee, settle any terms in dispute of the agreement to be entered into between the licensee and that authorised electricity operator or that person in such manner as appears to the Authority to be reasonable having...

4. If in respect of any bilateral agreement or construction agreement entered into pursuant to standard condition C8 (Requirement to offer terms) or standard condition C18 (Requirement to offer terms for connection or use of the national electricity transmission system during the transition period) or this condition either the licensee or other party to such agreement proposes to vary the contractual terms of such agreement in any manner provided for under such agreement, the Authority may, at the request of the licensee or other party to such agreement, settle any dispute relating to such variation in such manner as appears to the Authority to be reasonable.

# Northern Powergrid – minor errors

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- Clause ‘switching on’ DCC requirements was left in GC0100 glossary and definitions section in error (should have been in GC0104 implementing DCC)
- However, it is not in any way wrong – and in effect is redundant in GC0100 as none of the attendant DCC clauses exist until implementation of GC0104
- Separate typo in DRC schedule 11 can be corrected now

# GC0101

Respondent	Support		Summary of Points	View of Proposer
	Original	Implementation		
EDF Energy	Yes	Yes	None	No action required.
AMPS/ADE (Joint Submission)	Yes	Yes	Identified potential defect in the drafting of ECC 6.3.7.1.2 and ECP A.5.8 as far as Type B PGMs concerned. Type B is only required to have LFSM-O, but ECP only has a test regime that assumes FSM. Further, there is not clarity about what "as much as possible" means in practice in ECC 6.3.7.1.2(iii). Unmeetable challenge for diesel/gas driven synchronous PGMs in the 1-5MW size range.	Links to similar in G99. In proposer's view the GC0101 solution is compliant (see ECP.7.2.2(c)). Any remaining point is to do with existing Grid Code wording including the interpretation of 'as much as possible' which in the code is meant to indicate as much as viable economically rather than a cost-is-no-object solution. This is picked up by the general 'economic and efficient' licence condition.
Deep Sea Electronics Plc	Yes	Yes	Supports principle of matching existing Grid Code requirements wherever possible.	No action required.
Electricity North West	Yes	Yes	None	No action required.
Scottish Power Generation	Yes	Yes	None	No action required.
GE Power	Yes	Yes	Wants clarification on Type C and D FSM and LFSM-O(-U) requirements & Pmax.	Catch-up with respondent, clarification should resolve.
Scottish Power Renewable Ltd	Yes	No	Wants grace period before implementation	Catch-up with respondent, clarification should resolve. Timescale for implementation is not relevant as the point here is really around timescale for compliance which is not in GB gift.
RWE Generation UK	No	No	Identifies removal of CC.6.3.2 a) i) as an issue for existing GB users. Unhappy with final text of ECC.6.3.13.5 - which stems from Article 16.2(a)(ii) of RfG and enables National Grid to write in the requirement for operation under simultaneous voltage and frequency events.	Removal of CC.6.3.2 would not apply retrospectively so there is no impact of this on existing GB users. Text of ECC.6.3.13.5 needs consideration. These points were covered in workgroup and were thought to have been resolved with RWE.
Drax Power Ltd	Yes	Yes	None	No action required.
Northern Powergrid	Yes	Yes	Nothing further in GC0101	No action required.
NGET	Yes	Yes	None	No action required.

## AMPS/ADE – possible defect for type B PGMs in FSM/LFSM-O spec & testing

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- LFSM-O only is required from type B PGMs but test regime in ECP section only allows for testing of FSM
- Grid Code text is actually compliant (see next slide)
- Interpretation of 'as much as possible' as defined in response range is contentious – and could be worded better
- In the code it is meant to indicate as much as viable rather than a cost-is-no-object solution. This is picked up by the general 'economic and efficient' licence condition.
- For both these points the Proposer's view is that the GC0100-102 solution is compliant.
- The issue may be more around existing Grid Code text.
- Note that 1<sup>st</sup> parties to use these condition will be connecting (and undergoing tests) post-May 2019.

# Extract from ECP for Type B Generators

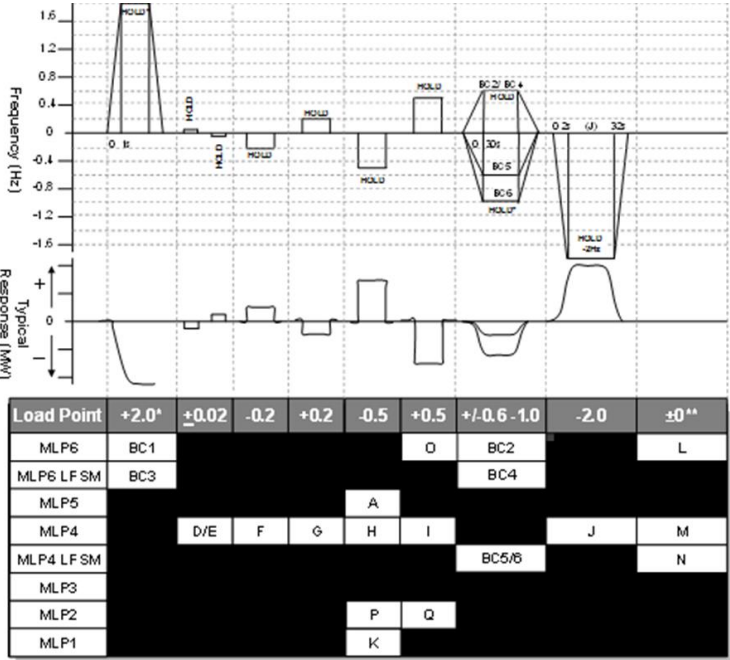


Figure 2: Frequency Response Capability LFSM-O, LFSM-U and FSM Step Response Tests

ECP.A.5.8.7 The tests are divided into the following three types;

(iii) Frequency response tests in Limited Frequency Sensitive Mode (LFSM) to demonstrate LFSM-O and LFSM-U capability as shown by ECP.A.5.8 Figure 2.

ECP.7.2.2 In the case of any Power Generating Module, OTSUA (if applicable) or HVDC Equipment these tests will reflect the relevant technical requirements and will comprise one or more of the following:

(c) governor or frequency control system tests to demonstrate that the Power Generating Module, OTSUA (if applicable) or HVDC Equipment can meet the requirements of ECC.6.3.6.2, ECC.6.3.7, where applicable ECC.A.3, and BC.3.7. In the case of a **Type B Power Generating Module only tests BC3 and BC4 in ECP.A.5.8 Figure 2** or ECP.A.6.6 Figure 2 must be completed. The results will also validate the Mandatory Service Agreement required by ECC.8.1. These tests may also be used to validate the governor model (PC.A.5.3) or frequency control system model (PC.A.5.4) as applicable. These tests may be witnessed by NGET.



# RWE – removal of paragraph on revised reactive range above nationalgrid rated output, simultaneous voltage/frequency excursion ride-through requirements

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- Identifies removal of CC.6.3.2 a) i) as an issue for existing GB users.
- Unhappy with final wording of ECC.6.3.13.5 which implements RfG article 16.2(a)(ii) in specifying a requirement for continued connection under simultaneous voltage and frequency excursions.
- Both of these points were identified in workgroup and were thought to have been resolved.
- Removal of CC.6.3.2 could not apply retrospectively so there is no impact of this on existing GB users.
- Implementation of ECC.6.3.13.5 is correct. Flexibility is also allowed for agreement of less arduous standards between NGET and generators.
- Neither of these points is thought by the proposer to be an issue.

## **CC.6.3.2 (a)**

...where Onshore Synchronous Generating Unit(s):

- (i) have a Connection Entry Capacity which has been increased above Rated MW (or the Connection Entry Capacity of the CCGT module has increased above the sum of the Rated MW of the Generating Units comprising the CCGT module), and such increase takes effect after 1st May 2009, the minimum lagging Reactive Power capability at the terminals of the Onshore Synchronous Generating Unit(s) must be 0.9 Power Factor at all Active Power output levels in excess of Rated MW. Further, the User shall comply with the provisions of and any instructions given pursuant to BC1.8 and the relevant Bilateral Agreement...

## **RfG article 16.2**

Type D power generating modules shall fulfil the following requirements relating to voltage stability:

- (a) with regard to voltage ranges:
- (ii) the relevant TSO may specify shorter periods of time during which power generating modules shall be capable of remaining connected to the network in the event of simultaneous overvoltage and underfrequency or simultaneous undervoltage and overfrequency;

***Translates in GC0101 to:***

## **ECC.6.3.13.5**

As stated in ECC.6.1.2, the System Frequency could rise to 52Hz or fall to 47Hz and the System voltage at the Grid Entry Point or User System Entry Point could rise or fall within the values outlined in ECC.6.1.4. Each Type C and Type D Power Generating Module (including DC Connected Power Park Modules) or any constituent element must continue to operate within this Frequency range for at least the periods of time given in ECC.6.1.2 and voltage range as defined in ECC.6.1.4 unless NGET has agreed to any simultaneous overvoltage and underfrequency relays and/or simultaneous undervoltage and over frequency relays which will trip such Power Generating Module

## GC0102

Respondent	Support		Summary of Points	View of Proposer
	Original/ Alternative	Implementation		
EDF Energy	Original	Yes	None	No action required.
AMPS/ADE (Joint Submission)	Original	Yes	Identifies serious concern in not having Test Certificate regime in place but acknowledges that this is not currently avoidable.	No action required. Note that wording of ECP section only requires testing of LFSM in this context and does NOT require all tests to be fulfilled.
Deep Sea Electronics Plc	Original	Yes	Identifies serious concern in not having Test Certificate regime in place but acknowledges that this is not currently avoidable.	No action required.
Electricity North West	Yes	Yes	None	No action required.
Scottish Power Generation	Original	Yes	None	No action required.
GE Power	Yes	Yes	Needs some clarity on FRT requirements.	Catch-up with respondent, clarification should resolve.
Scottish Power Renewable Ltd	Yes	No	Wants grace period before implementation	Catch-up with respondent, clarification should resolve. Timescale for implementation is not relevant as the point here is really around timescale for compliance which is not in GB gift.
RWE Generation UK	No	No	Questions whether ECC.6.3.5.6 should apply to all units or just those providing black start. States ECC.6.3.5.6 iii) requires NGET to specify the duration of houseload operation. Stems from RfG art 15.5(c)	In the sequence of clauses in the code ECC.6.3.5.6 only applies to parties opting in to provision of black start. Duration of houseload requirement is set out to be specified by NGET which it would be in the black start contract.
Drax Power Ltd	Original	Yes	None	No action required.
Northern Powergrid	Yes	Yes	Nothing further in GC0102	No action required.
NGET	Original	Yes	None	No action required.

## RWE – ‘Substantial modification’

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- Questions whether ECC.6.3.5.6 (which deals with quick re-synchronisation capability) should apply to all units or just those providing black start.
- States ECC.6.3.5.6 iii) requires NGET to specify the duration of houseload operation – which stems from RfG art 15.5(c).
- In the sequence of clauses in the code it is obvious that ECC.6.3.5.6 only applies to parties opting in to provision of black start as it is under section ECC.6.3.5 Black Start.
- Duration of houseload requirement is set out to be specified by NGET which it would be in any black start contract.
- Neither of these points is thought by the proposer to be an issue.

### ECC.6.3.5.6(iii)

Power Generating Modules including DC Connected Power Park Modules shall be capable of Houseload Operation, irrespective of any auxiliary connection to the Total System. The minimum operation time shall be specified by NGET, taking into consideration the specific characteristics of prime mover technology.

# Conclusions

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## Outstanding Points

- The point raised by AMPS/ADE on testing of LFSSM-O for type B generators needs to be resolved in conjunction with the D Code.
- Although in the Proposer's view compliant, the point raised by RWE regarding the application to existing plant undergoing substantial modification could be worded better.
- Neither of these issues is part of an equipment specification so they could only possibly be required post-May 2019.
- The typo identified by Northern Powergrid should be corrected.

## Way Forward

- The Proposer would recommend that, with the exception of the typo to be corrected, the GC0100-102 reports are submitted to Ofgem as they are.